REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

TENDER NUMBER: COM91/2023

TENDERER NAME:	

CLOSING DATE: 01 December 2023 AT 11:00

CSD REG NUMBER: MAAA……

EMPLOYER :	**ENGINEER :**
CITY OF MBOMBELA PO Box 45 Mbombela 1200 TEL: 013-759 9111 FAX: 013-759 2070	**TFC ENGINEERS (Pty) Ltd** PostNet Suite #370 Private Bag X11326 Mbombela 12100 Tel : 013-752 7475 E-mail : info@tfce.co.za

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

CONTRACT NO: COM91/2023

FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

SUMMARY FOR TENDER OPENING PURPOSES

NAME OF TENDERER : _____

ADDRESS : _____

_____

_____

_____

TELEPHONE NUMBER : _____

FAX NUMBER : _____

E-MAIL ADDRESS : _____

CLOSING DATE : _____

Signed by authorised representative of the TENDERER:

DATE: _____

* Should any discrepancy occur between this figure and that stated in the Form of Offer and Acceptance, the latter shall take precedence and shall apply.

IMPORTANT INFORMATION

PLEASE READ CAREFULLY BEFORE COMPLETING DOCUMENT.

1. Notice to all tenderers.
2. Standards applied in this document.

1. NOTICE TO ALL TENDERERS

This is an original document:

1. It may not be re-typed or altered in any way.
2. It must be completed in black ink (non-erasable) – in an eligible handwriting. Mistakes are to be corrected by drawing a line though it and writing the correct information above it. Tenderer to sign next to the correction. The use of erasing fluid or strips are not allowed.
3. It may not be taken apart.
4. It is not available in electronic format except PDF.
5. Bidders are required to attach returnable documents to the relative pages (where requested) and encouraged to use file fasteners and binding tape or any other similar method to ensure there are no loose pages. **Any other form of presentation (loose pages or separate documents) will not be accepted.**

2. STANDARDS APPLICABLE TO THIS DOCUMENT

Available from the S.A. Federation of Civil Engineering Contractors, the S.A. Institution of Civil Engineering and the S.A. Bureau of Standards, as applicable:

1.	CIDB	***CIDB Standard for uniformity in Construction Procurement**, 10 July 2015, as amended.*
2.	SANS 10845-1	*Processes, methods and procedures.*
3.	SANS 10845-2	*Formatting and compilation of procurement documentation.*
4.	SANS 10845-3	*Standard conditions of tender.*
5.	GCC	*General Conditions of Contract for Construction Works, Third Edition (2015) issued by the South African institution of Civil Engineering.*
6.	SANS 1200	*Standardized Specification for Civil Engineering Construction*

7. This Document, as presented.

CONTENTS

THE TENDER

THE CONTRACT

PART T1: TENDERING PROCEDURES

PART T2: RETURNABLE DOCUMENTS

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

CONTRACT NO: COM91/2023

FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

PART T1 TENDERING PROCEDURES

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

CONTRACT NO: COM91/2023

FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

Bids are hereby invited from potential services providers for the **Refurbishment of Saddleback Tunnel (Mechanical).**

Tender No	Description	CIDB Grading	Compulsory Meeting and Site Inspection Date	Closing Date
COM91/2023	Refurbishment of Saddleback Tunnel (Mechanical)	5 ME	N/A	01 December 2023 at 11:00

It is compulsory that service providers download a copy of the bid document that will ONLY be available as from 01 November 2023 on the municipal website: www.mbombela.gov.za on the tenders and notices folder and National e-Tender Portal: www.etenders.gov.za free of charge.

Duly completed bid documents and supporting documents which are, COPY OF TAX COMPLIANCE STATUS, CERTIFIED COPY OF B-BBEE CERTIFICATE OR SWORN AFFIDAVIT FOR B-BBEE TO CLAIM B-BBEE POINTS, CURRENT MUNICIPAL RATES AND TAXES CLEARANCE FROM RELEVANT LOCAL AUTHORITY OR PROOF OF RESIDENCE FROM A TRIBAL AUTHORITY OR LEASE AGREEMENT ACCOMPANIED WITH THE LESSOR'S UP-TO-DATE MUNICIPAL RATES AND TAXES CERTIFICATE FOR BOTH THE COMPANY AND ITS DIRECTORS, CSD REGISTRATION FULL REPORT (Summary Report will not be considered) and a copy of the COMPANY REGISTRATION CERTIFICATE, together with the bid document must be sealed in an envelope clearly marked: "BID NO.:COM91/2023 REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL) FOR THE CITY OF MBOMBELA, CLOSING DATE: DATE 01 December 2023" with the name of the bidder shall be placed in the bid box at MBOMBELA CIVIC CENTRE at 1 NEL STREET, MBOMBELA, before 11:00 on the closing date.

Bidders are advised not to commit fraudulent activities or forge documents. All abusers of the SCM system, including forging or faking of returnable documents, may be reported to SAPS and restricted from doing business with any Public Institutions for a period NOT exceeding 10 years which is in line with section 28 and 29 of the Prevention and Combating of Corrupt Activities Act 12 of 2004.

A preferential point system shall apply whereby this contract will be allocated to a bidder in accordance with the **Preferential Procurement Policy Framework Act**, No **5 of 2000** and as defined in the conditions of bid in the bid document, read in conjunction with the Preferential Procurement Regulations, 2022, where 80 points will be allocated in respect of price and 20 points in respect of targeted goals.

Procurement Enquiries	:	Christopher Nkambule (013) 759 2358
Technical Enquires	:	Lindani Ngcobo (013) 759 2306
Employer	:	City Manager, Mr Wiseman Khumalo City of Mbombela P. O. Box 45, Mbombela, 1200

VISIT OUR WEBSITE – www.mbombela.gov.za

NB: the results of this bid will be published on council's website as prescribed on section 75(1)(g) of the MFMA and section 23(c) of the SCM Regulations.

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

CONTRACT NO: COM91/2023

FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

T1.2 TENDER DATA

The conditions of tender are the standard conditions of tender as contained in SANS 10845-3 Construction procurement, Part 3: Standard conditions of tender, that apply specifically to this tender.

The Tender Data shall be read with the Standard Conditions of Tender to expand on the Tenderer's obligations and the Employer's undertakings in administering the tender process in respect of the project under construction.

The Tender Data hereafter shall have precedence in the interpretation of any ambiguity or inconsistency between it and the Standard Conditions of Tender. Each item of data given below is cross-referenced to the clause in the standard conditions of tender to which it mainly applies.

Clause Number	Data
	The conditions of tender are those contained in the latest edition of SANS 10845-3, Construction Procurement – Part 3: Standard conditions of tender. SANS 10845-3 makes several references to the Tender Data for details that apply specifically to this tender. The Tender Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and the provisions of SANS 10845-3. Each item of data given below is cross-referenced to the clause in SANS 10845-3 to which it mainly applies.
3.1	The Employer is: **City of Mbombela, 1 Nel Street, Mbombela, 1200**
3.2	The tender documents issued by the Employer comprise: **THE TENDER** **Part T1 Tendering Procedures** Part T1.1 Tender Notice and Invitation to Tender (white) Part T1.2 Tender Data (pink) Part T1.3 Preferential Procurement Policy of City of Mbombela (pink) **Part T2 Returnable Documents** Part T2.1 List of Returnable Documents (yellow) Part T2.2 Returnable Schedules to be completed by the Contractor (yellow) Part T2.3 Returnable Schedules II (yellow) **THE CONTRACT** **Part C1 Agreement and Contract Data** C1.1 Form of Offer and Acceptance (pink) C1.2 Contract Data (yellow) C1.3 Form of Guarantee (white) C1.4 Agreement in terms of Occupational Health and Safety Act, 1993 (white) C1.5 Authority for Signatory in Terms of OHS Act, 1993 (white) **Part C2 Pricing Data** C2.1 Pricing Assumptions (yellow) C2.2 Bill of Quantities and Information Sheets (yellow) **Part C3 Scope of Works** C3.1 Scope of Works (blue) C3.2 Engineering (blue)

<table>
<tr><th>Clause Number</th><th>Data</th></tr>
<tr><td></td><td>C3.3 Procurement (blue)
C3.4 Construction (blue)
C3.5 Management (blue)
C3.6 Health and Safety (blue)
Part C4 Site Information
C4 Site Information (green)

Appendices
Appendix A Health and Safety Specification (white)
Appendix B Drawings for Tender Purposes (white)</td></tr>
<tr><td>3.4</td><td>The Employer's Agent is:
Name: TFC Engineers (Pty) Ltd
Address: PostNet Suite #370
Private Bag X11326
Mbombela
1200
Tel: 013 752 7475
E-mail: info@tfce.co.za</td></tr>
<tr><td>3.5</td><td>The language for communications is English.</td></tr>
<tr><td>3.6</td><td>The competitive negotiation procedure shall not be applied.</td></tr>
<tr><td>4.1</td><td>Only those tenderers who satisfy the following eligibility criteria and who provide the required evidence in their tender submissions are eligible to submit tenders and have their tenders evaluated:

a) CIDB registration

Only those tenderers who are registered with the CIDB, or are capable of being so registered prior to the evaluation of submissions, in a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25 (1B) or 25 (7A) of the Construction Industry Development Regulations, for a 5 ME or higher class of construction work, are eligible to have their tenders evaluated.

Tenderers registered as potentially emerging enterprises but with a CIDB contractor grading designation lower than a contractor grading designation determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25(1B) or 25(7A) of the Construction Industry Development Regulations, are not eligible to have their tenders evaluated.

For the sake of clarity and subject to satisfactory proof of a tenderer’s ability to perform the work specified at the tendered value, the Employer lists in the table below the margins it considers reasonable. However, in the event that the sum tendered exceeds the margins shown then such tender shall be deemed non-responsive.

<table>
<tr><th>Category of tender</th><th>Upper limits per CIDB Table 8 Regulation 17</th></tr>
<tr><td>ME 3</td><td>R 3m</td></tr>
<tr><td>ME 4</td><td>R 6m</td></tr>
<tr><td>ME 5</td><td>R 10m</td></tr>
<tr><td>ME 6</td><td>R 20m</td></tr>
<tr><td>ME 7</td><td>R 60m</td></tr>
</table>
Joint Ventures are eligible to submit bids provided that:

(1) every member of the joint venture is registered with the CIDB;

(2) the lead partner has a contractor grading designation in the 5 ME or Higher class of construction work; and

(3) the combined contractor grading designation calculated in accordance with the Construction Industry Development Regulations is equal to or higher than a contractor grading designation determined in accordance with the sum tendered</td></tr>
</table>

Clause Number	Data
	for a 5 **ME or Higher class** of construction work or a value determined in accordance with Regulation 25 (1B) or 25(7A) of the Construction Industry Development Regulations. b) Key Personnel In order to be considered for an appointment in terms of this tender, the tenderer must have in its permanent employment key personnel who will be the single point accountability and responsibility for the management of the construction works. Alternatively, a signed undertaking from an organization having the required personnel, stating that they will undertake the necessary work on behalf of the tenderer in terms of a sub-contractor agreement, will be acceptable. Such undertaking must be attached to Forms T of the Returnable Schedules. Individuals must be identified for each of the key personnel listed under Forms T. Where the key personnel are no longer available to undertake the necessary work after the award of the tender, the contractor shall within a period of 14 working days replace the key personnel listed in Forms T with personnel with equivalent competencies and subject to approval by the Employer. Such approval shall not be unreasonably withheld. The key person shall be a suitably qualified and experienced contracts manager who will be the single point accountability and responsibility for the management of the construction works, and who is registered as a candidate engineer shall be required as a minimum. Where the Contracts Manager will not be employed on the Works full time, his powers will be delegated to the approved construction manager. Failure to comply with the requirements or to complete Form T may render the tender non-responsive.
4.6	**Bidders are encouraged to revisit the City's website regularly prior the closing date particularly on this project folder to ensure that all addenda/ erratum that may be issued are adhered to.** **Failure to apply instructions contained in addenda may render a tenderer's offer non-responsive in terms of Condition of Tender 5.8.**
4.7	The arrangements for the compulsory clarification meeting are as stated in the tender notice and invitation to tender. The onus rests with the tenderer to ensure that the person attending the clarification meeting on its behalf is appropriately qualified to understand all directives and clarifications given at that meeting. The clarification meeting shall start strictly at the time advertised. Only then will the Employer's Representative circulate the attendance register for completion by those present. During this time latecomers may enter and complete the register. On completion by all present the Employer's Representative will: (a) read out from the collected lists calling for confirmation that all have signed; (b) close the door and not allow any latecomers to enter. The signature on the attendance register and duly completed and signed Form A shall be considered proof that the tenderer attended the whole meeting and was available to hear all directives and clarifications given at the meeting. Tenderers must sign the attendance list in the name of the tendering entity. Addenda will be issued to and tenders will be received only from those tendering entities appearing on the attendance list.
4.8	**Request clarifications at least 7 working days before the closing time.**
4.10	Tenderers are required to state the rates and currencies in Rand.
4.12	An alternative tender offer will only be considered if a main tender offer, strictly in accordance with all the requirements of the tender documented is also submitted.

Clause Number	Data
	If the tenderer wishes to submit an alternative tender offer, the only criteria permitted for such alternative tender offer is that it demonstrably satisfies the Employer's standards and requirements, the details of which may be obtained from the Employer's Agent. Calculations, drawings and all other pertinent technical information and characteristics as well as modified or proposed Pricing Data must be submitted with the alternative tender offer to enable the Employer to evaluate the efficacy of the alternative and its principal elements, to take a view on the degree to which the alternative and to evaluate the acceptability of the pricing proposals. Calculations must be set out in a clear and logical sequence and must clearly reflect all design assumptions. Pricing Data must reflect all assumptions in the development of the pricing proposal. Acceptance of an alternative tender offer will mean acceptance in principle of the offer. It will be an obligation of the contract for the tenderer, in the event that the alternative is accepted, to accept full responsibility and liability that the alternative offer complies in all respects with the Employer's standards and requirements. The modified Tender Data must include an amount equal to 5% of the amount tendered for the alternative offer to cover the Employer's costs of confirming the acceptability of the detailed design before it is constructed.
4.13.1	Parts of each tender offer communicated on paper shall be submitted as an original, no copies required. The signed print-out shall be taken as the valid submission.
4.13 4.15	The Employer's address for delivery of tender offers and identification details to be shown on each tender offer package are: Location of tender box: City of Mbombela Physical address: 1 Nel Street, Mbombela 1200 Identification details: Tender COM91/2023: Refurbishment of Saddleback Tunnel (Mechanical) Tenders can be submitted 24 hours a day from Monday to Friday at the Employer's address. It is in the tenderer's interest to ensure that the delivery of the tender offer is recorded in the Employer's tenders received register.
4.13.4	The tenderer is required to submit all certificates as listed in the Schedule of Tender Compliance (Form V).
4.13.5	Place and seal the printed and completed tender document in an envelope clearly marked "TENDER" and bearing the Employer's name, the contract number and description, the tenderer's authorised representative's name, the tenderer's postal address and contact telephone numbers.
4.13.5	A two-envelope procedure will not be followed.
4.13.6	Telephonic, telegraphic, telex, facsimile or e-mailed tender offers will not be accepted.
4.15	The closing time for submission of tender offer is as stated in the Tender Notice and Invitation to Tender.
4.16.1	The tender offer validity period is 120 days.
4.16.2	Where a tenderer, at any time after the opening of his tender offer but prior to entering into a contract based on his tender offer: a) withdraws his tender; b) gives notice of his inability to execute the contract in terms of his tender; or c) fails to comply with a request made in terms of 4.17, 4.18 or 5.9, such tenderer shall be barred from tendering on any of the Employer's future tenders for a period to be determined by the Employer, but not less than six (6) months, from the date of tender closure. The Employer may fully or partly exempt a tenderer from the provisions of this condition if he is of the opinion that the circumstances justify the exemption.

Clause Number	Data
4.18	Any additional information requested under this clause must be provided within 5 (five) working days of date of request.
4.20	The tenderer is required to submit with his tender a letter of intent from an approved insurer undertaking to provide the Performance Bond to the format included in Part C1.8 of this procurement document.
5.1	The tenderer shall respond to clarifications received up to 7 working days before tender closing time.
5.2	The employer shall issue addenda until 5 working days before tender closing time.
5.4	All bid responses must be submitted before the Bid Closing date and time as stipulated on the tender invitation.
5.7	In the event of disqualification, the Employer may, at its sole discretion, impose a specified period during which tender offers will not be accepted from the offending tenderer and report same to CIDB and National Treasury.
5.9	Arithmetical errors, omissions, discrepancies, and imbalanced unit rates Check responsive tenders for discrepancies between amounts in words and amounts in figures. Where there is a discrepancy between the amounts in figures and the amount in words, the amount appearing in the summary to the Pricing Schedule shall govern. Check responsive tender offers for: a) the gross misplacement of the decimal point in any unit rate; b) omissions made in completing the pricing schedule or bills of quantities; or c) arithmetic errors in: i) line item totals resulting from the product of a unit rate and a quantity in bills of quantities or schedules of prices; or ii) the summation of the prices. d) imbalanced unit rates. Notify shortlisted tenderers of all errors, omissions or imbalanced rates that are identified in their tender offers. Where the tenderer elects to confirm the errors, omissions, or re-balancing of imbalanced rates the tender offer shall be corrected as follows: a) If bills of quantities or pricing schedules apply and there is an error in the line-item total resulting from the product of the unit rate and the quantity, the unit rate shall govern, and the line-item total shall be corrected. Where there is an obviously gross misplacement of the decimal point in the unit rate, the line-item total as quoted and the unit rate shall be corrected. b) Where there is an error in the total of the prices either because of other corrections required by this checking process or in the tenderer's addition of prices, the total of the prices shall be corrected. c) Where the unit rates are imbalanced adjust such rates by increasing or decreasing them and selected others while retaining the total of the prices derived after any other corrections made under (a) and (b) above. Where there is an omission of a line item, no correction is possible, and the offer may be declared non-responsive. Declare as non-responsive and reject any offer from a tenderer who elects not to accept the corrections proposed and subject the tenderer to the sanction under 4.16.2. The tenderer is required to submit balanced unit rates for rate only items in the pricing schedule. The rates submitted for these items will be taken into account in the evaluation of tenders.
5.10	**List of disqualifying factors of this tender are as follows:** A bid not complying with the requirements stated hereunder will be regarded as "Non Responsive", and as such will be rejected/disqualified for further evaluation

Clause Number	Data
	• Submit company registration certificate • Submit Tax Compliance Status issued by SARS • Full CSD report NOT older than 30 days from the closing date, Summary report will NOT be considered • Submit letter of intent for performance guarantee from a registered financial service provider (FSP). The letter should have full contact details of the service provider and the FSP number. • Submit Joint venture agreement in case of JV. • Authority for Signatory, duly signed and dated original or certified copy on the Company(s) Letterhead. This condition will not apply to companies owned by one director / member / sole • Submit copy of an active CIDB contractor grading designation of 5ME or higher. For JV, a combined CIDB grading is required. • Letter of good standing for COIDA. The letter of good standing must reflect the relevant nature of business in line with CLASS V, 0521 as stipulated in the Classification of Industries, the Compensation for Occupational Injuries and Diseases Act 130 of 1993. The COIDA certificate must be accompanied by the latest assessment report and proof of payment. • Proof of public liability Insurance / third party liability insurance for a minimum of R1 000 000.00. The letter must be issued by a registered insurance service provider. The letter should have the full contact details of the service provider and the underwriter. • Relevant Annual Financial Statements (AFS) for the latest 3 consecutive years. • Tenderer must provide valid copies of current municipal rates and taxes certificates from relevant local authority / proof of residential from tribal authority (if the business is operating or the directors are residing in rural areas) / lease agreement with the lessor's current municipal rates and taxes for both the company and active directors including JV/Consortium partners. Prospective bidders should ensure that the physical address details of the company and directors reflected on the CSD is similar to the one reflected on the company registration certificate. The municipality reserves the right to verify both the municipal rates and taxes of the company details reflected on the CSD and company registration certificates. The municipality further reserves the right to use ID numbers of the directors to verify if any municipal rates and taxes are not owned by each director. It is prudent and remains the responsibilities of the prospective bidders to ensure that each director, lessor and company rates are cleared with regards to the municipal rates and taxes. A bid will be rejected if any municipal rates and taxes owed by the bidder or any of its directors to the municipality, or to any other municipality or municipal entity, are in arrears for more than three months. • Fully completed and signed where applicable in the Returnable Schedules. • Failure to apply instructions contained in addenda that may be issued. • Submissions from bidders who did not attend a compulsory briefing session will not be acceptable. • Prospective service providers may not make any alterations or additions to the Bid document, except to comply with instructions issued by the employer. The tender document must be furnished with non-erasable black ink and all corrections made by the service provider should be dated and signed by the authorised signatory. Erasures and the use of masking fluid, tippex, pencil or erasable ink are prohibited and failure to adhere to this condition will render your submission non responsive.
5.11	The procedure for the evaluation of responsive tenders is Method 4: Financial offer, quality and preferences.
5.11.5	Method 4 Financial offer, quality and preferences is scored as follows: a) Score each tender in respect of the financial offer made and preferences claimed, if any.

<table>
<tr><th>Clause Number</th><th>Data</th></tr>
<tr><td></td><td>
b) Calculate the total number of tender evaluation points (TEV) in accordance with the following formula: $T_{EV} = N_{FO} + N_P + N_Q$

where: N_{FO} is the number of tender evaluation points awarded for the financial offer made in accordance with F.3.11.7;

N_P is the number of tender evaluation points awarded for preferences claimed in accordance with F.3.11.8.

N_Q is the number of tender evaluation points awarded for quality claimed in accordance with F.3.11.9.

c) Rank tender offers from the highest number of tender evaluation points to the lowest.

d) Recommend the tenderer with the highest number of tender evaluation points for the award of the contract, unless there are compelling and justifiable reasons not to do so.

e) Rescore and re-rank all tenderers should there be compelling and justifiable reasons not to recommend the tenderer with the highest number of tender evaluation points, and recommend the tenderer with the highest number of tender evaluation points, unless there are compelling and justifiable reasons not to do so and the process set out in this sub-clause is repeated.

f) Compelling and justifiable reasons not to recommend a tenderer are inter alia tenderers who:
• do not meet the minimum requirements listed in Part T2.1, List of Returnable Documents and/or
• failed to complete the tender document comprehensively with all the required information.
</td></tr>
<tr><td>5.11.7</td><td>
The financial offer will be scored using the following formula:

$N_{FO} = W_1 \times A$

Where: N_{FO} = the number of evaluation points awarded for the financial offer
W_1 = the maximum possible number of bid evaluation points awarded for the financial offer and will be:

(i) 90 where the financial value inclusive of VAT of all responsive tenders received have a value more than R 50,000,000; or

(ii) 80 where the financial value inclusive of VAT of one or more responsive tender offers equals or is less than R 50,000,000.

A = the number calculated using Formula 2 (Option 1)

Table 1: Formulae for calculating the value of A_a
<table>
<tr><th>Formula</th><th>Comparison aimed at achieving</th><th>Option 1[a]</th><th>Option 2[a]</th></tr>
<tr><td>1</td><td>Highest price or discount</td><td>$A = (1 + \frac{(P - P_m)}{P_m})$</td><td>$A = P / P_m$</td></tr>
<tr><td>2</td><td>Lowest price or percentage commission /fee '</td><td>$A = (1 - \frac{(P - P_m)}{P_m})$</td><td>$A = P_m / P$</td></tr>
</table>
[a] P_m is the comparative offer of the most favourable comparative offer.
P is the comparative offer of the tender offer under consideration.
</td></tr>
<tr><td>5.11.8</td><td>
Scoring preferences.

Up to 100 minus W_1 tender evaluation points will be awarded to tenderers who submit responsive tenders and who are found to be eligible for the preference claimed. Points are based on a tenderer’s scorecard measured in terms of the Broad-Based Black
</td></tr>
</table>

Clause Number	Data
	Economic Empowerment Act (B-BBEE, Act 53 of 2003) and the Regulations (2017) to the Preferential Procurement Policy Framework Act (PPPFA, Act 5 of 2000).

5.11.9

The quality criteria and maximum score in respect of each of the criteria are as follows:

Description of quality criteria	Maximum number of points
Plant and Equipment	15
Key Personnel	35
Construction Experience	50
Total evaluation points for quality (M_s)	100

"(d) Tender offers will only be considered responsive if the minimum quality requirement of 70 points is achieved.

Tenderers are required to demonstrate their ability to undertake the work and provide proof of previous experience, expertise and availability of plant and equipment to undertake a project of this nature. Tenderers are therefore required to meet a minimum Quality Score of 70% (70 points out of 100) based on the criteria listed below. A score of less than 70 out of 100 points for Quality will render the tender non-responsive. The onus rests with the Tenderer to supply sufficient information to allow for evaluation and award of points detailed below. If insufficient is provided, zero points will be awarded for that particular item.

Note that Quality points are only used to determine responsiveness and will not be used further in the evaluation.

i.) Plant and Equipment (Maximum 15 points)

Details of owned and hired plant and equipment are to be entered in Form R of the Returnable Schedules.

ii.) Key Personnel (Maximum 35 points)

Details of key personnel and their experience and qualifications are to be entered in Form T of the Returnable Schedules.

iii.) Construction Experience (Maximum 50 points)

Details of related projects & supporting information in terms of the points to be claimed in terms of quality, must be entered in Form Q in the Returnable Schedule.

5.13

In addition to the requirements of the Condition of Tender, offers will only be accepted if:

- the tenderer is registered on the Central Supplier Database (CSD) for the South African government (see https://secure.csd.gov.za/). CSD is compulsory for any company to bid. The full report should be submitted, not the summary.
- the tenderer is in good standing with SARS according to the Central Supplier Database.
- the tenderer submits an Original letter of intent from an approved insurer undertaking to provide the Performance Bond to the format included in Form S of this procurement document.
- the tenderer is registered with the Construction Industry Development Board in an appropriate contractor grading designation.
- the tenderer or any of its directors/shareholders is not listed on the Register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the public sector;
- the tenderer has not:
  - abused the Employer's Supply Chain Management System; or
  - failed to perform on any previous contract and has been given a written notice to this effect;
- the tenderer has completed the Compulsory Declaration and there are no conflicts of interest which may impact on the tenderer's ability to perform the contract in the best interests of the employer or potentially compromise the tender process;
- the tenderer is registered and in good standing with the compensation fund or with a licensed compensation insurer;

	• the employer is reasonably satisfied that the tenderer has in terms of the Construction Regulations, 2003, issued in terms of the Occupational Health and Safety Act, 1993, the necessary competencies and resources to carry out the work safely. • No Tippex has been used on the bid document. • The tenderer has not used an erasable pen and completed the bid document with a pencil.
5.17	The number of paper copies of the signed contract to be provided by the employer is One.
5.19	All requests shall be in writing.

CHECKLIST FOR RETURNABLE DOCUMENTS STIPULATED UNDER SPECIAL CONDITIONS OF TENDER DOCUMENTS AS MANDATORY REQUIREMENTS. THIS DOCUMENT SHALL BE APPLICABLE TO ALL TENDER DOCUMENTS OF THE CITY.

Preamble

The objective of this checklist is aimed at ensuring that interpretation and application of the special conditions and other mandatory requirements at Bid Evaluation Committee (BEC) & Bid Adjudication Committee (BAC) are aligned as envisaged by the Bid Specification Committee (BSC). This will enhance consistency and uniformity in the entire bid committee system whilst promoting "user friendly" principles by simplifying tender requirements to all interested prospective bidders.

ITEM NO:	DESCRIPTION / RETURNABLE DOCUMENTS	NOTES	FOR OFFICE USE ONLY	
			CHECKLIST	YES or NO or N/A
1.	Company Registration Certificate	a) It's a certificate issued by the Companies and Intellectual Property Commission in line with section 14 of the Companies Act 78 of 2008 b) A Certificate issued by CIPRO in line with section 2 of the Close Corporation Act 69 of 1984 NB: The registration of Close Corporations (CCs) was replaced by introduction of the New Companies Act which came to effect in April 2011. CCs to be recognized as valid registration certificate will be up to 2010.	Has the bidders attached a valid company registration document in line with the applicable legislation?	
2.	Company Profile	a) A Company Profile is a professional introduction of your Business that aims to inform Clients about its purpose, vision, trustworthiness, products and services, and experience of your Company. It is basically a "CV for your Business/Company"	Has the bidder attached a company profile and its experience is relevant to add value on this project?	

3.	Certification of documents to be submitted together with the tender document. I.e. ID Copies of business owners, qualifications, Licenses and certificates, accreditation by professional bodies, proof of ownership document, appointment letters, completion certificates, etc.	a) The certification of documents must be done by a commissioner of oath as prescribed in the Justice of the Peace and Commissioners of Oaths Act 16 of 1963 and its Regulations. b) Acceptable certified copies are copies originally certified from any police station, post office, Lawyers or notary public (who are members of a recognized professional body), Actuaries or accountants (who are members of a recognized professional body), Members of the judiciary, Directors, managers or company secretaries of a banks or regulated financial services business. *c) Commissioner of Oaths stamps can be purchased at Stationary shops, but it can be custom made following the below example:* CERTIFIED TRUE COPY OF THE ORIGINAL DOCUMENT. THERE ARE NO INDICATIONS THAT THE ORIGINAL DOCUMENT HAS BEEN ALTERED BY UNAUTHORISED PERSONS. Designation (rank) ……ex officio: RSA Date: …… Place …… Business Address: …… …… Commissioner of Oaths …… Signature Full Names NB: All certified copies must NOT exceed three months and be originally certified.	Has the bidder certified all documents to be certified as per special conditions of bid? Check validity on the date, check if the commissioner of oaths stamp is compliant as per example copied from the Regulations.	
4.	Central Supplier Database (CSD) Full report, (Summary report will **NOT** be acceptable). **N/B CSD Report date should not be more than 30 days before Bid closing date.**	a) The City requires that all prospective bidders should be registered on CSD. This is aimed at verification of email addresses, phone numbers, banking details, company registration numbers, tax status with SARS, state employees, etc.	Has the bidder attached a full CSD report, are tax matters in good order, are the directors not in the employment of any state and the CSD report is not older than 30 days from the closing date?	
5.	Tax Compliant Status (TCS)	a) Prospective bidders are required to attach a valid TCS together with the tender document.	Has the bidder attached a valid (not expired) TCS? The designated official should verify the bidder's tax compliance	

			status prior to finalization of the award of a bid or prize quotation. Where the recommended bidder is not tax compliant, the bidders should be notified of their non-compliant status and the bidder must be requested to submit to the City within 7 working days, written proof from SARS of their tax compliance status or proof from SARS that they have made arrangements to meet their outstanding tax obligations. The proof of tax compliance status submitted by the bidder to the City must be verified via the CSD report or e-Filing. The City should reject a bid submitted by the bidder if such a bidder fails to provide proof of tax compliance status within the timeframe stated above **(See MFMA Circular No: 90).**	
6.	Certified copy of B-BBEE Certificate / affidavit for B-BBEE status level of contributor (**to claim points only).**	a) EMEs in terms of the B-BBEE Act 53 of 2003 may submit a sworn affidavit confirming annual total revenue and level of black ownership or Certified Copy of B-BBEE Certificate. b) Bidders other than EMEs and QSEs **MUST** submit their certified copies of valid B-BBEE status level verification certificate, substantiating their B-BBEE rating issued by a registered auditor approved by IRBA or a verification agency accredited by SANAS. c) A trust, consortium or joint venture will qualify for points for their B-BBEE status level as an	Is the copy B-BBEE Certificate valid? Is the sworn affidavit for EME / QSE in line with the threshold for EME and EME and valid? If the tendering entity is a JV / Consortium / Large company, has the bidder attached a certified copy of a valid and consolidated B-BBEE certificate in order to claim points as prescribed by the MSCM Regulations?	

		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. NB: There is NO consolidated affidavit for B-BBEE status level of contributor. Only consolidated B-BBEE certificate will be considered for JVs / Consortium & large companies that are making an annual turnover in access of R50 million including value added tax (VAT). *This is not a disqualifying factor, non-adherence will lead to no allocation of B-BBEE points.*	Is the copy of B-BEE certificate certified by the Commissioner of Oaths reflects as prescribe on the regulations of the Act? Is the affidavit for B-BBEE stamped and signed by commissioner of oaths? I.e. full names and signature, force/practice number, designation / rank, date and address. Is the certification date not older than 3 months and original ink is clear on the document to confirm if it is originally certified?	
7.	Formal agreement must be attached in case of a joint venture (JV) or consortium.	a) The JV/consortium must amongst others, reflect clear profit and loses sharing percentages. It is compulsory that the lead partner must have at least 51% majority shares in the JV/consortium.	If the tendering entity / bidder is a JV/Consortium, has the bidder attached a detailed JV/Consortium agreement with all critical information?	
8.	In bids where Consortia / Joint Ventures / Sub-contractors are involved, each party must submit separate required returnable documents.	a) This will not be applicable to functionality and B-BBEE requirements.	If the tendering entity / bidder is a JV/Consortium, have the parties involved attached all individual required documents as per special condition of bid?	
9.	Latest municipal rates and taxes certificates from relevant local authority for the business and all business directors OR Proof of resident from tribal authority for the business and all business directors	a) If the business is operated and its director(s) are residing within a municipal area, bidders are expected to attach latest municipal rate and taxes certificates for the business and ALL its directors. b) If the business is operated and its director(s) are residing within a tribal authority. Bidders are expected to attach proof of resident for the business and ALL its directors.	Has the bidder attached latest municipal rates and taxes from relevant local authority for the company / business and all company directors / owners? In case of lease, has the bidders attached lease agreements and lessor's proof of res from a tribal	

	OR Lease agreement with the Lessor's latest municipal rates and taxes certificates from relevant local authority. NB: All accounts owing any municipality for more than 90 days will be disqualified as prescribed on the MSCM Regulations.	c) If the business directors are leasing a facility for residential purposes, they are required to attach individual lease agreement with lessor's latest municipal rates and taxes for a facility is within a Municipal boundary and if the business is renting office / business facility, the bidders are required to attach lease agreement for the business with lessor's latest municipal rates and taxes for a facility within a municipal boundary. If the facility leased is in a rural area, lease agreement will be accompanied with the lessor's proof of residential from a tribal authority. NB: *Domicilium citandi at executandi*: Domicilium citandi et executandi is a Latin legal term meaning the address nominated by a bidder in a legal contract where legal notices may be sent. Bidders are encouraged to update their addresses when they relocate their businesses and the preferred address on the CSD should be in line with the address on the Company Registration Document. It is the responsibility of the bidder to ensure that all physical addresses reflected either on the company registration document and CSD are not owing any municipal rates and taxes for more than three months including the Lessor's municipal account in case of lease. The rationale behind this requirement is the enhance revenue in RSA municipalities as enshrined on the Municipal Systems Act 32, 2000. Failure to attach is an immediate disqualification but failure to align addresses will not be a disqualifying factor, however all addresses reflected on the both the CSD and company registration document will be subjected to this requirement.	authority or latest municipal rates and taxes certificate? Is the account not in areas for more than 90 days (3 months)?	

10.	Forging of documents/certificates The City has noted that prospective bidders are allegedly submitting fraudulent and forged documents when bidding for tenders. Bidders are advised not to commit fraudulent activities and forge documents. The City will ensure that this Act is adhered to by reporting all abusers of the SCM system to SAPS and enlist them on the Register of Tender Defaulters as prescribed on section 29 of the Prevention and Combating of Corrupt Activities Act 12 of 2004. Abusers of the SCM system, amongst other penalties, may be restricted to do business with any Public Institutions for a period NOT exceeding 10 years (see section 28 of this Act).	Section 34(1)(b) of the Prevention and Combating of Corrupt Activities Act 12 of 2004, stipulates that: "any person who holds a position of authority and who knows or ought reasonably to have known or suspected that any other person has committed the offence of theft, fraud, extortion, forgery or uttering a forged document involving an amount of R100 000 or more, must report such knowledge or suspicion or cause such knowledge or suspicion to be reported to any police official". Section 34(2) of the same Act stipulates that: "subject to the provision of section 37(2), any person who fails to comply with subsection (1), is guilty of an offence".	Are there any suspicious / alleged fraudulent or forged documents? If yes, has the matter been reported to the nearest SAPS following correct institutional protocol? Has the matter been registered with the Registrar to enable due processes and per the Act? NB: The minutes of the BEC / BAC should detail all the elements of alleged fraud and forged documents.	
11.	Copy of Public Liability insurance. Only insurance covers from registered and authorized financial service providers will be accepted.	a) Public liability insurance may vary from one project to another on the basis of the level of risk and complexity of the project. Minimum cover to be determined by the BSC prior consultation with the project manager if deemed necessary.	If applicable, is the bidder compliant with the minimum cover stipulated in the bid document? Is the public liability insurance from a registered financial institution?	
12.	Recent audited / independently reviewed financial statements for three consecutive years. NB: if a company provides any financial statements in terms of section 29 of the Companies Act, such statements must comply with the provision of the Act.	a) Applicable to private companies that are not managed by its owners, if: - It compiles its financial statement internally and its public interest score is less than 100. - It has its financial statements compiled independently and its public interest score is between 100 and 349. - the public interest score is 350 points or more,	Has the bidder furnished MBD 5 as mandatory for all projects estimated to be in excess of R10 million? Has the bidder attached the relevant AFS as required by law and is it aligned with his/her declaration on MBD 5? False /	

		is required for an audit to be conducted.	mismatched / inconsistent declaration may lead to immediate disqualification.	
13.	Recent annual financial statement (AFS) for three consecutive years (unaudited AFS). NB: if a company provides any financial statements in terms of section 29 of the Companies Act, such statements must comply with the provision of the Act.	a) Applicable to private companies with a public interest score of less than 100. b) If, with respect to a particular company, every person who is a holder of, or has a beneficial interest in, any securities issued by that company is also a director of the company, that company is exempt from the requirements in this section to have its annual financial statements audited or independently reviewed. NB: An independent review will suffice if the company has opted to have its financial statement audited or is required by its Memorandum of Incorporation (MOI) to do so.	Has the bidders furnished MBD 5 as mandatory? Has the bidder attached the relevant AFS as required by law in line with his/her declaration on MBD 5?	
14.	Functionality / Quality for evaluation of complex projects	a) Functionality test refers to evaluation of bidders on various aspects of the contract to establish if the bidders has the capabilities to execute the contract or not. The various aspect may include but not limited to: track record and experience on similar projects, human resource and their individual experience, financial capabilities, relevant technology, etc. NB: Functionality will not be compulsory for all projects but for complex projects. Functionality criteria will vary from one project to another.	Has the bidder met the minimum threshold on functionality in order to qualify for further evaluation on price and B-BBEE? Has the bidders been scored in line with the evaluation criteria set on the tender document? All portfolio of evidence attached and certified as stated on the bid document?	

15.	The Compensation for Occupation Injuries and Diseases Act 130 of 1993 (COIDA)	a) The COIDA provides for compensation for disablement caused by occupational injuries or diseases sustained or contracted by employees in the course of their employment, or for death resulting from such injuries or diseases, hence bidders are expected to attach COIDA certificates in line with their specialize area aligned to the type/nature of business.	If applicable, is the COIDA certification / letter of good standing attached, valid and reflects the nature of work in line with the scope of works?	

CITY OF MBOMBELA

DEPARTMENT NAME:WATER & SANITATION

CONTRACT NO: COM91/2023

FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

PART T2 RETURNABLE DOCUMENTS

PART T2: RETURNABLE DOCUMENTS

1. Failure to fully complete the **compulsory** returnable documents shall render such a tender offer unresponsive.
2. Tenderers shall note that their signatures appended to each returnable form **represents a declaration that they vouch for the accuracy and correctness of the information provided**, including the information provided by candidates proposed for the specified key positions.
3. Notwithstanding any check or audit conducted by or on behalf of the Employer, the information provided in the returnable documents is accepted in good faith and as justification for entering into a contract with a tenderer. **If subsequently any information is found to be incorrect such discovery shall be taken as wilful misrepresentation by that tenderer to induce the contract**. In such event the Employer has the discretionary right under contract condition 9.2 to terminate the contract.

The Tenderer must complete the following returnable Schedules:

Returnable Schedules required for Tender evaluation purposes

COMPULSORY DOCUMENTS	
FORM A	CERTIFICATE OF ATTENDANCE AT CLARIFICATION MEETING
FORM B	RECORD OF ADDENDA TO TENDER DOCUMENTS
FORM C	PROPOSED AMENDMENTS, QUALIFICATIONS AND ALTERNATIVES
FORM D	PREFERENCING SCHEDULE: BROAD BASED BLACK ECONOMIC EMPOWERMENT STATUS
FORM E	COMPULSORY DECLARATION
FORM F	MUNICIPAL DECLARATION AND RETURNABLE DOCUMENTS
FORM G	CERTIFICATE OF INDEPENDENT TENDER
FORM H	DECLARATION OF GOOD STANDING REGARDING TAX
FORM I	DECLARATION OF TENDERER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES
FORM J	REGISTRATION ON NATIONAL TREASURY CENTRAL SUPPLIER DATABASE
FORM K	DECLARATION OF TENDERER'S LITIGATION HISTORY
FORM L	AUTHORITY OF SIGNATORY
FORM M	SCHEDULE OF SPECIALIST SUBCONTRACTORS
FORM N	PROOF OF GOOD STANDING WITH COMPENSATION COMMISSIONER
FORM O	SCHEDULE OF CURRENT COMMITMENTS
FORM P	REGISTRATION WITH CIDB
RETURNABLE FOR QUALITY CRITERIA	
FORM Q	FINANCIAL RESOURCES
FORM R	COMPANY EXPERIENCE IN RELATION TO SCOPE OF WORKS
FORM S	PLANT & EQUIPMENT
FORM T	MANAGERIAL CAPACITY, EXPERIENCE AND QUALIFICATIONS
CERTIFICATE FOR TENDER COMPLIANCE	
FORM U	SCHEDULE OF TENDER COMPLIANCE

COMPULSORY TENDER DOCUMENTS

FORM A: CERTIFIATE OF ATTENDANCE AT CLARIFICATION MEETING

Notes to Tenderer:

1. Unless the attendee's name, details and signature also appear on the attendance register this Certificate of Attendance shall not be accepted and the tenderer's offer shall be deemed non-responsive.

This is to certify that I, ...

representative of (tenderer) .....

of (address) .....

.....

.....

telephone number .....

fax number .....

e-mail .....

attended the clarification meeting on (date) .....

Signature of Representative: _____

Signature of Project Manager: _____

FORM B: RECORD OF ADDENDA TO TENDER DOCUMENTS(SIPDM)

We confirm that the following communications received from the Employer before the submission of this tender offer, amending the tender documents, have been taken into account in this tender offer:

	Date	Title or Details
▪		
▪		
▪		
▪		
▪		
▪		
▪		
▪		
▪		
▪		

Attach additional pages if more space is required.

Signed ..... Date .....

Name ..... Position .....

FORM C: PROPOSED AMENDMENTS, QUALIFICATIONS AND ALTERNATIVES(SIPDM)

The Tenderer should record any deviations or qualifications he may wish to make to the tender documents in this Returnable Schedule. Alternatively, a tenderer may state such deviations and qualifications in a covering letter to his tender and reference such letter in this schedule.

The Tenderer's attention is drawn to clause 5.8 of SANS 10845-3 regarding the employer's handling of material deviations and qualifications.

(a) AMENDMENTS

Page, Clause or Item No	Proposed Amendment

Note: (1) Amendments to the General and Special Conditions of Contract are not acceptable;
(2) The Tenderer must give full details of all the financial implications of the amendments and qualifications in a covering letter attached to his tender.

(**This is not an invitation for alternatives** but should the Tenderer desire to make any departures for the provisions of this contract he shall set out his proposals clearly hereunder.

(b) ALTERNATIVES

Proposed Alternative	Description of Alternative

Note: (1) Individual alternative items that do not justify an alternative tender, and an alternative offer for time for completion should be listed here
(2) In the case of a major alternative to any part of the work, a separate Bill of Quantities, programme, etc. and a detailed statement setting out the salient features of the proposed alternatives must accompany the tender
(3) Alternative tenders involving technical modifications to the design of the works and methods of construction shall be treated separately from the main tender offer.

Signed ..... Date _____

Name ..... Position .....

FORM D: PREFERENCING SCHEDULE: BROAD BASED BLACK ECONOMIC EMPOWERMENT STATUS (SIPDM) (MBD 6.1)

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2022

This preference form must form part of all tenders invited. It contains general information and serves as a claim form for preference points for specific goals.

NB: BEFORE COMPLETING THIS FORM, TENDERERS MUST STUDY THE GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF THE TENDER AND PREFERENTIAL PROCUREMENT REGULATIONS, 2022

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1. GENERAL CONDITIONS

1.1 The following preference point systems are applicable to invitations to tender:

- the 80/20 system for requirements with a Rand value of up to R50 000 000 (all applicable taxes included); and
- the 90/10 system for requirements with a Rand value above R50 000 000 (all applicable taxes included).

1.2 **To be completed by the organ of state**

a) The applicable preference point system for this tender is the 80/20 preference point system.

1.3 Points for this tender (even in the case of a tender for income-generating contracts) shall be awarded for:

(a) Price; and

(b) Specific Goals.

1.4 **To be completed by the organ of state:**

The maximum points for this tender are allocated as follows:

	POINTS
PRICE	80
SPECIFIC GOALS	20
Total points for Price and SPECIFIC GOALS	**100**

1.5 Failure on the part of a tenderer to submit proof or documentation required in terms of this tender to claim points for specific goals with the tender, will be interpreted to mean that preference points for specific goals are not claimed.

1.6 The organ of state reserves the right to require of a tenderer, either before a tender is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the organ of state.

2. DEFINITIONS

(a) **"tender"** means a written offer in the form determined by an organ of state in response to an invitation to provide goods or services through price quotations, competitive tendering process or any other method envisaged in legislation;

(b) **"price"** means an amount of money tendered for goods or services, and includes all applicable taxes less all unconditional discounts;

(c) **"rand value"** means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes;

(d) **"tender for income-generating contracts"** means a written offer in the form determined by an organ of state in response to an invitation for the origination of income-generating contracts through any method envisaged in legislation that will result in a legal agreement between the organ of state and a third party that produces revenue for the organ of state, and includes, but is not limited to, leasing and disposal of assets and concession contracts, excluding direct sales and disposal of assets through public auctions; and

(e) **"the Act"** means the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000).

3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

3.1. **POINTS AWARDED FOR PRICE**

3.1.1 **THE 80/20 OR 90/10 PREFERENCE POINT SYSTEMS**

A maximum of 80 or 90 points is allocated for price on the following basis:

80/20 **or** **90/10**

$$Ps = 80\left(1 - \frac{Pt - P\,min}{P\,min}\right) \text{ or } \quad Ps = 90\left(1 - \frac{Pt - P\,min}{P\,min}\right)$$

Where

Ps = Points scored for price of tender under consideration

Pt = Price of tender under consideration

Pmin = Price of lowest acceptable tender

3.2. **FORMULAE FOR DISPOSAL OR LEASING OF STATE ASSETS AND INCOME GENERATING PROCUREMENT**

3.2.1. **POINTS AWARDED FOR PRICE**

A maximum of 80 or 90 points is allocated for price on the following basis:

80/20 **or** **90/10**

$$Ps = 80\left(1 + \frac{Pt - P\,max}{P\,max}\right) \text{ or } \quad Ps = 90\left(1 + \frac{Pt - P\,max}{Pmax}\right)$$

Where

Ps = Points scored for price of tender under consideration

Pt = Price of tender under consideration

Pmax = Price of highest acceptable tender

4. POINTS AWARDED FOR SPECIFIC GOALS

4.1. In terms of Regulation 4(2); 5(2); 6(2) and 7(2) of the Preferential Procurement Regulations, preference points must be awarded for specific goals stated in the tender. For the purposes of this tender the tenderer will be allocated points based on the goals stated in table 1 below as may be supported by proof/ documentation stated in the conditions of this tender:

4.2. In cases where organs of state intend to use Regulation 3(2) of the Regulations, which states that, if it is unclear whether the 80/20 or 90/10 preference point system applies, an organ of state must, in the tender documents, stipulate in the case of—

(a) an invitation for tender for income-generating contracts, that either the 80/20 or 90/10 preference point system will apply and that the highest acceptable tender will be used to determine the applicable preference point system; or

(b) any other invitation for tender, that either the 80/20 or 90/10 preference point system will apply and that the lowest acceptable tender will be used to determine the applicable preference point system,

then the organ of state must indicate the points allocated for specific goals for both the 90/10 and 80/20 preference point system.

Table 1: Specific goals for the tender and points claimed are indicated per the table below.

(Note to organs of state: Where either the 90/10 or 80/20 preference point system is applicable, corresponding points must also be indicated as such.

***Note to tenderers: The tenderer must indicate how they claim points for each preference point system.*)**

Item no.	The specific goals allocated points in terms of this tender	Number of points allocated (80/20 system)	Number of points claimed (80/20 system) (To be completed by the tenderer)
1.	100% Black owned enterprises within the definition of the HDI	2	
2.	At least 30% women owned enterprises	2	
3.	At least 30% youth owned enterprises	2	
4.	At least 30% enterprises people living with disabilities	2	
5.	Enterprises regarded as EMEs located within the City of Mbombela	2	
6	Enterprise who will sub-contract minimum of 30% of the contract value to EME's in the ward or local communities where the services to be rendered of works to be undertaken (Bidders shall list sub-contracting works or items)	2	
7	Corporate Social Investment (CSI) Plan. (see notes below)	5	
8	B-BBEE level 1 contribution (SANAS verified B-BBEE certificate for generic enterprise, and for EME and SME a sworn affidavit or CIPC issued certificate confirming annual turnover and level of Black Ownership	3	

The City will utilize the CSD report for the above-mentioned information

Corporate Social Investment (CSI)

NB: The minimum total value of the CSI should not be less than 2% of the total project value excluding vat and contingencies. The CSI project should be delivered concurrently with the project. The final product should be delivered prior to the issuing of completion certificate. The nature of the CSI project must benefit the community at large. (1 page, Arial font size 12) Prospective bidders will be expected to provide the City with a written explanation on how to implement the Corporate Service Investment on that particular ward, community or region. The investment must benefit the community at large. In order to claim points, a detailed one page report must be included in the list of returnable documents. The corporate social investment initiates must be implemented by the company/successful bidder. The final details of the CSI project will be finalized prior to the signing of the contract in consultations with relevant stakeholders.

DECLARATION WITH REGARD TO COMPANY/FIRM

4.3. Name of company/firm…….

4.4. Company registration number: ……...

4.5. TYPE OF COMPANY/ FIRM

- ☐ Partnership/Joint Venture / Consortium
- ☐ One-person business/sole propriety
- ☐ Close corporation
- ☐ Public Company
- ☐ Personal Liability Company
- ☐ (Pty) Limited
- ☐ Non-Profit Company
- ☐ State Owned Company

[TICK APPLICABLE BOX]

4.6. I, the undersigned, who is duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the specific goals as advised in the tender, qualifies the company/ firm for the preference(s) shown and I acknowledge that:

i) The information furnished is true and correct;

ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;

iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct;

iv) If the specific goals have been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the organ of state may, in addition to any other remedy it may have

(a) disqualify the person from the tendering 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) recommend that the tenderer or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and

(e) forward the matter for criminal prosecution, if deemed necessary.

……..
SIGNATURE(S) OF TENDERER(S)

SURNAME AND NAME: ……..

DATE: ……

ADDRESS: ……

……

……

……

4 Declaration

The tenderer declares that

a) the tendering entity is a level contributor as stated in the submitted evidence of qualification as at the closing date for submissions

b) the tendering entity has been measured in terms of the following code (tick applicable box)

Generic code of good practice

Other – specify .....

c) the contents of the declarations made in terms of a) and b) above are within my personal knowledge and are to the best of my belief both true and correct

The undersigned, who warrants that he / she is duly authorized to do so on behalf of the tenderer, confirms that he / she understands the conditions under which such preferences are granted and confirms that the tenderer satisfies the conditions pertaining to the granting of tender preferences.

Signature: .....

Name: .....

Duly authorized to sign on behalf of: .....

Telephone: .....

Fax: ..... Date: .....

Name of witness ..... Signature of witness .....

Note:

1) Failure to complete the declaration will lead to the rejection of a claim for a preference.
2) Supporting documentation of the abovementioned claim for a preference must be submitted with the tender submission to be eligible for a preference. (see Clause 5.11.8 in Tender Data)

FORM E: COMPULSORY DECLARATION (SIPDM) (MBD 4)

The following particulars must be furnished. In the case of a joint venture, separate declaration in respect of each partner must be completed and submitted.

Section 1: **Enterprise Details**

Name of enterprise:	
Contact person:	
Email:	
Telephone:	
Cell no	
Fax:	
Physical address	
Postal address	

Section 2: Particulars of companies and close corporations

Company / Close Corporation registration number	

Section 3: SARS Information

Tax reference number	
VAT registration number:	*(State Not Registered if not registered for VAT)*

Section 4: CIDB registration number

CIDB Registration number *(if applicable)*	

Section 5: National Treasury Central Supplier Database

Supplier number	
Unique registration reference number	

Section 6: Particulars of principals

principal: means a natural person who is a partner in a partnership, a sole proprietor, a director of a company established in terms of the Companies Act of 2008 (Act No. 71 of 2008) or a member of a close corporation registered in terms of the Close Corporation Act, 1984, (Act No. 69 of 1984).

Full name of principal	Identity number	Personal tax reference number

Attach separate page if necessary

Section 7: Record in the service of the state

Indicate by marking the relevant boxes with a cross, if any principal is currently or has been within the last 12 months in the service of any of the following:

a) a member of any municipal council
b) a member of any provincial legislature
c) a member of the National Assembly or the National Council of Province
1. a member of the board of directors of any municipal entity
2. an official of any municipality or municipal entity

☐ an employee of any department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act of 1999 (Act No. 1 of 1999)

☐ a member of an accounting authority of any national or provincial public entity

☐ an employee of Parliament or a provincial legislature

If any of the above boxes are marked, disclose the following:

Name of principal	**Name of institution, public office, board or organ of state and position held**	**Status of service** *(tick appropriate column)*	
		Current	**Within last 12 months**

*insert separate page if necessary

Section 8: Record of family member in the service of the state

family member: a person's spouse, whether in a marriage or in a customary union according to indigenous law, domestic partner in a civil union, or child, parent, brother, sister, whether such a relationship results from birth, marriage or adoption

Indicate by marking the relevant boxes with a cross, if any family member of a principal as defined in section 5 is currently or has been within the last 12 months been in the service of any of the following:

d) a member of any municipal council
e) a member of any provincial legislature
f) a member of the National Assembly or the National Council of Province
3. a member of the board of directors of any municipal entity
4. an official of any municipality or municipal entity

☐ an employee of any provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act 1 of 1999)

☐ a member of an accounting authority of any national or provincial public entity

☐ an employee of Parliament or a provincial legislature

If any of the above boxes are marked, disclose the following:

Name of family member	Name of institution, public office, board or organ of state and position held	Status of service (tick appropriate column)	
		Current	Within last 12 months

***insert separate page if necessary**

Section 9: Record of termination of previous contracts with an organ of state

Was any contract between the tendering entity including any of its joint venture partners terminated during the past 5 years for reasons other than the employer no longer requiring such works or the employer failing to make payment in terms of the contract.

☐ Yes ☐ No (Tick appropriate box)

If yes, provide particulars (interest separate page if necessary)

Section 10: Declaration

The undersigned, who warrants that he / she is duly authorised to do so on behalf of the tendering entity confirms that the contents of this Declaration are within my personal knowledge, and save where stated otherwise in an attachment hereto, are to the best of my belief both true and correct, and:

i) neither the name of the tendering entity or any of its principals appears on:

a) the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004 (Act No. 12 of 2004)

b) National Treasury's Database of Restricted Suppliers (see www.treasury.gov.za)

ii) neither the tendering entity of any of its principals has within the last five years been convicted of fraud or corruption by a court of law (including a court outside of the Republic of South Africa);

iii) any principal who is presently employed by the state has the necessary permission to undertake remunerative work outside such employment (attach permission to this declaration);

iv) the tendering entity is not associated, linked or involved with any other tendering entities submitting tender offers

v) has not engaged in any prohibited restrictive horizontal practices including consultation, communication, agreement, or arrangement with any competing or potential tendering entity regarding prices, geographical areas in which goods and services will be rendered, approaches to determining prices or pricing parameters, intentions to submit a tender or not, the content of the submission (specification, timing, conditions of contract etc) or intention to not win a tender;

vi) has no other relationship with any of the tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest;

vii) neither the tenderer or any of its principals owes municipal rates and taxes or municipal service charges to any municipality or a municipal entity and are not in arrears for more than 3 months;

viii) SARS may, on an on-going basis during the term of the contract, disclose the tenderer's tax compliance status to the Employer and when called upon to do so, obtain the written consent of any subcontractors who are subcontracted to execute a portion of the contract that is entered into in excess of the threshold prescribed by the National Treasury, for SARS to do likewise.

Signed _____ Date .....

Name ..... Position .....

NOTE 1 The Standard Conditions of Tender contained in SANS 10845-3 prohibits anticompetitive practices (clause 3.1) and requires that tenderers avoid conflicts of interest, only submit a tender offer if the tenderer or any of his principals is not under any restriction to do business with employer (4.1.1) and submit only one tender either as a single tendering entity or as a member in a joint venture (clause 4.13.1). Clause 5.7 also empowers the Employer to disqualify any tenderer who engages in fraudulent and corrupt practice. Clause 3.1 also requires tenderers to comply with all legal obligations.

NOTE 2: Section 30(1) of the Public Service Act, 1994, prohibits an employee (person who is employed in posts on the establishment of departments) from performing or engaging remunerative work outside his or her employment in the relevant department, except with the written permission of the executive authority of the department. When in operation, Section 8(2) of the Public Administration Management Act, 2014, will prohibit an employee of the public administration (i.e. organs of state and all national departments, national government components listed in Part A of Schedule 3 to the Public Service Act, provincial departments including the office of the premier listed in Schedule 1 of the Public Service Act and provincial departments listed in schedule 2 of the Public Service Act, and provincial government components listed in Part B of schedule 3 of the Public Service Act) or persons contracted to executive authorities in accordance with the provisions of section 12A of the Public Service Act of 1994 or persons performing similar functions in organs of state from conducting business with the State or to be a director of a public or private company conducting business with the State. The offence for doing so is a fine or imprisonment for a period not exceeding 5 years or both. It is also a serious misconduct which may result in the termination of employment by the employer.

NOTE 3: Regulation 44 of Supply Chain Management regulations issued in terms of the Municipal Finance Management Act of 2003 requires that organs of state and municipal entities not award a contract to a person who is the service of the state, a director, manager or principal shareholder in the service of the state or who has been in the service of the state in the previous twelve months.

NOTE: 4: Regulation 45 of Supply Chain Management regulations requires a municipality or municipal entity to disclose in the notes to the annual statements particulars of any award made to a close family member in the service of the state.

NOTE: 5 Corrupt activities which give rise to an offence in terms of the Prevention and Combating of Corrupt Activities Act of 2004) include improperly influencing in any way the procurement of any contract, the fixing of the price, consideration or other moneys stipulated or otherwise provided for in any contract and the manipulating by any means of the award of a tender.

NOTE: 6 Section 4 of the Competition Act of 1998 prohibits restrictive horizontal practice including agreements between parties in a horizontal relationship which have the effect of substantially preventing or lessening competition, directly or indirectly fixing prices or dividing markets or constitute collusive tendering. Section 5 also prohibits restrictive vertical practices. Any restrictive practices that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties.

ATTACH THE FOLLOWING DOCUMENTS TO THIS PAGE

- **For Closed Corporations**

  CK1 or CK2 as applicable (Founding Statement)
  Certified Shareholders Certificate

OR

- **For Companies**

  A copy of the Certificate of Incorporation
  Certified shareholders register

OR

- **For Joint Venture Agreements**
- Joint Venture Agreement between all the parties,
- as well as the documents in (1) or (2) of each Joint Venture member.

FORM F: MUNICIPAL DECLARATION AND RETURNABLE DOCUMENTS

(SIPDM)

The following particulars must be furnished in relation to tenders for municipalities and municipal entities where:

a) contractors are required; and

b) goods, services or a combination thereof where the estimated total of the prices exceeds R 10 million including VAT.

In the case of a joint venture, separate municipal declarations and returnable documents shall be submitted in respect of each partner.

Section 1: Enterprise Details

Name of enterprise:	
Contact person:	
Email:	
Telephone:	
Cell no	
Fax:	
Physical address	
Postal address	

Section 2: Declaration for Contractor's services:

The enterprise has been awarded the following contract services by an organ of state during the last five years.

Name of organ of state	Estimated number of contracts	Nature of service, e,g, quantity surveying	Service similar to required service (yes / no)?

Attach separate page as necessary

Section 3: Goods, services or a combination thereof where the estimated total of the prices exceeds R 10 million including VAT

I / we certify that

1 *(tick one of the boxes):*

□ the enterprise **is not** required by law to prepare annual financial statements for auditing

□ the enterprise **is** required by law to have audited annual financial statements and attached the audited financial statements for the past three financial years, or since the establishment as the enterprise was established within the past three years

2) the enterprise and its directors has / have no undisputed commitments for municipal services towards a municipality or other service provider in respect of which payment is overdue for more than 30 days *(i.e.: all municipal accounts are paid up to date)* Attach Municipal Utility Account;

3) source of goods and / or services:

(tick one of the boxes and insert percentages if applicable):

□ goods and / or services are sourced only from within the Republic of South Africa

□ [ ] % of the total cost of goods and / or services will be sourced from outside the Republic of South Africa and the percentage of payment from the municipality or municipal entity which is expected to be transferred out of the Republic is [ ] %

I furthermore confirm that the following contracts were awarded to the enterprise by an organ of state during the last five years and attached particulars of any material non-compliance or dispute concerning the execution of such contracts:

Name of organ of state	**Estimated number of contracts**	**Nature of contracts**

Attach separate page as necessary

I, the undersigned who warrants that I am duly authorised on behalf of the tendering entity, hereby declare that the contents of this Declaration are within my personal knowledge, and save where stated otherwise are to the best of my belief both true and correct

Signed		Date	
Name		Position	

ATTACHED HERETO AN ORIGINAL OR CERTIFIED COPY OF THE MUNICIPAL UTILITY ACCOUNT NOT OWING MORE THAN 3 MONTHS

FORM G: CERTIFICATE OF INDEPENDENT TENDER (MBD 9)

Notes to tenderer:

a) This certificate conforms to Treasury Regulation 16A9 and the requirement of section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998, as amended, that prohibits an agreement between, or concerted practice by, firms, or a decision by an association of firms, if it is between parties in a horizontal relationship and if it involves collusive tendering.
b) Collusive tendering is a conspiracy between businesses that would normally be expected to compete, to agree not to compete, in a tender process.
c) This certificate serves as a declaration by the tenderer that the tender submitted is free from any collusion with a competitor.

CERTIFICATE OF INDEPENDENT TENDER DETERMINATION

I, the undersigned, in submitting the accompanying tender:

_____

(Tender Number and Description)

in response to the invitation for the tender made by:

_____

(Name of Municipality / Municipal Entity)

do hereby make the following statements that I certify to be true and complete in every respect:

I certify, on behalf of:_____that:

(Name of Tenderer)

i) I have read and I understand the contents of this Certificate;

ii) I understand that the accompanying tender will be disqualified if this Certificate is found not to be true and complete in every respect;

iii) I am authorized by the tenderer to sign this Certificate, and to submit the accompanying tender, on behalf of the tenderer;

iv) Each person whose signature appears on the accompanying tender has been authorized by the tenderer to determine the terms of, and to sign, the tender, on behalf of the tenderer;

v) For the purposes of this Certificate and the accompanying tender, I understand that the word "competitor" shall include any individual or organization, other than the tenderer, whether or not affiliated with the tenderer, who:
   (a) has been requested to submit a tender in response to this tender invitation;
   (b) could potentially submit a tender in response to this tender invitation, based on their qualifications, abilities or experience; and
   (c) provides the same goods and services as the tenderer and/or is in the same line of business as the tenderer

vi) The tenderer has arrived at the accompanying tender independently from, and without consultation, communication, agreement or arrangement with any competitor. However, communication between partners in a joint venture or consortium[3] will not be construed as collusive bidding.

vii) In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:

a) prices;
b) geographical area where product or service will be rendered (market allocation)
c) methods, factors or formulas used to calculate prices;
d) the intention or decision to submit or not to submit, a tender;
e) the submission of a tender which does not meet the specifications and conditions of the tender; or
f) bidding with the intention not to win the tender.

viii) In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the products or services to which this tender invitation relates.

ix) The terms of the accompanying tender have not been, and will not be, disclosed by the tenderer, directly or indirectly, to any competitor, prior to the date and time of the official tender opening or of the awarding of the contract.

x) I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to tenders and contracts, tenders that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

Signature	Date
Capacity under which Tender is Signed	Name of Tenderer

FORM H: DECLARATION OF GOOD STANDING REGARDING TAX (MBD 2)

ATTACH TAX COMPLIANCE STATUS (TCS) TO THIS PAGE

The Tax Compliance Status (TCS) must be submitted together with the tender. Failure to submit the above-mentioned documentation will result in the invalidation of the tender.

In tenders where Consortia / Joint Ventures / Sub-contractors are involved, each party must submit a separate Tax Compliance Status (TCS) .

FORM I: DECLARATION OF TENDERER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES (MBD 8)

Notes to tenderer:

1. This tender document must form part of all tenders invited.
2. This form serves as a declaration to be used by institutions in ensuring that when goods and services are being procured, all reasonable steps are taken to combat the abuse of the supply chain management system.
3. The tender of any tenderer may be disregarded if that tenderer or any of its directors have
   a. abused the institution's supply chain management system;
   b. committed fraud or any other improper conduct in relation to such system;
   c. failed to perform on any previous contract.
4. In order to give effect to the above, the following questionnaire must be completed and submitted with this tender.

Item	Question	Yes	No
4.1	**Is the tenderer or any of its directors listed on the National Treasury's Database of Restricted Suppliers as companies or persons prohibited from doing business with the public sector?** **(Companies or persons who are listed on this Database were informed in writing of this restriction by the Accounting Officer/Authority of the institution that imposed the restriction after the *audi alteram partem* rule was applied).** **The Database of Restricted Suppliers now resides on the National Treasury's website(www.treasury.gov.za) and can be accessed by clicking on its link at the bottom of the home page.**	Yes ☐	No ☐
4.1.1	If so, furnish particulars:		
4.2	Is the tenderer or any of its directors listed on the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004)? **for Tender Defaulters can be accessed on the National Treasury's website (www.treasury.gov.za) by clicking on its link at the bottom of the home page.**	Yes ☐	No ☐
4.2.1	If so, furnish particulars:		
4.3	Was the tenderer or any of its directors convicted by a court of law (including a court of law outside the Republic of South Africa) for fraud or corruption during the past five years?	Yes ☐	No ☐
4.3.1	If so, furnish particulars:		

4.4	Does the tenderer or any of its directors owe any municipal rates and taxes or municipal charges to the municipality / municipal entity, or to any other municipality / municipal entity, that is in arrears for more than three months?	Yes ☐	No ☐
4.4.1	If so, furnish particulars:		
4.5	Was any contract between the tenderer and the municipality / municipal entity or any other organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes ☐	No ☐
4.7.1	If so, furnish particulars:		

CERTIFICATION

I, THE UNDERSIGNED (FULL NAME) ……

CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM IS TRUE AND CORRECT.

I ACCEPT THAT, IN ADDITION TO CANCELLATION OF A CONTRACT, ACTION MAY BE TAKEN AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

Signature

Date

Capacity under which Tender is Signed

Name of Tenderer

FORM J: REGISTRATION ON NATIONAL TREASURY CENTRAL SUPPLIER DATABASE

The tenderer shall provide a printed copy of the Active Supplier Listing on the National Treasury Central Supplier Database. (www.treasury.gov.za). Tenderers who are not registered on the Central Supplier Database should attach proof of their application for registration (refer to Tender Data Clause 4.1). In the case of a Joint Venture, a printed copy of the Active Supplier Listing must be provided for each member of the Joint Venture.

Name of Contractor: .....

Central Supplier Database Supplier Number: .....

Affix Proof of the National Treasury Central Supplier Database to this page
(Full CSD required, not summary)

FORM K: DECLARATION OF TENDERER'S LITIGATION HISTORY

Does the tenderer have any litigation with which tenderer (including its directors, shareholders, or other senior members in previous companies) have been involved with any organ of state or state department within the last ten years?

If yes, furnish your details in table below.

YES	NO

NB: It is compulsory for all bidders to sign this form

The tenderer shall list below details of any litigation with which the tenderer (including its directors, shareholders or other senior members in previous companies) has been involved with any organ of state or state department within the last ten years. The details must include the year, the litigating parties, the subject matter of the dispute, the value of any award or estimated award if the litigation is current and in whose favour the award, if any, was made.

Client	Other Litigating Party	Dispute	Award Value	Date Resolved

Signature

Date

Capacity under which Tender is Signed

Name of Tenderer

FORM L: AUTHORITY OF SIGNATORY

Details of person responsible for tender process:

Name: ----------

Contact number: ----------

Office address: _____

Signatories for close corporations and companies shall confirm their authority by attaching to this form a **duly signed and dated original or certified copy on the Company Letterhead** of the relevant resolution of their members or their board of directors, as the case may be.

PRO-FORMA FOR COMPANIES AND CLOSE CORPORATIONS:

"By resolution of the board of directors passed on *(date)*

Mr

has been duly authorized to sign all documents in connection with the Tender for Contract Number/Name

……and any Contract which may arise there from on

behalf of ……
(BLOCK CAPITALS)

SIGNED ON BEHALF OF THE COMPANY

IN HIS CAPACITY AS .....

DATE .....

FULL NAMES OF SIGNATORY

SIGNATURE .....

AS WITNESSES: 1. NAME …… SIGNATURE ……

2. NAME …… SIGNATURE ……

PRO-FORMA FOR JOINT VENTURES:

Certificate of Authority for Joint Ventures

We, the undersigned, are submitting this tender offer in Joint Venture and hereby authorise…… Mr/Ms ……..., authorised signatory of the company ……, acting in the capacity of lead partner, to sign all documents in connection with the tender offer an any contract resulting from it on our behalf.

NAME OF FIRM	ADDRESS	DULY AUTHORISED SIGNATORY
		Signature: …….. Name: ……. Designation: ……..
		Signature: …….. Name: ……. Designation: ……..
		Signature: …….. Name: ……. Designation: ……..
		Signature: …….. Name: ……. Designation: ……..

ATTACHED HERETO THE DULY SIGNED AND DATED ORIGINAL OR CERTIFIED COPY OF AUTHORITY OF SIGNATORY ON COMPANY LETTERHEAD

FORM M: SCHEDULE OF SPECIALIST SUBCONTRACTORS

Notes to tenderer:

1. The tenderer shall list below the specialist items of work on this contract. Alternatives may be mentioned.
2. The tenderer shall state whether he intends to carry out any specialised work himself.

Acceptance of this tender shall not be construed as approval of all or any of the listed specialist subcontractors. Should any or all of the specialist subcontractors not be approved subsequent to the acceptance of the tender, it shall in no way invalidate this tender, and the tendered unit rates for the various items of work shall remain final and binding, even in the event of a subcontractor not listed below being approved by the engineer.

SPECIALISED ITEM	INDICATE IF SUB-CONTRACTED (Tick correct option)	
	YES	NO

In order to complete the Works under this Contract, I/we propose to employ the following sub-contractors to carry out the portion/type of work as detailed. **Affix Original or Certified proof of 3 previous projects for each sub-contractor.**

(Note: All proposed sub-contractors must be listed).

Sub-contractor: Name, Address and Telephone No.	Portion/type of work to be undertaken	
_____ _____ **(____)**_____		**Previous value of work:** **Previous Experience:**
_____ _____ **(____)**_____		**Previous value of work:** **Previous Experience:**

_____ _____ **(____)_____**		**Previous value of work:** **Previous Experience:**
_____ _____ **(____)_____**		**Previous value of work:** **Previous Experience:**

FORM N: PROOF OF GOOD STANDING WITH COMPENSATION COMMISSIONER

Notes to tenderer:

1. Discovery that the tenderer has failed to make proper disclosure may result in Ehlanzeni District Municipality terminating a contract that flows from this tender on the ground that it has been rendered invalid by the tenderer's misrepresentation.

2. The tenderer shall attach to this Form evidence that he is registered and in good standing with the compensation fund or with a licensed compensation insurer who is approved by Department of Labour in terms of section 80 of the Compensation for Injury and Disease Act 1993 (COID) (Act 130 of 1993).

Affix certified Proof of Good Standing with Compensation Commissioner to this page

FORM O: SCHEDULE OF CURRENT COMMITMENTS

Notes to tenderer:

(a) The tenderer shall list below all contracts currently under construction or awarded and about to commence and tenders for which offers have been submitted but awards not yet made.
(b) In the event of a joint venture enterprise, details of all the members of the joint venture shall similarly be attached to this form.
(c) The lists must be restricted to not more than 5 contracts and 5 tenders. If a tenderer's actual commitments or potential commitments are greater than 5 each, those listed should be in descending order of expected final contract value or sum tendered.

Contracts Awarded				
Employer	**Project**	**Expected Value of contract (Inclusive of VAT)**	**Durations (Months)**	**Expected Completion Date**

Tenders not Yet Awarded				
Employer	**Project**	**Tendered Amount (Inclusive of VAT)**	**Tendered Durations (Months)**	**Expected Commencement Date**

Signature

Date

Capacity under which Tender is Signed

Name of Tenderer

FORM P: REGISTRATION WITH CIDB

The tenderer shall provide a printed copy of the Active Contractor's Listing off the CIDB website. (www.cidb.org.za). Tenderers whose CIDB registration expires within 21 days after close of tender should attach proof of their application for re-registration (refer to Tender Data Clause 4.1). In the case of a Joint Venture, a printed copy of the Active Contractor's Listing must be provided for each member of the Joint Venture.

Name of Contractor: .....

Contractor Grading Designation: .....

CIDB Contractor Registration Number: .....

Expiry Date: .....

FORM Q: FINANCIAL RESOURCES BANKING INFORMATION

DETAILS OF TENDERERS BANKING INFORMATION

2 Notes to tenderer:

- The tenderer shall attach to this form a letter of intent for 10% guarantee from a financial institution.
- In the event that the tenderer is a joint venture enterprise, the bank guarantee will be expected from the lead partner.

BANK NAME:	
ACCOUNT NAME: *(e.g. ABC Civil Construction cc)*	
ACCOUNT TYPE: *(e.g. Savings, Cheque etc.)*	
ACCOUNT NO:	
ADDRESS OF BANK:	
CONTACT PERSON:	
TEL. NO. OF BANK / CONTACT:	
How long has this account been in existence:	0-6 months ☐ 7-12 months ☐ 13-24 months ☐ More than 24 months ☐ (Tick which is appropriate)

FORM Q: FINANCIAL RESOURCES DECLARATION OF PROCUREMENT ABOVE R 10 MILLION (MBD5)

For all procurement expected to exceed R10 million (all applicable taxes included), tenderer must complete the following questionnaire:

- Are you by law required to prepare annual financial statements for auditing?

3 YES / NO

1.1. If yes, submit audited financial statements for the past three years or since the date of establishment if established during the past three years.

……..

……..

2. Do you have any outstanding undisputed commitments for municipal services towards any municipal for more than three months or any other service provider in respect of which payments is overdue for more than 30 days?

4 YES / NO

……

……

2.1 If no, this serves to certify that the tenderer has no undisputed commitments for municipal services towards any municipality for more than three months or other service provider in respect of which payment is overdue for then 30 days?

……..……..……

……..…

2.2 If yes, please provide particulars

…….……

…….

4.1 Has any contract been awarded to you by an organ of state during the past five years, including particulars of any material non-compliance or dispute concerning the execution of such contract?

5 YES / NO

.....

……

a. If yes, furnish particulars

……

……

4.1 Will any portion of goods or services be sourced from outside the Republic, and, if so, what portion of payment from the municipality / /municipal entity is expected to be transferred out of the Republic?

6 YES / NO

4.1 If yes, furnish particulars

……

……

CERTIFICATION

7 I , THE UNDERSIGNED (NAME) ……..……..…

CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM IS CORRECT.

I ACCEPT THAT THE STE MAY ACT AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE

Signature	Date
Capacity under which Tender is Signed	Name of Tenderer

FORM Q: FINANCIAL RESOURCES
DOCUMENTATION OF INTENT TO PROVIDE A PERFORMANCE GUARANTEE

*The Tenderer must attach hereto an **Original Letter or Certified Copy** from a financial institution with whom he has made the necessary arrangements, to the effect that the said financial institution will be prepared to provide the required performance guarantee when asked to do so. (Letter of Intent)*

A Pro forma follows herewith for the tenderer to use.

PRO-FORMA FOR A PERFORMANCE GUARANTEE PERFORMANCE GUARANTEE

Employer

(Name and Address) _____

_____

Contract No _____

Contract Title _____

WHEREAS _____

(hereinafter referred to as "the Employer") entered into, a Contract with:

_____

(hereinafter called "the Contractor") on the _____ day of _____ 20 _____ for the construction of (Contract Title)

_____

at _____

AND WHEREAS it is provided by such Contract that the Contractor shall provide the Employer with security by way of a guarantee for the due and faithful fulfilment of such Contract by the Contractor;

AND WHEREAS WE _____ (hereinafter referred to as the Guarantor") has/have at the request of the Contractor, agreed to give such guarantee;

NOW THEREFORE WE do hereby guarantee and bind ourselves jointly and severally as Guarantor and Co-Principal Debtor to the Employer under renunciation of the benefits of division and exclusion for the due and faithful performance by the Contractor of all the terms and conditions of the said Contract, subject to the following conditions:

1) The Employer shall, without reference and/or notice to us, have complete liberty of action to act in any manner authorized and/or contemplated by the terms of the said Contract, and/or to agree to any modifications, variations, alterations, directions or extension of the Completion Data of the Works under the said Contract, and that its rights under this guarantee shall in no way be prejudiced nor or liability hereunder be affected by reason of any steps which the Employer may take under such Contract, or of any modification, variation, alterations of the Completion Date which the Employer may make, give, concede or agree to under the said Contract.

2) This guarantee shall be limited to payment of a sum of money.

3) The Employer shall be entitled, without reference to us, to release any guarantee held by it, and to give time to or compound or make any other arrangement with the Contractor.

However, upon receipt by us of an authenticated copy of the Certificate of Completion in terms of the Contract, the amount of liability shall be reduced by 50% which shall be in force until the issue of the Final Approval Certificate at expiry of the Defects Liability Period

This guarantee shall remain in full force and effect until the issue of the Certificate of Completion in terms of the Contract, unless we are advised in writing by the Employer before the issue of the said Certificate of Completion

4) His intention to institute claims, and the particulars thereof, in which event this guarantee shall remain in full force and effect until all such claims have been paid of liquidated,

5) Our total liability hereunder shall not exceed the sum of

_____

_____ (in words)

R _____(in figures)

(10% of the tender sum) that amount I/we agree to hold at your disposal.

6) The Guarantor reserves the right to withdraw from this guarantee by depositing the Guaranteed Sum with the beneficiary, whereupon the Guarantor's liability hereunder shall cease.

I/We declare that I/we, on behalf of the Guarantor, waive the legal exceptions available to a guarantor and undertake to pay the said amount or such portion thereof as may be demanded, immediately on receipt of a written demand from you.

A certificate under your hand shall be sufficient and satisfactory evidence as to the amount of the Guarantor's liability for the purpose of enabling provisional sentence or any similar relief to be obtained against the Guarantor.

This guarantee is neither negotiable nor transferable, and must be surrendered to the Guarantor in the event of the full amount of the Guarantee being paid to the Employer.

7) I/We hereby choose our address for the serving of all notices for all purposes arising here from as

_____

_____

IN WITNESS WHERE OF this guarantee has been executed by us at _____

_____ on the _____ day of _____ 20

As witness:

1. _____ Signature _____

2. _____ Signature _____

Duly authorized to sign on behalf of
(Guarantor) _____

Address _____

_____

_____

RETURNABLES FOR QUALITY CRITERIA

FORM Q: COMPANY EXPERIENCE IN RELATION TO SCOPE OF WORKS

The Tenderer will receive a maximum of 50 points based on information provided in this schedule.

The following is a statement of work of similar nature and size recently successfully executed by myself / ourselves:

1. Points will be given for projects completed of similar nature and size. Similar refers to upgrading or refurbishment of water retaining structures i.e. water channels, water tunnels, reservoirs, bulk distribution pipelines, water treatment works.
2. The tenderer scores a maximum of 10 points for a project from the value of R4 million but less than R5 million successfully completed in the last 5 years.
3. The tenderer scores a maximum of 20 points for a project from the value of R5 million but less than R6 million successfully completed in the last 5 years.
4. The tenderer scores a maximum of 30 points for a project from the value of R6 million but less than R7 million successfully completed in the last 5 years
5. The tenderer scores a maximum of 50 points for a project from the value R7 million and above successfully completed in the last 5 years.
6. The tenderer may list only the largest successfully completed project of a similar nature and size.
7. The maximum Quality points for each criterion are listed below.
8. Positive feedback from the Consulting Engineer from the designated / listed contact person will contribute toward points allocated for the attached certificates of completion.
9. Positive feedback from the Employer from the designated / listed contact person will contribute toward points allocated for the attached certificates of completion.
10. Points for completion certificates attached will be given for similar projects. Negative feedback will forfeit all points, meaning zero (0) points will be allocated for the attached certificates of completion.
11. Failure to submit all relevant information per project will result in the forfeiture of all points for that relevant project.
12. The experience of the Tenderer or joint venture partners in a consortium will be evaluated based on experience in similar projects or similar areas and conditions in relation to the scope of work required for this project.
13. In case of a panel appointment, bidders must attach a certified copy of panel appointment, allocation letter /Purchase Order and Completion Certificate per project.

NB: Practical/partial completion certificates will not be considered

Certified Appointment letter AND Completion Certificate (signed by client and engineer) of Relevant Work (to be attached – zero points if both is not attached)	**Consulting Engineer: Contact Person and Telephone Number**	**Employer: Contact Person and Telephone Number**	**Value of Work** (inclusive of VAT)	**Date Completed** (Attach Certified Completion Certificate)	**Points Awarded by the Engineer**
*Attach additional pages if more space is required		Total Points			

FORM R: PLANT & EQUIPMENT

The tenderer will receive a maximum of 15 points based on information provided in this schedule.

1. The following are lists of major items of relevant equipment that I / we presently own or lease and will have available for this contract or will acquire or hire for this contract if my / our tender is accepted.

2. The tenderer will receive Quality points for listing of plant available for this specific contract as follows:

   - Major plant for construction works if well identified and 100% is owned and available at start of contract maximum points will be as stated in allocated points if owned column.
   - No points will be allocated for hired plant as indicated in the Allocate points for hired plant column on the table below.
   - Points for the plant correctly identified and owned will be calculated according to the allocated points based on the quantities under the Quantities Required column.

3. Proof of ownership to be submitted: Natis to be attached. Certified copies of motor vehicle license (MVLX), or motor vehicle license and license disc (MVL1) or Certificate of registration (RC1) or any valid document issued by the department of transport

4. Documents requested above must be certified and not older than 3 months. Failure to adhere to the directive zero points will be allocated

Description, size, capacity, etc.	Number Required	Allocated Points if owned	Allocated Points if hired	Points Scored
Mobile Diesel Motor Driven Welder or Similar (Capacity 300 A output)	1	5	2.5	
Mobile Diesel Motor Driven Water Pump or Similar (Capacity 12l/s @ 22-meter head)	1	5	2.5	
Crane Truck 6 Ton with flat bed	1	5	2.5	
Total		15	7.5	
Total Points Allocated				

* Attached additional pages if more space is required.

FORM T: KEY PERSONNEL, EXPERIENCE AND QUALIFICATIONS

The Tenderer will receive a maximum of 35 points based on information provided in this Schedule

Notes to tenderer:

1. The intention of this form is to demonstrate the tenderer's project structure, as well as the lines of responsibility between members of the project team and the overall company structure. Attach own organogram to this form.
2. Joint Venture tenders require each element of the venture to submit separate organograms that show the individual structure of each member company and the lines of responsibility of the proposed personnel involved in the project. In addition, there must also be a combined organogram that indicates how the joint venture itself will function and the proposed share of the work will become a contractual obligation between the members of the joint venture.
3. State the city or town where the company's head office is located. The locality of regional or satellite offices, regardless of degree of autonomy or size is not required. Only submit the number of offices other than the head office. Do not count offices outside RSA.
4. Registered professional engineers, technicians or technologists means those who are involved in the construction of water retaining/channelling structures. Registered professionals of other disciplines (e.g. mechanical) are considered as employees only.
5. For all foreign qualifications must attach SAQA accreditation and certified proof of work permit

CONSTRUCTION PERSONNEL

TARGETED GOALS (Attach all CV's and Certified Qualifications)		TENDERED GOAL	POINTS CLAIMED BY TENDERER	ALLOCATED POINTS
1.	Underground Safety Officer (SACPCM) with First Aid plus OHSA. (Construction Regulations qualification) (2 + years' experience) Name: **……**	3.0		
	PLUS			
2.	Site Agent has National Diploma Mechanical Engineering and has completed four to six (6) similar mechanical projects in the past (4 + years of experience) Name: **……**	7.0		
	PLUS			
3.	Coded Welder Level 3 Qualification (2 + years of experience) Name: **……**	10.0		
	PLUS			
4.	Contracts Manager (Pr.Eng or Pr.Tech.Eng or Pr.Techni.Eng) (Mechanical) Name: **……** Qualification: **……**	15.0		
SUB-TOTAL: Construction Team Key Personnel		**35.0**		

KEY PERSONNEL EXPERIENCE (SAFETY OFFICER)

The tenderer shall provide details of previous experience required for this project. Proof of registration must be attached to this form.

Name	Position in Team	OH&S Reg. No	Category	SACPCMP Reg. No	Category	No. of Years' Experience

	Safety Officer					

Technical/Managerial Experience
(List only the most recent 5 projects of the key staff that the tenderer considers relevant to the specified scope of works.)

Description of Project	Position Held	Project Start Date	Project Completion Date	Contract Value	Client and Contact Person	Contact No.

KEY PERSONNEL EXPERIENCE (SITE AGENT)

The tenderer shall provide details of previous experience required for this project. Proof of registration must be attached to this form.

Name	Position in Team	ECSA Reg. No	Category	SACPCMP Reg. No	Category	No. of Years' Experience
	Site Agent					

Technical/Managerial Experience
(List only the most recent 5 projects of the key staff that the tenderer considers relevant to the specified scope of works.)

Description of Project	Position Held	Project Start Date	Project Completion Date	Contract Value	Client and Contact Person	Contact No.

KEY PERSONNEL EXPERIENCE (CODED WELDER)

The tenderer shall provide details of previous experience required for this project. Proof of registration must be attached to this form.

Name	Position in Team	ECSA Reg. No	Category	SACPCMP Reg. No	Category	No. of Years' Experience
	Coded Welder					

Technical/Managerial Experience
(List only the most recent 5 projects of the key staff that the tenderer considers relevant to the specified scope of works.)

Description of Project	Position Held	Project Start Date	Project Completion Date	Contract Value	Client and Contact Person	Contact No.

KEY PERSONNEL EXPERIENCE (CONSTRUCTION MANAGER)

The tenderer shall provide details of previous experience required for this project. Proof of registration must be attached to this form.

Name	Position in Team	ECSA Reg. No	Category	SACPCMP Reg. No	Category	No. of Years' Experience
	Construction Manager					

Technical/Managerial Experience
(List only the most recent 5 projects of the key staff that the tenderer considers relevant to the specified scope of works.

Description of Project	Position Held	Project Start Date	Project Completion Date	Contract Value	Client and Contact Person	Contact No.

ATTACH CV'S AND CERTIFIED QUALIFICATIONS OF KEY PERSONNEL TO THIS PAGE

Note: Only CV's and Certified Qualifications of Key personnel that were named and shown on the organogram to be attached.

COMPETENCE ACHIEVEMENT SCHEDULE (QUALITY)

DESCRIPTION		MAXIMUM POINTS TO BE ALLOCATED	MAXIMUM POINTS TO BE ALLOCATED	MAXIMUM POINTS TO BE ALLOCATED
Company Experience:	Form Q	50		
Plant and Equipment:	Form R	35		
Managerial Capacity:	Form T	15		
	Sub- Total	100		
	TOTAL	**100**		

Note:

Total allocated for Quality is 100 points. The minimum threshold required to qualify for the next stage of evaluation is 70 points. Only those tenders that achieve the minimum number will proceed to the price and preference evaluation stage.

SUPPLY CHAIN POLICY USING 80/20 PREFERENCE POINT SYSTEM

.1	MAXIMUM POINTS TO BE ALLOCATED
Price	**80**
B-BBEE Status Level of Contribution	**20**
TOTAL	**100**

FORM V: SCHEDULE OF TENDER COMPLIANCE

Note to tenderer:

This Table has been created as an aid to ensure a tenderer's compliance with the completion of the returnable forms and schedules and subsequent placement in the correct envelope.

FORM NO / GBD NO	FORM DESCRIPTION	TICK IF COMPLETED
A	CERTIFICATE OF ATTENDANCE AT CLARIFICATION MEETING	
B	RECORD OF ADDENDA TO TENDER DOCUMENTS	
C	PROPOSED AMENDMENTS AND QUALIFICATIONS	
D	PREFERENCING SCHEDULE: BROAD BASED BLACK ECONOMIC EMPOWERMENT STATUS	
E	COMPULSORY DECLARATION	
F	MUNICIPAL DECLARATION AND RETURNABLE DOCUMENTS	
G	CERTIFICATE OF INDEPENDENT TENDER	
H	DECLARATION OF GOOD STANDING REGARDING TAX	
I	DECLARATION OF TENDERER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES	
J	REGISTRATION ON NATIONAL TREASURY CENTRAL SUPPLIER DATABASE	
K	DECLARATION OF TENDERER'S LITIGATION HISTORY	
L	AUTHORITY OF SIGNATORY	
M	SCHEDULE OF SPECIALIST SUBCONTRACTORS	
N	PROOF OF GOOD STANDING WITH COMPENSATION COMMISSIONER	
O	SCHEDULE OF CURRENT COMMITMENTS	
P	REGISTRATION WITH CIDB	
Q	COMPANY EXPERIENCE IN RELATION TO SCOPE OF WORKS	
R	PLANT & EQUIPMENT	
S	FINANCIAL RESOURCES	
T	MANAGERIAL CAPACITY, EXPERIENCE AND QUALIFICATIONS	

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

CONTRACT NO: COM91/2023

FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

THE CONTRACT

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

CONTRACT NO: COM91/2023
FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

PART C1 AGREEMENT AND CONTRACT DATA

PART C2 PRICING DATA

PART C3 SCOPE OF WORKS

PART C4 SITE INFORMATION

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

CONTRACT NO: COM91/2023

FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

PART C1 AGREEMENT AND CONTRACT DATA

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

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FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

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FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

C1.1 FORM OF OFFER

C1.2 FORM OF ACCEPTANCE

C1.3 SCHEDULE OF DEVIATIONS

C 1.1: FORM of OFFER

OFFER

The employer, identified in the acceptance signature block, has solicited offers to enter into a contract for the procurement of:

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

The tenderer, identified in the offer signature block, has examined the documents listed in the tender data and addenda thereto as listed in the tender returnables and, by submitting this offer, has accepted the conditions of tender.

By the representative of the tenderer, deemed to be duly authorized, signing this part of this form of offer and acceptance, the tenderer offers to perform all of the obligations and liabilities of the contractor under the contract, including compliance with all its terms and conditions according to their true intent and meaning, for an amount to be determined in accordance with the conditions of contract identified in the contract data.

The offered total of the prices, inclusive of any value added tax or sales tax which the law requires the employer to pay, is

_____ (in words)

R _____ (in figures)

This offer may be accepted by the employer by signing the acceptance part of this form of offer and acceptance and returning one copy of this document to the tenderer before the end of the period of validity stated in the tender data, whereupon the tenderer becomes the party named as the contractor in terms of the conditions of the contract identified in the contract data.

for the TENDERER

Signature: _____

Name: _____

Capacity: _____

Name and address: _____

_____

_____

Name and _____ Date: _____

Signature of Witness _____

C1.2: FORM of ACCEPTANCE

ACCEPTANCE

By signing this part of this form of offer and acceptance, the employer identified below accepts the tenderer's offer. In consideration thereof, the employer shall pay the contractor the amount due in accordance with the conditions of contract identified in the contract data. Acceptance of the tenderer's offer shall form an agreement between the employer and the tenderer upon the terms and conditions contained in this agreement and in the contract, that is the subject of this agreement.

The terms of the contract, are contained in:

Part C 1: Agreements and contract data, (which includes this agreement)
Part C 2: Pricing data
Part C 3: Scope of work.
Part C 4: Site information

and drawings and documents or parts thereof, which may be incorporated by reference into Parts C1 to C4 above.

Deviations from and amendments to the documents listed in the tender data and any addenda thereto as listed in the tender schedules, as well as any changes to the terms of the offer agreed by the tenderer and the employer during this process of offer and acceptance, are contained in the schedule of deviations attached to and forming part of this agreement. No amendments to or deviations from said documents are valid unless contained in this schedule.

The tenderer shall within two weeks after receiving a completed copy of this agreement, including the schedule of deviations (if any), contact the employer's agent (whose details are given in the contract data) to arrange the delivery of any securities, bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the conditions of contract identified in the contract data at, or just after, the date this agreement comes into effect. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.

Notwithstanding anything contained herein, this agreement comes into effect on the date when the tenderer receives one fully completed original copy of this document, including the schedule of deviations (if any). Unless the tenderer (now contractor) within five working days of the date of such receipt, notifies the employer in writing of any reason why he cannot accept the contents of this agreement, this agreement shall constitute a binding contract between the parties.

for the EMPLOYER

Signature: _____

Name: _____

Capacity: _____

Name and address: _____

_____

_____

Name and _____ Date: _____

Signature of witness _____ _____

C1.3: SCHEDULE of DEVIATIONS

1 Subject
Details
2 Subject
Details
3 Subject
Details
4 Subject
Details

By the duly authorized representatives signing this agreement, the employer and the tenderer agree to and accept the foregoing schedule of deviations as the only deviations from and amendments to the documents listed in the tender data and addenda thereto as listed in the returnable schedules, as well as any confirmation, clarification or changes to the terms of the offer agreed by the tenderer and the employer during this process of offer and acceptance.

It is expressly agreed that no other matter, whether in writing, oral communication or implied during the period between the issue of the tender documents and the receipt by the tenderer of a completed signed copy of this Agreement, shall have any meaning or effect in the contract between the parties arising from this agreement.

for the TENDERER

Signature: _____

Name: _____

Capacity: _____

for the EMPLOYER

(Name and address): _____

_____

_____

Name and _____ Date: _____

Signature of witness _____

CITY OF MBOMBELA

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FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

C1.4 CONTRACT DATA

C1.4: CONTRACT DATA

GENERAL CONDITIONS OF CONTRACT

PART 1: DATA PROVIDED BY THE EMPLOYER

CONDITIONS OF CONTRACT

The General Conditions of Contract for Construction Works, Third Edition, 2015, published by the South African Institution of Civil Engineering, Private Bag X200, Halfway House, 1685, are applicable to this contract and is obtainable form www.saice.org.za.

CONTRACT SPECIFIC DATA

The following contract specific data, referring to the General Conditions of Contract for Construction Works, Third Edition, 2015, are applicable to this Contract.

PART 1: DATA PROVIDED BY THE EMPLOYER

The following contract specific data are applicable to this Contract:

Clause	Description
1.1.1.13	The Defects Liability Period is **12 months**
1.1.1.15	The Name of the Employer is the **City of Mbombela**.
1.1.1.16	The Name of the Employer's Agent is **Mr W Gower**, also referred to in the Contract as "TFC Engineers (Pty) Ltd".
1.1.1.26	The pricing strategy: **Re-Measurement Contract**
1.2.1.2	The Employer's address for receipt of communications is: Physical address: **1 Nel Street MBOMBELA 1200** Postal address: **PO Box 45 MBOMBELA 1200** Telephone: **013 759 2306** Fax: **013 759 2070** E-mail: **lindani.ngcobo@mbombela.gov.za**
1.2.1.2	The address of the Employer's Agent is: Physical address: **46 Murray Street Mbombela 1200** Postal address: **PostNet Suite #370 Private Bag X11326 Mbombela 1200** Telephone: **013 752 7475** E-mail: **info@tfce.co.za**
2.4	**Variations to the Conditions of Contract are:** Add the following at the end of sub clause 2.4.1: " The several documents forming the Contract shall rank in the following order of precedence:

Clause	Description
	1. Contract Agreement, 2. Form of Offer and Acceptance, 3. Contract Data, 4. Specification Data, 5. Standardized Specifications, 6. Drawings, 7. Bill of Quantities, 8. Statutory Regulations, 9. Other standard specifications. If the contents of any part of the documents contradict any other part, the document in the highest position on the above order of precedence shall have preference and apply."
4.3.3	Add the following at the end of sub clause 4.3.2: "4.3.3 The Employer and the Contractor hereby agree, in terms of the provisions of Section 37(2) of the Occupational Health and Safety Amendment Act, 1993 (Act 85 of 1993), hereinafter referred to as 'the Act', that the following arrangements and procedures shall apply between them to ensure compliance by the Contractor with the provisions of the Act: (i) The Contractor undertakes to acquaint the appropriate officials and employees of the Contractor with all relevant provisions of the Act and the Regulations promulgated in terms of the Act. (ii) The Contractor undertakes that all relevant duties, obligations and prohibitions imposed in terms of the Act and Regulations on the Contractor will be fully complied with. (iii) The Contractor accepts sole liability for such due compliance with the relevant duties, obligations and prohibitions imposed by the Act and Regulations and expressly absolves the Employer from himself being obliged to comply with any of the aforesaid duties, obligations and prohibitions, with the exception of such duties, obligations and prohibitions expressly assigned to the Employer in terms of the Act and its associated Regulations. (iv) The Contractor agrees that any duly authorized officials of the Employer shall be entitled, although not obliged, to take such steps as may be necessary to monitor that the Contractor has conformed to his undertakings as described in paragraphs (i) and (ii) above, which steps may include, but will not be limited to, the right to inspect any appropriate site or premises occupied by the Contractor, or any appropriate records or safety plans held by the Contractor. (v) The Contractor shall be obliged to report forthwith to the Employer and Employer's Agent any investigation, complaint or criminal charge which may arise as a consequence of the provisions of the Act and Regulations, pursuant to work performed in terms of this Contract, and shall, on written demand, provide full details in writing, to the Employer and Employer's Agent, of such investigation, complaint or criminal charge.

Clause	Description
	The Contractor shall furthermore, in compliance with Constructional Regulations 2003 to the Act: (vi) Acquaint himself with the requirements of the Employer's health and safety specification as laid down in regulation 5(1) of the Construction Regulation 2014, and prepare a suitably and sufficiently documented health and safety plan as contemplated in regulation 6(1) of the Construction Regulation 2014 for approval by the Employer or his assigned agent. The Contractor's health and safety plan and risk assessment shall be submitted to the Employer for approval within seven (7) days after acceptance of the bid. and shall be implemented and maintained from the Commencement of the Works. (vii) The Employer, or his assigned agent, reserves the right to conduct periodic audits, as contemplated in the Construction Regulations 2003, to ensure that the Contractor is compliant in respect of his obligations. Failure by the Contractor to comply with the requirements of these Regulations shall entitle the Employer's Agent, at the request of the Employer or his agent, to suspend all or any part of the Works, with no recourse whatsoever by the Contractor for any damages incurred as a result of such suspension, until such time that the Employer or his agents are satisfied that the issues in which the Contractor has been in default have been rectified." The Employer and Contractor agree that the Contractor will comply with the provisions of "The Mine Health and Safety Act, (Act 29 0f 1996) as amended by the Mine Health and Safety Amendment Act (Act 72 of 1997). The following arrangements and procedures will apply: (i) The Contractor shall himself obtain the Mining Authorisation for the sites. (ii) Contractor shall assume responsibility for the Environmental Management Programmes (EMP) in respect of the sites and shall ensure that the sites are rehabilitated at the conclusion of the Contract. (iii) The Contractor shall comply with the provisions of the Act and the requirements of the Director: Mineral Development of the Department of Minerals and Energy in making the necessary financial provisions to mine optimally and safety and to rehabilitate the surface of the land concerned satisfactory and to carry out the EMP. All costs incurred in providing a guarantee or other financial provision shall be borne by the Contract. (iv) This Agreement shall hold good from the date on which the Mining Authorisation is issued until the date on which a Closure Certificate is issued in terms of the Minerals Act, 1991. (v) Nothing in this Agreement shall exonerate the Contractor from compliance with any requirements of the Employer's Agent regarding the rehabilitation of sites prior to the issue of a Final Approval Certificate in terms of clause 5.16.2 of the General Conditions of Contract (2010). (vi) The Contractor shall undertake all the duties and accept all the responsibilities of the owner in compliance with the requirements of the Act as amended. (vii) The Contractor accepts responsibility for compliance with the Act, as amended, by all his sub-contractors whether or not selected and/or approved by the Employer.

Clause	Description
5.3.1	The documentation required before commencement with Works execution are: • Health and Safety Plan (refer to clause 4.3.1) • Initial programme (Refer to clause 5.6.1) • Security (Refer to clause 6.2.1) • Insurance (Refer to Clause 8.6.1)
5.3.2	The time to submit the documentation required, before commencement with Works execution is **14 calendar days.**
5.4.2	The access and possession of site shall **not** be exclusive to the Contractor.
5.8.1	The non-working days are public holidays and Sundays. The special non-working days are: The year-end break from **15-Dec-2023 to 08-Jan-2024 or as per SAFCEC TBA**
5.13.1	The penalty for failing to complete the Works is: is **0.05 %** of the Total Tender Sum per Calendar Day
5.14.1	Practical completion is reached when: The complete scope of works is tested and commissioned.
5.16.3	The latent defect period is **10 years** after date of completion
6.5.1.2.3	The percentage allowances to cover all charges for the Contractor's and subcontractor's profits, timekeeping, clerical work, insurance, establishment, superintendence and the use of hand tools is **15%**.
6.8.2	This contract does **not** include for contract price adjustment
6.8.3	Price adjustments for variations in the costs of special materials are **not** allowed.
6.10.1.5	The percentage advance on materials not yet built into the Permanent Works is **80%**
6.10.3	The limit of retention money is **10%**
8.6.1.1.2	Not required.
8.6.1.1.3	The amount to cover professional fees for repairing damage and loss to be included in the insurance sum will be calculated at **12%** of the claim value.
8.6.1.2	A coupon policy for Special Risks Insurance issued by the South African Special Risks Insurances Association is required.
8.6.1.3	The limit of indemnity for liability insurance is R 1 000 000.00 for any single liability claim
10.5.2	Dispute resolution shall be **ad-hoc** adjudication.
10.5.3	The number of Adjudication Board Members to be appointed is **one**.

Clause	Description
10.7.1	The determination of disputes shall be by **arbitration.**
Special Clause	The Contractor's CIDB grading must remain active at the same of higher level as at time of appointment, should the grading be suspended, downgraded and or expire the Contractor will only be allowed 21 days to remedy such and failure could result in termination of the Contract.

PART 2: DATA PROVIDED BY THE CONTRACTOR

The Contractor is advised to read the *General Conditions of Contract for Construction Works, Third Edition (2015)* published by the South African Institution of Civil Engineering, to understand the implications of this Data which is required to be completed.

Each item of data given below is cross-referenced to the clause of Conditions of Contract to which it mainly applies.

<table>
<tr><th>Clause</th><th>Description</th></tr>
<tr><td>1.1.1.9

1.2.1.2</td><td>The Contractor is ……..
……..
The Contractor's address for receipt of communications is:
Physical address: Postal address:
…….. …….
…….. …….
…….. ……
…….. …….
Telephone : ……..
Fax: ……..
E-mail: ……..</td></tr>
<tr><td>1.1.1.14</td><td>The time for achieving Practical Completion of the whole of the Works
is …… weeks after Commencement Date (site handover).</td></tr>
<tr><td>6.2.1</td><td>The security to be provided by the Contractor shall be one of the following
<table>
<tr><th>Type of Security</th><th>Contractor to choose: Indicate “ Yes” or “ No”</th></tr>
<tr><td>Cash deposit of 10% of the contract sum</td><td></td></tr>
<tr><td>Performance guarantee of 10% of the contract sum</td><td></td></tr>
</table></td></tr>
</table>

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

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FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

C1.5 FORM OF GUARANTEE

PRO FORMA

PERFORMANCE GUARANTEE

GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means: .....

Physical address: .....

"Employer" means: .....

"Contractor" means: .....

"Employer's Agent" means: .....

"Works" means: .....

"Site" means: .....

"Contract" means: The Agreement made in terms of the Form of Offer and Acceptance and such amendments or additions to the Contract as may be agreed in writing between the parties.

"Contract Sum" means: The accepted amount inclusive of tax of R .....

Amount in words: .....

"Guaranteed Sum" means: The maximum aggregate amount of R .....

Amount in words.....

"Expiry Date" means.....

CONTRACT DETAILS

Employer's Agent issues: Interim Payment Certificates, Final Payment Certificate and the Certificate Completion of the Works as defined in the Contract.

PERFORMANCE GUARANTEE

1. The Guarantor's liability shall be limited to the amount of the Guaranteed Sum.

2. The Guarantor's period of liability shall be from and including the date of issue of this Performance Guarantee and up to and including the Expiry Date or the date of issue by the Employer's Agent of the Certificate of Completion of the Works or the date of payment in full of the Guaranteed Sum, whichever occurs first. The Employer's Agent and/or the Employer shall advise the Guarantor in writing of the date on which the Certificate of Completion of the Works has been issued.

3. The Guarantor hereby acknowledges that:

   3.1 any reference in this Performance Guarantee to the Contract is made for the purpose of convenience and shall not be construed as any intention whatsoever to create an accessory obligation or any intention whatsoever to create a suretyship;

   3.2 its obligation under this Performance Guarantee is restricted to the payment of money.

4. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor hereby undertakes to pay the Employer the sum certified upon receipt of the documents identified in 4.1 to 4.3:

   4.1 A copy of a first written demand issued by the Employer to the Contractor stating that payment of a sum certified by the Employer's Agent in an Interim or Final Payment Certificate has not been made in terms of the Contract and failing such payment within seven (7) calendar days, the Employer intends to call upon the Guarantor to make payment in terms of 4.2;

   4.2 A first written demand issued by the Employer to the Guarantor at the Guarantor's physical address with a copy to the Contractor stating that a period of seven (7) days has elapsed since the first written demand in terms of 4.1 and the sum certified has still not been paid;

   4.3 A copy of the aforesaid payment certificate which entitles the Employer to receive payment in terms of the Contract of the sum certified in 4.

5. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor undertakes to pay to the Employer the Guaranteed Sum or the full outstanding balance upon receipt of a first written demand from the Employer to the Guarantor at the Guarantor's physical address calling up this Performance Guarantee, such demand stating that:

   5.1 the Contract has been terminated due to the Contractor's default and that this Performance Guarantee is called up in terms of 5; or

   5.2 a provisional or final sequestration or liquidation court order has been granted against the Contractor and that the Performance Guarantee is called up in terms of 5; and

   5.3 the aforesaid written demand is accompanied by a copy of the notice of termination and/or the provisional/final sequestration and/or the provisional liquidation court order.

6. It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 4 and 5 shall not exceed the Guarantor's maximum liability in terms of 1.

7. Where the Guarantor has made payment in terms of 5, the Employer shall upon the date of issue of the Final Payment Certificate submit an expense account to the Guarantor showing how all monies received in terms of this Performance Guarantee have been expended and shall refund to the Guarantor any resulting surplus. All monies refunded to the Guarantor in terms of this Performance Guarantee shall bear interest at the prime overdraft rate of the Employer's bank compounded monthly and calculated from the date payment was made by the Guarantor to the Employer until the date of refund.

8. Payment by the Guarantor in terms of 4 or 5 shall be made within seven (7) calendar days upon receipt of the first written demand to the Guarantor.

9. Payment by the Guarantor in terms of 5 will only be made against the return of the original Performance Guarantee by the Employer.

10. The Employer shall have the absolute right to arrange his affairs with the Contractor in any manner which the Employer may deem fit and the Guarantor shall not have the right to claim his release from this Performance Guarantee on account of any conduct alleged to be prejudicial to the Guarantor.

11. The Guarantor chooses the physical address as stated above for the service of all notices for all purposes in connection herewith.

12. This Performance Guarantee is neither negotiable nor transferable and shall expire in terms of 2, where after no claims will be considered by the Guarantor. The original of this Guarantee shall be returned to the Guarantor after it has expired.

13. This Performance Guarantee, with the required demand notices in terms of 4 or 5, shall be regarded as a liquid document for the purposes of obtaining a court order.

14. Where this Performance Guarantee is issued in the Republic of South Africa the Guarantor hereby consents in terms of Section 45 of the Magistrate's Courts Act No 32 of 1944, as amended, to the jurisdiction of the Magistrate's Court of any district having jurisdiction in terms of Section 28 of the said Act, notwithstanding that the amount of the claim may exceed the jurisdiction of the Magistrate's Court.

Signed .....

Date

Guarantor's signatory (1) .....

Capacity .....

Guarantor's signatory (2) .....

Capacity .....

Witness signatory (1) .....

Witness signatory (2) .....

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

CONTRACT NO: COM91/2023

FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL

C1.6 AGREEMENT IN TERMS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT, 1993 (ACT NO 85 OF 1993)

AGREEMENT IN TERMS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT, 1993 (ACT NO 85 OF 1993)

THIS AGREEMENT made at .....

on this the ..... day of ..... in the year ……

between **CITY OF MBOMBELA** (hereinafter called "the Employer") of the one part, herein represented by

in his capacity as .....

and .....

(hereinafter called "the Mandatory") of the other part, herein represented by .....

.....

in his capacity as .....

WHEREAS the Employer is desirous that certain works be constructed, viz **REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)** and has accepted a Tender by the Mandatory for the construction, completion and maintenance of such Works and whereas the Employer and the Mandatory have agreed to certain arrangements and procedures to be followed in order to ensure compliance by the Mandatory with the provisions of the Occupational Health and Safety Act, 1993 (Act 85 of 1993);

NOW THEREFORE THIS AGREEMENT WITNESSETH AS FOLLOWS:

1 The Mandatory shall execute the work in accordance with the Contract Documents pertaining to this Contract.

2 This Agreement shall hold good from its Commencement Date, which shall be the date of a written notice from the Employer or Employer's Agent requiring him to commence the execution of the Works, to either

(a) the date of the Final Approval Certificate issued in terms of Clause 52.1 of the General Conditions of Contract (hereinafter referred to as "the GCC"),

(b) the date of termination of the Contract in terms of Clauses 54, 55 or 56 of the GCC.

3 The Mandatory declares himself to be conversant with the following:

(a) All the requirements, regulations and standards of the Occupational Health and Safety Act (Act 85 of 1993), hereinafter referred to as "The Act", together with its amendments and with special reference to the following Sections of The Act:

(i) Section 8 : General duties of employers to their employees;

(ii) Section 9 : General duties of employers and self-employed persons to persons other than employees;

(iii) Section 37 : Acts or omissions by employees or Mandatory, and

(iv) Subsection 37(2) relating to the purpose and meaning of this Agreement.

(b) The procedures and safety rules of the Employer as pertaining to the Mandatory and to all his subcontractors.

4 In addition to the requirements of Clause 33 of the GCC and all relevant requirements of the above-mentioned Volume 3, the Mandatory agrees to execute all the Works forming part of this Contract and to operate and utilise all machinery, plant and equipment in accordance with the Act.

5 The Mandatory is responsible for the compliance with the Act by all his subcontractors, whether or not selected and/or approved by the Employer.

6 The Mandatory warrants that all his and his subcontractors' workmen are covered in terms of the Compensation for Occupational Injuries and Diseases Act, 1993, which cover, shall remain in force whilst any such workmen are present on site. A letter of good standing from the Compensation Commissioner to this effect must be produced to the Employer upon signature of the agreement.

7 The Mandatory undertakes to ensure that he and/or subcontractors and/or their respective employers will at all times comply with the following conditions:

(a) The Mandatory shall assume the responsibility in terms of Section 16.1 of the Occupational Health and Safety Act. The Mandatory shall not delegate any duty in terms of Section 16.2 of this Act without the prior written approval of the Employer. If the Mandatory obtains such approval and delegates any duty in terms of section 16.2 a copy of such written delegation shall immediately be forwarded to the Employer.

(b) All incidents referred to in the Occupational Health and Safety Act shall be reported by the Mandatory to the Department of Labour as well as to the Employer. The Employer will further be provided with copies of all written documentation relating to any incident.

(c) The Employer hereby obtains an interest in the issue of any formal inquiry conducted in terms of section 32 of the Occupational Health and Safety Act into any incident involving the Mandatory and/or his employees and/or his subcontractors.

In witness thereof the parties hereto have set their signatures hereon in the presence of the subscribing witnesses:

SIGNED FOR AND ON BEHALF OF THE EMPLOYER: _____

WITNESS 1 _____ 2

NAME 1 _____ 2

(IN CAPITALS)

SIGNED FOR AND ON BEHALF OF THE MANDATORY: _____

WITNESS 1 _____ 2

NAME 1 _____ 2

(IN CAPITALS)

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

CONTRACT NO: COM91/2023

FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

C1.7 CERTIFICATE OF AUTHORITY FOR SIGNATORY TO AGREEMENT IN TERMS OF OCCUPATIONAL HEALTH AND SAFETY ACT, 1993 (ACT NO 85 OF 1993)

CERTIFICATE OF AUTHORITY FOR SIGNATORY TO AGREEMENT IN TERMS OF OCCUPATIONAL HEALTH AND SAFETY ACT, 1993 (ACT NO 85 OF 1993)

The signatory for the company that is the Contractor in terms of the above-mentioned Contract and the Mandatory in terms of the above-mentioned Act shall confirm his or her authority thereto by attaching to this page a duly signed and dated copy of the relevant resolution of the Board of Directors.

An example is given below:

"By resolution of the Board of Directors passed at a meeting held on _____ 20 _____ ,

Mr/Ms _____ whose signature appears below, has been duly authorised to sign the AGREEMENT in terms of THE OCCUPATIONAL HEALTH AND SAFETY ACT, 1993 (ACT 85 of 1993) on behalf of

_____

SIGNED ON BEHALF OF THE COMPANY :

IN HIS/HER CAPACITY AS :

DATE :

SIGNATURE OF SIGNATORY :

WITNESS: 1. _____ 2. _____

NAME (in capitals): 1. _____ 2. _____

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

CONTRACT NO: COM91/2023

FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

PART C2 PRICING DATA

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

CONTRACT NO: COM91/2023

FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

C2.1 PRICING INSTRUCTIONS

C2.1: PRICING INSTRUCTIONS

1 The Tender Data, the Contract Data, the Scope of Work, the Site Information and the Drawings shall be read in conjunction with the Schedule of Quantities.

2 The Schedule comprises items covering the Contractor's profit and costs of general liabilities and of the construction of Temporary and Permanent Works.

Although the Tenderer is at liberty to insert a rate of his own choosing for each item in the Schedule, he should note the fact that the Contractor is entitled, under various circumstances, to payment for additional work carried out and that the Employer's Agent is obliged to base his assessment of the rates to be paid for such additional work on the rates the Contractor inserted in the Schedule.

The measurement and payment clauses of each Specification, read together with the relevant clauses of the Specification Data, all set out which ancillary or associated activities are included in the rates for the specified operations.

3 Descriptions in the Schedule of Quantities are abbreviated and may differ from those in the Standardized and Specification Data. No consideration will be given to any claim by the Contractor submitted on such a basis. The Schedule has been drawn up generally in accordance with the latest issue of Civil Engineering Quantities[1]. Should any requirement of the measurement and payment clause of the appropriate Standardized or Specification Data be contrary to the terms of the Schedule or, when relevant, to the Civil Engineering Quantities, the requirement of the appropriate Standardized Specification or Specification Data as the case may be, shall prevail.

4 Unless stated to the contrary, items are measured and paid for net, in accordance with the Drawings, without any allowance having been made for waste.

5 The amounts and rates to be inserted in the Schedule of Quantities shall be the full inclusive amounts to the Employer for the work described under the several items. Such amounts shall cover all the costs and expenses that may be required in and for the construction of the work described, and shall cover the costs of all general risks, profits, taxes (but excluding value-added tax), liabilities and obligations set forth or implied in the documents on which the Tender is based.

6 An amount or rate shall be entered against each item in the Schedule of Quantities, whether or not quantities are stated. An item against which no amount or rate is entered will be considered to be covered by the other amounts or rates in the Schedule.

The Tenderer shall also fill in a rate against the items where the words "rate only" appears in the amount column. Although no work is foreseen under these items and no quantities are consequently given in the quantity column, the tender rates shall apply should work under these items actually be required.

Should the Tenderer group a number of items together and tender one sum for such group of items, the single tender sum shall apply to that group of items pro rata and not to each individual item, or should he indicate against any item that full compensation for such item has been included in another item, the rate for the item included in another item shall be deemed to be nil.

The tender rates, prices and sums shall, subject only to the provisions of the General Conditions of Contract, remain valid irrespective of any change in the quantities during the execution of the Contract.

1 The standard system of measurement of civil engineering quantities published by the South African Institution of Civil Engineers.

7 The quantities of work as measured and accepted and certified for payment in accordance with the General Conditions of Contract, and not the quantities stated in the Schedule of Quantities, will be used to determine payments to the Contractor. The validity of the Contract shall in no way be affected by **any** differences between the quantities in the Schedule of Quantities and the quantities certified for payment.

The ordering of materials shall **not** be based on the quantities in the Schedule of Quantities. Materials ordered from the Schedule of Quantities without prior confirmation by the Employer's Agent shall be at the risk of the Contractor. No compensation shall be paid for materials ordered erroneously and all costs shall be borne by the Contractor.

8 For the purposes of this Schedule of Quantities, the following words shall have the meanings hereby assigned to them:

Unit	:	The unit of measurement for each item of work as defined in the COLTO Standardized Specification for Road and Bridge Works for State Authorities (1998 edition) or the Specification Data.
Quantity	:	The number of units of work for each item
Rate	:	The payment per unit of work at which the Tenderer tenders to do the work
Amount	:	The quantity of an item multiplied by the tender rate of the (same) item
Sum	:	An amount tender for an item, the extent of which is described in the Schedule of Quantities, the Specifications or elsewhere, but of which the quantity of work is not measured in units

9 The units of measurement indicated in the Schedule of Quantities are metric units. The following abbreviations may appear in the Schedule of Quantities:

mm	=	millimetre
m	=	meter
km	=	kilometre
km-pass	=	kilometre-pass
m^2	=	square metre
m^2-pass	=	square meter-pass
ha	=	hectare
m^3	=	cubic meter
m^3-km	=	cubic meter kilometre
kW	=	kilowatt
kN	=	kilo-Newton
kg	=	kilogram
l	=	litre
kl	=	kilolitre
Ml	=	mega litre
t	=	ton (1 000 kg)
%	=	per cent
MN	=	mega-Newton
MN-m	=	mega-Newton-meter
PC Sum	=	Prime Cost Sum
Prov Sum	=	Provisional Sum
Sum	=	Lump Sum

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

CONTRACT NO: COM91/2023

FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

C2.2 SCHEDULE OF QUANTITIES

C2.2: BILL of QUANTITIES

REFURBISHMENT OF SADDLEBACK TUNNEL PIPEWORK
CITY OF MBOMBELA

SCHEDULE 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
		SCHEDULE 1: PRELIMINARY AND GENERAL					
A.1	8.3	**FIXED-CHARGE ITEMS**					
A.1.1	8.3.1	Contractual Requirements	Sum	1			
	8.3.2	Establish Facilities on the Site :					
		Facilities for Engineer (SANS 1200 AB)					
A.1.2	8.4.2.1	Contract nameboard (One only) (Refer to PS AB 5.1)	Sum	1			
	8.3.2.2	Facilities for Contractor					
A.1.3		a) Offices and storage sheds	Sum	1			
A.1.4		b) Workshops	Sum	1			
A.1.5		d) Living accommodation	Sum	1			
A.1.6		e) Ablution and latrine facilities	Sum	1			
A.1.7		f) Tools and equipment	Sum	1			
A.1.8		g) Water supplies, electric power and communications	Sum	1			
A.1.9		h) Dealing with water (Subclause A- 5.5)	Sum	1			
A.1.10		i) Access (Subclause A-5.8)	Sum	1			
	8.3.3	Other fixed-charge obligations					
A.1.11		i) Provision for OH&S requirements as specified, such as, but not limited to: Safety officer payment, safety training, HIV awareness, etc.	Sum	1			
A.1.12		ii) Provision for Environmental Management Plan requirements	Sum	1			
A.1.13	8.3.4	Remove Engineer's and Contractor's Site establishment on completion	Sum	1			
Total Carried Forward							

REFURBISHMENT OF SADDLEBACK TUNNEL PIPEWORK

CITY OF MBOMBELA

SCHEDULE 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward							
A.2	8.4	**TIME-RELATED ITEMS**					
A.2.1	8.4.1	Contractual Requirements	Sum	1			
	8.4.2	Operate and maintain facilities on site:					
	8.4.2.1	Facilities for Engineer					
A.2.2	8.4.2.1	Name board (Only one)	Sum	1			
	8.4.2.2	Facilities for Contractor for duration of construction.					
A.2.3		a) Offices and storage sheds	Sum	1			
A.2.4		b) Workshops	Sum	1			
A.2.5		d) Living accommodation	Sum	1			
A.2.6		e) Ablution and latrine facilities	Sum	1			
A.2.7		f) Tools and equipment	Sum	1			
A.2.8		g) Water supplies, electric power and communications	Sum	1			
A.2.9		h) Dealing with water (Subclause 5.5)	Sum	1			
A.2.10		i) Access (Subclause 5.8)	Sum	1			
	8.4.5	Other time-related obligations					
A.2.11		i) Provision for OH&S requirements as specified, such as, but not limited to: Safety officer payment, safety training, HIV awareness, etc.	Sum	1			
A.2.12		ii) Provision for Environmental Management Plan requirements	Sum	1			
Total Carried Forward							

REFURBISHMENT OF SADDLEBACK TUNNEL PIPEWORK

CITY OF MBOMBELA

SCHEDULE 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward							
A.3	PS A 8.5	**SUMS STATED PROVISIONALLY BY ENGINEER**					
A.3.1		1) Community Liason Officer monthly remuneration	Prov Sum	1	42,000.00	42,000	00
A.3.5		2) Occupational Health and Safety Requirements	Prov Sum	1	150,000.00	150,000	00
A.3.6		3) Environmental Management Requirements Consultant	Prov Sum	1	150,000.00	150,000	00
A.3.8		4) Social Facilitator	Prov Sum	1	210,000.00	210,000	00
A.3.9		5) Quality Control in Accordance with DWS 2020	Prov Sum	1	350,000.00	350,000	00
A.3.10		6) Lomati Dam Level Measure Equipment	Prov Sum	1	250,000.00	250,000	00
A.3.11		7) Overheads, charges and profit on item 1 to 6	%	1,152,000			
A.4	PS A 8.7	**DAYWORKS**					
		a) Labour					
A.4.1		i) Un-skilled	hr	20			
A.4.2		ii) Semi-skilled	hr	20			
A.4.3		iii) Skilled	hr	20			
A.4.4		iv) Foreman	hr	30			
		b) Plant					
A.4.5		i) 5 ton tipper truck with operator	hr	15			
A.4.6		ii) 0.5 m³ excavator with operator	hr	15			
A.4.7		iii) 5000ℓ water truck with operator	hr	15			
A.4.8		iv) Bomag (BW 90) compactor with operator	hr	15			
Total Carried Forward To Summary							

REFURBISHMENT OF SADDLEBACK TUNNEL PIPEWORK

CITY OF MBOMBELA

SCHEDULE 2: LOMATI DAM STAINLESS STEEL PIPE WORK

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
2	**PS L 3.7.3**	**SCHEDULE 2: STAINLESS STEEL PIPE WORK**					
	PS L 3.7.3.2	**Manufacture, Supply and Install 304 Stainless Steel pipe work complete, refer to drawings**					
2.1		1) Pipe Item 1	No.	1			
2.2		2) Pipe Item 2	No.	1			
2.3		3) Pipe Item 3	No.	1			
2.4		4) Pipe Item 4	No.	1			
2.5		5) Pipe Item 5	No.	1			
2.6		6) Pipe Item 6	No.	1			
2.7		7) Pipe Item 7	No.	4			
		TESTING OF WELDS NON-DESTRUCTIVE					
2.8		8) 100% DYE Penetrating Testing to be done on all welding Joints.	Sum	1			
2.9		9) X- Ray of all welding joints.	Sum	1			
	PS L 3.8.3	**FASTENERS**					
2.10		10) Supply all gaskets for joining up to adjacent flanges. (KLINGERSEAL C-4300, 3mm THK	Sum	1			
2.11		11) Supply all insulation kits for flanges, bolts and nuts. (Top Hat)	Sum	1			
2.12		12) Supply all 304 Stainless Steel bolt units, consisting of a standard length bolt, nut and two washers per bolt.	Sum	1			
2.13		13) Supply all 304 Stainless Steel Stud-bolts, consisting of a bolt, 2 x Heavy Nuts and 2 x washers per bolt.	Sum	1			
2.14		14) Installation, commissioning, acceptance of all material under item as above (10-13)	Sum	1			
2.15		15) Supply and install materials and equipment for pipe work installation not included in items (10-13), to provide a fully working installation. Specify:	Sum	1			
Total Carried Forward							

REFURBISHMENT OF SADDLEBACK TUNNEL PIPEWORK

CITY OF MBOMBELA

SCHEDULE 2: LOMATI DAM STAINLESS STEEL PIPE WORK

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward							
	PS L 3.10	**VALVES**					
2.16		16) Supply FOUR (4) Ø 500 NB Stainless Steel Insamcor wafer type valves PN 10 F/F 127mm	No.	4			
2.17		17) Supply extended spindles as per valve specifications 1,200 mm additional	No.	4			
2.18		18) Supply 304 Stainless Steel Penstock for Insamcor valves complete	No.	4			
2.19		19) Installation, commissioning, acceptance of all material under item as above (16-17)	Sum	1			
		FLOW / LEVEL CONTROL VALVE					
		Supply One (1) Ø 500 NB Level and Flow Control Valve					
2.20		20) Bermad 757-666-U (Order WW-20"-757-66- - Y- N -16 - UC - - NN - T)	No.	1			
2.21		21) Supply 4 Way Bi-Level Vertical Float Model 66, inclusive of all covers and brackets	No.	1			
2.22		22) Installation, commissioning, acceptance of all material under item as above (20-21)	Sum	1			
	PS L 4.1	**REMOVAL OF EQUIPMENT**					
2.23		23) Dismantle and remove top structure over existing walkways 5 meter x 2.5 meter. Mentis Grating open -floor. Material to be re-installed after new pipe work was installed.	Sum	1			
2.24		24) Removal of old existing pipework and valves and deliver to Municipal Stock Yard	Sum	1			
2.25		25) Clean area and prepare for new equipment installation.	Sum	1			
2.26		26) Provide Carting System that will run on existing railway tracks with Winch to transport equipment in and out of Tunnel. (Tunnel is 100 meters long with an gradient of 45 degrees.)	Sum	1			
2.27		27) Provide working lights with backup generator power.	Sum	1			
2.28		28) Provide de-watering pump with backup power for duration of works in tunnel.	Sum	1			
2.29		29) Provision for Diving Services require to isolate inlet valves in Lomati Dam that is providing the pipeline with water. (Isolation valves is underwater) Valves to be re-opened after new pipework was installed. Allowance for 3 x 500 mm pipe plugs to be inserted and be removed on completion of work. Divers will be required for 2 x days inclusive of all gear required.	Prov Sum	1	80,000.00	80,000	00
Total Carried Forward							

REFURBISHMENT OF SADDLEBACK TUNNEL PIPEWORK

CITY OF MBOMBELA

SCHEDULE 2: LOMATI DAM STAINLESS STEEL PIPE WORK

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward							
		PROVISION OF TEMPORARY WATER					
2.30		30) Supply and Maintain Diesel Driven Water Pump inclusive of fuel for supply of temporary water during work execution. (Capacity 12l/s @ 22-meter head.)	Sum	1			
2.31		31) Supply and Maintain 100 mm layflat hose for duration of project	m	300			
		OUTLET PIPEWORK					
2.32		32) Supply and install electrical Actuated valve for Linear Open / Closed of valve. Model Demca PSL202 (230 V) inclusive of mountig bracket.	No.	1			
2.33		33) Allow cost for setup and commisioning of item 32	No.	1			
Total Carried Forward To Summary							

REFURBISHMENT OF SADDLEBACK TUNNEL PIPEWORK

CITY OF MBOMBELA

SCHEDULE 3: RIMERS CREEK PIPE LINE PIPE TRENCHES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
3	**SANS 1200 DB**	**SCHEDULE 3: EARTH WORKS (PIPE TRENCHES)**					
	C 8.3.1	**SITE CLEARANCE**					
3.1	8.2.1	Clear and grub site along pipeline route and dispose off at dump site 6 km from works site	ha	1			
	D & DB 8.3.2	**EXCAVATION**					
	PS DB 8.3.2	a)1)Hand excavate in soft material for trenches as per drawing:					
		1) 1 x 350 mm for depths:					
3.2		Over 0,0 m up to 1,0 m	m	850			
	8.3.3	**EXCAVATION ANCILLARIES**					
	PS DB 8.3.3.1	Make up deficiency in backfill material (provisional)					
3.3		a) From other necessary excavations on site	m³	100			
3.4		b) By importation from designated borrow pits	m³	668			
	8.3.6	**FINISHING**					
3.5	PS DB 8.3.6.2	Reinstate mountain surface according to the Environmental Management Plan and clear painted AV chambers	Sum	1			
Total Carried Forward To Summary							

REFURBISHMENT OF SADDLEBACK TUNNEL PIPEWORK

CITY OF MBOMBELA

SCHEDULE 4 : MEDIUM-PRESURE PIPELINES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
4.1	**SABS 1200 L**	**SCHEDULE 4 : MEDIUM-PRESURE PIPELINES**					
		PIPELAYING					
	8.2.1	Supply, handle, lay and bed pipes complete with couplings, pressure-test and disinfect					
	8.2.1.1	uPVC Class 12 pipes					
4.2		a) 350 mm dia.	m	850			
		SPECIALS					
	8.2.2	Extra-over 8.2.1 for the supplying, laying, and bedding of specials complete with couplings and disinfect					
		Special fittings for 350 mm dia. uPVC Class 12 pipes.					
		i) 11,25 deg bends					
4.3		a) 350 mm dia.	No	35			
		ii) 22,5 deg bends					
4.4		a) 350 mm dia.	No	18			
		iii) 0 to 45 deg adjustable bends					
4.5		a) 350 mm dia.	No	10			
		iv) 90 deg bends					
4.6		a) 350 mm dia.	No	4			
		v) Reducing T-piece					
4.7		a) 350 mm x 100 mm	No	36			
		vi) End caps					
4.8		a) 350 mm dia.	No	2			
Total Carried Forward							

REFURBISHMENT OF SADDLEBACK TUNNEL PIPEWORK

CITY OF MBOMBELA

SCHEDULE 4 : MEDIUM-PRESURE PIPELINES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward							
		vii) Flange adaptor (Table 2500/3)					
4.9		a) 100 mm dia.	No	36			
4.10		b) 350 mm dia	No	11			
		viii) 45 deg T-piece					
4.11		a) 350 mm dia.	No	2			
		ix) Reducers for uPVC pipes					
4.12		a) 450 mm x 350 mm	No	2			
4.13		b) 350 mm x 200 mm	No	2			
4.14		c) 150 mm x 50 mm	No	2			
4.15		d) 100 mm x 50 mm	No	2			
		CONTROL VALVES					
	8.2.3	Extra-over 8.2.1 for the supplying, fixing and bedding of valves					
		Combination air valve (25 Bar) and vacuum release valve assembly (valve chamber and tee measured elsewhere) as per drawing for					
4.16		a) 50ND RBX type air valve assembly to fit on 100 mm dia air valve tee (measured elsewhere) including stainless steel ball valve, distance piece, galvanized nuts and gasket complete as per drawing	No	8			
4.17		b) 25ND RBX type air valve assembly to fit on 100 mm dia air valve tee (measured elsewhere) including stainless steel ball valve, distance piece, galvanized nuts and gasket complete as per drawing	No	28			
	8.2.3	Extra-over 8.2.1 for the supplying and installation of butterfly valves (25 Bar)with stainless steel disc and gearbox					
		a) On newly installed "Klambon" steel pipe					
4.18		i) 350 mm valve	No	4			
	8.2.3	Extra-over 8.2.1 for the supplying and installation of Pressure Control Valves (25 Bar)					
4.19		a) 200 mm Bermad 720 P/D/V Valve	No	6			
4.20		b) 200 mm Bermad 720 BX/66/V Valve	No	6			
	8.2.3	Extra-over 8.2.1 for the supplying and installation of fittings (25 Bar):					
4.21		a) 200 mm (Cast Iron) Y-type stainer	No	6			
Total Carried Forward							

REURBISHMENT OF SADDLEBACK TUNNEL PIPEWORK

CITY OF MBOMBELA

SCHEDULE 4 : MEDIUM-PRESURE PIPELINES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward							
4.22		b) 200 mm sharp edge 304 stainless steel orifice plate (6 mm thick) with 2 measuring points (one upstream of orifice and one downstream)	No	4			
		CONCRETE WORK					
	8.2.11	Anchor/thrust blocks and Pedestals					
4.23		b)(1) Concrete (20/19 MPa)	m³	62			
4.24		b)(2) Formwork	m²	95			
4.25		b)(3) Reinforcement	kg	680			
	8.2.13	Valve chambers (air, pressure control and RSV valves)					
4.26		a) 1200 mm x 1500 mm chamber for combined set of air valves as per drawing inclusive of all concrete work (30/19 concrete), steel reinforcement, drilling/casting of vent hole and lockable vandal proof cover and frame complete (excluding pipe fittings measured elsewhere)	No	18			
4.27		b) 1200 mm x 2400 mm chamber for combined set of pressure control valves and orifice as per drawing inclusive of all concrete work (30/19 concrete), steel reinforcement, drilling/casting of vent hole and lockable vandal proof cover and frame complete (excluding pipe fittings measured elsewhere)	No	1			
4.28		c) Provisional sum for tunnel outlet chamber	Prov Sum	1	35,000.00	35,000	00
4.29		d) Provisional sum for water treatment work inlet chamber	Prov Sum	1	75,000.00	75,000	00
		CONCRETE WORK					
	8.2.11	Anchor/thrust blocks and Pedestals					
4.30		b)(1) Concrete (20/19 MPa)	m³	40			
4.31	8.2.13	(a) New valve chambers for PRV and FCV combination	No	2			
4.32		(b) PC Sum for Control Valve Specialist	P C Sum	1	65,000.00	65,000	00
Total Carried Forward To Summary							

REFURBISHMENT OF SADDLEBACK TUNNEL PIPEWORK

CITY OF MBOMBELA

SCHEDULE 5 : BEDDING (PIPES)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
5.1	**SABS 1200 LB**	**SCHEDULE 5 : BEDDING**					
	8.2.1	Provision of bedding from trench excavation					
5.2		a) Selected granular material sieved from trench (< 13,2 mm) for bedding cradle	m³	260			
5.3		b) Selected fill material from trench excavation for fill blanket (< 75 mm)	m³	520			
	8.2.2	Supply only of bedding by importation					
	8.2.2.2	b) Borrow pits (Provisional)					
5.4		a) Selected granular material for bedding cradle	m³	80			
5.5		b) Selected fill material for blanket	m³	100			
5.6	8.2.3	Concrete bedding cradle (15/19 MPa)	m³	12			
Total Carried Forward To Summary							

REURBISHMENT OF SADDLEBACK TUNNEL PIPEWORK

CITY OF MBOMBELA

SCHEDULE 6: DISINFECTION SYSTEM

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
6		**SCHEDULE 6: DISINFECTION SYSTEM**					
6.1		Supply ONE wall-mounted chlorinator and TWO injectors on the feeds to the manifolds in the flocculation channels and ONE injector on the feed to the manifold in the clear-water tank	Sum	1			
6.2		Supply TWO booster pumps complete with motors	Sum	1			
6.3		Supply all piping, sparge manifold and valves as specified	Sum	1			
6.4		Supply wind direction indicator as specified	Sum	1			
6.5		Supply all miscellaneous equipment as specified	Sum	1			
6.6		Supply complete chlorine gas leakage detection system, as specified	Sum	1			
6.7		Supply safety and warning signs as specified	Sum	1			
6.8		Installation, commissioning, acceptance and maintenance obligations of all plant and equipment under items 6.1 to 6.7	Sum	1			
6.9		Supply THREE sets of operation and maintenance manuals	Sum	1			
6.10		Allow for the cost of returning to site, if required and if ordered, in order to carry out tests on the plant - EXCLUDING VISITS required for successful commissioning of the plant	Sum	1			
Total Carried Forward To Summary							

REFURBISHMENT OF SADDLEBACK TUNNEL PIPEWORK

CITY OF MBOMBELA

SCHEDULE 7: RIMERS CREEK WATER TREATMENT PLANT

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
		SCHEDULE 7: RIMERS CREEK WATER TREATMENT PLANT					
7		**SUMS STATED PROVISIONALY**					
7.1		1) Supply and install new blower unit for WTW inclusive of switchgear.	Prov Sum	1	480,000.00	480,000	00
7.2		2) Refurbish existing gravity sand filtration system, work to be done by approved Specialist Service Provider.	Prov Sum	1	2,100,000.00	2,100,000	00
7.3		3) Replace all valves for filter system	Prov Sum	1	350,000.00	350,000	00
7.4		4) Overheads, charges and profit on item 1 to 3	%	2,930,000			
Total Carried Forward To Summary							

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

CONTRACT NO: COM91/2023

FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

SUMMARY OF SCHEDULE OF QUANTITIES

SECTION	DESCRIPTION	PAGE	AMOUNT
1	Preliminary & General	C2.2-4	
2	Lomati Dam Stainless Steel Pipe Work	C2.2-7	
3	Rimers Creek Pipe Line Pipe Trenches	C2.2-8	
4	Rimers Creek Pipeline Medium Pressure Pipe Lines	C2.2-11	
5	Rimers Creek Pipe Line Bedding (Pipe Lines)	C2.2-12	
6	Disenfection System	C2.2-13	
7	Rimers Creek Water Treatment Plant	C2.2-14	
1	**SUB-TOTAL**		
	Allowance for Contingencies (10% of 1)		
2	**TOTAL AMOUNT OF TENDER**		
	PLUS 15% VAT of 2		
TOTAL AMOUNT CARRIED TO FORM OF OFFER			

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

CONTRACT NO: COM91/2023

FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

PART C3 SCOPE OF WORKS

PART C3: SCOPE of WORK

CONTENTS

C3.1: DESCRIPTION of WORKS

C3.1.1 EMPLOYER'S OBJECTIVES

The Employer requires the replacement of pipework at the Saddleback Tunnel and Rimers Creek Water Treatment Plant.

The Employer desires that the work required be of a high standard and be completed in the shortest practical time.

C3.1.2 OVERVIEW OF THE WORKS

The contract entails the installation of new 500 mm Stainless Steel Pipework at the Saddleback Tunnel at the Lomati Dam in Umjindi Municipal Area. The pipe work will manufacture from 304 Stainless Steel due to submerged water conditions. All the isolating valves and a level control valve will also be manufactured from 304 Stainless Steel. All this equipment will be installed in a tunnel below ground level.

The existing Rimers Creek bulk water pipeline will be refurbished, the work includes isolation valves, air release valves, Bermad Pressure Valves, and steel pipes for stream crossings.

At the Rimers Creek Water Treatment Plant the disinfection system will be refurbished and upgraded, the existing sand filtration system will be refurbished including sand, filter nozzles & laterals, pipe work and isolation valves. The provision will also be made to supply and install one new air blower complete for the works.

C3.1.3 EXTENT OF WORKS

The Works to be carried out by the Contractor under this Contract comprise mainly the following:

Saddle Back Tunnel

(a) Location, moving and protection of existing services.
(b) Site clearance.
(c) Installation of new 500 mm Stainless Steel Pipework.
(d) Installation of 4 x 500 mm Stainless Steel Isolation Valves.
(e) Installation of 1 x 500 mm Level and Flow control valve.
(f) Supply of temporary water during pipe replacement phase by means Diesel motor pump set.

Rimer Creek Water Treatment Plant

(g) Refurbish and upgrade the disinfection system,
(h) Upgrade the sand filtration system,
(i) Replace isolation valves,
(j) Supply instal new blower unit with switchgear,

Rimers Creek Bulk Water Supply

(k) Repair damaged 350 mm dia uPVC Class 12 pipes,
(l) Install Air valves,

(m) Install isolation valves,
(n) Small concrete works for valve chambers,
(o) Correction of defects in the Works in accordance with the requirements specified in the Contract Documents.
(p) Commissioning of the works done.
(q) Finishing of the site.
(r) Correction of defects in the Works in accordance with the requirements specified in the Contract Documents.

This description of the Works is not necessarily complete and shall not limit the work to be carried out by the Contractor under this Contract.

Approximate quantities of each type of work are given in the Bill of Quantities.

C3.1.4 LOCATION OF THE WORKS

The Saddleback Tunnel site is in uMjindi Municipal area at the Lomati Dam. The latitude and longitude of the site is: 25,811099° S & 31,099650° E.

C3.1.5 TEMPORARY WORKS

Supplying of Water during pipe installation phase.

C3.2: ENGINEERING

C3.2.1 DESIGN

(a) The Employer is responsible for the design of the permanent Works as reflected in the Contract Documents unless otherwise stated.

(b) The Contractor is responsible for the design of the temporary Works (if applicable) and their compatibility with the permanent Works.

(c) The Contractor shall supply all details necessary to assist the Employers Agent in the compilation of the as-built drawings.

C3.2.2 EMPLOYER'S DESIGN

The Employer's Design is contained in the Tender Documentation and Drawings. Amendments to the design, if necessary, will be issued during the construction phase.

C3.2.3 CONTRACTOR'S DESIGN

Where the Contractor is to supply the design of designated parts of the permanent Works or temporary Works, he shall supply full working drawings supported by a professional engineer's design certificate.

C3.2.4 DRAWINGS

The Contractor shall use only the dimensions stated in figures on the Drawings in setting out the Works, and dimensions shall not be scaled from the Drawings, unless required by the Employers Agent. The Employers Agent will, on the request of the Contractor in accordance with the provisions of the Conditions of Contract, provide such dimensions as may have been omitted from the Drawings.

The Contractor shall ensure that accurate as-built records are kept of all infrastructure installed or relocated during the contract. The position of pipe bends, junction boxes, duct ends and all other underground infrastructure shall be given by either co-ordinates or stake value and offset. Where necessary, levels shall also be given. A marked-up set of drawings shall also be kept and updated by the Contractor. This information shall be supplied to the Employers Agent's Representative on a regular basis.

All information in possession of the Contractor, required by the Employers Agent and/or the Employers Agent's Representative to complete the as-built/record drawings, must be submitted to the Employers Agent's Representative before a Certificate of Completion will be issued.

The Drawings prepared by the Employer for the permanent Works are listed below and are bound in a separate document or is attached at the back of this volume. The Employer reserves the right to issue and/or amended additional drawings during the Contract.

Drawing Number	**Title**
Ns3293-M00	Locality Plan
NS3303-M01	Isometric Pipe View
NS3303-M02	Layout and Arrangement
NS3303-M03	Pipe Detail 1
NS3303-M04	Pipe Detail 2

C3.2.5 DESIGN PROCEDURES

Not applicable.

C3.3: PROCUREMENT

C3.3.1 PREFERENTIAL PROCUREMENT

C3.3.1.1 Requirements

Tenders will be evaluated in terms of the City of Mbombela Preferential Procurement Policy. Points will be awarded for price and specific contract participation goals as contained in the Tender Data.

C3.3.1.2 Resource standard pertaining to targeted procurement

The Preferential Procurement Policy (PPP) of the City of Mbombela is applicable to this project. Refer to the Tender Data.

C3.3.2 SUBCONTRACTING

C3.3.2.1 Scope of mandatory subcontract works

Local subcontractors should be considered provided they are capable.

C3.3.2.2 Preferred subcontractors/suppliers

Where possible, local subcontractors should be considered for subcontract work provided they are capable.

C3.3.2.3 Subcontracting procedures

The contractor is solely responsible for negotiating with local subcontractors.

C3.3.2.4 Attendance on subcontractors

Not applicable.

C3.4: CONSTRUCTION

C3.4.1 WORKS SPECIFICATIONS

C3.4.1.1 Applicable SANS 1200 Standardized Specifications for Civil Engineering Construction

(a) The following SANS 1200 Standardized Specifications for civil engineering construction are applicable:

SANS 1200 A : General (1986)

SANS 1200 AA : General (Small Works) (1986)

SANS 1200 AB : Engineer's office (1986)

SANS 1200 G : Concrete (Structural) (1982)

SANS 1200 GA : Concrete (Small Works) (1982)

(b) The term "project specification" must be replaced by "scope of works" wherever it appears in these standardized specifications.

(c) The term "Engineer" must be replaced by "Employer's Agent" wherever it appears in these standardized specifications

C3.4.1.2 National and International Standards

The most important specifications are listed below. However, all the specifications referred to in these specifications that are not listed below are also applicable.

NO.	DESCRIPTION
DWS Specifications	
DWS 1130	Design, manufacture and supply of steel pipes
DWS 2010	Quality Inspection Services
DWS 2020	Quality Control
DWS 2510	Supply of valves
DWS 9900	Corrosion Protection of Steel Pipes and Specials for Pipelines
SANS Specifications	
SANS 719	Electric Welded Low Carbon Steel Pipes for Aqueous Fluids – Grades A; B and C
SANS 1217	Production of Painted and Powder Coated Steel Pipes
International Specifications	
API 5L	Steel Grades X46, X52, X56 and X60
API 1104	Standard for Welding Pipelines and Related Facilities (API)
BS 2633	Class 1 Arc Welding of Ferritic Steel Pipe Work for Carrying Fluids
BS 4504	Flanges for Bolting for Pipes, Valves and Fittings

(b) The term "project specification" must be replaced by "scope of works" wherever it appears in these standardized specifications.

(c) The term "Engineer" must be replaced by "Employer's Agent" wherever it appears in these standardized specifications

C3.4.1.2 National and International Standards

Applicable.

C3.4.1.3 Project and Particular Specifications

Section 2: Project Specifications – SANS 1200
Section 3: The Particular Specifications, if applicable are listed in section C

C3.4.1.4 Variations and Additions to the SANS 1200 Standardized Specifications for Civil Engineering Construction

Variations and additions to the SANS 1200 Standardized Specifications listed in C3.4.1.1 and the Particular Specifications (if applicable) listed in C3.4.1.3 are given in section C3.4.6.

C3.4.2 SITE ESTABLISHMENT

C3.4.2.1 Services and facilities provided by the Employer

(a) Water sources

Reticulated potable water supply is available in the vicinity of the site.

The responsible water supply authority around the site is City of Mbombela.

Should the Contractor, in complying with his obligations in terms of subclause C3.4.2.2(b): Water, wish to utilise such water supply, he shall himself be responsible for making his own arrangements with the responsible water supply authority for the supply of all water that he may require from such reticulation network for construction purposes as well as for domestic consumption.

(b) Electricity supply

Reticulated electrical power supply is available in the vicinity of the site.

The responsible electricity supply authority around the site is City of Mbombela.

Should the Contractor, in complying with his obligations in terms of subclause C3.4.2.2(c): Electricity, wish to avail himself of such supply, he shall, in accordance with the provisions of subclause C3.4.2.2(c), and at his own cost, be responsible for making his own arrangements with the responsible electricity supply authority for the supply of all electrical power he may require from such reticulation network for construction purposes as well as for domestic consumption.

(c) Excrement disposal

Water borne type disposal systems exist in the vicinity of the site.

The responsible sewage disposal authority is City of Mbombela.

Should the Contractor, in complying with his obligations in terms of subclause C3.4.2.2(d): Excrement disposal, wish to avail himself of such facility, he shall, in accordance with the provisions of subclause C3.4.2.2(d), and at his own cost, be responsible for making his own arrangements with the responsible disposal authority, and for making such connections he may require to the available services.

(d) Area for contractor's site establishment

A specific area near or on the site of the Works will be made available by the Employer to the Contractor for the Contractor's site establishment. The specific area for the Contractor's site establishment will be identified to the Contractor by the Employer and the Contractor shall have sole use of such area for the duration of the Contract. The Contractor shall use this area only for the purposes of erecting his site offices, workshops, stores and other facilities required for the execution of the Contract. The Contractor shall not use the area nor allow it to be used for any purposes not directly associated with the execution of the Contract.

The Contractor shall be responsible for arranging, at his own cost, for the provision of all services he may require in the area, as well as elsewhere on the site.

Should the Contractor deem the area made available by the Employer to be inadequate or unsuitable for the Contractor's particular needs, then the Contractor shall be at liberty to make his own arrangements with the owners of other sites which he considers are better suited to his needs; provided always that the use by the Contractor of any area other than that made available to him by the Employer shall be subject to the prior written approval of the Engineer, which approval shall not be unreasonably withheld; and provided further that the Contractor shall have no claim against the Employer in respect of any costs incurred by him, either directly or indirectly in consequence of utilising any area other than that made available to him by the Employer, and which costs exceed those costs allowed for by the Contractor in his Tender.

C3.4.2.2 <u>Facilities provided by the Contractor</u>

(a) Facilities for the Engineer

The Contractor shall provide on the site, for the duration of the Contract the following facilities for the Engineer:

Refer to applicable specifications in C3.4.1.1.

(b) Water

The Contractor shall, at his own expense, be responsible for obtaining and distributing all water as may be required for the purposes of executing the Contract, including water for both construction purposes and domestic use, as well as for making all arrangements in connection therewith. The Contractor shall further, at his own expense, be responsible for providing all necessaries for procuring, storing, transporting and applying water required for the execution of the Contract, including but not limited to all piping, valves, tanks, pumps, meters and other plant and equipment, as well as for all work and superintendence associated therewith.

The sources of all water utilised for the purposes of the Contract shall be subject to the prior approval of the Engineer, which approval shall not be unreasonably withheld.

The Contractor shall comply with all prevailing legislation in respect of drawing water from natural and other sources and shall, when required by the Engineer, produce proof of such compliance. The distribution of water shall be carried out by the Contractor strictly in accordance with the applicable laws and regulations.

All water provided by the Contractor for construction purposes shall be clean, free from undesirable concentrations of deleterious salts and other materials and shall comply with any further relevant specifications of the Contract. The Contractor shall, whenever reasonably required by the Engineer, produce test results demonstrating such compliance. Water provided by the Contractor for human consumption shall be healthy and potable to the satisfaction of the health authorities in the area of the site.

No separate payment will be made to the Contractor for the obtainment, distribution and consumption of water, the costs of which will be deemed to be included in the Contractor's tendered rates.

(c) Electricity

The Contractor shall, at his own expense, be responsible for obtaining and distributing all electricity as he may require for the purposes of executing the Contract, including electricity for both construction purposes and domestic use, as well as for making all arrangements in connection therewith.

The distribution of electricity shall be carried out by the Contractor strictly in accordance with the applicable laws and regulations.

No separate payment will be made to the Contractor for the obtainment, distribution and consumption of electricity, the costs of which will be deemed to be in the Contractor's tendered rates and prices.

(d) Excrement disposal

The Contractor shall, at his own expense, be responsible for safely and hygienically dealing with and disposing of all human excrement and similar matter generated on the site during the Contract, to the satisfaction of the Engineer and the responsible health authorities in the area of the site.

The Contractor shall further comply with any other requirements in this regard as may be stated in the Contract.

No separate payment will be made to the Contractor in respect of discharging his obligations in terms of this subclause and the costs thereof shall be deemed to be included within the Contractor's tendered Preliminary and General Items.

C3.4.2.3 Site usage

The Contractor's employees will not be allowed to stay on site except for the duration of a working day. The only person to be allowed on site for the duration of a calendar day will be the site guard(s).

Access to the site will be in a controlled manner. People visiting the site will have to sign in and out daily.

C3.4.2.4 Permits and way leaves

The Employer shall be responsible to obtain permits and/or way leaves if required for this Contract.

C3.4.2.5 Features requiring special attention

(a) Site maintenance

During progress of the work and upon completion thereof, the site of the Works shall be kept and left in a clean and orderly condition. The Contractor shall store materials and equipment for which he is responsible in an orderly manner and shall keep the site free from debris and obstructions.

(b) Testing and quality control

(i) Contractor to engage services of an independent laboratory

Notwithstanding the requirements of the Specifications pertaining to testing and quality control, the Contractor shall engage the services of an approved

independent laboratory to undertake all testing of materials, the results of which are specified in, or may reasonably be inferred from, the Contract. These results will be taken into consideration by the Engineer in deciding whether the quality of materials utilised, and workmanship achieved by the Contractor comply with the requirements of the Specifications. The a foregoing shall apply irrespective of whether the specifications indicate that the said testing is to be carried out by the Engineer or by the Contractor.

The Contractor shall be responsible for arranging with the independent testing laboratory for the timeous carrying out of all such testing specified in the Contract, at not less than the frequencies and in the manner specified. The Contractor shall promptly provide the Engineer with copies of the results of all such testing carried out by the independent laboratory.

(ii) Additional testing required by the Engineer

In addition to the provisions of subclause C3.4.2.5(b)(i): Contractor to engage services of an independent laboratory, the Engineer shall be entitled at times during the Contract to require that the Contractor arrange with the independent laboratory to carry out any such tests, additional to those described in subclause C3.4.2.5(b)(i), at such times and at such locations in the Works as the Engineer shall prescribe. The Contractor shall promptly and without delay arrange with the independent laboratory for carrying out all such additional testing as required by the Engineer, and copies of the test results shall be promptly submitted to the Engineer.

(iii) Costs of testing

(a) Tests in terms of subclause C3.4.2.5(b)(i)

The costs of all testing carried out by the independent laboratory in accordance with the requirements of subclause C3.4.2.5(b)(i), above shall be borne by the Contractor and shall be deemed to be included in the tendered rates and prices for the respective items of work as listed in the Schedule of Quantities and which require testing in terms of the Specifications. No separate payments will be made by the Employer to the Contractor in respect of any testing carried out in terms of subclause C3.4.2.5(b)(i).

Where, as a result of the consistency of the materials varying or as a result of failure to meet the required specifications for the work, it becomes necessary to carry out additional tests (eg re-tests on rectified work and/or replacement materials), the costs of such additional testing shall be for the Contractor's account.

(b) Additional tests required by the Engineer

The costs of any additional tests required by the Engineer in terms of subclause C3.4.2.5(b)(ii): Additional testing required by the Engineer, shall be reimbursed to the Contractor against substitution of the Provisional Sum allowed therefore in the Schedule of Quantities; provided always that the costs of any such additional tests ordered by the Engineer, the results of which indicate that the quality of the materials utilised and/or the standard of workmanship achieved are/is not in accordance with the specifications, shall not be reimbursable to the Contractor.

(c) Subcontractors

All matters pertaining to subcontractors (including Selected Subcontractors) and the work executed by them shall be dealt with directly between the Engineer and the Contractor in the context of all subcontract work being an integral part of the Works for which the Contractor is responsible.

The Engineer will not liaise directly with any subcontractors, nor will he issue instructions concerning the subcontract works directly to any subcontractor.

All matters arising from the subcontract agreements shall be dealt with directly between the Contractor and the subcontractors and the Engineer will not become involved.

(d) Opening up and closing of designated borrow pits

Refer to standardized and or projects specifications.

(e) Access to properties

The Contractor shall organise the work to cause the least possible inconvenience to the public and to the property owners adjacent to or affected by the work, and except as hereunder provided, shall at all times provide and allow pedestrian and vehicular access to properties within or adjoining or affected by the area in which he is working.

If, as a result of restricted road reserve widths and the nature of the work, the construction of bypasses is not feasible, construction shall be carried out under traffic conditions to provide access to erven and properties.

Notwithstanding the aforegoing, the Contractor may, with the prior approval of the Engineer (which approval shall not be unreasonably withheld), make arrangements with and obtain the acceptance of the occupiers of erven and properties to close off part of a street, road, footpath or entrance temporarily, provided that the Contractor duly notifies the occupiers of the intended closure and its probable duration, and reopens the route as punctually as possible. Where possible, such streets, roads, footpaths and entrances shall be made safe and reopened to traffic overnight.
Such closure shall not absolve the Contractor from his obligations under the Contract to always provide access. Barricades, traffic signs, drums and other safety measures appropriate to the circumstances shall be provided by the Contractor to suit the specific conditions.

(f) Existing residential areas

Electricity and water supply interruptions in existing residential areas shall be kept to a minimum. The Engineer's approval shall be obtained prior to such interruptions and residents shall be notified in writing at least 24 hours but not more than 48 hours in advance. Supplies shall be normalised by 16:00 on the same day.

(g) Employment of local labour and CLO

The contractor or his appointed agent will appoint a Community Liaison Officer (CLO) after consultation with the local communities, the engineer and the employer. The contractor shall direct all his liaison efforts with the local communities through the appointed officer. The contractor shall, however, accept the appointed as part of his management personnel.

(1) Duties of the Community Liaison Officer

The Community Liaison Officer’s duties will be:

(i) To be available on site daily between the hours of 07h00 and 17h00 and at other times as the need arises. His normal working day will extend from 07h00 in the morning until 17h00 in the afternoon.

(ii) To determine, in consultation with the contractor, the needs of the temporary labour for relevant skills training. He will be responsible for the identification of suitable trainees and will attend one of each of the training sessions if applicable.

(iii) To communicate daily with the contractor and the engineer to determine the labour requirements with regard to numbers and skill, to facilitate in labour disputes and to assist in their resolution.

(iv) To assist in and facilitate in the recruitment of suitable temporary labour and the establishment of a “labour desk”.

(v) To attend all meetings in which the community and/or labour are present or are required to be represented.

(vi) To assist in the identification, and screening of labourers from the community in accordance with the contractor’s requirements.

(vii) To inform temporary labour of their conditions of temporary employment and to inform temporary labourers as early as possible when their period of employment will be terminated.

(viii) To attend disciplinary proceedings to ensure that hearings are fair and reasonable.

(ix) To keep a daily written record of his interviews and community liaison.

(x) To attend monthly site meetings to report on labour and RDP matters in writing.

(xi) All such other duties as agreed upon between all parties concerned.

(2) Payment for the community liaison officer

A special pay item is incorporated in section 1200 of the bill of quantities relating to payment of the liaison officer on a prime cost sum basis. This payment shall only be made for the period for which the duties of the liaison officer are required and not necessarily for the full duration of the contract. The remuneration of the CLO shall be determined by the Employer with a minimum salary of R 8,500.00 per month.

The CLO shall be paid pro rata for work done over a calendar month.

(3) Period of employment of the community liaison officer

The period of employment of the community liaison officer shall be as decided upon jointly by the contractor, engineer and employer at a maximum period of a six months basis, but with the option of renewal.

(h) Monthly statements and payment certificates

The statement to be submitted by the Contractor in terms of Clause 6.10 of the General Conditions of Contract shall be prepared by the Contractor at his own cost, strictly in accordance with the standard payment certificate prescribed by the Engineer, in digital electronic computer format. The Contractor shall, together with a copy of the digital electronic computer file of the statement, submit two (2) A4 size paper copies of the statement.

For the purposes of the Engineer’s payment certificate, the Contractor shall subsequently be responsible, at his own cost, for making such adjustments to his statement as may be required by the Engineer for the purposes of accurately reflecting the actual quantities and amounts which the Engineer deems to be due and payable to the Contractor in the payment certificate.

The Contractor shall, at his own cost, make the said adjustments to the statement and return it to the Engineer within three (3) normal workings days from the date on which the Engineer communicated to the Contractor the adjustments required. The Contractor shall submit to the Engineer five (5) sets of A4 size paper copies of such adjusted statement, together with a copy of the electronic digital computer file thereof.

Any delay by the Contractor in making the said adjustments and submitting to the Engineer the requisite copies of the adjusted statement for the purposes of the

Engineer's payment certificate will be added to the times allowed to the Engineer in terms of Subclause 6.10.4 of the Conditions of Contract to submit the signed payment certificate to the Employer and the Contractor. Any such delay will also be added to the period in which the Employer is required to make payment to the Contractor.

(i) Construction in restricted areas

Working space is sometimes restricted. The construction method used in these restricted areas largely depends on the Contractor's Plant. Notwithstanding, measurement and payment will be strictly according to the specified cross-sections and dimensions irrespective of the method used, and the rates and prices tendered will be deemed to include full compensation for any difficulties encountered by the Contractor while working in restricted areas. No extra payment or any claim for payment due to these difficulties will be considered.

(j) Notices, signs, barricades and advertisements

All notices, signs and barricades, as well as advertisements, may be used only if approved by the Engineer. The Contractor shall be responsible for their supply, erection, maintenance and ultimate removal and shall make provision for this in his tendered rates.

The Engineer shall have the right to instruct the Contractor to move any sign, notice or advertisement to another position, or to remove it from the site of the Works if in his opinion it is unsatisfactory, inconvenient or dangerous.

(k) Workmanship and quality control

The onus to produce work that conforms in quality and accuracy of detail to the requirements of the Specifications and Drawings rests with the Contractor, and the Contractor shall, at his own expense, institute a quality control system and provide suitably qualified and experienced engineers, foremen, surveyors, materials technicians, other technicians and technical staff, together with all transport, instruments and equipment to ensure adequate supervision and positive control of the Works at all times.

The cost of supervision and process control, including testing carried out by the Contractor, will be deemed to be included in the rates tendered for the related items of work.

The Contractor's attention is drawn to the provisions of the various Standardized Specifications regarding the minimum frequency of testing required. The Contractor shall, at his own discretion, increase this frequency where necessary to ensure adequate control.

On completion and submission of every part of the work to the Engineer for examination and measurement, the Contractor shall furnish the Engineer with the results of the relevant tests, measurements and levels to demonstrate the achievement of compliance with the Specifications.

C3.4.2.6 Extension of time due to abnormal rainfall

(a) Extension of time in respect of delays resulting from wet climatic conditions on the site will only be considered in respect of abnormally wet climatic conditions and shall be determined for each calendar month or part thereof, in accordance with the formula given below:

$$V = (Nw - Nn) + (Rw - Rn)/X$$

in which formula the symbols shall have the following meanings:

V = Potential extension of time in calendar days for the calendar month under consideration:
If V is negative and its absolute value exceeds Nn, then V shall be taken as equal to minus Nn.
When the value of V for any month exceeds the number of days in the particular month, V will be the number of days in the month.

Nw = Actual number of days in the calendar month under consideration on which a rainfall of Y mm or more was recorded on the site

Nn = Average number of days, derived from existing records of rainfall in the region of the site, on which a rainfall of Y mm or more was recorded for the calendar month

Rw = Actual rainfall in mm recorded on the site in an approved rain gauge for the calendar month under consideration

Rn = Average rainfall in mm for the calendar month, derived from existing records of rainfall in the region of the site

The factor (Nw - Nn) shall be deemed to be a fair allowance for variations from the average number of days during which the rainfall exceeds Y mm.

The factor (Rw - Rn)/X shall be deemed to be a fair allowance for variations from the average number of days during which the rainfall did not exceed Y mm but wet conditions prevented or disrupted work.

(b) The rainfall records at rainfall station White River for the period 1903 to 1997 are reproduced in the accompanying table, and the monthly averages (Rn and Nn) for this period shall, for the purposes of this Contract be taken as normal and as the values to be substituted for Rn and Nn in the formula above. The values of X and Y shall be 20 and 10 respectively.

MONTH	N_n	R_n	MONTH	N_n	R_n
January	4.4	164.5	July	0.2	8.8
February	3.8	157.2	August	0.4	11.3
March	3.4	105.6	September	0.9	31.5
April	1.1	42.1	October	2.5	72.3
May	0.5	76.7	November	8.6	118
June	0.3	6.7	December	4.2	142

(c) The Contractor shall, at his own cost, provide and erect on the site at a location approved by the Engineer, an approved rain gauge, which shall be fenced off in a manner which will prevent any undue interference by workmen and others. The Contractor shall, at his own cost, arrange for the reading of the rain gauge on a daily basis for the duration of the Contract. The gauge readings, as well as the date and time at which the reading was taken shall be recorded in a separate record book provided by the Contractor for this purpose.

All entries in the rainfall record books shall be signed by the person taking the reading and the gauge shall be properly emptied immediately after each reading has been taken. If required by the Engineer, the Engineer shall be entitled to witness the reading of the gauge.

(d) The Contractor's claims in terms of Subclause 5.12.1 of the Conditions of Contract for extension of time in respect of delays resulting from wet climatic conditions on

the site during each month, shall be submitted in writing to the Engineer monthly; provided always that

(i) the period allowed to the Contractor in terms of Clause 10.1.1.1 of the Conditions of Contract in which to submit his claim for each month shall be reduced to seven (7) days, calculated from the last day of the month to which the claim applies; and

(ii) the 28-day period allowed to the Engineer in terms of Subclause 10.1.5 of the Conditions of Contract in which to give his ruling on the claim, shall be reduced to fourteen (14) days.

The Contractor's monthly claim shall be accompanied by a copy of the signed daily rainfall readings for the applicable month.

(e) The extent of any extension of time which may be granted to the Contractor in respect of wet climatic conditions (whether normal or abnormal) shall be determined as the algebraic sum of the "V" values for each month between the Commencement Date and the Due Completion Date of the Contract, calculated in accordance with subclause C3.4.2.6(a) above;
provided always that

(i) rainfall occurring within the period of the Contractor's Christmas shut-down period (referred to in Subclause 5.8 of the Conditions of Contract) shall not be taken into account in the calculation of the monthly "V" values;

(ii) rainfall occurring during any period during which the Contractor was delayed due to reasons other than wet climatic conditions on the site, and for which delay an extension of time is granted by the Engineer, shall not be taken into account in the calculation of the monthly "V" values;

(iii) if the algebraic sum of the "V" values for each month is negative, the time for completion will not be reduced on account of subnormal rainfall, and

(iv) where rainfall is recorded only for part of a month, the "V" value shall be calculated for that part of the month using pro rata values for Nn and Rn.

(f) The Engineer shall, simultaneous with granting any extension of time in terms of this clause, revise the Due Completion Date of the Contract to reflect an extension of time having been granted in respect of wet climatic conditions, to the extent of the algebraic sum of all the "V" values for all the preceding months of the Contract, less the aggregate of the "Nn" values for the remaining (unexpired) months of the Contract (viz less aggregate of the potential maximum negative "V" values for the remaining Contract Period). Thus, provided that where such period is negative, the Due Completion Date shall not be revised.

(g) Any extension of time in respect of wet climatic conditions granted in terms of this clause shall not be deemed to take into account delays experienced by the Contractor in repairing or reinstating damage to or physical loss of the Works arising from the occurrence of abnormal climatic conditions. Extension of time in respect of any such repairs or reinstatement regarding damage shall be the subject of a separate application for extension of time in accordance with the provisions of Clause 5.12 and Clause 10 of the Conditions of Contract.

C3.4.3 PLANT AND MATERIALS

C3.4.3.1 Plant and materials supplied by the employer

Not applicable.

C3.4.3.2 Materials, samples and shop drawings

(a) Samples

Materials or work which does not conform to the approved samples submitted in terms of Subclause 7.4 of the General Conditions of Contract will be rejected. The Engineer reserves the right to submit samples to tests to ensure that the material represented by the sample meets the specification requirements.

The costs of any such tests conducted by or on behalf of the Engineer, the results of which indicate that the samples provided by the Contractor do not conform to the requirements of the Contract, shall, in accordance with the provisions of Subclause 7.4.4 of the General Conditions of Contract, be for the Contractor's account.

C3.4.4 CONSTRUCTION EQUIPMENT

C3.4.4.1 Requirements for equipment

Equipment to be utilised must be such that the work can be executed in an efficient manner. Old plant which leak hydraulic fluid and have breakages shall be removed from site and replaced with proper plant.

C3.4.4.2 Equipment provided by the employer

No equipment will be provided by the Employer.

C3.4.5 EXISTING SERVICES

C3.4.5.1 Known services

All known services are indicated on the drawings. The onus rests on the Contractor to locate the known services before any construction commences.

C3.4.5.2 Treatment of existing services

Existing services shall be relocated or removed as indicated on the drawings only at the instruction of the Engineer.

C3.4.5.3 Use of detection equipment for the location of underground services

The Contractor shall utilise whatever necessary equipment to locate underground services. No extra payment will be done for this, except for items listed in the Bill of Quantities.

C3.4.5.4 Damage to services

Damage that occurs to unknown services during construction will be paid by the Employer through contingencies.

However, all services that have been located and exposed, and are subsequently damaged by the Contractor or his subcontractor, shall be reinstated to the same state as it was before the damage occurred at the time and cost of the Contractor.

C3.4.5.5 Reinstatement of services and structures damaged during construction

The Contractor shall inform the Engineer immediately when a service or structure is damaged. The extent of the damage and a proposal how to reinstate the service or structure shall be submitted to the Engineer on a sketch with dimensions and time frames.

The Contractor shall not be allowed to reinstate any service or structure unless indicated so by the Engineer. The Contractor shall inform and render all reasonable assistance to the service or structure owner with the reinstatement of the service or the structure if required.

The Contractor shall be liable to reinstate the service or structure to its original state before damage occurred.

C3.4.6 VARIATIONS AND ADDITIONS TO SANS 1200 STANDARDIZED SPECIFICATIONS AND PARTICULAR SPECIFICATIONS (if applicable)

In certain clauses, the Standardized Specifications allow a choice to be specified in the Specification Data between alternative material or methods of construction, and for additional requirements to be specified to suit a particular contract. Details of such alternatives or additional requirements applicable to this contract are contained in this part of the Specification Data. It also contains such additional specifications as are required for this particular contract.

The number of each clause and each payment item in this part of the project specifications consists of the prefix “PS” followed by a number corresponding to the number of the relevant clause or payment item in the Standardized Specifications. New clauses and payment items not covered by clauses or payment items in the Standardized Specifications if included here are also designated “PS”, followed by a number. The new numbers follow on the last clause or item number used in the relevant section of the Standardized Specifications.

SECTION 2 : PROJECT SPECIFICATION

SANS 1200 A : GENERAL

A 3 MATERIALS

PS A 3.1 QUALITY

Substitute the second sentence of the first paragraph of A 3.1 with the following:

Materials shall bear the official mark of the appropriate standard.

Substitute the second paragraph with the following:

Samples, on which control the Engineer requires testing, shall be delivered free of charge to a recognised commercial laboratory. The Contractor is responsible for the cost of all testing to ascertain that the materials do comply with the relevant minimum requirements and all such costs shall be deemed to be included in the tendered rates. The cost of control tests done by the Engineer and of which the results do not comply with the minimum requirements shall be for the Contractor's account.

The Contractor shall inform the Engineer of any control testing to be done at least 48 hours before such tests are required and must allow in his program for the time necessary for the tests and the processing of the results thereof.

A 5 CONSTRUCTION

A 5.1 SURVEY

PS A 5.1.1 Setting Out of the Works

Substitute the first sentence in A 5.1.1 with the following:

Setting out of the works is the sole responsibility of the Contractor and shall be done from survey pegs and from benchmarks where applicable. Otherwise existing stand boundaries will be used as reference. The Contractor shall, within two weeks after the site has been handed over to him, ascertain himself of the correctness of all pegs and benchmarks. Any discrepancy shall immediately be reported in writing to the Engineer. Any costs or subsequent costs arising from discrepancies, which had not been reported to the Engineer within the aforementioned period, shall be the sole responsibility of the Contractor.

No extra compensation will be applicable for the setting out of the works. It will be deemed covered by other tendered rates.

PS A 5.2 WATCHING, BARRICADING, LIGHTING AND TRAFFIC CROSSINGS

Add the following to A 5.2:

The crossing of existing streets with services must be done in half widths.

Road traffic signs shall comply with the requirements of the "South African Road Traffic Signs Manual" and shall be approved by the Engineer before construction commences.

PS A 5.9 **COMMUNITY LIAISON OFFICER**

The Contractor in consultation with the PSC and the Local Municipality shall appoint a Community Liaison Officer. His/her role will be to liaise between the contractor, labourers, community and PSC. The contractor will pay his remuneration and a provisional sum has been provided for this expenditure. The CLO will assist with the recruitment of labour, based on recommendations by the PSC. The CLO must submit a written report about the status of the project at every site meeting. It is the responsibility of the contractor to ensure that the CLO attends site meetings and submit a report in writing.

A 7 **TESTING**

PS A 7.2 **APPROVED LABORATORIES**

Substitute A 7.2 with the following:

Only laboratories that are SANAS accredited (civils, materials, testing laboratories) shall be regarded 'approved'.

PS A 7.4 **STATISTICAL ANALYSIS OF CONTROL TESTS**

Substitute A 7.4 with the following:

Test results shall not be evaluated by statistical methods. All results shall comply with the specified minimum requirements as specified in the relevant SANS standards.

A 8 **MEASUREMENT AND PAYMENT**

A 8.2 **PAYMENT**

PS A 8.2.5 **Adjusted Payment for Time-Related Items**

The payment to the Contractor for time-related items shall be adjusted in accordance with the following formula in the event of the contract being extended by means of a variation order:

$$\text{Sum of Tendered amounts for time-related items} \times \frac{\text{Extended contract period as authorised by variation order}}{\text{Tendered contract period}}$$

The above-mentioned adjustment of the payment for time-related items shall be made in the Completion Payment Certificate and shall be the only payment for additional time-related costs.

PS A 8.3.1 **Contractual Requirements**

Add the following paragraph:

"The tendered amount shall be paid pro-rata per year during the implementation of the multi-year project. The portion payable for the first year shall not be escalated. The second and subsequent years shall be escalated."

PS A 8.4.1 **Contractual Requirements**

Add the following paragraph:

"The tendered amount shall be paid pro-rata per year during the implementation of the multi-year project. The portion payable for the first year shall not be escalated. The second and subsequent years shall be escalated.

PS A 8.5 **Sum stated provisionally by Engineer**

a)	**Community Liaison Officer**	**Unit : Prov Sum**
b)	**OHS Officer for Project Duration**	**Unit : Prov Sum**
c)	**Environmental Management Requirements**	**Unit : Prov Sum**
d)	**Social Facilitator**	**Unit : Prov Sum**
e)	**Lomati Dam Level Measure Equipment**	**Unit : Prov Sum**
f)	**Quality Control in Accordance with DWS 2020**	**Unit : Prov Sum**

The provisional sums will be dealt with as per Clause 6.6 of the GCC. The onus to do direct payments to subcontractors for work done under this item, rests solely with the Employer.

PS A 8.7 **DAYWORK**

Add the following daywork items:

a) Labour

i) un-skilled ……..…….. Unit : hr

ii) semi-skilled ……..…….. Unit : hr

iii) skilled ……..…….. Unit : hr

iv) foreman ……..…….. Unit : hr

b) Plant

i) 5 ton tipper truck with operator ……..…….. Unit : hr

ii) 0.5m³ excavator with operator……..…….. Unit : hr

iii) 5000 l water truck with operator……..…….. Unit : hr

iv) Bomag BW 90 compactor with operator …….. Unit : hr

The unit cost will make, in addition to the standard specifications, provision for the cost of the machine, the fuel and the operator, inclusive of all costs except VAT.

SECTION 2 : PROJECT SPECIFICATION

SANS 1200 AB : ENGINEER'S OFFICE

AB 3 MATERIALS

PS AB 3.1 NAME BOARDS

Substitute "South African Institution of Civil Engineers" in the first paragraph of AB 3.1 with "South African Association of Consulting Engineers".

PS AB 3.2 OFFICE BUILDINGS

Office building(s) are required for the engineer.

PS AB 3.3 GARAGES

The garage(s) shall be lean-to structures made of; treated 100 mm diameter wooden poles (as struts), 0.5 mm thick IBR sheeting (as roof) and heavy duty 70% shade netting (as walls). The structures shall have a floor area of 5 m x 3 m each. The roof shall be sloped to one side.

AB 5 CONSTRUCTION

PS AB 5.1 NAME BOARDS

Add the following to AB 5.1:

The name boards shall be erected within a month of the commencement date of the contract and shall be placed at the position indicated by the Engineer. Any damage to these boards shall be repaired within fourteen days of a written instruction issued by the Engineer. The Contractor will be permitted to erect a maximum of two of his own name boards, in positions approved by the Engineer. The Engineer reserves the right to order the removal of these boards if they are not kept in good repair.

PS AB 5.5 SURVEY ASSISTANTS

Substitute "two or more suitably educated survey labourers" in the first sentence of AB 5.5 with "two semi-skilled labourers."

PS AB 5.6 SURVEY EQUIPMENT

The Contractor shall provide the following tested and approved survey equipment on site for the duration of the contract and for the sole use of the Engineer:

a) one automatic level (Wild, Leica NAK2 Engineering level or similar with a 32 x zoom),

b) one heavy duty wooden tripod,

c) one 5 m long three-piece telescope metric survey staff with staff bubble,

The Contractor shall keep the equipment continuously insured against any loss, damage or breakage, and he shall indemnify the Engineer and the Employer against any claims in this regard. Damaged equipment shall be replaced immediately. The equipment shall become the property of the Employer after completion of the project.

SECTION 2 : PROJECT SPECIFICATION

SANS 1200 C : SITE CLEARANCE

C 3 MATERIAL

PS C 3.1 DISPOSAL OF MATERIAL

Substitute the first sentence of C 3.1 with the following:

Material obtained from clearing and grubbing, and demolition of structures shall be disposed off at the site indicated during the site clarification meeting.

C 5 CONSTRUCTION

PS C 5.1 AREAS TO BE CLEARED AND GRUBBED

Substitute the first sentence of C 5.1 with the following:

The Engineer will indicate to the Contractor, which areas need to be cleared and grubbed. The Contractor may proceed with clearing and grubbing of pipe routes limited to a 3 m wide strip only after the Engineer has indicated the above-mentioned routes. Measurement and payment for clearing and grubbing shall only occur for areas as instructed in writing by the Engineer.

Substitute the last paragraph with the following:

The Contractor shall program his work in such a manner that re-clearing will not be necessary. The cost of re-clearing shall be borne by the Contractor.

C 5.2 CUTTING OF TREES

C 5.2.3 Preservation of Trees

PS C 5.2.3.2 Individual trees

Add the following to C 5.2.3.2:

Trees outside street, channel and pipeline routes must be left standing and undamaged, except where otherwise ordered in writing by the Engineer.

A penalty of R 5,000-00 per tree for trees damaged and/or removed will be charged.

PS C 5.9 EXISTING FENCING

The existing fences must be repaired to its original state immediately after damage to it has occurred. No additional payment will be applicable for repair work.

C 8 **MEASUREMENT AND PAYMENT**

PS C 8.2 **SCHEDULED ITEMS**

Add the following items:

PS C 8.2.5 **(a) Take down existing fences and boundary walls and reinstate to its original state after completion of the works** **Unit: m**

The rate shall cover the cost of taking down existing fences, boundary walls in meters and removing of paving blocks, kerbs and concrete slabs, asphalt paving etc. in square meters which needs to be removed for exploration, storing it in a safe place, and reinstating it to its original state before it was removed. The meter and square meter of items removed and reinstated shall be measured for payment. The rate shall cover the cost of all required new materials and labour to reinstate the work as well as disposing of waste at a registered waste disposal site.

SECTION 2 : PROJECT SPECIFICATION

SANS 1200 G : CONCRETE (STRUCTURAL)

G 3 MATERIAL

G 3.2 CEMENT

PS G 3.2.1 Applicable Specifications

Substitute G 3.2.1 with the following:

All cement types shall comply with the requirements of SANS ENX 197-1.

For this contract only CEM I Portland cement shall be used.

PS G 3.2.3 Storage of Cement

Add the following to G 3.2.3:

Consignments of cement shall be used in the same sequence as that in which they are delivered to site. No cement shall be used which has been stored on site for a period longer than 6 (six) weeks. All cement so stored for a period longer than 6 (six) weeks, all cement damaged in any way or re-bagged, and all cement which does not comply with the specification, shall be removed immediately and permanently from the site.

PS G 3.5.2 Air-entraining Agents

Substitute G 3.5.2 with the following:

Air-entraining agents shall **not** be used in concrete.

G 4 PLANT

PS G 4.5.3 Ties

Add the following to G 4.5.3:

Permanent sacrificial metal ties shall have a minimum concrete cover of 40 mm after formwork has been removed.

Tie holes shall be filled with an approved expansive cementitious grout similar to "SikaGrout-212" of Sika. The product shall be prepared and applied to the manufacturer's specifications.

G 5 CONSTRUCTION

G 5.1 REINFORCEMENT

PS G 5.1.3 Cover

Substitute G 5.1.3 with the following:

The cover of concrete over reinforcement, unless otherwise indicated on the drawings, shall in no case be less than 40 mm.

PS G 5.2.1 **Classification of Finishes**

Add the following to G 5.2.1:

The following surface conditions are required on the various portions of the finished concrete:

8 (a) **Rough**

9 Concealed surfaces and surfaces more than 100 mm below final ground level.

10 (b) **Smooth**

11 All surface finishes not classified as "rough" in paragraph (a) shall be classified as "smooth". All exposed arises (i.e. where the angle between adjacent sides is 110° or less) unless otherwise indicated on the drawings, shall be chamfered 20 mm x 20 mm by means of triangular fillets fixed to the formwork.

PS G 5.2.5 **Removal of Formwork**

In Table 2 of G 5.2.5.2, substitute “Portland cement and Portland cement 15” in columns 2, 3 and 4 with “CEM 1 Portland cement and delete columns 5 to 10.

PS G 5.4 **PIPES AND CONDUITS**

Add the following to G 5.4:

All pipes and specials that must be installed in the floors and walls of structures shall be embedded in the concrete during the casting of such concrete. No holes shall be left for the later installation of pipes and specials, without the written approval of the Engineer.

Where the Engineer has approved such holes, the Contractor shall be responsible for the grouting-in of such pipes or specials with an approved expansive cementitious grout as specified in PS G 4.5.3, regardless of whether or not these have been supplied by him. The Contractor shall provide a smooth, dense and waterproof finish around the pipes or specials.

The clear space between pipes of any kind embedded in reinforced concrete and the clear space between such pipes and reinforcement shall at any point be not less than -

12 (a) 40 mm, or

13 (b) 5 mm plus the maximum size of coarse aggregate,

whichever is the greater.

G 5.5 **CONCRETE**

PS G 5.5.1.5 **Durability**

Substitute G 5.5.1.5 with the following:

Concrete shall be so proportioned to ensure that the water/cement ratio does not exceed 0,5 and, to ensure workability, water-reducing admixtures of approved manufacture shall be used in preference to increasing the cement content.

PS G 5.5.1.7 **Strength concrete**

Add the following to G 5.5.1.7:

The grade of strength concrete and the maximum nominal size of coarse aggregate for each portion of the works, unless otherwise indicated on the drawings, shall be as follows:

14 (a)..... Mass concrete under floors and foundations
.....20 MPa/19 mm

15 (b)..... Blinding layers
.....20 MPa/19 mm

16 (c)..... Encasing of pipes
.....20 MPa/19 mm

17 (d)..... Strip foundations
.....25 MPa/19 mm

18 (e).....Benching and screeds
.....20 MPa/10 mm

19 (f).....Reinforced concrete in water retaining structures
.....35 MPa/19 mm

20 (g)..... All other reinforced concrete
.....30 MPa/19 mm

PS D 5.5.7 **Construction Joints**

Add the following to G 5.5.7.1:

Construction joints shall be limited to the minimum and shall only be made in positions as shown on the drawings or in positions as specifically approved by the Engineer. Construction joints between tank bottoms, floors, or wall bases, and the walls standing on them shall not be made flush with the supporting surface but shall be made in the wall 75 mm above the base. The 75 mm high riser wall shall be cast as an integral part of the bottom, floor or base, i.e. the concrete in the riser shall be deposited simultaneously with the concrete in the bottom, floor or base adjacent to it. Where there is a fillet at the bottom of a wall, the construction joint shall be made 150 mm above the fillet.

Water stops shall be installed at all construction joints in walls of water retaining structures. The size and type of water stops shall be as indicated on the drawings.

PS G 5.5.9 **Adverse Weather Conditions**

Add the following to G 5.5.9.1:

No material having a temperature of below 5°C shall be used for concrete, and no concrete shall be deposited when the ground or air temperature is below 2°C. Furthermore, if the air or ground temperature is likely to fall below 2°C within 12 (twelve) hours after depositing of concrete, no concreting shall be done without the written consent of the Engineer. If such consent is given the Contractor shall heat the aggregate stockpiles and mixing water and defrost the formwork and reinforcement.

PS G 5.5.10 **Concrete Surfaces**

Add the following to G 5.5.10.1:

Concrete surfaces under screeds, granolithic floor finishes or benching and surfaces of strip foundations and footings shall be brought up to a plane, uniform surface with a suitable screed board.

PS G 5.5.10.4 **Wood-floated finish**

Where wood floating is specified or scheduled, the surface shall first be given a finish as specified in G 5.5.10.1 and after the concrete has hardened sufficiently; it shall be floated to a uniform surface free from trowel marks. The screed surface shall be wood-floated, either by hand or machine, only sufficiently to produce a uniform surface free from screed marks.

PS G 5.5.10.5 **Steel-floated finish**

Where steel floating is specified or scheduled, the surface shall be treated as specified in PS G 5.5.10.4 except that, when the moisture film has disappeared and the concrete has hardened sufficiently to prevent laitance from being worked to the surface, the screed surface shall be steel-floated under firm pressure to produce a dense, smooth, uniform surface free from trowel marks.

PS G 5.5.11 **Watertight Concrete**

Add the following to G 5.5.11:

The following sections of the works are required to hold or exclude water and shall be regarded as water retaining structures:

21 a) Reservoir

PS G 5.5.11.2 **Requirements and tests for water tightness of structures**

The completed structure shall be watertight, and the quality and finish of the work shall be such that no after-treatment of the work such as plastering or cement wash is necessary to ensure compliance with this requirement.

The works will not be certified practical complete until the structures enumerated in PS G 5.5.11 has been proved by testing to be watertight.

Upon completion of construction and when so agreed by the Engineer, the structure shall be filled by the gradual admission of water until the water level reaches the designed maximum level.

The water level shall then be carefully noted and recorded by the Engineer in relation to a fixed benchmark, and the structure shall be allowed to remain filled for a period of 2 (two) weeks or such longer time as may be required to permit complete saturation of the concrete. During this period, the Engineer will take readings and the results so obtained will be available for the information of the Contractor.

At the end of this period more water shall be added, if necessary, to bring the water level back to the designed maximum level and the water shall be left undisturbed for a period of at least 4 (four) days during which time the Engineer shall again record the level at regular intervals. The structure shall be considered to be watertight if the drop-in water level does not exceed 6 mm in 96 (ninety six) hours in the case of a roofed structure and if no leakage is apparent.

The acceptable drop in level in the case of an unroofed structure shall be such that it allows for normal evaporation during the time of the test.

If appreciable leakage is evident at any stage of the filling or testing or if, in the opinion of the Engineer, the degree of water tightness is unsatisfactory, the Contractor shall, when so ordered by the Engineer, discontinue the test immediately

and at his own expense take approved steps to rectify the work. The work of rectification shall be continued assiduously until, on repetition of the test procedure, a satisfactory test result is obtained, and the degree of water tightness is acceptable.

Backfilling around structures shall not commence until a satisfactory test result has been obtained.

The Engineer shall have the right to retest the structure before the expiry of the defects liability period and the results of these tests will be made available to the Contractor. If these tests indicate to the Engineer that the degree of water tightness is unsatisfactory, the Engineer (before issuing the final certificate) will be entitled to order the Contractor to rectify the work at his own expense in such a manner as will cause least interruption of the water supply to consumers and will ensure that the degree of water tightness of the structure is satisfactory.

PS G 5.6 STERILISATION OF STRUCTURES HOLDING POTABLE WATER

The structures shall be sterilised before testing, and before retesting, for water tightness.

The walls, floors and soffits of roof slabs shall be hosed down and brushed until clean and free from loose material.

The structures shall then be filled with clean water containing 150 g/m³ of calcium hypochlorite, to a water depth of 150 mm. The walls shall be thoroughly washed down after which all dirty water shall be flushed out.

Staff doing the washing down with the chlorine solution shall wear rubber boots.

PS G 5.7 JOINING NEW CONCRETE TO EXISTING

Where partial demolition is required for extension work to existing structures, the contact face shall be cut to predetermined line and level, and any loose and fragmented material shall be removed, and projecting steel cleaned and bent as directed by the Engineer. Where partial demolition is not required but extension work only, the contact surface shall be brushed and cleaned of all dirt and loose particles.

If dowels are required, they shall be installed in holes drilled into the existing structure, in accordance with the details shown on the drawings, and secured by means of an approved type of epoxy bonding compound such as Sika AnchorFix-3 of Sika or similar.

Fresh concrete shall be bonded to the old concrete with an approved type of epoxy bonding compound, such as Sikadur-32 ZA of Sika or similar.

G 8 MEASUREMENT AND PAYMENT

G 8.1 MEASUREMENT AND RATES

PS G 8.1.1 Formwork

Delete the following in G 8.1.1.3(c):

"and for different prop heights for beams and slabs".

Add the following paragraph:

e) No payment shall be made for formwork to sloping sides of the clarifier walls and for the sloping surfaces of the troughs in the clarifier nor for any other surface sloping at up to the end including 5°.

Finishes to these surfaces shall be measured once only under PS G 8.4.4.

PS G 8.1.3 **Concrete**

Add the following to PS G 8.1.3.1(d):

Strip foundations and encasement of pipes under structure or elsewhere shall be cast directly against the sides and bottoms of excavations. No payment shall be made for additional concrete in over-break.

Delete the full stop at the end of G 8.1.3.3(a) and add the following:

"and special steps necessary before depositing concrete during cold weather, as prescribed in PS G 5.5.9".

G 8.2 **SCHEDULED FORMWORK ITEMS**

PS G 8.2.5 **Narrow Widths ……..……. Unit : m**

Substitute G 8.2.5 with the following:

Narrow widths of formwork shall not be measured separately but shall be included in G 8.2.1 and G 8.2.2, as applicable.

PS G 8.2.7 **Chamfers Exceeding 20 mm x 20 mm, Grooves and Rebates ……. Unit : m**

The size of chamfers, or the width and depth in the case of grooves and rebates, is stated.

G 8.4 **SCHEDULED CONCRETE ITEMS**

PS G 8.4.4 **Unformed Surface Finishes ……. Unit : m^2**

Add the following to G 8.4.4:

The concrete surface finishes under screeds, granolithic finishes or benching as prescribed in PS G 5.5.10 shall not be measured separately. The rates for the related concrete items shall also cover the cost of these surface finishes.

PS G 8.4.7 **Concrete Complete with Formwork and/or Trowel Finish …….. Unit : m^3**

The rate shall cover the cost of the provision of concrete (made from ordinary Portland cement, unless otherwise scheduled), mixing, testing, placing, compacting, the forming of stop-ends and unforeseen construction joints, striking-off or levelling as applicable, floating and curing and repairing where necessary, together with the cost of all parts of formwork in contact with the concrete and the necessary bearers, struts, and other supports, plus the layout and plant necessary to erect and strike such formwork.

PS G 8.8 **TEST STRUCTURE FOR WATER TIGHTNESS …….. Unit : Sum**

The rate shall cover the cost of all equipment and labour necessary to test the structure for water tightness as described in PS G 5.5.11.1, including the supply of water and filling such structure.

No additional payment will be made for retesting the structure for water tightness after the repair of leaks.

PS G 8.9 **STERILIZE STRUCTURE …….…… Unit : Sum**

The rate shall cover the cost of all equipment, water, chemicals and labour necessary to sterilise the structure.

No additional payment will be made for re-sterilising the structure before retesting for water tightness.

PS G 8.10 **GROUT PIPES INSTALLED ..... Unit : No**

The rate shall cover the cost of scrubbing, cleaning and preparing the concrete surface, providing an approved non-shrink epoxy grout, placing and ramming of it solidly into all voids, formwork and finishing to a smooth watertight surface.

SECTION 2 : PROJECT SPECIFICATION

SANS 1200 L : MEDIUM PRESSURE PIPELINES

L 3 MATERIAL

PS L 3.1 GENERAL

Substitute the first sentence of L 3.1 with the following:

"Types and classes of pipes shall be as scheduled."

Add the following:

"PS L 3.7.3 STAINLESS STEEL PIPES

PS L 3.7.3.1 General

Stainless steel pipes shall be plain ended or flanged, as shown on the drawings. Pipe wall thicknesses shall comply with ASTM Schedule 105 and flanges shall comply with SANS 1123, Table 1600/3.

PS L 3.7.3.2 Grade and welding procedure

The grade of stainless steel shall be 304.

Welding procedure shall be only those recommended by the stainless steel manufacturer or by the South African Institute of Welding. Written confirmation that welding has been carried out by welders coded to ASME IX, 1995, shall be provided prior to manufacturing.

Welds shall be smooth and free from blowholes, undercuts, sharp projections and similar visual defects.

Stainless steel fabrications shall be carried out in a clean working place where there is no contamination by mild steel. Grinding and polishing equipment shall be dedicated and shall not be contaminated with other metals.

Stainless steel shall be handled in such a way as to avoid scratching of the surface.

PS L 3.7.3.3 Pickling and passivation

Cut edges, welds end heat affected surfaces shall be pickled and passivated to remove all discolorations, lickling and passivating pastes shall be used as prescribed by the manufacturer.

Care shall be taken not to exceed the maximum contact time recommended. No heat discolouration shall remain after pickling and passivation. After passivation, surfaces shall be thoroughly washed to remove all traces of acid."

PS L 3.8 **JOINTING MATERIALS**

PS L 3.8.3 **Flanges and accessories**

Add the following to L 3.8.3:

"Flanges shall be drilled to SANS 1123 Table 1600/3.

Bolts, nuts and washers shall comply with PS L 3.9.5"

PS L 3.8.4 **Loose Flanges**

Substitute the first sentence of the last paragraph of L 3.8.4 with the following:

"Bolts and nuts shall comply with the requirements of SANS 135."

PS L 3.9 **CORROSION PROTECTION**

PS L 3.9.5 **Joints, Bolts, Nuts and Washers**

Substitute L 3.9.5 with the following:

"All joints, bolts, nuts and washers shall be stainless steel. Stainless steel bolts used on mild steel pipes and fittings shall be provided with nylon sleeves and felt washers to prevent contact between the stainless steel and the mild steel."

PS L 3.10 **VALVES**

Detail technical information of all valves must be submitted to the Engineer for approval before ordering.

PS L 3.10.1 **Gate/Scour Valves**

All gate/scour valves must be cast iron AVK valves in accordance with SANS 664 and SANS 665 and fittings in accordance with JASWIC R18-1986 or similar and of the water works type suitable for a working pressure of 1,6 MPa. All gate/scour valves must be able to open and close against a differential pressure equal to work pressure.

Gate/scour valves shall be as shown on the drawings and shall open anti-clockwise. The direction for opening and closing shall be permanently displayed on the valves. Valves shall have non-rising spindles.

Pipes shall not be testes against a closed valve. Thrust blocks for test sections shall be approved by the Engineer prior to testing of pipes.

PS L 3.10.2 **Fire Hydrants**

Fire hydrant steel pipes shall be manufactured of SANS 62, heavy-duty pipe. All joints shall be flanged to SANS 1123 Table 1600/3, except where Viking Johnson couplings are shown on the drawings. The pipe-work shall include all pipes, joints, valves, hydrant tee, fittings and the Pretoria type vandalism proof hydrant.

Hydrant installations shall be supplied with all the fittings and pre-cast concrete support stand complete as shown on the drawings.

PS L 3.10.3 **Butterfly Valves**

Butterfly valves shall be fully flanged.

The valves shall be fitted with gearboxes with stainless steel shafts. The body shall be clad with rubber.

Butterfly valves shall be similar and equal to the “compact” type with a working pressure of 1,0 MPa.

Flanges shall be drilled according to SANS 1123 Table 1600/3.

PS L 3.10.4 **Air Valves**

Air valves shall be of the “Vent-O-Mat RBX”- type and shall be able to withstand pressures of up to 1,6 or 2,5 MPa whichever is applicable.

The valves shall vary between 25 mm to 50 mm diam.

PS L 3.10.5 **Electromagnetic Flow Meter**

The meter shall be a 100 and 250 mm diameter flanged meter with the following features:

a) stainless steel flow tube,
b) obstruction less bore,
c) automatic zero and span stability,
d) no need for electrode cleaning,
e) sensor removable with pipe under pressure,
f) grounding ring,
g) remote converter in control room.

The meter shall be able to read a min flow of 10 ℓ/s and a max flow of 100 ℓ/s.

L 4 **PLANT**

L 4.1 **HANDLING AND RIGGING**

Add the following:

PS L 4.1.1 **Transportation**

Pipes and valves shall be protected during transportation and handling against damages caused by impact, dropping, etc. Special care shall be taken during transportation to protect pipes and valves. All pipes and valves shall be inspected for defects immediately before laying and faulty pipes/valves or pipes/valves that have suffered damage, which would affect their serviceability, shall not be used in the Works.

PS L 4.1.2 **Off-loading and storage**

Pipes/valves which cannot be off-loaded by hand shall only be lifted by means of suitably approved broad band slings. The use of wire, chains, hooks, crowbars and similar items shall not be permitted, and the pipes, fittings and specials shall not be handled in such a manner as could cause damage to occur.

Pipes, fittings and specials shall at no time be laid, stacked or rolled directly into the ground but shall be supported on suitable padded cradles or other approved material near each end of the pipe, fittings or special. Care shall be taken where pipes with fitted couplings are handled or stacked to prevent any pressure on the couplings.

All pipe work as well as the rubber sealing rings in pipe couplings shall be protected from the elements to prevent deterioration of the pipe work.

No concessions will be made in the above regard and failure on the Contractor's part to comply shall be considered just cause for the Engineer to order such part of the works to be closed down.

Where the pipes are to be stored on site it is essential that the storage are be as level as possible and cleaned of any object that may cause damage to the pipes. When a load of pipes arrives ensure that a representative of the manufacturer is present to supervise the off-loading.

PS L 4.1.3 **Inspection on delivery**

The Engineer will thoroughly inspect all pipes, fittings and specials delivered to the site but his acceptance of same as being in good condition shall not relieve the Contractor of any of his obligations or responsibilities under this Contract.

Materials rejected by the Engineer shall be removed from the site and shall be replaced by other approved materials by the Contractor at his own expense.

PS L 4.2 **SETTING OUT**

Add the following:

Alignment of the pipes may be done either by means of infra-red sighting equipment or by sight rails. The following method should be followed if alignment is to be done by sight rails:

Prior to the preparation of the pipe bedding, the Contractor is to erect sight rails of 38 mm x 150 mm timber at intervals of a maximum of 60 m or at points of change of pipe gradient, whichever may be the lesser. These shall be supported by wooden posts on each side firmly fixed on solid ground and the rails shall be accurately placed in position as regards alignment and invert level of the proposed trench. The centre line of the trench (i.e. pipeline) shall be denoted on each sight rail, both back and front by a single vertical line drawn thereon, and the rail on either side of the centre line painted in two contrasting colours.

The Contractor shall also provide boning rods of an appropriate length marked in even centimetres for use in the fixing of the trench bottom to the correct line and level.

PS L 4.3 **TESTING**

Add the following to L 4.3

The Contractor must ensure that the test equipment is in good order and that it is calibrated.

L 5 **CONSTRUCTION**

L 5.1 **LAYING**

L 5.1.1 **GENERAL**

The supplier will provide the contractor with an induction course on good practice for the installation and testing of the pipes. The consultant will inspect the coarse outcome for approval. The final responsibility of the quality of installation lies with the client.

PS L 5.1.4 **Depths and Cover**

PS L 5.1.4.1 **Cover**

The minimum cover to the soffit of pipes is 900 mm and 1500 mm when a street is crossed.

L 5.6 **VALVE AND HYDRANT CHAMBERS**

PS L 5.6.1 **General**

Substitute the first sentence of L 5.6.1 with the following:

The drawings of valve and hydrant chambers, which are in the document containing drawings, shall supersede the corresponding drawings in the standard specification.

L 5.5 **ANCHOR/THRUST BLOCKS**

Measurement for anchor blocks will be determined on site by the Engineer after each position has been inspected and shall be according to the drawings.

PS L 7 **TESTING**

PS L 7.3 **STANDARD HYDRAULIC PIPE TEST**

PS L 7.3.1 **Test pressures and time of test**

Add the following to L 7.3.1.1:

Pipes shall not be tested against isolating valves. Special blank flanges or end caps, fully anchored, shall be provided for testing.

Substitute L 7.3.1.2 with the following:

The test pressure for field testing shall be 1, 5 times the rated maximum working pressure of the pipe.

Substitute L 7.3.1.3 with the following:

The test pressure applied according to L 7.3.1.2, must, with allowance for any level differences along the pipeline, be such that the pressure at any point in the pipeline will be at least 1,25 times and not more than 1,5 times the rated working pressure of the pipe.

PS L 8 **MEASUREMENT AND PAYMENT**

PS L 8.2 **SCHEDULED ITEMS**

PS L 8.2.3 Refer to Schedule of Items Mechanical Componanats

SECTION 2 : PROJECT SPECIFICATION

SANS 1200 LB : BEDDING (PIPES)

LB 3 **MATERIALS**

PS LB 3.1 **SELECTED GRANULAR MATERIAL**

Substitute LB 3.1 with the following:

Selected granular material shall be an aggregate, sand or granular material, all of a non-cohesive nature and free from any organic material, of which the grading analysis shows 100% passing a 13,2 mm sieve and not more than 5% passing a 0,075 mm sieve.

PS LB 3.2 **SELECTED FILL MATERIAL**

Substitute LB 3.2 with the following:

The requirements of PS LB 3.1 shall apply mutatis mutandis.

PS LB 3.3 **BEDDING**

Add the following to LB 3.3:

All pipes shall be classified as rigid pipes and shall be laid on a Class C bedding except house/yard connections, which shall be classified as flexible pipes.

LB 5 **CONSTRUCTION**

LB 5.1 **GENERAL**

PS LB 5.1.4 **Compacting**

Substitute “90 % of MOD AASHTO” in LB 5.1.4 with “93 % of MOD AASHTO (100 % for sand)”.

LB 8 **MEASUREMENT AND PAYMENT**

LB 8.1 **PRINCIPLES**

PS LB 8.1.1 **Supply of bedding materials measured separately**

Add the following to LB 8.1.1.

Payment for bedding material and selected fill material shall only be made if the selected trench-excavation material cannot be used in the same position as bedding material but has to be obtained from another part of the site of works or designated borrow pits, or from commercial sources.

PS LB 8.1.4 **Separate items for cradle and blanket**

Substitute LB 8.1.4 with the following:

No distinction shall be made between material for the bedding cradle and selected fill blanket, and the material shall comply with the requirements for material for bedding cradle.

PS LB 8.1.5 **Disposal of displaced material**

Substitute LB 8.1.5 with the following:

Surplus displaced material shall be evenly spread over the trench to form the shape of a rounded berm. Cross berms will be constructed every 20 meters with the surplus material where the trench is on a slope steeper than 4%. Rocks and stones larger than 50 mm in diameter must be spoiled at a designated site as indicated by the Engineer. No overhaul will be payable. No extra payment will be applicable to this action and it will be deemed included in other rates.

SECTION 2 : WORK SPECIFICATION

DWS 1130 : DESIGN, MANUFACTURE AND SUPPLY OF STEEL PIPES, SPECIALS AND FITTINGS FOR DUTIES UP TO 4,6 MPA DESIGN PRESSURE

1. SCOPE

This specification covers the design, manufacture and supply of bare, electric welded low carbon steel pipes, specials and other fittings for the conveyance of water at ambient temperatures and at medium pressures.

2. INTERPRETATIONS

2.1 Supporting specifications

2.1.1 Where this specification is required for a project, the following specifications shall form part of the contract document:

(a) Project specifications;
(b) SABS 1200A and SABS 1200AA, as applicable;

2.1.2 Reference is made to the latest issues of the following standards:

DWS	1131	Lining and coating of steel pipes and specials.
SABS	1200	As given in 2.1.
SABS	62	Steel pipes and pipe fittings up to 150 mm nominal bore, suitable for screwing to SABS 1109 pipe threads.
SABS	719	Electric welded low carbon steel pipes for aqueous fluids (ordinary duties).
SABS	974	Rubber joint rings (non-cellular).
SABS	1431	Weldable structural steels.
SABS	044	Welding.
SABS	0121	Cathodic protection of buried and submerged structures.
BS	534	Steel pipes and specials for water and sewage.
BS	2633	Class 1 arc welding of ferritic steel pipework for carrying fluids.
BS	2815	Compressed asbestos fibre jointing.
BS	4360	Weldable structural steels.
BS	4416	Method for penetration testing of welded or brazed joints in metals.
BS	4504	Flanges and bolting for pipes, valves and fittings. etric series.
BS	5500	Specification for unfired fusion welded pressure vessels.
SIS	05 59 00	Pictorial surface preparation standards for painting steel surfaces (Swedish)
API	5L	Line pipe.
API	1104	Standard for welding pipelines and related facilities.
AWWA	June 1955	Design of wye branches for steel pipe.
AWWA	M11	Steel pipe - a guide for design and installation. (Second edition)ISO 2084 Pipeline flanges for general use

2.2 Application

This specification contains clauses that are generally applicable to the design, manufacture and supply of steel pipes, specials and fittings for duties up to 4,6 MPa. Should no other specification for pipes of outside diameter larger than 2 220 mm be included in a contract, then the requirements of this document shall apply.

2.3 Definitions

or the purposes of this specification the definitions and abbreviations given in the applicable specifications listed in 2.1 and the following definitions shall apply:

Skelp: The jointing edges of steel coils used to manufacture spiral welded pipes.

H: The cross-sectional shape of a weld at skelp

Cut and shut bend: See definition with sketches in BS 2633

3. MATERIALS

3.1 Pipes and specials

Materials used for the manufacture of pipes and specials of nominal bore up to 150 mm shall conform to SABS 62 and API 5L: steel grades up to X52, whilst that for pipes and specials of nominal bore over 150 mm shall conform to SABS 719: steel grades A, B and C, as well as API 5L: steel grades X46, X52, X56 and X60.

Flanges shall be manufactured from steel plates conforming to BS4360, or SABS 1431 grade 300W. Specials and fittings shall be manufactured from materials conforming to SABS 62 for nominal bores up to 150 mm, and to BS 534 for nominal bores over 150 mm.

3.2 Rubber joint rings

Rubber rings shall comply with SABS 974 Class F.

3.3 Jointing materials

Bolts, studs, nuts and washers for flanges shall be of materials conforming to the requirements of BS4504 unless otherwise specified. Gaskets for flanged joints shall be of compressed asbestos fibre to BS 2815 grade A, and full faced with a minimum thickness of 3 mm. For pressures up to and including 1,6 MPa, cloth-inserted rubber may be used.

4. PLANT

The Contractor shall supply and maintain suitable tools, plant and equipment to manufacture and supply steel pipes, specials and fittings to the required standard.

5. GENERAL REQUIREMENTS

5.1 Design of pipes

The design stress for pipes subjected to the specified design pressures shall be 60% of the minimum yield stress of the steel. Unless otherwise specified in the Schedule of Quantities or on the drawings, the minimum pipe wall thickness to prevent buckling of straight piping due to internal sub-atmospheric pressures, shall not be less than the following:

Outside diameter (mm)	Minimum wall thickness (mm)
219,1 to 558,8	4
609,6 to 660,4	5
711,2 to 812,8	6
863,7 to 1092	8
1118 to 1245	10
1397 to 1620	12
1708 to 1860	14
2020 to 2220	16

5.2 **Dimensional requirements**

Unless otherwise specified in the Schedule of Quantities or on the drawings, all line pipes shall be of one fixed standard length between 9 metres and 19,5 metres. Standard pipes from which samples for destructive testing have been cut may be jointed together by butt-welding to form single pipe lengths of the required standard length.

The tolerances on all other dimensions shall be in accordance with SABS 719 clause 4.1, except that for pipe outside diameters bigger than 1 250 mm it shall be +6 mm and -6 mm. The tolerances on the outside diameters of pipe ends and bodies shall be as specified for pipe diameters of 250 mm to 1 250 mm.

5.3 **Fabrication**

5.3.1 **Welding**

Welds shall comply with SABS 719, SABS 044 and BS 2633 as modified below.

a. Sections 1, 2 are excluded.
b. Section 8

In addition to clause 8.1 the following shall also apply:

All butt-welds and branch fillet welds on specials shall where considered possible (refer clause 3.2.4.2, Section 3) have an internal weld. The weld bead of this internal weld shall not extend above the prolongation of the original inside surface of the pipe by more than 1,0 mm. Internal reinforcement in the form of backing rings at weld seams shall not be permitted.

c. Section 10

Procedure qualification and qualifying tests shall be restricted to branch connections only.

The internal weld bead/upset metal and flash on the inner surface shall not exceed 1 mm. For pipes and specials to be jointed by butt welding, the internal weld bead shall not protrude more than 1 mm into the bore of the pipe or special. For electric resistance welded pipes, the height of upset metal and flash on the inner surface shall not exceed 1 mm. For pipes and specials to be jointed by butt welding, the internal weld bead shall be ground flush with the pipe body for a length of 200 mm from the ends to be jointed. For pipes and specials to be coupled by flexible couplings, external weld reinforcement or upset metal and flash shall be ground flush with the pipe body for a length of 200 mm from the end to be coupled.

Where automatic submerged-are welding is employed, at least one pass shall be made on the inside and at least one pass on the outside. This shall apply for double jointing of pipes in the factory as well. The number of longitudinal weld seams shall not exceed:

(a) 1 for pipes up to 1 000 mm nominal diameter;
(b) 2 for pipes larger than 1 000 mm and up to 2 220 mm nominal diameter.

For pipes to be jointed by flexible couplings the pipe manufacture is required to weld steel plates not less than 50 mm x 75 mm x 6 mm thick to each end of all pipes during the pipe manufacturing process, (i.e. before priming, lining and coating).

All manual or semi-automatic welds and repair welds shall only be undertaken by welders qualified under the tests laid down in the Code of Practice for Welding SABS 044.

5.3.2 **Pipes**

Pipes shall be manufactured in conformity with SABS 719.

5.3.3 **Specials and fittings**

5.3.3.1 **General**

All specials and fittings shall be designed and manufactured by the Contractor in accordance with the general arrangement shown on the drawings and/or described in the Schedule of Quantities, in conformity with SABS 62 or sections 3 and 4 of BS534. In the latter case specials shall be manipulated or fabricated by welding from pipes which have been tested to SABS 719. Detailed drawings shall be approved by the Engineer.

5.3.3.2 **Bends**

Bends shall either be smooth formed or segmented. The maximum angle between oblique butt-ends of segments for gussetted bends shall not exceed 22£ degrees. Cut-and-shut bends shall not be permitted. Segmented bends shall be classified as short, medium and long with radii equal to one, two or three diameters respectively. All bends shall however be of a long radii type, unless otherwise specified in the Schedule of Quantities or on the drawings.

5.3.3.3 **Branch connections**

Branch connections shall have barrel and branch plate thicknesses such that the maximum stress shall not be greater than that for an uncut pipe of the theoretically required minimum thickness. However, where it is more economical to provide external reinforcement in the form of saddle-type rings or triform shoes, these forms of reinforcement shall be used to achieve the same results. The attachment of reinforcement to the pipe branches shall be by full penetration welding. Branch connections shall be as remote as possible from the seam weld on the barrel, and except where specifically indicated to the contrary on the drawings, the positioning and extent of external reinforcement is to be determined by the following methods:

(i) Saddle-type reinforcement: section 13.3 of AWWA Manual M11.
(ii) Triform-shoe reinforcement: in accordance with "Design of Wye Branches for Steel Pipe" by H.S. Swanson and co-authors, published in the Journal of the AWWA, June 1955.

Scour valve tees are to be at right angles to the barrel of the pipe, but tangential to the circumference at the invert of the pipe. The flanges are to be aligned to suit the gradient of the pipeline as indicated on the drawings.

Unless otherwise specified complete flanged air valve and access branches shall be supplied loose with the one end profiled and prepared for welding to the pipe or special. Branches are to be prealigned to suit the pipeline gradient as indicated on the drawings.

5.3.3.4 **Reducers**

Taper pieces shall not have more than two longitudinal weld seams.

5.3.3.5 **Flexible couplings**

Flexible couplings shall be of the Viking-Johnson type with centre register, except where specified to the contrary in the Schedule of Quantities or on the drawings. Flexible couplings shall be supplied complete with all necessary bolts, nuts and rubber jointing rings.

5.3.3.6 **Insulated joints**

Insulated joints shall have their insulation material arranged as given in SABS 0121, unless otherwise specified.

5.3.3.7 **Flanges**

Flanges shall be of the steel-plate for welding type and shall have flat joint faces, with dimensions and joint surfaces in accordance with BS 4504 or ISO 2084, unless otherwise specified in the Schedule of Quantities or on the drawings. For flange thickness not covered in BS 4504 and for domed and conical ends the various thicknesses and methods shall be calculated in accordance with section 3 and where applicable manufactured in accordance with the remainder of BS 5500. Back surfaces may be left unmachined. All flanges shall be suitable for field welding to pipes and specials and shall conform to BS 2633, section 7, with preparation of plate flanges as shown in figure 41 ("slip-on") for pipes and specials up to 100 mm N.B. and figure 39 or 40 ("bore and fillet") for pipes and specials 125 mm N.B. and larger. Unless otherwise specified, jointing material i.e. bolts, nuts and washers, in conformity with BS4504 shall be supplied by others.

6. **MARKING OF PIPES AND SPECIALS**

All pipes and specials shall be clearly hard stamped alongside a longitudinal or spiral weld on one end of the pipe with the following:

(a) grade and thickness of steel;
(b) serial number of the pipe or specials;
(c) nominal diameter;
(d) hydraulic test pressure.

The applicable drilling table shall be stamped on the periphery of all flanges. Bends shall have their centre plane marked with two small punch marks close to both ends to facilitate correct positioning in laying.

7. **STORAGE, HANDLING AND TRANSPORT**

Pipes and specials shall be protected against damage at all stages from manufacture to delivery. The ends of all pipes and specials shall be protected against denting. Pipes shall be transported and stacked in a manner such as to prevent deformation of the pipe body in excess of 2 percent of the diameter. Dents causing a protrusion in excess of 3 mm into the interior of the pipe shall be repaired by cutting out. The Contractor shall be responsible for dispatching and transporting of the pipes to site and off-loading. Suitable access along the pipeline route will be provided unless otherwise specified.

Access for delivery on site might be restricted by poor weather conditions and the Contractor shall make due allowance for such disruption. Unless otherwise specified the pipes shall be off-loaded adjacent to the laying position, and placed on sandbags or other approved protective supports.

As indicated on the drawings, the Contractor shall stack the pipes, specials and fittings at the top or bottom of very steep inclines from where the pipeline construction Contractor will transport them to their destination as required. He will furthermore provide in the rates for his delivery trucks to be hauled/towed up the steep inclines along the pipeline route where necessary.

8. INSPECTION AND METHODS OF TEST

8.1 General

Factory inspection, supervision of tests, and adjudication of test records shall be carried out by an independent Inspectorate appointed by the Employer to act on behalf of the Engineer. Tests and inspections shall be carried out at the manufacturer's works at his expense. He shall provide all necessary testing facilities, labour, instruments, equipment and samples that might be required, free of charge. The Inspectorate shall be afforded every facility during the course of manufacture and testing to enable the inspection to be carried out effectively. All test samples shall be selected by the appointed inspectors, and all instruments used for testing purposes shall be approved by the inspectors and if in their opinion any instrument should require calibration, such instruments shall be calibrated at the expense of the Contractor, by the SABS or other such body as may be approved by the Inspectorate. No mechanical working or straining of pipes and specials shall be allowed after testing and inspection.

8.2 Non-destructive inspection

8.2.1 Visual inspection

All finished pipes and specials shall be visually examined and shall be free of injurious defects as defined in API 5L section 10.7. In addition welds on specials shall be inspected by the application of a penetrant-dye on the inside of the welds. No trace of the dye should appear on the outside.

8.2.2 Ultrasonic inspection to API 5L

Pipes shall be made by an approved welding process and 100 percent of all longitudinal or spiral welds on straight pipes shall be checked with an approved ultrasonic method capable of continuous and uninterrupted inspection of the weld seam in accordance with API 5L, sections 9.14, 9.15, 9.16, and 9.17, except that the equipment shall be checked with an applicable reference standard at least twice every working turn.

8.2.3 Radiographic inspection to API 1104

(a) Longitudinal welds: All electric fusion welded pipes shall be inspected by radiological methods for a distance of 200 mm from each pipe end.

(b) Spiral welds: All electric fusion welded pipes shall be inspected by adiological methods for a distance of 100 mm from each end of each length of pipe and of the complete "H" at all skelp and welds, including 150 mm of the spiral welds in both directions away from the intersection points of the skelp and welds.

(c) Circumferential butt welds and welds on specials: 100 percent of the weld length shall be examined. When consistently acceptable results are obtained, the number of welds to be so tested may be reduced by mutual agreement between the Engineer, Inspectorate and Contractor.

(d) Repairs

(i) Straight piping - 100 percent of the total length of all repairs shall be examined radiographically. Where repairs are made before ultrasonic

inspection, and such repairs pass ultrasonic inspection, no further radiographic inspection of same is required.

(ii) Specials - 100 percent of all repairs shall be examined radiographically.

(e) Pipes for rail, road and river crossings: 100 percent of the total length of all welds shall be examined radiographically.

8.2.4 **Hydrostatic testing**

All pipes shall be hydrostatically tested to a pressure such as to produce a circumferential tensile stress in the steel not less than 90 percent of the minimum yield stress of the steel, or 9 MPa, whichever is the lesser. Each individual straight pipe shall be subjected to a hydrostatic test in accordance with the methods described in API 5L section 5. Leaks or sweats shall be considered injurious defects. Should it not be possible to hydrostatically test straight piping and/or specials, a liquid penetrant test shall be done on all welds over and above the non-destructive tests specified above. This will only be applicable with the prior written approval of the Engineer.

8.2.5 **Liquid penetrant testing**

Where requested by the Inspectorate, liquid penetrant testing shall be done in accordance with BS 4416.

8.2.6 **Magnetic particle testing**

Where requested by the Inspectorate, magnetic particle testing shall be done in accordance with ASME Boiler and Pressure Vessel Code, Section V, Article 7.

8.3 **Repair of injurious defects**

Injurious defects found by non-destructive testing of welds, visual examination, hydrostatic testing or determined by any other means to exceed the limitations in API 5L section 10.7 shall be repaired in accordance with API 5L sections 10.8 and 10.9, but subject always to the requirements of this specification.

8.4 **Destructive testing**

8.4.1 **Tests**

Destructive tests shall be performed in accordance with SABS 719 clause 7.2 on the first pipe and thereafter on one of every 500 subsequent pipes.

8.4.2 Sampling and compliance with the specification. This shall be performed in accordance with SABS 719 clause 6.

9. **MEASUREMENT AND PAYMENT**

Measurement and payment shall be per linear metre of straight pipe fabricated, supplied and delivered to site. Measurement and payment of specials and fittings shall be per the number of each special and fitting fabricated, supplied and delivered to site. Where pipe linings and coatings are applied prior to delivery, the rates for pipes, specials and fittings shall include for all such linings and coatings as required under Departmental Specification DWS 1131, unless otherwise specified in the Schedule of Quantities.

SECTION 2 : WORK SPECIFICATION

DWS 2020 : QUALITY CONTROL

1. GENERAL QUALITY CONTROL REQUIREMENTS

1.1 RESPONSIBILITY FOR QUALITY

The Contractor's Quality Management System shall be in accordance with ISO 9000.

The Contractor shall implement a comprehensive Quality Control programme and accept full responsibility for the quality of his workmanship and material used, irrespective of any quality surveillance that may be carried out by the Engineer or his appointed representative.

In keeping with the principles contained in the above mentioned code of practice, the Contractor or any nominated and approved Sub-Contractor(s) shall -

(a) be responsible for compliance with all the clauses of this specification in every respect;

(b) carry out all inspections and tests called for in the specification in the presence of the Engineer or his appointed representative. The cost of these inspections and tests shall be included in the Tender prince; and

(c) draft a quality control plan for manufacture and comply with the Departmental quality plan for corrosion protection of all components indicating all the intended stages of testing during manufacture, cleaning, preparation and application as well as hold points for independent quality surveillance.

The quality control plans will not be compromised once in agreement and shall be adhered to at all times.

1.2 NOTICE OF INSPECTION

The Engineer shall be notified at least seven days in advance, or as otherwise agreed, of impending inspections or when cleaning and first coat application are to be carried out as well as for witnessing the points in terms of the agreed Quality Control Plans.

1.3 CONTRACTOR QUALIFICATION

The Contractor and Sub-Contractor(s) shall satisfy the Project and Corrosion Engineers that they have the management, facilities and equipment, skilled staff, a quality control procedure and required test methods and standards to carry out quality control during manufacture and corrosion protection.

The above mentioned Contractors shall be subject to a Quality Audit.

1.4 SUBMISSION FOR APPROVAL

The Contractor shall submit the following to the Engineer, including data sheets where applicable, for approval:

1.4.1 For manufacture:

(a) Drawings
(b) A programme
(c) A quality control plan
(d) A draft Operation and Maintenance manual

1.4.2 For corrosion protection:

(a) A programme
(b) The Departmental Quality Control Plan for corrosion protection duly completed
(c) Blast material
(d) Coating products
(e) Pickling and passivating products

1.4.3 Manufacture and corrosion protection programmes

The manufacture and corrosion protection programmes shall state the time and place when the following will be conducted:

(a) Inspection of material
(b) Hydrostatic testing of uncoated castings, pipes and fittings
(c) Manufacture of components
(d) Fettling or dressing
(e) Degreasing
(f) Water soluble salts test
(g) Blast cleaning and application of the first coat.
(h) Application of intermediate and final coats.
(i) The commencement of site repairs.

1.5 SUBSTANDARD QUALITY CONTROL

All material, certification and records of the Contractor shall be subject to examination by the Engineer.

This shall include the checking and testing of the equipment. If any deviation is found, additional testing and quality surveillance shall be carried out.

If the additional testing confirms inaccurate quality control by the Contractor, all work shall be stopped and shall only proceed after remedial action has been implemented.

1.6 ACCESS FOR SURVEILLANCE

For the purpose of carrying out quality surveillance, the Engineer or his representative shall be granted access to any part of the Contractor's premises relevant to the work being carried out, at any reasonable time.

The Contractor shall provide, at his own cost, any equipment or labour necessary to gain access to surfaces which are coated, to be coated or are in the process of being coated.

1.7 COST OF QUALITY CONTROL

The cost for quality control shall be included in the Tender price.

When surveillance results in rejection of the lot or when notice by the Contractor results in a fruitless trip, the cost borne by the Department shall be debited against the Contractor's account.

If additional inspections, tests and analyses requested by the Department prove that the corrosion protection of the equipment is in accordance with the Specification, the costs of the inspections and/or tests including transport will be defrayed by the Department. However, should the additional investigations prove that the manufacture and/or corrosion protection of the equipment does not conform to the Specification, the cost shall be defrayed by the Contractor.

The Department shall have the right, without prejudice to any other legal remedy, to deduct such costs from payments due to the Contractor under the Contract.

Where equipment or services fail to meet the Contract requirements but are nevertheless accepted at an agreed revised price, the costs with regard to

inspections, test and analyses shall be for the Contractor's account unless otherwise directed by the Department.

1.8 NON-COMPLIANCE WITH THE SPECIFICATION

Equipment, materials and services that do not conform to the requirements of this Specification shall be rejected.

Such rejected equipment shall be held at the cost and risk of the Contractor who shall, when called upon, and at his own cost, repair the defects or corrosion protection according to the Contract.

Failing satisfactory repair of rejected equipment, the equipment shall be returned to the Contractor at his cost and risk without any opportunity to substitute the rejected equipment. Alternative equipment may be purchased at the Contractor's expense or an approved Contractor may be employed to do the repair to the corrosion protection.

Should the Contractor fail to comply with the provisions of the Corrosion Specification, the Completion Certificate shall not be issued.

1.9 FINAL ACCEPTANCE

No equipment shall be accepted nor be delivered to site unless all Quality Control requirements have been complied with.

2. QUALITY CONTROL RECORDS

2.1 COATING AND MATERIAL RECORDS

Quality control, material and coating records for all stages of the work, i.e. batch numbers of materials used, environmental conditions and all test data shall be recorded on the approved Quality Control Plan for manufacture and the Departmental Quality Control Plan for corrosion protection.

Certificates for all materials used shall also be required.

2.2 DATA SHEETS, SPECIFICATIONS AND CODES OF PRACTICE

The Contractor shall have available the latest issues of the following:

(a) A copy of this Specification.
(b) Relevant Standard Specifications and Codes of Practice.
(c) Manufacturer's data sheets for materials to be used.

The above mentioned shall be available to all the Contractor's Quality Control and Production personnel.

2.3 QUALITY CONTROL RECORDS

Accurate and detailed quality control records shall be kept by the Contractor for all stages of the work.

Data of corrosion protection shall be recorded in the following Departmental Record sheets for corrosion protection:

(a) Quality Control Plan
(b) Coating Application Records
(c) Surface Profile and Dry Film Thickness readings

All the quality control records shall be available for inspection by the Engineer or his representative.

Incomplete, inaccurate or inadequate records shall be regarded as non-compliance with the Specification.

The collection of documents for each item of equipment shall be collated and bound in a logical manner and retained by the Contractor as proof of quality achieved. These shall be available on demand for quality control and part payment releases. The records shall be handed over to the Engineer on completion of the work.

The records shall be bound in the Operation and Maintenance manuals where such manuals are supplied.

2.4 PROVISION FOR TESTING

The Contractor shall at no additional cost provide all material, samples, labour and the necessary calibrated instruments which may be required for the purpose of inspection, testing and analyses, unless otherwise specified.

3. QUALITY SURVEILLANCE BY THE ENGINEER

3.1 INSPECTION BY THE ENGINEER

Inspection of equipment shall be carried out by the Engineer, his appointed representative or a nominated and approved inspection authority at the manufacturer’s and corrosion applicator’s works.

The Engineer's inspection shall in no way relieve the Contractor or Sub-contractors of any of their obligations to design, manufacture and supply equipment of superior quality and workmanship in accordance with the specification.

3.2 INDEPENDENT SURVEILLANCE

The Engineer may employ an independent, technically qualified organisation to carry out quality surveillance of the work on his behalf.

The inspection authority has the right to inspect any item covered in the Contract at any stage of execution of the Contract.

Where imported supplies are to be inspected before shipment, the Contractor shall notify his suppliers abroad of the conditions applicable to inspections and also request them to notify the Department's representative abroad when consignments are ready so that arrangements for inspection may be made.

3.3 MATERIAL TESTS

The Manufacturer's material test data certification and the Contractor's quality records shall be subject to examination by the Engineer or his representative. Reasonable samples of the cleaning and coating materials to be used may be removed for testing.

Rejection of the samples shall place a hold on the use of materials of the same batch number and any components that have already been cleaned/coated with rejected material shall be reworked.

3.4 DESTRUCTIVE TESTING

The Engineer or his representative may carry out reasonable destructive tests to ascertain compliance with the Specification. Areas thus damaged shall be repaired by the Contractor to the satisfaction of the Engineer at no additional cost.

SECTION 2 : WORK SPECIFICATION

DWS 2510 : SUPPLY OF VALVES

1 SCOPE

This section covers the basic specifications for the design, manufacture and supply of valves for the transportation and control of raw water. Valves shall be manufactured in accordance with the appropriate valve codes and standards

2 STANDARDS AND DEFINITIONS

2.1 REFERENCES

When reference is made to a code, specification or standard, the reference shall be taken to mean the latest edition of the code, specification or standard; including addenda, supplements and revisions thereto.

2.2 SUPPORTING SPECIFICATION

Where this specification is required for a project, the following specifications shall, inter alia, form part of the contract.

a) SABS Standards
b) b) BS Standards
c) c) ISO Standards
d) d) DIN Standards
e) e) API Standards
f) f) ANSI Standards.

2.3 DEFINITIONS

For the purpose of this specification the following definitions apply.

2.3.1 Face to face dimensions.

The distance between the two planes perpendicular to the body axis located at the extremities of the body and ports.

2.3.2 Nominal pressure (PN).

All pressure units throughout the valve specification will be recorded in kilopascals (kPa).

Nominal pressure (PN) is a numerical designation, which is a convenient round number for reference purposes.

Note 1 : The maximum allowable working pressure depends upon the materials, design and working temperature and shall be selected from the pressure/temperature rating tables in the appropriate standards.

Note 2 : It is designated by PN followed by the allowable working pressure.

Note 3 : This definition is in accordance with ISO 7268.

2.3.3 **Nominal size (DN).**

A numerical designation of size that is common to all components in a piping system other than components designated by outside diameters. It is a convenient round number for reference purposes and is only loosely related to manufacturing dimensions in millimetres.

Note 1 : Nominal size is designated by DN followed by the size in millimetre.

Note 2 : This definition is in accordance with ISO 6708.

All equipment of the same size (DN) designated by the same PN number shall have compatible mating dimensions.

2.3.4 **Tight shut off valve.**

A valve that has no leakage past the sealing faces in it's closed position under test conditions.

2.3.5 **Low leakage rated valve.**

A valve that has an agreed leakage rate past the sealing faces when the valve is in the closed position.

2.3.6 **Regulating valve.**

A valve intended for regulating purposes, and which may have a clearance between the sealing faces when the valve is in the closed position.

2.4 **PRECEDENCE**

Any conflict between the technical requirements stated in the Project Specification and the technical requirements of this specification shall be referred to the Department for clarification.

2.5 **DEVIATIONS**

The Department will not permit any substitution or deviation from the requirements of this specification without prior approval. Any substitution or deviation from the original specification must be submitted to the Department for approval only during the tender stage of the project.

3 **GENERAL CONDITIONS AND REQUIREMENTS**

3.1 **NOMINAL PRESSURE**

Each valve is assigned a nominal pressure (PN) in kPa and shall be tested in accordance with these specified pressures.

3.2 **MINIMUM PRESSURE RATING**

1 000 kPa is considered to be the lowest acceptable pressure rating for any valve irrespective of lower system pressures.

3.3 DESIGN LIFE

All valves and appurtenant fittings shall be designed for a useful life of forty-five (45) years under the operating conditions specified in the Project Specification.

3.4 GUARANTEE

All valves shall be guaranteed against faulty design, materials and workmanship for a period of five (5) years from date of delivery. During this period the Contractor shall attend to and rectify at his own cost any defects that can be attributed to faulty design, materials and workmanship. Normal wear and tear shall be excluded.

3.5 FLANGES

Unless specified under the Project Specification, all valves shall be double flanged and drilled off centre to SABS 1123. Flange thickness shall be in accordance with BS 4504 for cast iron valves and SABS 1123 for fabricated valves.

Should a required flange size fall beyond the range of SABS 1123, mating dimensions shall be in accordance with ISO Standard 7005 with thickness adequate to withstand closed end pressures.

Flanges with a pressure rating between 1000 - 1600 kPa shall have flat joint faces machined in accordance with the above SABS or BS specifications. Flange pressure ratings that exceed 1600 kPa shall incorporate an “O” ring sealing arrangement. Details of the proposed “O” ring groove shall be furnished at the tendering stage for consideration.

Flange sizes exceeding and including DN 1500 or shall however incorporate an “O” ring sealing arrangement irrespective of pressure rating.

For details on the corrosion protection of the "O" ring arrangement see Standard Specification DWS 9900 Section C3 .

The periphery of all flanges shall be machined to the correct outside diameter dictated by the flange pressure rating. Flanges for pipes and fabricated valves shall be machined on both faces.

All holes, shall be drilled perpendicular to the face and spot machined on the bolt head/nut bearing faces.

Sufficient clearance shall be allowed between the body and flange to enable flange bolts to be removed or tightened. Tapped holes shall only be permissible where stiffening ribs or shaft bosses interfere with bolts.

One flange of the valve body shall be clearly marked, identifying the respective pressure rating. (Refer to Paragraph 3.14)

3.6 JOINTING MATERIAL AND FASTENERS

Valves shall be supplied complete with bolt units, consisting of a standard length bolt, nut and two washers. The stud unit, where applicable, shall be supplied with a standard length stud, nut and washer. A washer shall be fitted under all bolt/screw heads and nuts.

The shortest standard bolt or stud that protrudes beyond the nut by a minimum of two threads when the assemblies are fully tightened shall be used. The same applies to stud units.

The manufacturer shall specify a fastening sequence for bolts (if applicable) and the torque settings (in Nm) for all bolts. These torque settings and fastening sequences shall be included in the Operation and Maintenance Manual.

In addition each valve shall be supplied with full-face gaskets or "O" rings for joining up to adjacent flanges.

Depending on the valve location in a piping system and the atmospheric conditions, the following specifications will apply:

a) Black bolted units to SABS 135
b) Precision bolted units to SABS 136
c) Galvanised bolted units to SABS 763
d) Stainless steel bolted units to DIN 931
e) Stainless steel set screws to DIN 933

For all valve components, i.e. bonnet covers, glands etc., drilled holes for bolts shall be perpendicular to the flange face.

All bolts and stud units shall be the same length and appropriate size and corrosion protected as per Standard Specification DWS 9900 Section C3 Specification.

When required by the Project Specification, isolating bolt units shall be supplied with bolt, nut, two washers, an isolating sleeve and two isolating washers.

3.7 CONTACT BETWEEN DISSIMILAR METALS

Refer to Standard Specification DWS 9900 Section C3 .

3.8 CORROSION PROTECTION

Corrosion protection shall be as specified in Standard Specification DWS 9900 Section C3

3.9 VALVE SUPPORTS AND LIFTING

Valves of DN 400 and larger shall have supporting feet cast integrally with the valve body.

Each valve over DN 300 or 100 kg mass, shall have two eye bolts of the required strength securely attached to the valve body to facilitate easy handling during transport and installation.

3.10 BYPASSING

Where specified in a Project Specification, valves shall be fitted with bypasses and bypass valves. Piping shall be flanged.

Bypasses shall be bolted to the valve body and not to the adjoining pipe work. Piping and fittings shall be hot dipped galvanised after fabrication.

3.11 PRESSURE GAUGES

Where specified in the Project Specification, valves shall be fitted with glycerine filled pressure gauges complete with separate stainless steel isolating ball cocks. The pressure gauges shall in general conform to SABS 1063.

The gauge face shall have a minimum diameter of 100mm with black lettering and needle on a white background. A red line or needle shall indicate the maximum safe working pressure, where applicable. Pressure gauges shall be calibrated in increments of 5 % of the full scale reading. The normal working pressure shall give a reading of between 50 and 75 % of the full scale.

3.12 MATERIALS

Unless otherwise specified in the Particular Valve Specification, valve bodies and components shall be of the materials listed below:

Mild steel	:	BS 4360 Gr 43, SABS 1431 : Gr 300WA
SG iron	:	BS 2789 Gr 420/12, SABS 936 SG 42
Cast iron	:	SABS 1034 Gr 250
Cast steel	:	BS 1504-161 Gr 480, SABS 1465 Part 1
Stainless steel components	:	BS 970 Part 4 Gr 304, 316 or 431

All material shall be new and of first grade quality. Material certificates for all materials are required.

Where copper alloys are used they shall have a zinc content of less than 0,5% and be suitably insulated against galvanic currents.

Cast material shall only be cast in moulds coated with a mould wash.

Cast components shall not be warped or distorted in any way.

No repair of cast components will be permitted unless approved by the Engineer. The structure of cast components shall be homogeneous and free from non-metallic impurities or visible chaplets.

Items to be galvanised shall be fabricated from aluminium-killed steel or silicon-killed steel with <0,04% Silicon and 0,009 < Phosphor < 0,025%.

3.13 CONSTRUCTION

3.13.1 Bodies

Bodies shall be of sturdy construction, capable of functioning satisfactorily under abnormal operating conditions without distortion of the body or malfunction of component parts and shall be shaped to give minimum change in waterway.

Designs of bodies and components shall be free from pockets that cause eddies or accumulate debris.

Where applicable, access openings and covers shall be well designed and the creation of stress risers shall be prevented. Any gussets applicable to the design of the valve should form an integral part of the casting.

3.13.2 **Doors and discs**

Doors and discs shall were applicable be cast or fabricated as a unit with integrally cast hinge lugs.

Doors and discs shall operate freely. Their travel shall however be restricted by the provision of substantial stops, fitted with specified facings to minimise wear and damage to the corrosion protection.

3.13.3 **Sealing faces**

Sealing faces shall be deposit welded with stainless steel unless otherwise specified in the Project Specification. Where approved in writing by the Engineer the sealing faces may be securely fixed with corrosion resistant elements.

Faces shall be accurately machined and finished to meet the requirements of the specification.

3.13.4 **Bearings**

Main bearings shall, were applicable, be external and accessible without emptying or removal of the valve body from the line.

Bearings shall be designed to take any unbalanced thrusts on doors or discs.

Bearings shall retain a low co-efficient of friction. Any possibility of bearings becoming tight during service due to ageing shall be eliminated.

Where possible, bearings shall be water lubricated with a proven record of dependable operation of not less than five (5) years.

Details of the type and construction of bearings will be as specified in the Particular Valve Specification (if applicable).

Where shafts protrude through the valve at the non-drive end (NDE) they shall be sealed with bolted stainless steel, grade 316, bearing cover plates. Screwed taper plug covers are not acceptable.

Sleeve type bearings shall be fully corrosion resistant and shall be fitted in the hubs in the valve body. Steel back bearings shall not accepted.

3.13.5 **Bearing and shaft seals**

Bearing and shaft seals shall be of the "O" ring or radial cup type with machined weep holes or grooves for drainage at the gearbox mounting flange.

3.13.6 **Handwheels:**

All valves shall be supplied complete with handwheels, which shall have the wording, “OPEN” and “CLOSE” together with directional arrows legibly cast in recesses on the upper surface of the rim.

Closure of valves shall be through the clock-wise rotation of hand wheels. All valves shall be capable of being opened or closed under an unbalanced pressure equal to the Nominal Pressure. The effort required on hand wheels to open or close valves under these conditions shall not exceed 90 N.

Handwheels shall be manufactured to ensure a close fit between the hand wheel and the mating spindle head and shall be firmly fixed to the spindle head. Loose-fitting hand wheels are not acceptable.

3.13.7 **Lubricating points:**

All lubricating points for grease gun lubrication shall be fitted with 1/8" BSP stainless steel button head type grease nipples. Nipples shall be painted red for easy identification. Electro-plated nipples will under no circumstances be accepted.

3.14 **MARKING**

3.14.1 **General**

Each valve shall be clearly marked in accordance with the requirements of BS 5418.

3.14.2 **Body Marking**

All valve bodies shall be permanently and indelibly marked (cast in 15 mm minimum lettering size on castings or welded on fabricated valves) as follows:

a) Nominal size (DN),
b) Nominal pressure (PN in kPa),
c) Arrow to indicate the direction of flow,
d) The contract number plus identification number to identify each individual valve.

The above markings shall be legible after painting.

In order to facilitate identification at the factory and at site, all valve bonnets, gates, discs, doors, etc. shall be permanently marked (cast in or welded on in 15mm minimum lettering) with the contract number and an identification number for each individual valve.

In addition to the above, one flange for a flanged valve shall be clearly market with a single set of machined notches (at least 3mm wide, 3mm deep and the length of the notch to suit the width of the flange). For wafer type valves, the width and depth of the notch shall be identical to that of the flanged valves. The length of the notch however shall be 8mm long.

- One notch - 1000 kPa operating pressure
- Two notches - 1600 kPa operating pressure
- Three notches - 2500 kPa operating pressure
- Four notches - 4000 kPa operating pressure

3.14.3 **Identification Plate Markings**

Identification plate markings shall be hard-stamped, printed or engraved on a stainless steel nameplate fitted to the valve with stainless steel screws. (Refer to drawing BF 1817 in Annexure VS1) If necessary a boss/raised face shall be cast as part of the body to fit the nameplates.

a) Manufacturer's name or trade mark
b) Nominal size (DN) in millimetres
c) Contract number
d) Nominal pressure (PN) in kPa
e) Serial number
f) Material, disc/gate and body
g) Date of manufacture
h) Mass of valve in kg

3.15 POSITION INDICATORS

Position indicating plates shall be embossed to clearly show the fully open and closed positions as well as the ¼, ½, and ¾ intermediate positions (Refer to drawing BF 1816 in Annexure VS1).

All pulleys, brackets, pins, cables, counterweights, sleeves, indicator gears and fasteners shall be of stainless steel 304 or better.

The indicator system shall be accurately installed and calibrated to give true linear indication of the valve opening. Calibration of the indicator scale shall be done in-situ and directly recorded against the actual valve operation.

Electronic position indicators will be considered. Full details must however be supplied with the offer. Special valve position indicators, calibrated in the specified increments of the valve opening, shall be designed, supplied and installed as required in the Project Specification.

3.16 PIPES AND SPECIALS

3.16.1 General

Pipes and specials shall be manufactured in accordance with SABS 719 and all referred specifications. Either longitudinal butt welding or spiral welding is acceptable.

The surface finishes after fabrication shall be free of score marks, pits, weld spatter and other defects that may affect the performance of the steel in service.

Fabrication of corrosive resistant steel i.e. stainless steel and 3CR12 pipes must take place in a shop separated from carbon steel components. All equipment used in the forming and manipulation of corrosive resistant steel pipes and specials during manufacture must be clean and free of materials that may introduce defects or contaminate the metal with carbon steel.

3.16.2 Welding

Welding shall be in accordance with BSS 2633 and BSS 5135 for mild steel and BSS 4677 for corrosive resistant steel.

Welding of flanges shall be in accordance with BSS 806 type 6.

Weld strength shall not be less than 90 % of that of the plate calculated on the original measured thickness of the plate before welding.

The welding process used should limit heat input to a minimum. This can include the following:

a) Manual metal arc - (MMA)
b) Metal inert gas - (MIG)

3.17 Actuators

Were required actuators shall be in accordance with Standard Specification DWS 2510/02: Auxiliary Drives.

3.18 **Inspection and quality Control**

Refer to Standard Specification DWS 2010: Quality Control for the general requirements for quality control.

Specific requirements for quality control and testing of valves will be covered by the following paragraphs

3.19 **PRESSURE TEST REQUIREMENTS**

Valves shall be pressure tested by the manufacturer to prove that all the fully assembled valves are capable of functioning satisfactorily under the specified operating conditions.

3.19.1 **Pressure Testing**

Test flanges shall be used, tapped holes in valve bodies are unacceptable. Tie-bolts or other forms of restraint applied across the blank flanges for the testing of flanged valves shall not be permitted.

Note :
a) No valve undergoing pressure testing shall be subject to shock loading.
b) Valves and connections shall be purged of air prior to pressure testing.

3.19.2 **Test Fluid**

The test fluid for all pressure tests shall be either water with the addition of a suitable inhibitor, or another liquid whose viscosity at ambient temperature is equal to or less than that of water.

3.19.3 **Test Procedures**

General
Test pressures shall be maintained for not less than a two (2) minute duration or as otherwise specified by the Engineer and the valves shall be watertight in all respects.

Structural and seat test shall be executed on both sides of double seated valves i.e. gate valves.

All valves, completely assembled, shall be pressure tested by the manufacturer in accordance with Table 1.

TABLE 1 : APPLICABILITY OF PRESSURE TESTS

TEST	SERVICE APPLICATION		
	TIGHT SHUT-OFF	LOW LEAKAGE	REGULATION
Structural			
i. Body	✓	✓	✓
ii. Disc strength	✓	✓	N/A
Seat / Seal	✓	✓	✓

Structural test:

Body:
Uncoated valve bodies and bonnets shall be subjected to 1,5 x the maximum permissible working pressure at ambient temperature. Testing shall be carried out before valves are painted or otherwise internally coated with materials that are capable of sealing against leakage.

Both ends of the body shall be blanked off so that the valve is subjected to the full pressure stresses in all directions induced by the test pressure. The valve disc shall be in the open or partially open position during the test. There shall be no visually detectable leakage through the shell of the valve during the test period.

Assembled and fully coated valves shall be subjected to an open-end test for material strength and soundness at a pressure of 1,5 x the maximum permissible working pressure at ambient temperature.

Seepage past gland seals at the abovementioned test pressure shall not be cause for rejection, provided that the gland seals are watertight when the internal test pressure is reduced to the maximum permissible working pressure.

Disc/gate strength:
1,5 x maximum permissible working pressure at ambient temperature.

The valve shall be closed in the normal manner, and the test pressure applied to one side of the disc with the other side open to atmosphere. There shall be no visible evidence of structural damage to or deformation of the disc or of leakage through the disc during the test duration.

Seat/Seal test:
Each assembled valve shall be subjected to open-end tests for drop tightness at the permissible working pressures at ambient temperature. Valves shall be drop tight over the complete range of pressures. Valves with symmetrical seatings shall be tested in either direction.

The maximum permissible leakage shall be as given in Table 2.

TABLE 2 : TEST PRESSURE LEAKAGE RATES

VALVE TYPD	LEAKAGE RATE
Tight shut-off	Rate 3 *: No visible leakage for duration of test. Subject to the Engineer's approval Rate 1
Low leakage	Rate 1 : 0.1 mm^3/s x DN

*****Leakage rates are define in BS 5146 : Part 2

3.19.4 **Test Certificate**

When a test certificate is issued it shall contain a statement by the manufacturer confirming that the valves have been tested in accordance with this standard and stating the actual pressures and medium used in the test.

3.19.5 Anti-static

Valves designated as anti-static shall have electrical continuity between shaft, disc and body when tested in accordance with A.2 of BS 5146 : Part 1.

3.19.6 Pipes and specials

Uncoated pipes and specials including unflanged straight sections prior to fabrication of specials shall be subjected to 1,5x the permissible working pressure at ambient temperature.

Flange welds shall be visually inspected.

Items, which cannot be hydrostatically tested, shall be subjected to a 10 % radiographic inspection plus 100 % dye penetrant or paraffin test.

The following procedure must be observed when radiographic test methods are used:

a) The weld length to be radiographed shall be clearly marked by the inspector using an identification symbol.
b) This symbol shall clearly appear on the respective radiograph.
c) The radiographed weld symbol shall not be obliterated by finishing processes until the inspector has accepted the respective weld.
d) No alternatives to this procedure will be accepted.

3.20 FUNCTIONAL TEST REQUIREMENT

The manufacturer shall do a functional test on each valve. This shall consist of taking the valve through one complete cycle, from fully closed to fully open and back. The manufacturer shall take particular note that the valve position indicator is correctly calibrated.

3.21 EQUIPMENT DRAWINGS

The Contractor shall submit drawings for the following purposes:

- Tendering
- Manufacturing
- Installation
- Records

3.21.1 Tendering

Drawings giving detailed information of the valves, to make a proper assessment of the equipment offered, shall be submitted with the tender. The drawings shall include overall dimensions of the valves, actuator details, materials of construction, etc.

3.21.2 Manufacturing

After receipt of order, but before manufacturing commences, drawings in triplicate shall be submitted for approval in principle by the Engineer. These drawings shall cover the general arrangements and assemblies of the valves including flange details (drilling, PCD, number-off and diameter of holes etc.), all functional dimensions of valves and actuators, clearance between concrete face and flanges, ease of bolt and stud removal, materials, standard parts, etc.

Two weeks after submission by the Contractor, the Engineer will return one of the above mentioned prints either with his certified approval or else with his comments regarding any amendments that may be required. Drawings returned to the Contractor for amendment purposes shall be re-submitted in its amended form within 2 weeks of the date of receipt of the drawing by the Contractor.

Approval of the above mentioned drawings by the Department shall only signify approval of the general design and layout and shall not make the Department liable for any error by the Contractor.

The Engineer has the right to suspend manufacture until a set of drawings, a draft Operation and Maintenance Manual and Quality Control Plans (for the manufacture and corrosion protection including data sheets of paint and abrasives used) are in his possession and approved in principle.

3.21.3 **Installation**

Not later than three weeks after the proposed equipment has been given approval in principle, drawings shall be submitted to allow for adequate site preparation before the arrival of the equipment. These drawings shall offer the necessary details for the programming of civil works, including foundation details.

3.21.4 **Records**

A complete set of "As Built" drawings in accordance with SABS 0111 must be completed and submitted to the Department together with a electronically saved version preferably on Compact Disc. These "As Built" drawings shall contain general arrangements, assemblies, parts lists (including part numbers) and complete component details. Drawings shall be clear, black line on white paper, unfolded and suitable for photographing for microfilming purposes. The size of the drawing shall not compromise the clarity of the print. All legends shall be in English and all dimensions in the metric system in SI units. Acceptable paper size shall be from A1 to A4.

Each drawing shall be supplied with a title block in accordance with the typical title block. (Refer to Annexure VS1 drawing BF 1819) The name of the scheme, structure and contract number shall be highlighted in bold letters.

In addition to the above, the Department will issue key information to Contractors, i.e. Internal Drawing Numbers, Codes, etc., which shall be included on all documentation and drawings.

3.22 **OPERATING AND MAINTENANCE MANUALS**

Two copies of Operating and Maintenance Manuals shall be supplied. A Draft copy of the manual shall be submitted for approval simultaneously with the drawings for manufacturing purposes. (Refer to paragraph 3.20.)

3.22.1 **General contents**

The purpose of these documents is to simultaneously provide a permanent and accurate record of all the equipment provided as well as a usable guide in simple language covering operating, maintenance and fault finding procedures.

3.22.2 **Binding**

The manuals shall be securely bound in A4 size, hard backed plastic/waterproof 4-ring binders, with clear pockets on the spine and front cover for the insertion of title slips, giving the Contract Number, Scheme, Dam and a description of the equipment supplied.

Drawings larger than A3 size, index and other title pages shall be contained in separate plastic pockets, bound in the appropriate section.

3.22.3 **Layout**

The sections shall be separated by plastic dividers, clearly and visibly marked to match the index, and shall be set out as follows:

a) Title page
b) Index
c) Specification and Technical Schedules (supplied by the Department)
d) General description with test certificates and final test certificate relating to any tests carried out.
e) Operating Instructions: These shall be clear, concise and easy to follow and must include, where applicable, pre-start, safety and shut down procedures.
f) Routine maintenance and lubricating schedule.
g) Fault diagnosis and repair procedure.
h) Detailed schedule of plant components giving materials, corrosion protection, part numbers, etc.
i) Spare parts list: Suppliers/Agents details must be provided.
j) Drawings. They shall include; general arrangements, assembly drawings, hydraulic and electrical diagrams, parts and material list in A3 and flow discharge curves. Suppliers/Agents ORIGINAL brochures and instrumental literature shall also be incorporated in the manual.

3.23 **HANDLING AND TRANSPORT**

The Contractor is responsible for the safe and undamaged delivery of equipment.

After final product inspection and approval, the valve and related fittings shall be securely packed to prevent damage in transit.

In order to protect the corrosion protection (lining), the ends of valves and fittings shall be securely blanked off with sturdy blank flanges which shall be clearly marked:

“DO NOT REMOVE UNTIL FINAL INSTALLATION”

Plastic sheeting will not be acceptable.

Bolts and other small parts shall be sewn up in strong bags and crated. The bags shall be tagged using metallic tags and indicate the following information:

- manufacturer's identification and contract number,
- part numbers,
- description,
- sizes and
- quantities.

Each bag shall have the delivery address listed on a separate metallic tag.

The use of ropes, wire or chains for lifting without suitable padding is strictly forbidden. For transport or storage purposes, balks of timber shall be used to support the components on any surface and separate them from each other.

Precaution shall be taken shall be taken to support and chock the equipment to prevent movement when loading onto vehicles. Components shall be firmly lashed or chained with padded lashing supported on sawdust bags. The area of padded surfaces shall be adequate to prevent damage to coatings.

The Site Engineer shall be notified of the delivery date and of any requirements regarding off loading and storage at site.

For site delivery, the transportation and supervision during off-loading will be the responsibility of the Contractor. The final inspection and acceptance of equipment

supplied will be undertaken on site after off-loading has been completed. Any damage that occurs during the handling, assembly and storage of equipment at the Manufacturer/Contractor's works, including transportation to site, shall be repaired by the Contractor at his own cost, in accordance with the valve specification and to the satisfaction of the Engineer.

3.24 MATERIAL SYMBOLS

Where appropriate the following symbols shall be used for body material designation:

- grey cast iron	CI
- austenitic cast iron	AI
- spheroidal graphite cast iron	SG
- gunmetal	GM
- aluminium bronze	AB
- phosphor bronze	PB
- carbon steel	CS
- stainless steel	SS
- nickel copper	NC
- integral seat	INT
- resilient seat	RES
- deposited seat	DEP

SECTION 2 : WORK SPECIFICATION

DWS 9900 : CORROSION PROTECTION OF STEEL PIPES AND SPECIALS FOR PIPELINES

1. SCOPE

This specification covers the corrosion protection of steel pipes and specials to be used for the conveyance of potable water at ambient temperature, which may be buried or subjected to environments with variable corrosive tendencies.

2. INTERPRETATIONS

2.1 PROJECT SPECIFICATION

Steel pipes and specials shall be manufactured and corrosion protected in accordance with the requirements specified in the Project Specification. No deviation from specification will be allowed without the written consent of the Project Engineer. In the case of there being conflict between specifications, the Project Specification will take preference.

2.2 APPLICATION

This specification contains clauses that are generally applicable to the corrosion protection of steel pipes and specials.

2.3 DEFINITIONS

LINING

Refers to the internal coating of pipes and specials.

COATING

Refers to the external coating of pipes and specials.

DIS-BONDED AREA

An area of lining or coating that initially did adhere to the steel substrate after application, but which subsequently became loose from the substrate as a result of mechanical, chemical or other action.

UN-BONDED AREA

An area of lining or coating which at no stage adhered to the steel substrate.

3. APPROVAL PROCEDURE

3.1 APPROVALS BEFORE AWARD OF CONTRACT

(a) The Corrosion Protection System specified in the Project Specification, shall be agreed upon between the Corrosion and Project Engineers.

(b) Approval by the Corrosion Engineer of the corrosion protection system, procedures and specific materials offered in the Tender. Manufacturer's data sheets or legible copies thereof shall be submitted for each product.

(c) Acceptance of the Departmental Quality Control Plan for Corrosion Protection - refer to DWS 2020 QCC1.

3.2 APPLICATION APPROVALS

(a) Qualification of personnel

(b) Quality of equipment

(c) Pre-preparation

(d) Surface preparation

(e) Application

(f) Final acceptance

4. GENERAL REQUIREMENTS

4.1 QUALITY ASSURANCE AND PROCEDURES

Quality procedures as specified in DWS 2020 shall be adhered to.

The production and application shall be in accordance with SABS ISO 9000, Quality System.

The Contractor shall ensure that he is fully conversant with the requirements of this specification and the relevant coating systems.

4.1.1 QUALITY PLAN

A detailed quality plan shall be submitted for approval and completion by the Corrosion Engineer before manufacture/coating is initiated – refer to DWS 2020 QCC1 section 1.

4.2 QUALIFIED STAFF

4.2.1 APPLICATION

A high standard of workmanship is required. Only experienced personnel shall be used to carry out corrosion protection work.

All work shall be carried out under the constant supervision of a qualified supervisor.

4.2.2 REPAIR WORK AT SITE

All repair work shall be done by competent personnel of the approved applicator under the supervision of a qualified supervisor.

4.3 COMPATIBILITY OF MATERIALS

The Contractor shall ensure that metals or alloys are compatible or are adequately protected if, in the galvanic series, there is a 0,3 volt difference in the galvanic potential.

4.3.1 DESIGN PRECAUTIONS

All equipment shall be designed to suppress corrosion in an exposed environment.

4.3.1.1 ACCESSIBILITY

Easy access for protection and maintenance shall be provided. The use of back to back angles, partially open box sections or inaccessible stiffeners shall be avoided.

Corrosion protection of areas that are unavoidably inaccessible shall be specifically specified or approved by the Corrosion Engineer.

4.3.1.2 WATER RETENTION AREAS

Pockets, recesses and crevices in which water and dirt may collect shall be avoided. Water retention areas shall be properly drained by holes as large as possible i.e. 150 mm diameter – minimum 50 mm diameter.

Surfaces of corrodible metals, such as the insides of tanks or hollow sections that cannot be protected by any method (e.g. painting or dipping), shall be avoided, or where not possible, be fully sealed against ingress of air and moisture.

4.3.1.3 PERMANENT INSTALLATIONS

Permanent installations in concrete shall be manufactured from stainless steel as specified in Section 5.

4.3.2 CORROSION PREVENTION

The Contractor shall ensure that the following steps are taken to minimise corrosion:

(a) If dissimilar metals are used:

Coat all surfaces of the whole assembly including the more noble member of the galvanic series.

(b) If the noble member of the assembly cannot be entirely covered:

(i) Keep the anode/cathode ratio as large as possible in the particular component.

(ii) Use electrical insulators between two metals. Insulation must be complete, a bolt requires a sleeve as well as washers of an insulating material.

(c) Joints and crevices between metals shall be sealed.

(d) Where fastening is unavoidable, the fasteners shall be more noble (cathodic) than the base material. Fasteners shall be coated where possible and/or adequately electrically insulated between fasteners and the base material.

4.4 EQUIPMENT

4.4.1 MEASURING EQUIPMENT

The Contractor shall have the following measuring equipment at his shop or site at all times:

Ambient temperature gauge
Blast profile gauge
Dew point instrument
Dry film thickness gauge
Electric insulation defect detector
Surface temperature gauge
Relative humidity instrument
Wet film comb

All test equipment shall have current calibration certification.

All instruments shall be calibrated daily, except where otherwise specified by manufacturers, to achieve the required accuracy.

Dry film thickness gauges shall be calibrated on a flat surface, provided that the surface profile is in accordance with the specification.

4.4.2 SPRAY EQUIPMENT

Spray equipment shall be suitable for the production of high quality work, capable of properly atomising the coating material and equipped with suitable pressure regulators and gauges. Air caps, needles and nozzles shall be of the type recommended by the coating manufacturer.

All spray equipment shall be fitted with suitable oil and moisture traps.

4.4.3 MIXER

A low speed mixer, which does not introduce air into the coating material being mixed, shall be utilised.

4.5 INSTALLATION REQUIREMENTS

4.5.1 SUPPORTS

When pipes are installed or mounted on concrete supports, rubber insertion shall be used to insulate the pipe from the support. The thickness of the rubber insertion shall not be less than 10 mm and protrude not less than 20 mm all round.

4.5.2 ANCHORS IN CONCRETE

All permanent anchors in concrete shall be stainless steel to ASTM A240 grade 316.

Special care shall be taken to ensure that anchors be installed to the correct level and depth. Anchors shall not be cut after installation without prior inspection and approval of the Engineer.

To avoid a galvanic reaction (stainless steel/galvanizing) under wet conditions, the nut and washer shall be FBE coated. Where necessary caps shall be specified by the Corrosion Engineer.

4.5.3 **SEALING**

Pipes that enter or exit concrete shall be sealed on their circumference with a continuous polyurethane or polysulphide flexible sealer, in a 25 mm square recess, approved by the Corrosion Engineer.

4.5.4 **ARMOURING**

Armoured or special protection shall be applied to surfaces at all road and rail crossings, through sleeves and culverts, and as requested by the Engineer.

4.6 **HANDLING AND TRANSPORT**

4.6.1 **PHYSICAL PROTECTION**

Adequate provision shall be made for the protection of the pipe coating, between the completion of manufacture and installation.

The coated items shall not be handled within the drying time recommended by the coating manufacturer, relevant to the ambient temperature.

4.6.2 **END COVERS**

After inspection, testing and final acceptance, all ends (including branch ends), shall be sealed as follows:

All plain ends shall be sealed with plastic or other approved sheeting secured to the pipe circumference with double flat steel binding strips and all flanged ends shall be closed off with sturdy timber flanges.

All plastic covers and timber flanges to be clearly marked:

“NOT TO BE REMOVED BEFORE INSTALLATION”

Plastic covers and timber flanges shall remain in place during, handling, transport, storage and laying.

4.6.3 **LIFTING**

All coated items shall only be lifted by means of broad band slings that will not damage the coating. Slings shall not be less than 500 mm wide for pipes up to 500 mm nominal bore, 1 000 mm wide for larger pipes and 50 mm wide for other items, or as approved by the Engineer.

4.6.4 **MARKING OF PIPES, CRATES AND BAGS**

(a) Each pipe and special shall be legibly, indelibly and durably marked, (in such a manner that the coating is not damaged), with the following information:

- Contract number,
- Scheme name,
- Serial number of the pipe or special,
- Nominal diameter,
- Grade and thickness of steel,
- Hydrostatic test pressure,
- Item number.

(b) The bags and crates shall be tagged using metallic tags and shall indicate the following information:

- Contract number,
- Scheme name,
- Part numbers,
- Description,
- Sizes,
- Quantities.

Each bag or crate shall have the delivery address listed on a separate metallic tag.

4.6.5 **TRANSPORT**

Coated items shall be handled with due regard to the relatively soft nature of organic coatings and appropriate precautions shall be taken.

The Contractor is responsible for the safe delivery of all the items and small parts to site without damage. All items shall be securely packed to prevent damage while in transit.

If transported by a third party , the Contractor is responsible for ensuring protection of items as specified.

Precaution shall be taken to support and chock the pipes on padded cradles and/or saw-dust filled bags to prevent movement when loading onto vehicles.

Where stacked pipes are transported, the packing shall be of a thickness and positioned to ensure that pipes do not touch when they flex.

Items shall be firmly lashed or chained with padded lashing. The area of padded surfaces shall be adequate to prevent damage to coatings.

Bolts in strong hessian bags and other small components shall be labelled and crated. The bags and crates shall be tagged using metallic tags and shall be marked in accordance with paragraph 4.6.4 (b).

Each bag or crate shall have the delivery address listed on a separate metallic tag.

The Site Engineer shall be notified of the delivery date and of any requirements regarding off-loading and storage at site.

4.6.6 **OFF-LOADING AT SITE**

The pipe supplier shall be responsible for the transportation and supervision during off-loading of the pipes and other small components at the delivery site.

Under no circumstances shall coated pipes be allowed to rest directly on the ground.

The final delivery inspection and acceptance of equipment supplied shall be undertaken on site after off-loading has been completed.

4.6.7 **STACKING AND STORAGE**

The Contractor shall provide all the necessary balks of timber and saw-dust filled bags used to support the items on soil, concrete or other hard surface and to separate them from each other both at his works, on site and when stringing along the trench.

Pipes shall be stacked to a safe height not exceeding two pipes high on cradles and on level ground.

Grass or other vegetation shall not be allowed to grow in the storage area within three metres of the equipment.

4.6.8 **DAMAGE**

Any damage that occurs during the handling and storage of items at the Manufacturer/Contractor's works, including transportation to site, shall be repaired by the Manufacturer/Contractor at his own cost, in accordance with the specification and to the approval of the Engineer.

4.6.9 **REJECTION**

The Engineer has the right to reject any damaged items and materials which have been delivered and off-loaded at site.

4.7 **SPARE PIPES**

Corrosion protection of spare pipes for the following pipelines:

- Bitumen lined/coated.
- Tape wrapped.
- Cement mortar lined/coated.

shall be as specified in paragraph 5.6.

Top coat

Re-coatable Polyurethane to a DFT of 30 – 50 µm, colour white or silver, for storage and above ground installation

And before burying in soil

Single armoured tape wrapping to be applied in accordance with paragraph 12.3.5.

4.8 **MEASUREMENT AND PAYMENT**

The lining and coating of straight pipes shall be measured per linear metre of pipe lined and coated.

The lining and coating of specials, whether lined by hand or otherwise, shall be measured per unit of completed specials, except where such specials are lined and coated in a single in-situ operation by mechanical means. In this case the lining and coating of the same shall be included, measured per linear metre of completed pipeline.

Payment for factory applied linings and coatings shall be included in the payment for pipes delivered to site.

Payment for in situ applied linings and coatings shall be for completed linings and coatings at the rates scheduled.

5. RECOMMENDED COATING SYSTEMS

5.1 TOXICITY OF LINING MATERIAL

Materials used for the lining of pipes shall be non-toxic and shall not impart any odour, taste, or colour to the water. Certification shall be submitted to the Corrosion Engineer for his approval.

5.2 PROPRIETARY ITEMS

Components that are supplied painted or protected e.g. gearboxes, actuators etc. **shall only be accepted** provided that they meet the corrosion protection requirements of this specification. If this specification cannot be adhered to the Contractor **shall submit full details of the equivalent coating systems** at tendering stage for approval by the Corrosion Engineer.

5.3 COATING SYSTEMS FOR PIPES AND SPECIALS

Selection of all corrosion protection systems shall be cleared with the Corrosion Engineer before finalisation of the Project Specification.

The following tables are abbreviated guidelines and the systems are not listed in order of preference.

See **NOTES** under paragraph 5.9.

5.3.1 ENCASED IN CONCRETE

ENVIRONMENT	MATERIAL	SURFACE	SYSTEM	MINIMUM DFT (µm)
Encased in concrete	3CR12 (See note 9) MS (See note 10)	Lining	1. Two pack Epoxy	400
			2. FBE	300
			3. Elastoplastic Polyurethane	2 mm
	3CR12	Coating	1. Two pack Epoxy	250
			2. FBE	200
	MS	Coating	1. Two pack Epoxy	300
			2. FBE	250
	SS 304 or SS 316 See note 6	Lining	1. Two pack Epoxy	250
			2. FBE	175
			3. Elastoplastic Polyurethane	1 mm
		Coating	1. Two pack Epoxy plus sealant of Polyurethane or Polysulphide – See note 2	150
			2. FBE plus sealant of Polyurethane or Polysulphide - See note 2	100
			3. Pickle and passivate – See note 4	
Buried in soil – chamber to coupling	All materials	Coating	Petrolatum wrapping system – refer Section 12	

5.3.2 ABOVE GROUND

ENVIRONMENT	MATERIAL	SURFACE	SYSTEM	MINIMUM DFT (µm)
Above ground For wet conditions see paragraph 5.3.5	MS	Lining	1. Two pack Epoxy	400
			2. FBE	300
			3. Elastoplastic Polyurethane	1-3 mm
			4. HDG – See note 1	105
		Coating	1. Two pack Epoxy plus top coat of Re-coatable Polyurethane	250 40
			2. Multi-purpose Epoxy plus top coat of Re-coatable Polyurethane if required	250 40
			3. FBE plus top coat of Re-coatable Polyurethane	200 40
			4. HDG – See note 1 If required: Epoxy primer for galvanised surfaces plus top coat of Re-coatable Polyurethane	105 40-80 40

5.3.3 BURIED IN SOIL

ENVIRONMENT	MATERIAL	SURFACE	SYSTEM	MINIMUM DFT (µm)
Buried in soil	MS	Lining	1. Two pack Epoxy	400
			2. FBE	300
			3. Bitumen – refer paragraph 11.4	2.5 mm
			4. Cement mortar – refer paragraph 15.3	
			5. Elastoplastic Polyurethane	1-3 mm
		Coating Depth < 4 m	1. Reinforced bitumen – refer paragraph 11.3.4	
			2. FBPE	2-3 mm
			3. Tape wrapping – refer paragraph 12.3.4	
			4. Two pack Epoxy plus tape wrapping – refer paragraph 12.3.5	300
			5. FBE plus tape wrapping – refer paragraph 12.3.5	200
		Coating Depth > 4 m and proximity of other services	1. Reinforced bitumen – armour wrapping - refer paragraph 11.3.4	
			2. FBPE	2-3 mm
			3. Armoured tape wrapping – refer paragraph 12.3.4	See paragraph 12.3.5
			4. Two pack Epoxy plus tape wrapping – refer paragraph 12.3.5	400
			5. FBE plus tape wrapping – refer paragraph 14.4	300

5.3.4 IN CHAMBER WALLS

ENVIRONMENT	MATERIAL	SURFACE	SYSTEM	MINIMUM DFT (µm)
In chamber walls	3CR12 MS	Lining	1. Two pack Epoxy	400
			2. FBE	300
			3. Cement mortar – refer paragraph 17.3	
			4. Elastoplastic Polyurethane	1-3 mm
			5. HDG plus Epoxy primer plus Two pack Epoxy	105 40-80 300
			6. HDG plus FBE	105 250
		Coating See note 2	1. Two pack Epoxy plus top coat of pure Aliphatic Polyurethane plus sealant of Polyurethane or Polysulphide - See note 2	400 25
			2. FBE plus top coat of pure Aliphatic Polyurethane plus sealant of Polyurethane or Polysulphide - See note 2	300 25
			3. HDG plus Epoxy primer plus Two pack Epoxy plus top coat of pure Aliphatic Polyurethane	105 40-80 300 25
			4. HDG plus FBE plus top coat of pure Aliphatic Polyurethane	105 275 25
	SS 304 or SS 316	Lining	1. Two pack Epoxy	250
			2. FBE	175
			3. Elastoplastic Polyurethane	1 mm
		Coating	1. Two pack Epoxy plus top coat of pure Aliphatic Polyurethane plus sealant of Polyurethane or Polysulphide – See note 2	150 25
			2. FBE plus top coat of pure Aliphatic Polyurethane plus sealant of Polyurethane or Polysulphide - See note 2	100 25
Buried in soil – chamber to coupling	All materials	Coating	Petrolatum wrapping system – refer Section 12	

5.3.5 IN WATER

ENVIRONMENT	MATERIAL	SURFACE	SYSTEM	MINIMUM DFT (µm)
In water and severe corrosion conditions	3CR12 MS	Lining	1. Two pack Epoxy	400
			2. FBE	300
			3. Elastoplastic Polyurethane	1-3 mm
		Coating	1. Two pack Epoxy plus pure Aliphatic Polyurethane	400 25
			2. FBE	300
			3. Elastoplastic Polyurethane	1-3 mm
			4. FBPE	2-3 mm
	SS 304 See note 6	Lining	1. Two pack Epoxy	250
			2. FBE	150
			3. Elastoplastic Polyurethane	1 mm
		Coating	1. Two pack Epoxy	250
			2. FBE	150

5.4 COUPLINGS AND FLANGE ADAPTORS (SEE PARAGRAPH 5.6)

MATERIAL	SURFACE	SYSTEM	MINIMUM DFT (µm)
MS	Lining and Coating	1. Two pack Epoxy	400
		2. FBE	300
		3. HDG plus Epoxy primer plus Two pack Epoxy	105 40-80 250
		4. HDG plus FBE	105 250
SS 304	Lining and coating	Pickle and passivate – See note 4	
SS 304 buried	Lining and coating	1. Two pack Epoxy	150
		2. FBE	125

5.5 JOINTS

ENVIRONMENT	MATERIAL	SYSTEM	MINIMUM DFT (µm)
Plain Ended Pipes where couplings/flange adaptors are to be fitted	MS	Same as lining material for 300 mm from end	400
		Two pack Epoxy for cement mortar lining with 100 mm overlap inside and outside	400
Flanges of Bitumen wrapped pipes	MS	Same as lining material on top and back of flange with an overlap of 100 mm from the flange	400
		Two pack Epoxy for cement mortar lining with 100 mm overlap inside and outside	400
Flange faces	MS	Two pack Epoxy or FBE	60 - 90
Coupling or Flanged Joints Buried in Soil or in Wet Chambers	MS SS 304 SS316	Coating system plus Petrolatum wrapping system - refer Section 13	
Welded Joints Buried in Soil and encased in concrete	MS SS 304 SS316	As specified for lining and coating	

5.6 SPARE PIPES

MATERIAL	SURFACE	SYSTEM	MINIMUM DFT (µm)
MS	Lining	1. Two pack Epoxy	400
		2. FBE	300
	Coating Final colour white or silver	1. Two pack Epoxy plus top coat of Re-coatable Polyurethane Wrap before burying in soil	400 40
		2. FBE plus top coat of Re-coatable Polyurethane Wrap before burying in soil	300 40

5.7 STAINLESS STEEL ITEMS

SURFACES	COATING	MINIMUM DFT (µm)
Stainless steel components (Dissimilar materials in submerged conditions)	Two pack Epoxy or FBE to a smooth, glossy and uniform finish	125
3CR12 steel components (All submerged conditions)	Two pack Epoxy or FBE	400 250
Stainless steel components (Dry or compatible metal conditions)	Pickle and passivate – See note 4	
3CR12 steel components (Dry conditions only)	Pickle and passivate – See note 4	

5.8 FASTENERS AND ANCHORS

5.8.1 FASTENERS

ENVIRONMENT	MATERIAL	SYSTEM	MINIMUM DFT (µm)
Fasteners and washers - Dry	MS	HDG plus threads coated with Molybdenum Disulphide lubricant or wax	45
	SS 304	Threads coated with Molybdenum Disulphide lubricant or Nickel Anti-seize compound	Uniform cover
Fasteners and washers - Wet/Submerged	SS 316	1. Pickle and passivate - See note 4 plus threads coated with Molybdenum Disulphide lubricant or Nickel Anti-seize compound	Uniform cover
		2. Fusion bonded Epoxy coated (thread surfaces excluded) plus threads coated with Molybdenum Disulphide lubricant or Nickel Anti-seize compound	50
Fasteners and washers - Buried in soil	MS	1. HDG plus threads coated with Molybdenum Disulphide lubricant or wax plus Bitumen or Tape wrapping	45
	SS 304	1. Threads coated with Molybdenum Disulphide lubricant or Nickel Anti-seize compound plus Bitumen or Tape wrapping	Uniform cover
Fasteners for flange adaptors – Drilled and tapped	MS	HDG plus wet assembly with Epoxy or threads coated with Molybdenum Disulphide lubricant	45
	SS 304	Pickle and passivate - See note 4 plus wet assembly with Epoxy	Uniform cover
Fasteners for flange adaptors - welded	SS 304	Pickle and passivate - See note 4	

5.8.2 **ANCHORS**

ENVIRONMENT	MATERIAL	SYSTEM	
Anchors in concrete - Dry See paragraph 4.5.1	SS 316	Threads coated with Molybdenum Disulphide Lubricant or Nickel Anti-seize compound	Uniform cover
Anchors in concrete - Wet See paragraph 4.5.1	SS 316	Threads coated with Molybdenum Disulphide Lubricant or Nickel Anti-seize compound plus nut and washer FBE coated	Uniform cover 50

5.9 **ABBREVIATIONS AND NOTES**

ABBREVIATIONS

DFT : Dry film thickness
FBE : Fusion-bonded Epoxy
FBPE : Fusion-bonded Polyethylene
HDG : Hot-dip galvanized
MS : Mild steel – grade 300WA
SS : Stainless steel – grades 304L
UV : Ultra Violet
3Cr12 : Corrosion resistant steel
µm : Micrometer

NOTES

The following items shall be approved by the Corrosion Engineer

1. Hot-dip galvanizing
   - Only for pipes up to 200 mm diameter maximum and flow less than 2 m/s.
   - Pipes shall not be embedded in concrete.
   - Water analysis shall be provided.
   - Pipes over 200 mm diameter to be coated with a duplex system

2. Sealant
   - Interfaces of different environments shall be sealed with a Polyurethane or Polysulphide flexible sealant to be applied in accordance with the manufacturers data sheets.

3. Un-coated stainless steel
   - Only to be used if no galvanic reaction and anaerobic conditions are found.

4. Pickle and passivate
   - If not in contact with less noble material.
   - If exposed to anaerobic conditions seal-coat all crevices with Elastoplastic Epoxy.
   - Shall be done by the dipping process.

5. Galvanic cells
   - Where a galvanic cell is situated within a water path <150 mm and concrete cover <75 mm, both the MS, 3Cr12 or SS shall be coated.

6.	Anaerobic conditions	-	SS grade 316L shall be used under anaerobic and aggressive water conditions.
7.	Polyurethane for	-	Re-coatable or pure Aliphatic Polyurethane where required colour coding for colour coding. Only UV resistant Polyurethane shall be used.
8.	Primers	-	Primers shall only be used in special cases i.e. over-coating of galvanized surfaces.
9.	3CR12	-	In view of superior corrosion resistance, coated 3CR12 material is preferred
10.	Mild steel	-	Mild steel may only be used where the pipe lining can be refurbished in situ
11.	Epoxy primer	-	Epoxy primer may not be required if appropriate two pack Epoxy/ Re-coatable or pure Aliphatic Polyurethane is being used.

6. MANUFACTURE AND PRE-PREPARATION

6.1 RESPONSIBILITY

6.1.1 PRE-PREPARATION

The Manufacturer or Refurbisher shall be responsible for all the pre-preparation of equipment prior to surface preparation. Pre-preparation shall be carried out to the approval of the Corrosion Engineer and the Corrosion Protection Contractor.

6.1.2 PERSONNEL

Pre-preparation shall be carried out by competent personnel, under the supervision of an experienced supervisor.

6.1.3 MARKING

All items shall be permanently and indelibly marked to identify each individual item as specified by the Engineer.

6.2 FABRICATION REQUIREMENTS

6.2.1 SURFACE DEFECTS

All extrusions, rolled steel and castings shall be clean and free of score marks, pits, protrusions, blisters, porosity, blowholes, cracks or any other flaws which may be detrimental.

Laminations, scabs or occluded scale shall be ground out. If such grinding penetrates deeper than 7% of the metal thickness, the area shall be repaired by welding or the metal shall be rejected at the discretion of the Engineer.

6.2.2 **UNDERCUTS, CAVITIES AND PITS**

Weld undercuts and cavities as well as pits in metal surfaces are not permitted.

All undercuts, cavities and pits shall be ground out, re-welded and ground to a smooth contour.

6.2.3 **WELDS**

All welds shall be continuous and shall have a smooth contour.

Staggered welds, where specified, shall only be permitted with prior approval of the Corrosion Engineer on submission of appropriate remedial corrosion protection procedures.

Welding processes used shall limit heat input to a minimum to restrict the heat affected zone.

6.2.4 **LIFTING LUGS**

Where required, lugs shall be fitted by the manufacturer to the requirements of the Corrosion Contractor and the approval of the Engineer.

6.2.4.1 **LUGS TO BE REMOVED**

After removal the damaged coating area shall be repaired in accordance with the original Specification.

6.2.4.2 **PERMANENT LUGS**

Lugs, not intended to be removed, shall be manufactured of equal or more noble grade than the base material in accordance with the Specification.

6.3 **REFURBISHMENT**

6.3.1 **INSPECTION PROCEDURE**

Corrosion damage must be exposed by manual, mechanical or abrasive blast-cleaning for inspection. The refurbishment procedures shall then be specified by the Engineer.

6.3.2 **PREPARATION METHODS**

(a) Smooth out all shallow pits with a pencil grinder.

(b) Weld up and grind to a smooth finish where:

- More than 25% of the material has been lost by pitting corrosion.
- Material loss detrimentally affects the strength of the item.

(c) Replace damaged section.

6.4 PRE-PREPARATION

6.4.1 GENERAL REQUIREMENTS

6.4.1.1 PROTRUSIONS

Protrusions shall be removed by grinding and dressing to a smooth contour.

6.4.1.2 SHARP EDGES

Burrs and rough faces caused by guillotining, flame cutting, drilling, machining or punching shall be removed by grinding.

All sharp edges shall be radiused to a minimum of 2 mm.

6.4.1.3 WELDS

Welds shall be free from slag, slag inclusions, cracks, surface cavities and under-cuts.

Irregular projections shall be ground to a smooth contour.

Areas adjacent to welds shall be free from weld spatter. Such spatter shall be removed by grinding or scraping.

6.4.2 MATERIALS

6.4.2.1 CASTINGS

Castings with defects exceeding the restrictions given in the table below shall be rejected.

In the case of blowholes occurring opposite each other, the combined depth shall be taken into account.

Blowholes and cavities not exceeding 2 mm depth shall be smoothed out by grinding.

Acceptance criteria for the repair of blowholes and cavities.

SURFACE	DEPTH OF BLOWHOLES	DIAMETER OF BLOWHOLES	REPAIR
Internal	Maximum 20% of material thickness	40% maximum of material thickness	Welding only
External	Maximum 10% of material thickness	20% maximum of material thickness	Solvent free Epoxy or welding
External	10 to 20% maximum of material thickness	40% maximum of material thickness	Welding only

Castings shall, after inspection by the Engineer, be ground smooth.

Small and repaired blowholes shall be ground level and smooth.

6.4.2.2 **HOT-DIP GALVANIZED ITEMS**

The design and manufacture of all items to be hot-dip galvanized shall conform to SABS Code of Practice 0214.

Vent holes shall be drilled by the manufacturer, in accordance with the above Code of Practice, to the approval of the Engineer and Galvanizer.

The Silicon and Phosphorus contents of materials to be galvanized shall comply with the standard below. If no material certificates are available, samples of the materials shall be analysed for their Silicon and Phosphorus contents.

The following materials shall be used:

(a) For aesthetic appearance
- Aluminium-killed steel or
- Silicon-killed steel with a Silicon content not exceeding 0,04% and a Phosphorus content not exceeding 0,02%.

NOTE: Material certification shall be supplied.

b) For general corrosion protection
- Aluminium killed steel or
- Silicon killed steel with a Silicon content not exceeding 0,25% and a Phosphorus content not exceeding 0,02%.

6.4.2.3 **CORROSION RESISTANT STEELS**

Fabrication shall take place in dedicated areas separated from carbon steel.

All equipment used in the forming and manipulation of stainless steel items during fabrication shall be clean and free of materials that may contaminate the metal with carbon steel.

The manufacture of items from corrosion resistant steels shall be in accordance with the SASSDA's Information Series and the guidelines of the material supplier.

Discoloration caused by welding or cutting shall be mechanically cleaned by buffing followed by pickling and passivation in accordance with the SASSDA's Information Series and the guidelines of the material supplier.

Organic contamination shall be removed by degreasing.

Iron contamination shall be removed by pickling and passivation, by the dipping process, after degreasing.
All surfaces shall be tested for free iron contamination by the water or the ferroxyl test method.

6.5 **PRIMARY CLEANING**

The Manufacturer or Refurbisher shall remove excessive oil, grease or other surface contaminants with a water soluble solvent degreaser followed by rinsing with clean soft water before the items are despatched to the Corrosion Protection Contractor.

7. SURFACE PREPARATION

7.1 STANDARDS

SABS	1344	Medium duty solvent detergent.
SABS	064	The preparation of surfaces for coating.
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after overall removal of previous coatings.
SABS ISO	8504-2	Preparation of steel substrates before application of paints and related products – Surface preparation methods – Part 2: Abrasive blast cleaning.
SABS Method	770	Cleanliness of blast-cleaned steel surfaces for painting (freedom of soluble salts).
SABS Method	772	Profile of blast-cleaned steel surfaces for painting (profile gauge).
SABS Method	769	Cleanliness of blast-cleaned steel surfaces for painting (freedom from dust and debris).
ISO	11125	Preparation of steel substrates before application of paints – Metallic blast-cleaning abrasives.
ISO	11127	Preparation of steel substrates before application of paints – Non-metallic blast–cleaning abrasives.

7.2 RESPONSIBILITY

7.2.1 SURFACE PREPARATION

The corrosion protection Contractor shall be responsible for preparation of all surfaces to be coated.

On completion of the Contract, all plant, equipment, temporary structures and materials shall be removed from the site.

7.2.2 PERSONNEL

The Contractor carrying out the surface preparation shall have competent personnel with the necessary technical knowledge of the processes involved.

All work shall be carried out under the supervision of an experienced supervisor.

7.2.3 EQUIPMENT

Plant and equipment shall, to achieve the specified surface preparation, comply with the following:

(a) Equipment and air supply free of oil and moisture.

(b) Compressors shall have a capacity and pressure output to achieve the required nozzle pressures.

(c) Worn nozzles shall be replaced.

If the correct surface preparation is not achieved due to inadequate plant and equipment, the Engineer may order the Contractor to obtain such plant and equipment as may be necessary to achieve the specified results.

All plant, equipment and temporary structures shall at all times be maintained in good and safe working order.

7.2.4 WORKING CONDITIONS

Surface preparation shall not take place when conditions are likely to affect the corrosion protection processes adversely.

The Contractor shall provide screens, covers, trestles or any other equipment necessary to avoid contamination of surfaces and to minimise time delays caused by inclement weather.

7.2.5 HEALTH AND SAFETY

The Contractor shall at all times enforce health and safety measures necessary to comply with the Occupational Health and Safety Act No. 85 of 1993 and the manufacturer’s requirements.

7.3 PROCEDURE

7.3.1 APPROVAL OF WORKS AND PROGRAMME

The Contractor’s programme, plant and equipment and works shall be approved by the Corrosion Engineer prior to commencement of surface preparation.

7.3.2 **INITIAL INSPECTION**

Before accepting items from the Fabricator, the corrosion protection Contractor shall check the initial condition of the surface for:

(a) Visible surface defects
(b) Corrosion or contamination
(c) Any required metal dressing
(d) Elimination of burrs and radiusing of edges
(e) Removing of weld spatter and weld imperfections such as blowholes
(f) Suitable lifting lugs

7.3.3 **DEGREASING**

All surfaces to be coated shall be tested for oil and grease contamination by the water break free test.

Oil and grease contamination shall be removed by:

- Steam-cleaning.
- An emulsifiable or aqueous detergent applied in accordance with SABS 1344.
- An alkaline cleaning solution.

Allow to react, then rinse off with clean, potable water to remove all residues prior to surface preparation, all in accordance with clauses 3.3 and 3.4 of SABS 064.

The surfaces shall be tested after degreasing and show no oil, grease and chemical contamination after degreasing.

Care shall be taken to avoid entrapment of cleaning agents in recesses or other retention areas.

7.3.4 **ROUGH-BLAST**

All rust, millscale, old coating or marking paint shall be removed by rough-blasting.

The Engineer shall be advised when blast-cleaning of the appropriate section will be completed so that an inspection can be carried out to determine if repairs are required.

Blast-cleaning shall be done in accordance with the code of practice SABS 064 to achieve a cleanliness of Sa 2. (SABS ISO 8501-1)

7.3.5 **WATER SOLUBLE SALTS**

The surfaces to be coated shall be tested for water soluble salts after blast-cleaning. The maximum level of salts allowable on the surfaces shall not exceed the values given in paragraph 7.4.1.

Should these values be exceeded, the surfaces shall be cleaned by:

(a) A liquid soluble salt remover approved by the Corrosion Engineer or
(b) Washing with a high pressure jet of clean potable water or
(c) Water injected blast-cleaning or
(d) Flash blast-cleaning until the soluble salts are within the specified limits.

7.3.6 **FINAL-BLAST**

7.3.6.1 **FINAL-BLAST**

7.3.6.1.1 **Humidity and Temperature**

All blast-cleaned surfaces shall be coated within:

Four (4) hours when humidity is below 70% or

Two (2) hours when humidity is between 70% and 85%.

Final-blasting shall not be carried out if the steel temperature is less than 3°C above dew point.

7.3.6.1.2 **Blasting-material**

Final blast-cleaning shall be carried out using clean, uncontaminated blast-medium in accordance with paragraph 7.4.2.

7.3.6.1.3 **Cleanliness**

All surfaces for “wet/submerged conditions” and for “dry conditions” shall be blast-cleaned to Sa 3 and Sa 2½ respectively.

7.3.6.1.4 **Profile**

The required surface profile specified in paragraph 7.4.1 shall be achieved by final-blasting in accordance with SABS 064 and SABS ISO 8504-2.

7.3.6.1.5 **Residual Dust and Debris**

Prior to coating, dust and debris shall be removed by vacuum-cleaning in accordance with SABS 769. Dust and debris may only be removed by blowing with clean uncontaminated compressed air, with prior approval of the Corrosion Engineer.

7.3.6.1.6 **Contamination**

After final-blasting un-coated steel shall not be touched with bare hands. All applicators shall wear white gloves and shoe covers where applicable.

7.3.6.2 **FLASH-BLAST**

Flash blast-cleaning shall be carried out to reinstate the surfaces specified in paragraph 7.4.1, in accordance with paragraph 7.3.6.1.

7.3.6.3 **SWEEP-BLASTING**

Sweep blast-cleaning is used to create a fine, even profile on soft materials and to remove portions of a coating.

The parameters for sweep blast-cleaning are as follows:

Equipment and air supply	Free of oil and moisture
Nozzle pressure	Not greater than 300 kPa
Nozzle angle to the surface being cleaned	30 to 60°
Sweeping distance	450 to 600 mm
Abrasive – ultra fine non-metallic grit	Minimum 0,2 mm – maximum 0,8 mm
Grit	Only new grit shall be used

7.4 **REQUIREMENTS**

7.4.1 **SURFACE CONDITIONS**

Prepared surfaces shall be in accordance with the table below.

PROPERTY	FOR DRY CONDITIONS	FOR WET/SUBMERGED CONDITIONS	TAPE WRAPPING
Cleanliness to ISO 8501-1 (min) (SIS 055900)	Sa 2½	Sa 3	St 2
Residual dust and debris (SABS Method 769)	0,5%	0,3%	0,5%
Oil, grease and perspiration	Nil	Nil	Nil
Surface Profile (min) Coats up to 200 µm (max)	30 µm 50 µm	30 µm 50 µm	- -
Surface Profile (min) Coats up to 300 µm (max)	50 µm 80 µm	50 µm 80 µm	- -
Surface Profile (min) Coats up to 500 µm (max)	60 µm 100 µm	60 µm 100 µm	- -
a) Water soluble salts: Maximum at any point. Average of any 250 cm.	500 mg/m^2 100 mg/m^2	100 mg/m^2 100 mg/m^2	500 mg/m^2 100 mg/m^2

Note: Surface profile shall be about ↓ of the coating thickness.

7.4.2 **ABRASIVE MATERIAL**

7.4.2.1 **MATERIAL**

The blast-cleaning abrasive shall be composed of clean, sound hard particles free from foreign substances such as dirt, oil, grease, toxic substances, organic matter, water soluble salts and foreign metals.

7.4.2.2 **CERTIFICATION**

The abrasive material supplier shall certify that all products supplied conform to all the requirements specified.

7.4.2.3 **SHAPE AND SIZE**

The individual abrasive particles shall be angular in shape and within the following sizes:

Non-metallic material 0,2 to 0,8 mm or 0,4 to 1,4 mm
Metallic material 0,3 to 0,9 mm

7.4.2.4 **HARDNESS**

The minimum hardness of abrasive material shall be as follows:

For non-metallic material – 6 on the Moh's scale
For metallic material – 390 HV

7.4.2.5 **pH**

The pH of the prepared slurry mixture shall not be below 6,2.

7.4.2.6 **WATER SOLUBLE SALTS**

The conductivity of slurry shall be less than 25 mS/m in accordance with ISO 11127.

7.4.2.7 **MOISTURE CONTENT**

The moisture content for abrasive material shall not exceed 0,2 percent.

7.4.2.8 **RE-CYCLING**

Re-cycled blasting-material shall only be used if:

(a) Blasting-materials were only used on degreased surfaces
(b) Dust and debris is removed from the blasting-material
(c) Particles are kept angular and within specified sizes

7.4.3 **AIR SUPPLY**

The air pressure at the nozzle shall be a minimum of 600 to 700 kPa.

Air supply equipment shall be fitted with efficient oil and water traps to avoid contamination of the surface.

7.5 **SURFACE PREPARATION OF OTHER MATERIALS**

7.5.1 **GALVANIZED SURFACES TO BE COATED**

7.5.1.1 **PASSIVATION**

Surfaces to be coated shall **not** be passivated.

7.5.1.2 **DEGREASING**

Galvanized steel surfaces shall be degreased prior to coating, using either a water soluble solvent degreaser in accordance with SABS 1344 and the manufacturer's instructions, or a mild acid-detergent degreasing solution to be approved by the Corrosion Engineer.

7.5.1.3 **PROFILE**

7.5.1.3.1 **Sweep-blasting**

Large areas shall be prepared by sweep-blasting with non-metallic abrasive in accordance with paragraph 7.3.6.3. Cracking, flaking, or any form of delamination of the zinc coating due to excessive blast-cleaning shall not be permitted. Removal of zinc by blast-cleaning shall not exceed 10 µm.

7.5.1.3.2 **Mechanical**

Surfaces that can not be sweep-blasted shall be abraded manually or mechanically with abrasive paper grade 220 or by using non-metallic abrasive pads.

7.5.1.4 **DUST AND DEBRIS**

Finally, all dust and debris shall be removed by vacuum-cleaning.

7.5.1.5 **PRIMER**

Primer for galvanised surfaces shall be applied immediately after surface preparation, not exceeding the time limits specified in paragraph 7.3.6.1.1.

7.5.2 **ALUMINIUM SURFACES TO BE COATED**

Aluminium surfaces to be coated shall be treated as follows:

7.5.2.1 **DEGREASING**

Surfaces shall be degreased in accordance with paragraph 7.3.3.

7.5.2.2 **PROFILE**

Sweep-blast with non-metallic abrasive in accordance with paragraph 7.3.6.3.

7.5.2.3 **DUST AND DEBRIS**

All dust and debris shall be removed by vacuum-cleaning.

7.5.2.4 **PRIMER**

Primer for aluminium surfaces shall be applied immediately after surface cleaning, not exceeding the time limits specified in paragraph 7.3.6.1.1.

7.5.3 **CORROSION RESISTANT AND STAINLESS STEEL**

Components fabricated from stainless steel shall not be contaminated with iron or mild steel.

7.5.3.1 **UN-COATED SURFACES**

Stainless steel surfaces shall not be contaminated with carbon steel, scratched or stressed.

The following areas shall be pickled and passivated:

(a) All un-coated areas.

(b) Ground and sheared edges.

(c) Heat affected zones caused by welding or cutting.

It is recommended that, if possible, pickling and passivation be done by the dipping process.

Proprietary pickling and passivation chemicals (as supplied by approved suppliers) shall only be used in accordance with the manufacturer's recommendations. Care shall be taken not to exceed the maximum contact time recommended.

After pickling and passivation, surfaces shall be very thoroughly washed with clean potable water to remove all traces of acid. Surfaces shall be allowed to dry, then polished where necessary, using polishing compounds recommended by the stainless steel manufacturer.

7.5.3.2 **SURFACES TO BE COATED**

7.5.3.2.1 **Degreasing**

Surfaces shall be degreased in accordance with paragraph 7.3.3.

7.5.3.2.2 **Profile**

Corrosion resistant steel surfaces shall be blast-cleaned with stainless steel grit or non-metallic abrasive to create a profile in accordance with table 7.4.1. The use of steel shot and steel or cast iron grit is strictly prohibited.

Where blasting is impractical, the surface shall be roughened manually with abrasive paper grade 220, disc grinders or flapper wheel abrasive pads. In all instances, clean, uncontaminated equipment must be used.

Surface profile shall be in the range of 30 to 50 µm.

7.5.3.2.3 **Dust and Debris**

Dust and debris shall be removed by vacuum-cleaning.

7.5.4 **SYNTHETIC MATERIALS TO BE COATED**

7.5.4.1 **DEGREASING**

Surfaces shall be degreased in accordance with paragraph 7.3.3.

7.5.4.2 **PROFILE**

Abrade the surface with abrasive paper grade 220 to achieve a uniform matt finish.

7.5.4.3 **DUST AND DEBRIS**

Dust and debris shall be removed by vacuum-cleaning.

7.5.5 **COATED SURFACES**

7.5.5.1 **PRIMED SURFACES TO BE OVER-COATED**

7.5.5.1.1 **Degreasing**

Surfaces shall be degreased in accordance with paragraph 7.3.3.

7.5.5.1.2 **Profile**

Primers to be over coated outside the over-coating period shall be abraded with abrasive paper grade 220 to a uniform matt finish.

All un-coated areas and all areas with micro rust shall be re-blasted to the original surface finish as specified.

7.5.5.1.3 **Dust and Debris**

Dust and debris shall be removed by vacuum-cleaning.

7.5.5.2 **COATED SURFACES TO BE REPAIRED**

Spot repairs shall be carried out in accordance with the original specification or as specified by the Corrosion Engineer. Repairs shall overlap the undamaged area by a minimum of 25 mm. Repairs shall be built up to the original undamaged coating thickness.

7.5.5.2.1 **Preparation of Bare Areas.**

Bare areas shall be prepared by spot-blasting to Sa 3 in accordance with paragraph 7.3.6. If spot-blasting is not possible, clean with abrasive paper grade 220 to a bright metal surface.

7.5.5.2.2 Soluble Salts

The surfaces shall be tested for water soluble salts in accordance with paragraph 7.3.5.

7.5.5.2.3 **Feathering of Coated Surfaces**

The surrounding paint, which must be intact, shall be feathered for a minimum distance of 25 mm beyond the damaged areas.

7.5.5.2.4 **Dust and Debris**

Dust and debris shall be removed by vacuum-cleaning.

7.5.5.3 **COATED SURFACES TO BE OVER COATED**

7.5.5.3.1 **Degreasing**

Surfaces shall be cleared of all contamination and degreased in accordance with paragraph 7.3.3.

7.5.5.3.2 **Profile**

Coated surfaces to be over-coated outside the over-coating period shall be abraded with abrasive paper grade 220 to a uniform matt finish.

7.5.5.3.3 **Dust and Debris**

Dust and debris shall be removed by vacuum-cleaning.

7.5.5.3.4 **Solvent-wiping**

The surfaces to be coated shall be wiped with the solvent specified by the coating manufacturer and approved by the Corrosion Engineer.

Further coats shall then be applied as specified in the Project Specification.

7.6 **TEST METHODS**

Tests, instruments, methods and criteria shall be as specified below or in the Project Specification.

7.6.1 **FREE OF OIL AND GREASE**

7.6.1.1 **WETTING WITH WATER**

All surfaces cleaned of oil and grease shall be tested using the “water-break-free” method. The surface shall be wetted with water and the entire surface shall be covered by an unbroken film.

7.6.1.2 **SOLVENT-WIPING**

Where water soluble lubricants may be present the surface shall be further tested by wiping with a clean cotton wool swab soaked in solvent. No stain shall be evident on the swab after solvent-wiping.

7.6.2 **WATER SOLUBLE SALT CONTAMINANTS**

Substrate surfaces shall be tested for the presence of water soluble salt contaminants in accordance with SABS Method 770 or by means of the Weber Reilly Test.

7.6.3 **STANDARD OF MECHANICAL SURFACE PREPARATION**

Mechanical surface preparation shall be visually compared to the standard shown in SABS ISO 8501-1.

7.6.4 **BLAST PROFILE**

The blast profile of the substrate surfaces shall be determined in accordance with SABS Method 772.

7.6.5 **RESIDUAL DUST AND DEBRIS**

Substrate surfaces shall be tested for the presence of residual dust and debris in accordance with SABS Method 769.

7.6.6 **BLASTING-MATERIAL**

All blasting-materials shall be approved by the Corrosion Engineer.

7.6.6.1 **METALLIC ABRASIVE**

Abrasive shall be tested in accordance with ISO 11125 for particle size, hardness, density, foreign matter and moisture.

7.6.6.2 **NON-METALLIC ABRASIVE**

Abrasive shall be tested in accordance with ISO 11127 for particle size, hardness, density, moisture and water soluble contaminants.

8 EPOXY COATING SYSTEM

8.1 STANDARDS

Equipment, materials and operational methods shall comply with the relevant SABS, ISO, BS, DIN or equivalent American Standard.

The Contractor shall ensure that he is in possession of the latest editions of all the relevant National Specifications, Codes of Practice or Standards referred to in this specification.

Reference is made to the latest issues of the following Standard Specifications:

SABS	1091	National colour standards for paint.

SABS	1217	The production of painted and powder coated steel pipes.
SABS Method	769	Cleanliness of blast-cleaned steel surfaces for painting (dust and debris).
SABS Method	772	Profile of blast-cleaned steel surfaces for painting.
SABS ISO	2808	Determination of film thickness.
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after removal of previous coatings.
BSS	5493	Protective coating of iron and steel structures against corrosion.
SABS ISO	9000	Model for quality assurance in production and installation.

8.2 **MATERIAL**

(a) The Contractor shall have the latest editions of all the relevant National Specifications and Codes of Practice and the manufacturer's data sheets of materials to be used available.

(b) Two pack Epoxies shall be in accordance with SABS 1217. Preference will be given to Contractor's utilising solvent free Epoxies in confined spaces.

Two pack Epoxies offered shall be either polyamide or polyamine cured.

(c) Multi-purpose Epoxy shall be of the high build, modified aluminium Epoxy mastic type, containing at least 90% solids.

(d) Materials and procedures shall comply with the relevant SABS Specifications and Codes of Practice.

(e) All materials in a coating system shall be purchased from the same manufacturer unless approved by the Corrosion Engineer.

(f) Details of coating materials to be supplied and approved – refer to paragraph 3.1.
The Contractor shall only proceed with the purchase of coating materials upon receipt of written approval from the Corrosion Engineer.

(g) Materials offered and subsequently approved shall not be changed without written approval of the Corrosion Engineer.

Coating material selection shall also be approved by the material manufacturer/supplier. The Contractor shall receive a written assurance from the material suppliers that the materials comply with the specified requirements.

(h) All coating materials shall be delivered in the manufacturer's original containers, clearly marked with the following:

- Manufacturer's name
- Product Brand and Reference Number
- Batch Number which may incorporate the date of manufacture
- Abbreviated instructions for storage and use of material, which shall include mixing ratios of the components of multi-component materials, minimum and maximum temperature of application and the method of application
- The SABS mark where applicable

(i) All coating materials shall be kept in an approved dry and enclosed store. The temperature shall not drop below 0°C nor exceed 40°C.

(j) Usage of materials shall be on a first in, first out basis and no materials shall be used that have exceeded the shelf life recommended by the manufacturer.

8.3 SPECIAL COATING AREAS

(a) Areas that are inaccessible after assembly shall be prepared and fully coated with the specified system to the specified requirements before assembly. The coating shall be fully cured before assembly.

(b) Mating surfaces of joints shall be coated with primer (where specified) or first coat only. The coating shall be uniform in thickness and shall not interfere with the mechanical tolerances. After assembly the outside surface of the joints shall be fully coated.

(c) Steel edges to be welded after coating shall not be coated for a distance of 50 mm from the welding edge. The unlined strip of grit blasted surface shall be temporarily protected with a coat of (red or a different colour to the lining/coating) weldable primer between coating application and installation.

(d) Friction grip areas shall be left un-coated unless otherwise specified.

8.4 APPLICATION

8.4.1 ACCEPTABILITY OF ITEMS TO BE COATED

Shall conform to sub-clause 4.1.1 of SABS 1217, with the proviso that pipes shall read items to be coated.

8.4.2 SURFACE PREPARATION

The Contractor shall satisfy himself that the condition of each item to be coated is such that it is fit for coating or lining, or both, as relevant. Immediately after surface preparation each item or special shall be examined, including the inside surface, where possible, for compliance with the relevant requirements of this sub-clause.

Pre- and surface preparation shall conform to Sections 6 and 7 respectively.

For pipes and specials intended for butt welding the prepared surfaces shall extend to the pipe ends.

8.4.3 COATING THICKNESSES

Coating thicknesses shall conform to Section 5 or as specified in the Project Specification.

8.4.4 MANUFACTURER'S INSTRUCTIONS

Recommendations supplied by the manufacturer in the form of the latest edition of printed data sheets, or given in writing on the manufacturer's letterhead, shall be followed.

The following details shall be made available to the applicator:

(a) Brand and type of epoxy resin
(b) Mixing and thinning instructions
(c) Recommended type and quantity of solvent required for thinning during application
(d) Pot life of mixed product
(e) Minimum and maximum recommended dry film thickness per coat
(f) Recommended time intervals between coats
(g) Recommended minimum and maximum steel surface temperatures during application
(h) Time for complete drying and curing on steel surfaces
(i) All relevant information the Supplier wishes to submit on his product
(k) Recommended method of coating application

Verbal information by the manufacturer's representative will not be accepted unless confirmed in writing by the Company.

8.4.5 **COATING APPLICATION**

8.4.5.1 **ENVIRONMENTAL CONDITIONS**

8.4.5.1.1 **Dusty Conditions**

Coatings shall not be applied in dusty or contaminated conditions.

8.4.5.1.2 **Surface Temperature**

Coatings shall not be applied if the surface temperature of the steelwork is less than 3°C above dew point or outside the range 5-40°C, unless otherwise specified by the coating manufacturer.

8.4.5.1.3 **Relative Humidity and Time of Application**

The first coat shall be applied as soon as possible after blast cleaning, but not exceeding four (4) hours if the relative humidity (RH) is below 70% or two (2) hours if the RH is between 70% and 85%. Refer to paragraph 7.3.6.1.

8.4.5.1.4 **Ambient Temperature**

Coatings shall not be applied when the ambient temperature is less than the minimum or greater than the maximum specified by the manufacturer of the coating material.

8.4.5.2 MIXING

The Contractor shall ensure that all paints are mixed in accordance with the requirements of Specification BS 5493.

All coating components, particularly two- or multi-component materials, shall be thoroughly mixed until a homogeneous mixture is achieved.

In the case of two-pack materials, each component containing pigments shall be thoroughly mixed. The two components shall then be mixed together in the proportions supplied by the Manufacturer until the mixture is completely homogeneous. For two pack materials, the use of part of the contents (split packs) is strictly forbidden unless the components can be accurately measured to within 0,5% of material by volume. Splitting of packs will only be accepted if measurement

of components is done by the use of a laboratory volume beaker (0-1000 ml) and mixed in the precise volume specified by the manufacturer.

In the case of solvent based Epoxy materials, it is recommended that the mixed material be allowed to stand for an induction period, as recommended by the manufacturer, before use.

During application, coating materials shall be agitated regularly to keep the solids in suspension. The preparation time, induction time and pot life of these materials shall be closely adhered to.

8.4.5.3 **APPLICATION REQUIREMENTS**

8.4.5.3.1 **Equipment**

Application equipment shall be maintained in a clean condition and in good working order.

The use of equipment not maintained in good condition may lead to rejection of the coating.

8.4.5.3.2 **Compatibility of Coats**

All primer, intermediate and finishing coats shall be mutually compatible.

8.4.5.3.3 **Surface Restoration**

Should immediate lining/coating not be possible, or should any atmospheric oxidisation take place between the completion of blast cleaning and commencement of lining/coating, such oxidisation shall be removed by flash blasting to restore the specified surface finish. Removal of dust and debris shall be in accordance with paragraph 7.3.6.1.5.

8.4.5.3.4 **Supports**

During coating application, the items shall be so supported to prevent damage to the wet coatings until the coatings have hardened adequately. Items shall remain supported during curing, storing and handling.

8.4.5.4 **METHOD OF APPLICATION**

8.4.5.4.1 **Application**

Epoxy coatings shall be applied by any appropriate method recommended by the manufacturer thereof, and approved by the Corrosion Engineer.

8.4.5.4.2 **First Coat**

The first coat shall be applied to a minimum dry film thickness of 40 µm above the peaks of the blast profile.

8.4.5.4.3 **Cleanliness**

During application and curing of the layers, the items shall be protected against contamination by dust or other foreign matter and shall be kept dry and shaded from direct sunlight.

All coats shall be clean and free from dust, oil, moisture and perspiration before over-coating.

Operators handling blast-cleaned or partially painted surfaces shall wear clean gloves to avoid contamination of the surface.

8.4.5.4.4 **Stripe Coat and Crevices**

All metal edges, up stands, welds, bolts and nuts shall be adequately coated. Additional stripe coatings shall be applied after initial priming, if ordered by the Engineer.

Special attention shall be given to crevices and edges to ensure complete coverage and uniform paint thickness.

8.4.5.4.5 **Second and Subsequent Coats**

The second and subsequent layers shall then be applied within the recommended over-coating periods.

8.4.5.4.6 **Coat Colours**

The colour of each subsequent coat shall be different to that of the previous coat except where two finishing coats of the same colour are necessary to achieve colour uniformity.

8.4.5.4.7 **Over-coating Times**

Over-coating times shall be not less than the minimum nor greater than the maximum specified by the manufacturer relevant to the ambient temperature.

Strict adherence to over-coating times is particularly important for coatings which are subsequently immersed.

8.4.5.5 **PIPE ENDS**

(a) Extension of Lining

For flanged pipes or specials and pipes or specials intended for joining with flexible couplings or for site welding by means of double sleeve weld-on couplings, the lining shall extend to the ends of pipes and specials including edges and shall overlap by at least 300 mm on the outside of the pipe. Coatings shall overlap epoxy surfaces on the outside by at least 25 mm.

(b) Butt Weld Edges

For pipes and specials intended for site butt welding, lining and coating shall extend up to a distance of 80 mm from the pipe ends.

The unlined circumferential strip of grit blasted surface shall be temporarily protected between the works and the site with a coat of (red or a different colour to the lining/coating) weldable primer.

8.4.5.6 **IN-SITU APPLIED EPOXY LINING**

In-situ application shall only be used to make good defects. No welding whatsoever shall be performed on any pipe or special on which the lining or coating has been completed, without the approval in writing of the Engineer. The temporary protected surfaces shall be blast cleaned before coating with the specified system. The approval shall only be considered by the Corrosion Engineer after submission by the Contractor of acceptable proposals for making good un-coated and damaged areas.

8.4.5.7 **PROTECTION WITH TAPE WRAP**

Pipes to be tape wrapped (when buried in soil) shall be wrapped in accordance with paragraph 12.3.4.

8.4.5.8 **OVER-COATING WITH POLYURETHANE**

8.4.5.8.1 **Wet, Submerged or High Humidity Conditions**

Pure Aliphatic Polyurethane

(a) The area to be over-coated shall be abraded with abrasive paper grade 220 to a uniform matt finish.

(b) The surface shall be vacuum-cleaned to remove dust and debris – refer paragraph 7.3.6.1.5.

(c) Contaminants shall be removed and surfaces prepared by wiping with an organic solvent.

(d) Over-coat with a 25 to 35 µm layer of pure Aliphatic Polyurethane in accordance with the Departmental colour code.

8.4.5.8.2 **Dry or UV Conditions**

Re-coatable Polyurethane

(a) The area to be over-coated shall be abraded with abrasive paper grade 220 to a uniform matt finish.

(b) The surface shall be vacuum-cleaned to remove dust and debris – refer paragraph 7.3.6.1.5.

(c) Over-coat with a 40 µm minimum layer of Re-coatable Polyurethane in accordance with the Departmental colour code.

8.4.5.9 **QUALITY OF COATING**

8.4.5.9.1 **Finish**

The fully cured coating shall have a uniform, smooth, gloss finish with proper adhesion.

8.4.5.9.2 **Dry Film Thickness (DFT)**

The Epoxy coating shall be evenly applied to the minimum final film thickness as specified in section 5 and shall be tested in accordance with paragraph 8.5.4.

8.4.5.9.3 **Electrical Insulation Defects**

All coated surfaces intended for water immersion or where likely to be frequently wetted under normal service conditions shall show no electrical insulation defects when tested in accordance with paragraph 8.5.3.

8.4.5.9.4 **Finishing Coat Colours**

The finishing coat colours shall be as specified in the Project Specification in accordance with the Departmental Colour Code.

Colours shall be in accordance with SABS 1091 as follows:

Valves and outlet pipes for raw water	Brilliant green to SABS 1091 code - H10
Valves and outlet pipes for chlorinated filtered water	Arctic blue to SABS 1091 code – F28
Handwheels	Golden yellow to SABS 1091 code – B49

Where not specified, the selection of final colours shall be approved by the Engineer.

8.4.5.9.5 **Solvent Entrapment**

Coatings showing evidence of entrapped solvents after full cure will be rejected. No inter-coat de-lamination shall be allowed.

The Contractor shall be held responsible for blistering of coatings, when shown to be caused by solvent retention.

8.5 **TESTING**

To be read in conjunction with paragraph 4.1, Quality Assurance.

8.5.1 **CONTRACTOR'S AND ENGINEER'S INSPECTIONS**

Paragraphs 1.4 and 3.1 of DWS 2020 shall apply.

8.5.2 **VISUAL INSPECTION**

All surfaces shall be inspected visually and shall be free from tears, runs, sags, wrinkles, blisters, change in colour or gloss, orange peel, dirt, visible pinholes, dust or fluff occlusions or any other visible defects.

8.5.3 **HOLIDAY INSPECTION (ELECTRICAL INSULATION DEFECTS INSPECTION)**

100% of the lining and coating of all pipes shall be tested and there shall be no electrical insulation defects on any area inspected.

Except for coating containing conductive pigment (Zn, Al), low-voltage wet sponge electrical insulation defects inspection shall be carried out in accordance with SABS 1217 for coatings and linings of thickness not exceeding 500 µm.

For films exceeding 500 µm thickness, the high voltage, sparking electrical insulation defects detector is used in accordance with SABS 1217.

Inspection procedure shall ensure that sufficient moisture is present at all times i.e. only measure the bottom section of pipes.

8.5.4 **DRY FILM THICKNESS (DFT)**

(a) Measurements shall be taken in accordance with SABS ISO 2808, unless the frequency of readings is specified in the Project Specification.

(b) 100% of all coating thicknesses measured shall comply with the minimum requirements of the Project Specification.

(c) In the case of coats applied after the erection of steel work on Site, the frequency at which measurements of the DFT are taken shall be at the discretion of the Engineer’s Inspector or the Engineers Representatives, and may be dictated by accessibility.

(d) DFT in excess of the prescribed maxima shall not necessarily constitute reason for rejection if the paint film is demonstrated to be sound in all respects.

(e) Owing to delayed solvent release, solvent-borne coatings shrink over a period of time resulting in a lower film thickness and therefore it is important that DFT measurements be taken within seven days.

DFT measurements taken at times beyond seven days after application, shall not constitute a valid claim against the original satisfactory and documented execution of the work.

(f) The method used to measure DFT, and the significance of the readings for each particular project, shall be agreed upon by all parties prior to commencement of the work.

8.5.4.1 **AUTOMATED SHOP APPLIED LINING AND COATING**

The film thickness on the first pipe and thereafter on at least one pipe selected at random from every day's production, but not less than one pipe out of every ten pipes, shall be measured non-destructively by an approved eddy current instrument. At least four readings at equally spaced intervals around the circumference, approximately 300 mm from each end of the pipe, shall be taken. The first reading shall be over the weld bead. When practicable an additional four readings at equally spaced intervals around the circumference in the centre of the pipe shall be taken. The thickness shall not be less than the minimum specified over 100% of the area including weld beads. The Inspectorate may at their discretion supplement the above test by checking wet film thickness on any or all pipes during application of the epoxy resin.

8.5.4.2 **HAND AND IN-SITU APPLIED LINING AND COATING**

All the applied lining and coating thicknesses shall be tested by means of an approved eddy current or magnetic instrument. At least four readings shall be taken at equally spaced intervals around the pipe circumference at any test point. The first reading shall be over the weld bead. The thickness shall not be less than the minimum specified over 100% of the area including weld beads.

8.5.5 **DEGREE OF CURE OF TW0-COMPONENT MATERIALS**

The degree of cure of a two-component material will vary with time, temperature and ventilation and shall be assessed by solvent wiping in accordance with the method given in SABS 1217 (methyl ethyl ketone resistance test)

8.6 **DAMAGED COATINGS**

(a) All repairs and procedures shall be approved by the Corrosion Engineer and subject to inspection procedures as set out in paragraph 8.5.1.

Where the damage is extensive the remedial procedures shall be agreed with the Corrosion Engineer in writing

(b) All repairs shall comply with the requirements of the repair-product manufacturer’s data sheet. The Engineer may at his discretion request that repaired coating areas undergo adhesion tests.

(c) Any damage occurring during transit from the Contractor’s premises to the site, shall be the responsibility of the Contractor. The Contractor responsible for installation of equipment at site shall repair and damage occurring on site during handling, assembly, storage, transport and erection.

(d) The repaired area shall be tested in accordance with sub-clauses 8.4 and 8.12 of SABS 1217 for compliance with the relevant requirements for thickness and electrical insulation defects respectively.

(e) Any item showing electrical insulation defects exceeding an average of five per square metre (a cluster of pinholes within a radius of 25 mm being regarded as a single defective area), or flaking or other signs of loss of adhesion, shall not be repaired. The item shall be blast cleaned and re-coated in accordance with the relevant requirements of the specification

8.7 REPAIR METHODS FOR MINOR DEFECTS

The repair of areas showing electrical insulation defects or low film thickness shall, if approved by the Corrosion Engineer, be carried out as follows:

(a) Degrease in accordance with paragraph 7.3.3.

(b) Thoroughly abrade the damaged area, including an adjacent surrounding area of at least 25 mm wide, with a medium grade 220 abrasive paper.

(c) Vacuum-clean the surface to remove dust and debris in accordance with SABS method 769 and paragraph 7.4.1.

(d) Wipe the abraded paint surface with methyl ethyl ketone and allow to dry

(e) Apply as many coats of repair material as necessary to achieve the specified thickness and finish.

NOTE: 1. When solvent borne materials are used, curing time between coats, as specified by the coating material manufacturer, shall be adhered to.

2. Apply a final top coat over the repaired area to achieve a pleasing, uniform finish of the item.

8.8 REPAIR METHODS FOR MAJOR DEFECTS

The repair of areas showing damage down to the steel surface shall, if approved by the Corrosion Engineer, be carried out as follows:

(a) Degrease in accordance with paragraph 7.3.3.

(b) Blast-clean all damaged areas to Sa 3 (SABS ISO 8501-1).

(c) Feather the surrounding paint for a distance of 25 mm beyond the damaged areas with a medium grade 220 abrasive paper.

(d) Vacuum-clean the surface to remove dust and debris in accordance with SABS method 769 and paragraph 7.4.1.

(e) Wipe only the abraded paint surface with methyl ethyl ketone and allow to dry.

(f) Apply as many coats of repair material as necessary to achieve the specified thickness and finish.

NOTE: 1. When solvent borne materials are used, curing time between coats, as specified by the coating material manufacturer, shall be adhered to.

2.Apply a final top coat over the repaired area to achieve a pleasing, uniform finish of the item.

9 FUSION BONDED EPOXY COATING SYSTEM (HEAVY DUTY)

9.1 STANDARDS

Equipment, materials and operational methods shall comply with the relevant SABS, ISO, BS, DIN or equivalent American Standard.

The Contractor shall ensure that he is in possession of the latest editions of all the relevant National Specifications, Codes of Practice or Standards referred to in this specification.

Reference is made to the latest issues of the following Standard Specifications:

SABS	1217	The production of painted and powder coated steel pipes.
SABS Method	769	Cleanliness of blast-cleaned steel surfaces for painting (dust and debris).
SABS Method	772	Profile of blast-cleaned steel surfaces for painting.
SABS ISO	2808	Determination of film thickness.
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after removal of previous coatings.
BSS	5493	Protective coating of iron and steel structures against corrosion.
SABS ISO	9000	Model for quality assurance in production and installation.

9.2 **MATERIAL**

Shall conform to SABS 1217, Type 2, powder coating.

9.3 **APPLICATION**

9.3.1 **SURFACE PREPARATION**

Pre- and surface preparation shall conform to Sections 6 and 7 respectively.

9.3.2 **COATING THICKNESSES**

Coating thicknesses shall conform to Section 5 or as specified in the Project Specification.

9.3.3 **COATING APPLICATION**

Items shall be heated to a temperature of 200°C (only applicable to heavy items) and coated with Fusion-bonded Epoxy by means of an electrostatic powder gun.

The normal procedures pertaining to powder application shall apply.

On completion of the coating, items shall be cured for 60 minutes at 200°C (mean temperature).

9.3.4 **QUALITY OF COATING**

9.3.4.1 **Finish**

The fully cured coating shall have a uniform, smooth, gloss finish with proper adhesion.

9.3.4.2 **Film Thickness**

The Epoxy coating shall be evenly applied to the minimum final film thickness as specified in section 5 and shall be tested in accordance with paragraph 9.4.4.

9.3.4.3 **Electrical Insulation Defects**

All coated surfaces intended for water immersion or where likely to be frequently wetted under normal service conditions shall show no electrical insulation defects when tested in accordance with paragraph 9.4.3.

9.3.4.4 **Finishing Coat Colours**

The finishing coat colours shall be as specified in the Project Specification in accordance with the Departmental Colour Code.

Colours shall be in accordance with SABS 1091.

Where not specified, the selection of final colours shall be approved by the Engineer.

9.4 **TESTING**

To be read in conjunction with paragraph 4.1, Quality Assurance and SABS 1217.

9.4.1 **CONTRACTOR'S AND ENGINEER'S INSPECTIONS**

Paragraphs 1.4 and 3.1 of DWS 2020 shall apply.

9.4.2 **VISUAL INSPECTION**

All surfaces shall be inspected visually and shall be free from tears, runs, sags, wrinkles, blisters, change in colour or gloss, orange peel, dirt, visible pinholes, dust or fluff occlusions or any other visible defects.

9.4.3 **HOLIDAY INSPECTION (ELECTRICAL INSULATION DEFECTS INSPECTION)**

100% of all coated surfaces shall be tested and there shall be no electrical insulation defects on any area inspected.

Inspection procedure shall ensure that sufficient moisture is present at all times.

For films exceeding 500 µm thickness, a high voltage, electrical insulation defects detector shall be used in accordance with SABS 1217.

9.4.4 **FILM THICKNESS**

(a) Measurements shall be taken in accordance with SABS ISO 2808.

(b) 100% of all coating thicknesses measured shall comply with the minimum requirements of the Project Specification.

(c) Film thickness in excess of the prescribed maxima shall not necessarily constitute reason for rejection if the coating is demonstrated to be sound in all respects.

(d) The method used to measure film thickness, and the significance of the readings for each particular project, shall be agreed upon by all parties prior to commencement of the work.

9.4.5 **DEGREE OF CURE OF FUSION-BONDED MATERIALS**

The degree of cure of fusion-bonded material shall be assessed by solvent wiping in accordance with the method given in SABS 1217 (methyl ethyl ketone resistance test)

9.5 **DAMAGED COATINGS**

(a) All repairs and procedures shall be approved by the Corrosion Engineer and subject to inspection procedures as set out in paragraph 8.5.1.

Where the damage is extensive the remedial procedures shall be agreed in writing with the Corrosion Engineer.

(b) All repairs shall comply with the requirements of the repair-product manufacturer's data sheet. The Engineer may at his discretion request that repaired coating areas undergo adhesion tests.

(c) Any damage occurring during transit from the Contractor's premises to site, shall be the responsibility of the Contractor. The Contractor responsible for installation of equipment on site shall repair any damage occurring on site during handling, assembly, storage, transport and erection.

(d) The repaired area shall be tested in accordance with sub-clauses 8.4 and 8.12 of SABS 1217 for compliance with the relevant requirements for thickness and electrical insulation defects respectively.

(e) Any item showing electrical insulation defects exceeding an average of five per square metre (a cluster of pinholes within a radius of 25 mm being regarded as a single defective area), or flaking or other signs of loss of adhesion, shall not be repaired. The item shall be blast cleaned and re-coated in accordance with the relevant requirements of the specification

9.6 **REPAIR METHODS FOR MINOR DEFECTS**

The repair of areas showing electrical insulation defects or low film thickness shall, if approved by the Corrosion Engineer, be carried out as follows:

(a) Degrease in accordance with paragraph 7.3.3.

(b) Thoroughly abrade the damaged area, including an adjacent surrounding area of at least 25 mm wide, with a medium grade 220 abrasive paper.

(c) Vacuum-clean the surface to remove dust and debris in accordance with paragraph 7.4.1.

(d) Wipe the abraded paint surface with methyl ethyl ketone and allow to dry

(e) Apply as many coats of the following repair material as necessary to achieve the specified thickness and finish.

(i) Solvent free Epoxy or

(ii) Fusion-bonded Epoxy powder repair kit.

NOTE: 1. Apply a final top coat over the repaired area to achieve a pleasing, uniform finish of the item.

9.7 REPAIR METHODS FOR MAJOR DEFECTS

The total un-coated areas for renovation by the applicator shall not exceed 0,5 percent of the total surface area of a component. Each un-coated area for renovation shall not exceed 2 500 mm². If damaged areas are larger, the items containing such areas shall be re-coated.

The repair of areas showing damage down to the steel surface shall, if approved by the Corrosion Engineer, be carried out as follows:

(a) Degrease in accordance with paragraph 7.3.3.

(b) Blast-clean all damaged areas to Sa 3 (SABS ISO 8501-1).

(c) Feather the surrounding paint for a distance of 25 mm beyond the damaged areas with a medium grade 220 abrasive paper.

(d) Vacuum-clean the surface to remove dust and debris in accordance with SABS method 769 and paragraph 7.4.1.

(e) Wipe only the abraded paint surface with methyl ethyl ketone and allow to dry.

(f) Apply as many coats of the following repair material as necessary to achieve the specified thickness and finish.

  (i) Solvent free Epoxy or

  (ii) Fusion-bonded Epoxy powder repair kit.

NOTE: 1. Apply a final top coat over the repaired area to achieve a pleasing, uniform finish of the item.

10 GALVANIZING

10.1 STANDARDS

Reference is made to the latest issues of the following Standard Specifications:

SABS ISO	14713	Protection against corrosion of iron and steel in structures - guidelines.
SABS EN	10240	Internal/external protective coatings for steel tubes.
SABS ISO	1461	Hot-dip galvanized coatings on fabricated iron and steel articles.
SABS Method	772	Profile of blast-cleaned steel surfaces for painting.
SABS ISO	2063	Metallic and other inorganic coatings – Thermal spraying.
SABS ISO	2808	Determination of film thickness.
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after removal of previous coatings.
SABS	0374-1	The suitability of hot-dip galvanized steel piping for the transportation of water.
SABS	1344	Medium duty solvent detergent.
ISO	752	Zinc ingots.
EN	1179	Zinc and zinc alloys – primary zinc
SABS ISO	9000	Model for quality assurance in production and installation.

10.2 **MATERIAL**

(a) The impurities in the molten zinc, as defined in ISO 752 and EN 1179, shall not exceed a total of 1,5%.

(b) Steel to be hot-dip galvanized shall be:

(i) For aesthetic appearance

- Aluminium-killed steel or
- Silicon-killed steel with a Silicon content not exceeding 0,04% and a Phosphorus content not exceeding 0,02%.

NOTE: Material certification shall be supplied.

(ii) For general corrosion protection

- Aluminium killed steel or
- Silicon killed steel with a Silicon content not exceeding 0,25% and a Phosphorus content not exceeding 0,02%.

(c) The condition of articles to be hot-dip galvanized shall comply with “Annexure C” of SABS ISO 1461.

(d) The condition of tubes to be hot-dip galvanized on a continuous line shall comply with “Annexure A” of SABS EN 10240.

10.3 **APPLICATION**

(a) Shall only be done by members of the Hot Dip Galvanizers Association of Southern Africa (HDGASA) in accordance with SABS ISO 9000.

(b) Shall be in accordance with SABS ISO 1461 and SABS EN 10240 for tubes.

10.4 **TOLERANCES**

10.4.1 **STEEL SPECIALS**

Shall be in accordance with clause 6 of SABS ISO 1461.

10.4.1.1 **SURFACE**

The surfaces shall be free from nodules, blisters, roughness and sharp points. Un-coated areas, flux residues, lumps and zinc ash shall not be permitted.

Notwithstanding Clause 6.1 of SABS ISO 1461, in the case of handrails etc. a high quality surface finish is required and a bright smooth surface shall be achieved. Only materials specified under paragraph 10.2 (b) (i) shall be utilised. Double dipping shall not be allowed.

10.4.1.2 **THICKNESS**

The thickness of hot-dip galvanizing shall comply with the requirements of the table below.

Minimum coating thicknesses on items that are not centrifuged.

ARTICLES AND ITS THICKNESS	**HEAVY DUTY COATING**	**LIGHT DUTY COATING**	
	Coating thickness µm (min)	Local coating thickness µm (min)	Mean coating thickness µm (min)

≥ 6 mm ≤	Steel	105	70	85
3,0 mm ≤	Steel < 6,0 mm	80	55	70
1,5 mm ≤	Steel < 3,0 mm	65	45	55
	Steel < 1,5 mm	55	35	45
	Castings ≥ 6,0 mm	105	70	80
	Castings < 6,0 mm	-	60	70

Heavy duty coatings are required except in the following cases:

(a) Where a high surface finish is required.

(b) Where otherwise specified in the Project Specification.

10.4.2 **STEEL TUBES**

Shall be in accordance with clause 7 of SABS EN 10240.

10.4.2.1 **SURFACE**

The surface of the coating shall be continuous, smooth and free from flux residues.

10.4.2.2 **THICKNESS**

The thickness shall comply with the requirements of the coating quality A1, in accordance with clause 8, Table 1 of SABS EN 10240, as specified below.

Minimum local coating thickness requirements for coating quality A1

Requirements	Coating quality A1
Minimum local coating thickness on the inside surface except at the weld bead	55 µm
Minimum local coating thickness on the inside surface at the weld bead	28 µm
Minimum local coating thickness on the outside surface	55 µm

10.4.2.3 **ADHESION**

The coating shall show no evidence of flaking or cracking when tested in accordance with clause 11.4 of SABS EN 10240.

10.4.2.4 **COATING QUALITIES**

(a) Coating qualities shall be A1 for water installations – see sub-clause 8.2 of SABS EN 10240.

(b) The surface of the coating on the inside shall be as smooth as can be achieved by steam blowing.

10.5 **TESTING**

10.5.1 **STEEL ITEMS**

To be read in conjunction with paragraph 4.1, Quality Assurance.

10.5.1.1 **VISUAL EXAMINATION**

Where a superior aesthetic appearance of hot-dip galvanizing is requested, a bright mirror surface finish shall be achieved by the galvanizer.

10.5.1.2 **THICKNESS**

Thicknesses shall be in accordance with paragraph 10.4.1.2 and shall be tested in accordance with sub-clause 6.2 of SABS ISO 1461.

10.5.2 **STEEL TUBES**

To be read in conjunction with paragraph 4.1, Quality Assurance.

10.5.2.1 **VISUAL EXAMINATION**

Where a superior aesthetic appearance of hot-dip galvanizing is requested, a bright mirror surface finish shall be achieved by the galvanizer.

10.5.2.2 **THICKNESS**

Shall be tested in accordance with sub-clause 11.3 of SABS EN 10240.

10.5.2.3 **ADHESION**

Shall be tested in accordance with sub-clause 11.4 of SABS EN 10240.

10.5.2.4 **CHEMICAL ANALYSIS**

Shall be tested in accordance with sub-clause 11.5 of SABS EN 10240.

10.6 **REPAIR METHODS**

10.6.1 **STEEL ITEMS**

The total un-coated areas for renovation by the galvanizer shall not exceed 0,5% of the total surface area of a component. Each un-coated area for renovation shall not exceed 400 mm². If un-coated areas are larger, the item containing such areas shall be re-galvanized.

The repair method shall be approved by the Corrosion Engineer before repairs are initiated.

Repairs shall be by zinc thermal spray in accordance with SABS ISO 2063 or three component zinc solvent free Epoxy repair system. The repair shall include removal of any scale, cleaning and any necessary pre-treatment to ensure adhesion – refer surface preparation Section 7.

The coating thickness on the renovated areas shall be a minimum of 30 µm more than the local coating thickness specified in paragraph 10.4.1.2 for the relevant hot-dip galvanized coating unless otherwise specified by the Corrosion Engineer. The coating on the renovated areas shall be capable of giving sacrificial protection to the steel to which it is applied.

10.6.2 **STEEL TUBES**

- Repairs shall not be allowed on internal surfaces of tubes. Tubes shall be re-galvanized.
- Repairs on external surfaces shall be in accordance with paragraph 10.6.1.

10.7 **DUPLEX SYSTEM (HOT-DIP GALVANIZING + ORGANIC COATING)**

10.7.1 **SURFACE PREPARATION**

10.7.1.1 **SURFACE PASSIVATION**

Items to be over-coated shall not be passivated.

10.7.1.2 **CONTAMINANTS AND PHYSICAL FACTORS**

The following contaminants shall be removed:

(a) Galvanizing residues and passivation products.

(b) Oil and grease.

(c) Perspiration and oil contamination from contact with hands.

(d) Dust and chemical contamination.

10.7.1.3 **DEGREASING**

Galvanized steel surfaces shall be degreased prior to coating, using either a water soluble solvent degreaser in accordance with SABS 1344 and the manufacturer's instructions, or a mild acid-detergent degreasing solution to be approved by the Corrosion Engineer.

10.7.1.4 **SWEEP BLAST-CLEANING**

Large areas shall be prepared by sweep-blasting with non-metallic abrasive in accordance with paragraph 7.3.6.3. Cracking, flaking, or any form of de-lamination of the zinc coating due to excessive blast-cleaning shall not be permitted. Removal of zinc by blast-cleaning shall not exceed 10 µm.

10.7.1.5 **MECHANICAL CLEANING**

Surfaces that can not be sweep-blasted shall be abraded manually or mechanically with abrasive paper grade 220 or non-metallic abrasive pads.

10.7.2**.** **APPLICATION**

Coatings shall be applied immediately after surface preparation in accordance with paragraph 8.4.5. All coating materials shall be applied strictly in accordance with the manufacturer's instructions.

In the case of nuts, bolts and other fasteners, care shall be taken to ensure that all edges are over-coated to the minimum specified thickness.

Only coatings approved by the Corrosion Engineer for application on hot-dip galvanized surfaces shall be used.

For additional protection under high humidity conditions and for colour coding Epoxy and Polyurethane coatings shall be applied to thicknesses specified in paragraph 5.

Epoxy primer may not be required if appropriate two pack Epoxy/ Re-coatable or pure Aliphatic Polyurethane is being used.

10.7.3. **REPAIRS OF DUPLEX SYSTEM**

To repair coatings damaged during transportation, handling or erection, the following procedures shall be followed:

10.7.3.1 **DAMAGE DOWN TO BARE STEEL**

(a) Degrease in accordance with paragraph 7.3.3.

(b) Thoroughly abrade the damaged area, including an adjacent surrounding area of at least 25 mm wide, with grade 80 abrasive paper.

(c) Vacuum-clean the surface to remove dust and debris in accordance with SABS method 769 and paragraph 7.4.1.

(d) Where originally over-coated with two component Epoxies, wipe the surface with methyl ethyl ketone and allow to dry.

(e) Apply sufficient coats of three component zinc solvent free Epoxy to a dry film thickness of 30 µm more than the original thickness of the zinc.

(f) When dry, apply the same system as originally applied so as to cover the damaged area extending for 25 mm over the surrounding area.

NOTE: 1. When solvent borne materials are used, curing time between coats, as specified by the coating material manufacturer, shall be adhered to.

2. Apply a final top coat over the repaired area to achieve a pleasing, uniform finish of the item.

10.7.3.2 **DAMAGE DOWN TO ZINC SURFACE**

(a) Prepare the surface as described in paragraph 10.7.3.1 - (a), (b) (c) and (d).

(b) Apply coating as described in paragraph 10.7.3.1 – (e) and (f).

NOTE: 1. When solvent borne materials are used, curing time between coats, as specified by the coating material manufacturer, shall be adhered to.

2. Apply a final top coat over the repaired area to achieve a pleasing, uniform finish of the item.

11. BITUMEN COATING SYSTEMS

11.1 STANDARDS

Reference is made to the latest issues of the following Standard Specifications:

SABS	1130	Glass fibre reinforcing material for pipe wrapping.
SABS	1136	Cold-applied bitumen primer for steel pipeline protection.
SABS	1137	Hot-applied bitumen for steel pipeline protection.
SABS	1178	The production of lined and coated steel pipes using bitumen or coal tar enamel.
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after removal of previous coatings.
SABS ISO	9000	Model for quality assurance in production and installation.

11.2 MATERIAL

11.2.1 HOT APPLIED BITUMEN AND PRIMER

Shall conform to SABS 1137 & 1178. In all cases where bitumen or primer is to be stored in open tanks at elevated temperatures, or the storage temperature of the bitumen in enclosed tanks exceeds 180°C, the supplier shall be consulted and certificates obtained from him indicating recommended maximum temperatures and temperature/time relationships for storage. These certificates shall be made available to the Engineer or the Inspectorate on request.

NOTE: Bitumen that has been heated to a temperature in excess of 230°C shall be discarded.

11.2.2 COLD APPLIED BITUMEN PRIMER

Shall conform to SABS 1136

11.2.3 GLASS FIBRE TISSUE AND WOVEN WRAP

Shall conform to SABS 1130.

11.3 APPLICATION

11.3.1 ACCEPTABILITY OF PIPES

Shall conform to sub-clause 3.3.1 of SABS 1178.

11.3.2 SURFACE PREPARATION

Surfaces shall be prepared in accordance with Section 7 and shall conform to sub-clause 3.3.2 of SABS 1178 with preparation grade Sa 2½ of ISO 8501-1 and surface profile amplitude 75 micrometers (**µm**)

11.3.3 **LINING**

(a) Primers shall be applied in accordance with clause 3.5 of SABS 1178. The lining shall then be applied in accordance with clause 3.6 of SABS 1178, except that the maximum lining thickness shall be 5 mm.

(b) Where pipe ends are intended for jointing by butt welding, the lining shall be cut back 100 mm from each end of the pipe. The primer shall however extend over the full length of the pipe.

11.3.4 **COATING**

11.3.4.1 **COATING PROCEDURE**

The coating procedure shall conform to sub-clauses 3.5.2, 3.7.2 and 3.7.3 of SABS 1178 and as specified here.

11.3.4.2 **RE-INFORCED COATING**

The re-inforced wrapping shall be of glass fibre tissue and shall have a fifty (50) percent overlap from one end of the pipe to the other. On completion of the first wrap a further coat of hot bitumen of temperature not exceeding 230°C shall be applied, whilst a second wrap shall be applied in the same manner as the first, but in the reverse direction. On no account shall the bitumen layer between two wraps be less than 1 mm thick.

The minimum cover of bitumen over the second glass fibre tissue wrap shall not be less than 1 mm. The nominal thickness of the completed coating shall be 5,5 mm. The coating surface shall be free of surface craters, crazing, laminations, and pinholes and shall have an acceptable smooth surface.

11.3.4.3 **ARMOURED COATING**

Armoured coated pipes shall, where specified in the Schedule of Quantities and in the documents, be "armoured" against mechanical damage as follows:

Immediately after completion of the second glass fibre tissue (to SABS 1130, Type 1) wrap, a further coat of hot bitumen, not exceeding 230°C, shall be applied with bitumen impregnated woven glass fibre reinforcement, (to SABS 1130, Type 2 or Type 3) as in the above paragraphs (a) and (b).

It shall be helically wound around the pipe as a single wrap from end to end, applied under tension with a minimum overlap of 35 mm.

On no account shall the minimum thickness of the bitumen layer between the outer wrap and the second tissue wrap be less than 1,5 mm.

The minimum cover of bitumen over the woven glass fibre outer wrap shall not be less than 1,0 mm.

The nominal thickness of "armoured" coatings shall be 7 mm.

11.3.4.4 **PIPE ENDS**

Treatment of pipe ends shall conform to sub-clause 3.7.11 of SABS 1178.

Where pipe ends are intended for jointing by slip couplings, the coating shall be cut back 250 mm from the end of the pipe.

11.3.4.5 **REFLECTIVE FINISH**

Reflective finishes shall conform to paragraph 11.3.7 and sub-clause 3.7.10 of SABS 1178.

11.3.5 **BITUMEN COATING OF PIPES WITH LININGS OTHER THAN BITUMEN**

Bitumen and glass fibre reinforcement shall comply with paragraphs 11.2.1 and 11.2.3 respectively. Cold applied bitumen primer shall conform to SABS 1136.

11.3.5.1 **APPLICATION OF COATING**

(a) Within four (4) hours of having been grit blasted, and provided the pipes and specials are kept dry and free of dust, cold applied bitumen primer shall be applied by brush, spray, roller or mechanical equipment. The pipe or special shall be supported on skids or in any other suitable manner to avoid damage to and contamination of the primed surface. Primer shall be applied in a uniform manner and at the coverage rate specified or as recommended by the manufacturer, but at a rate of not less than 0,8 litres per square metre of pipe surface. Particular care is required to ensure complete penetration and coverage of welds and sharp edges. All defects in priming shall be immediately touched up by brush, care being taken to overlap the joint with the correctly primed area. Care shall be taken not to contaminate the inside of the pipes or specials with the primer.

All equipment used for priming shall be maintained in a clean condition. Primer shall be stored in sealed containers and before material is drawn from containers, the contents shall be agitated or stirred to ensure uniformity. After sufficient material for application is withdrawn, containers shall be sealed immediately to prevent contamination or loss of solvent. Material shall not be kept in open containers overnight, nor shall it be exposed to the sun. Primer which has become fouled with foreign substances shall be discarded. Primer shall be maintained at the correct consistency by mechanical agitation during application. Thinners may be used as recommended by the manufacturer, provided the thinners are uniformly mixed with the primer before use.

(b) As soon as the primer is dry to the touch, but not later than three (3) days after application of the primer and provided primed surfaces are kept clean, dry, free from dust and shaded from sunlight, the primed pipes shall be transferred to a lathe-like coating machine. Coating shall further proceed strictly in accordance with paragraph 11.3.4.

Reflective finishes shall only be applied and the specified inspections and non-destructive tests shall only be carried out after the lining, if applicable, has been completed and fully cured.

11.3.6 **LINING AND COATING OF SPECIALS**

In the case of specials, where length and/or shape preclude the application of lining and coating by the mechanical processes as described for pipes, the lining and coating shall be applied by hand. The lining and coating shall not be inferior to that applied by machine. The standards of pre-cleaning of specials and linings and coatings applied to specials shall comply with all the requirements of this specification.

11.3.7 **REFLECTIVE FINISH**

Bitumen coated pipes shall be given a temporary reflective finish of white wash to minimise heat absorption in transit and prior to laying and back filling on site.

11.4 **TOLERANCES**

The minimum acceptable lining thickness shall be 2,5 mm and the maximum acceptable thickness 5 mm.

The nominal coating thickness shall be 5,5 mm with a tolerance of -0,5 mm and +0,5 mm.

The nominal thickness of "armoured" coatings shall be 7,0 mm with a tolerance of –0,5 mm and +0,5 mm.

11.5 **SPARE PIPES**

Spare pipes shall be lined and coated in accordance with paragraph 4.7.

11.6 **TESTING**

To be read in conjunction with paragraph 4.1, Quality Assurance.

11.6.1 **VISUAL INSPECTION**

(a) Linings shall have a smooth glossy finish and shall be free from ripples, runs, pinholes, craters, bubbles, laminations and visible impurities.

(b) Coatings shall be free of surface craters, crazing lamination, dis-bonding, un-bonded areas, pinholes and shall have an acceptable smooth surface. No hollow sounds shall be detected when the coating is tapped. The glass fibre reinforcement of the fibre pattern thereof shall not be discernible on the bitumen surface.

11.6.2 **NON-DESTRUCTIVE TESTS**

11.6.2.1 **HOLIDAY TESTING**

Shall conform to sub-clause 7.2.2 of SABS 1178.

11.6.2.2 **THICKNESS TESTING**

On each pipe in the sample, taken in accordance with paragraph 11.6.4.2 (b), the thickness of lining and coating shall be measured by means of a suitable magnetic or eddy current instrument. The instrument must be designed for non-destructive measurement of the thickness of non-metallic films on a magnetic base and be suitable for use on curve surfaces. Set zero and calibrate the instrument on steel similar to that used in the manufacture of the pipe, using a suitable shim of which the thickness is approximately equivalent to the thickness of the coating/lining under test. Take readings as specified in sub-clause 7.2.1 (a) and (b) of SABS 1178.

11.6.3 **DESTRUCTIVE TESTS**

11.6.3.1 **PEEL TEST ON LINING**

Shall conform to sub-clause 7.3.2 of SABS 1178. Three tests shall be carried out, one of which shall be over the longitudinal or spiral weld seam, the test areas being approximately 120° apart. The lining shall not be accepted as having passed the test if the average of the three peel length readings is greater than 3 mm.

11.6.3.2 **CONDITION OF BITUMEN**

Shall conform to sub-clause 7.3.3 (a) and (b) of SABS 1178, to the following standards:

(a) Fraas breaking point : no failure to +10°C
(b) Softening point : 100 - 125°C
(c) Penetration : 1,0 - 2,2 mm
(d) Resistance to cracking : no cracking down to –10°C

In the event of the condition of bitumen test results not satisfying all these requirements, a series of three (3) other tests shall be carried out by the Contractor, and witnessed by the Inspectorate. The average of the three (3) results for each test shall be determined. If the average does not comply with the requirements, then the day's production, from which lining and coating samples were obtained, shall be rejected.

11.6.4 **TEST SAMPLES**

11.6.4.1 **VISUAL**

All pipes to be inspected.

11.6.4.2 **NON-DESTRUCTIVE TESTING**

(a) Holiday testing

All pipes to be inspected.

(b) Thickness

On the first pipe and thereafter on at least 10 percent of the number of pipes and specials in each day's production.

11.6.4.3 **DESTRUCTIVE TESTING**

Sufficient lining and coating material shall be removed from the ends of at least one pipe selected at random from that day's production for the purpose of carrying out the tests. The peel test shall be carried out the next day on the same pipe.

11.7 **REPAIR METHODS**

11.7.1 **DAMAGE TO SUBSTRATE**

Areas dis-bonded or damaged through to the substrate shall be repaired as follows:

(i) The problem areas shall be stripped back to the substrate and the edges feathered back for 100 mm minimum to achieve St2 of ISO 8501.

(ii) The repair shall be effected by firstly applying a coat of primer

(iii) (a) Using liquid bitumen and cut pieces of glass fibre tissue or a blanket, rebuild the coating to the original specification. Gas heated repair irons shall be used to blend in the various layers or

(b) Apply a layer of the “torch on” bitumen tape with 50 mm overlap by heating the side of the tape with a gas torch until the compound is glossy and just molten. Then smooth firmly onto the surface to eliminate air pockets and voids.

Overlaps and seams shall be smoothed and sealed by tooling with a heated bullnose trowel

11.7.2 **PARTIALLY DAMAGED**

Areas partially de-laminated or damaged through the thickness shall be repaired as follows:

The de-laminated or damaged areas shall be stripped back to the lamination or bottom of the damage and using liquid bitumen and cut pieces of glass fibre tissue, the coating shall be rebuilt to the original specification. Gas heated repair irons shall be used to blend in the various layers.

11.7.3 **ELECTRICAL INSULATION DEFECTS**

Electrical insulation defects (holidays) shall be repaired by hot ironing.

11.7.4 **TOP COAT**

Completed repairs shall be protected as per paragraph 11.3.7

12 TAPE WRAPPING SYSTEM

12.1 STANDARDS

Reference is made to the latest issues of the following Standard Specifications:

SABS	1117	Plastic wrappings for the protection of steel pipelines.
SABS	0129	Plastics tape wrapping of steel pipelines.
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after removal of previous coatings.
SABS ISO	9000	Model for quality assurance in production and installation.

12.2 MATERIAL

Polyethylene pressure-sensitive or polyethylene laminated to an elastomeric layer of butyl rubber tapes shall conform to SABS 1117, types A, B or C.

12.3 APPLICATION

12.3.1 GENERAL

Steel pipes, fittings and specials, protected by means of tapes, shall be wrapped in accordance with SABS 0129 as amended and extended by this Specification. All pipes shall be wrapped outside the trench in accordance with acceptable factory applications. Tape wrapping may be carried out in an "over the trench" operation for pipe diameters up to 450 mm.

If in the opinion of the Engineer adverse weather conditions are such as to interfere with the successful application of an efficient corrosion protective wrapping, he shall order a stoppage of work. It shall be regarded that the Contractor has accepted this risk and made provision for it in his tender.

The production and application of the tapes shall be controlled by SABS ISO 9000, Quality System.

12.3.2 SURFACE PREPARATION

Shall conform to clause 3.2 of SABS 0129.

12.3.3 PRIMING

Immediately after cleaning but not later than 4 hours after cleaning, provided the pipe surfaces are kept dry and free from dust, a primer shall be applied according to sub-clause 4.2.1 of SABS 0129.

12.3.4 **NORMAL WRAPPING**

Tape wrapping shall be applied with sufficient pre-tensioning immediately after priming, in accordance with sub-clause 4.2.2 of SABS 0129, and shall ensure a smooth wrap free from wrinkles, blisters, frayed or torn edges, cracks or other defects even at temperatures up to 65°C.

For normal wrapping, tape shall be applied in two layers with a minimum overlap of 50 mm on both the inner and outer wraps.

Tape joints and repairs shall be done in accordance with sub-clause 4.2.3 of SABS 0129.

Hand wrapping shall only be allowed for short lengths that are inaccessible to a wrapping machine, specials, joints, small diameter pipes and small repairs – refer paragraph 12.6.

12.3.5 **ARMOURING**

Where armour wrapping is specified, two layers of tape wrapping shall first be applied, with sufficient pre-tensioning immediately after priming, in accordance with sub-clause 4.2.2 of SABS 0129, and shall ensure a smooth wrap free from wrinkles, blisters, frayed or torn edges, cracks or other defects even at temperatures up to 65°C.

The first layer of wrap shall overlap by half the tape width plus 25 mm and the second wrap shall overlap by not less than 50 mm.

The above-mentioned layers of tape shall be armoured by the application of a third layer of pressure-sensitive polyethylene tape with a carrier thickness of 750 micrometers and a minimum overlap of 50%.

Armoured wrappings shall generally be applied at the following positions:

(a) all road crossings through sleeves and culverts;
(b) all railway crossings through sleeves or culverts; and
(c) wherever the Engineer may consider that special conditions warrant such measures.

12.3.6 **WRAPPING OF SPECIALS**

In the case of specials or pipe lengths where length and/or shape preclude the application of a protective wrapping system by any means, the protection shall be carried out either by bitumen-fibre glass or epoxy coating in accordance with paragraphs 11.3 or 8.4.5 respectively. In the case of access, scour, air valve and farmers off-take tees the special shall be deemed to incorporate at least two (2) diameter lengths either side of the main tee barrel.

12.3.7 **ARMOUR WRAPPING OF COATED PIPES**

Where armour wrapping of coated pipes is specified, a single layer of pressure-sensitive polyethylene tape with a carrier thickness of 750 micrometers and a minimum overlap of 50% shall be applied.

12.4 TOLERANCES

12.4.1 PRESSURE SENSITIVE TAPE WRAPPING

The minimum thickness of the inner low-density polyethylene tape carrier component shall be 300 µm and the maximum thickness of the outer high-density tape carrier shall be 1000 µm. Total minimum polyethylene thickness of 1450 µm.

The adhesive part of the inner layer shall be a minimum thickness of 1.5 times the polyethylene tape carrier thickness. For the outer layer the adhesive layer shall be at least equal to the thickness of the polyethylene tape carrier thickness.

12.4.2 BUTYL RUBBER LAMINATES

The minimum thickness of the completed wrapping shall be 750 µm. The inner layer shall be a butyl rubber laminate of 450 µm minimum thickness of which the butyl rubber film shall not be less than 200 µm thick and the polyethylene film shall not be less than 200 µm thick.

The outer layer shall be high density pressure tape of 300 µm minimum thickness.

12.5 TESTING

To be read in conjunction with paragraph 4.1, Quality Assurance.

12.5.1 VISUAL INSPECTION

The wrapping shall have a smooth appearance, free from wrinkles, blisters, bridging across weld beads, frayed edges, cracks, dis-bonding and any signs of physical damage.

12.5.2 NON-DESTRUCTIVE TESTING

(a) Electrical Insulation Defect (Holiday) Testing

The entire wrapping of the pipeline shall be tested with an approved holiday detector equipped with a rolling ring detector around the pipe by the Contractor to the Engineer’s satisfaction. The ring shall be in close contact with the surface of the wrapping along the pipe circumference. The test shall be carried out immediately prior to lowering the pipe into the trench. The wrapping on specials or short pipe lengths shall be tested with an approved holiday detector fitted with a copper bristle brush detector of suitable form. The wrapping shall exhibit no holidays when tested with an effective voltage of 12 kV at a nominal pulse frequency of not less than 30 Hz.

The Engineer may instruct any length of pipe or any number of specials to be re-tested using a holiday detector with a copper bristle brush detector.

(b) Coating Insulation Test

The Engineer shall carry out a conductance test on the wrapping over any section of pipeline between valves when the pipeline has been wrapped and installed in the trench with padding and back filling completed. The test shall be conducted with the valves temporarily removed from the line, at the Contractor's expense, to ensure complete isolation of the pipeline section under test or between gaps left for tie-ins.

The length of the section of pipeline under test shall be carefully measured and the conductance over the section tested shall not exceed 180 micro-Siemens per square metre of pipe surface under all conditions of test. If the results of the test for the section of pipeline tested are not satisfactory, two

sections immediately adjacent to the testing section will be tested. If the results on one or both of these sections tested are not satisfactory, all sections of wrapped pipeline shall be tested.

12.5.3 **DESTRUCTIVE TESTING**

The Engineer may from time to time collect samples of 10 metres of each type of tape and one litre of primer for testing, for compliance with the specification, by any independent laboratory appointed by the Engineer. The supply of samples shall be for the Contractor's account. The Engineer reserves the right to reject the whole batch of materials from which unsatisfactory samples were obtained.

12.5.4 **REPAIRS**

The Contractor shall be required to locate areas of faulty protection on all sections on which unsatisfactory results are obtained and to affect the necessary repairs. The cost of this work and all additional materials provided or supplied, including the reinstatement of the trench and the retest shall be for the Contractor's account.

12.6 **REPAIR METHODS**

Where damage to the wrapping on a pipeline has occurred and where there are creases, wrinkles and folds in the wrapping, proceed as follows:

12.6.1 **SMALL DAMAGED AREAS**

If the width of the tape being used exceeds by at least 100 mm the length of the section affected, cut the area of damaged wrapping away to bare metal leaving no raised edges or protrusions.

Clean and prime the exposed area in accordance with paragraphs 12.3.2 and 12.3.3 and apply a patch of tape, ensuring an overlap of not less than 50 mm on all sides onto the surrounding wrap.

Apply by hand-wrapping with a 55% overlap, a further layer of tape commencing two turns before and continuing for two turns beyond the patch.

12.6.2 **LARGE DAMAGED AREAS**

Where the extent of damaged or faulty wrapping is such that the tape cannot span the affected area and provide a 50 mm overlap on all sides it must be completely remove from the pipe over the affected section. The area must be cleaned and primed in accordance with paragraphs 12.3.2 and 12.3.3. The pipe must be re-wrapped with a 55% overlap, commencing two turns before and finishing two turns beyond the bared section.

12.6.3 **DAMAGE ON DOUBLE WRAP**

Where damage or a defect has occurred in a section that has been double wrapped and in the case of small holidays, the outer wrap shall be removed for a distance equal to three (3) times the width of the inner wrap tape on each side of the damaged area.

The appropriate procedure given in paragraphs 12.6.1 or 12.6.2 shall be used to effect the repair of the inner wrap.

The outer wrap shall be re-instated in accordance with paragraph 12.3.5.

12.6.4 **OUTER WRAP DAMAGE**

Where damage extends through an outer wrap/rockshield (see Section 6 of SABS 0129), this should be carefully removed for a distance equal to three (3) times the width of the inner wrap tape on each side of the damaged area without damaging the inner wrapping.

The repair shall be carried out by the appropriate method given in paragraphs 12.6.1 or 12.6.2 and the outer wrap/rockshield re-instated in accordance with paragraph 12.3.5.

13 **PETROLATUM WRAPPING SYSTEM**

Profiling mastic and mastic blankets are used for corrosion protection of couplings and flanges in chambers with high humidity and buried in soil.

13.1 **STANDARDS**

Reference is made to the latest issues of the following Standard Specifications:

SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after removal of previous coatings.
SABS	0129	Plastics tape wrapping of steel pipelines.
SABS ISO	9000	Model for quality assurance in production and installation.

13.2 **SURFACE PREPARATION**

Mechanically clean and wire brush the joint to remove all loose rust, scale, old coating and foreign matter to St 2 (ISO 8501-1).

Areas subjected to chemical attack, salt spray, fungus or bacteria shall be neutralised, rinsed with clean potable water and mechanically cleaned as specified above.

13.3 **PRIMING**

Brush priming solution well over the entire joint area, leaving a thin film (at a nominal coverage rate of 0,8 m²/litre). Apply a liberal amount around the bolt threads, narrow cavities and crevices.

Paste shall be used where excessive surface corrosion has occurred and under high humidity or submerged conditions.

13.4 **APPLICATION OF MASTIC AND TAPE**

(a) Use profiling mastic and/or strips to fill all voids, crevices and sharp or irregular contours.

(b) Apply mastic tape circumferentially over the area to be coated with a 25 mm overlap on either side of the mastic with a 75 mm end overlap.

(c) Pre-formed petrolatum mastic blanket system (10 mm thick), supported by a coated tape backing, is available to provide a quick and easy method to apply this system.

(d) Eliminate all air pockets, wrinkles and creases.

13.5 **TOP COAT**

13.5.1 **BURIED CONDITIONS**

Two complete turns of the polyethylene sheeting shall be applied circumferentially. The ends are secured to the pipe barrels with 48 mm wide bands of PVC adhesive tape, which is also applied to the outside diameter of the bolted joint.

13.5.2 **HIGH HUMIDITY CONDITIONS**

Overcoat with a synthetic coating mixed with a cementitious filler to give a tough, flexible coating. The base coat may be over-coated with water based Acrylics or Epoxies.

NOTE: Detail of application shall be in accordance with the manufacturer's data sheets and approved by the Corrosion Engineer.

14 **POLYOLEFIN-BITUMEN WRAPPING SYSTEM**

This system shall be used for corrosion protection of galvanised pipes up to 200 mm diameter.

The system comprises an inner layer and outer coating whereby the inner layer is made up of a self-adhesive rubber bitumen compound reinforced with a fully impregnated heat set polyester mat. The outer layer is a tough medium density cross-linked Polyolifin heat shrinkable sleeve.

14.1 **STANDARDS**

Reference is made to the latest issues of the following Standard Specifications:

SABS ISO	1461	Hot-dip galvanized coatings on fabricated iron and steel articles.
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after removal of previous coatings.
SABS	1117	Plastic wrappings for the protection of steel pipelines.
SABS	0129	Plastics tape wrapping of steel pipelines.
SABS ISO	9000	Model for quality assurance in production and installation.

14.2 **MATERIAL**

Tapes shall conform to SABS 1117, type C.

14.3 **APPLICATION**

14.3.1 SURFACE PREPARATION

Surfaces, hot-dip galvanised in accordance with SABS ISO 1461, shall be degreased as per Sections 6 and 7.

14.3.2 **APPLICATION**

(a) Apply an adhesive bitumen layer at 130°C.

(b) Allow the compound to cure for thirty (30) minutes and cool to room temperature.

(c) Fit the oversized sleeve onto the pipe protruding 75 mm beyond the pipe ends.

(d) Shrink the sleeve with a yellow LPG or propane flame.

(e) Trim the sleeve edges.

14.4 **TOLERANCES**

Prime coat	20 µm DFT
Inner layer	900 µm nominal
Outer layer	600 µm nominal
Overall thickness	1,5 mm nominal
Colour	Black

14.5 **TESTING**

To be read in conjunction with paragraph 4.1, Quality Assurance.

14.5.1 **VISUAL INSPECTION**

The wrapping shall have a smooth appearance, free from wrinkles, blisters, bridging across weld beads, frayed edges, cracks, dis-bonding and any signs of physical damage.

14.5.2 **ELECTRICAL INSULATION DEFECT (HOLIDAY) TESTING**

The entire wrapping of the pipeline shall be tested with an approved holiday detector equipped with a rolling ring detector around the pipe by the Contractor to the Engineer's satisfaction. The ring shall be in close contact with the surface of the wrapping along the pipe circumference. The test shall be carried out immediately prior to lowering the pipe into the trench. The wrapping on specials or short pipe lengths shall be tested with an approved holiday detector fitted with a copper bristle brush detector of suitable form. The wrapping shall exhibit no holidays when tested with an effective voltage of 12 kV at a nominal pulse frequency of not less than 30 Hz.

The Engineer may instruct any length of pipe or any number of specials to be re-tested using a holiday detector with a copper bristle brush detector.

14.5.3 **ADHESION**

Shall be tested in accordance with SABS 1117 (Type C).

14.6 **REPAIRS**

14.6.1 **SMALL REPAIRS (LESS THAN 10 MM)**

(a) Remove any contaminants from the damaged area.

(b) Cut away any protrusions.

(c) Use a weld stick and seal the damaged area by gently heating the point of the weld stick until it begins to flow. Press the weld stick firmly over the damaged area.

14.6.2 **LARGE REPAIRS**

(a) Remove any contaminants from the damaged area.

(b) Cut away any protrusions.

(c) Using a 100 mm wide bitumen tape and beginning 100 mm from the affected area, spirally wrap the tape utilising a 55 percent overlap. Continue to apply the tape until the repair is 100 mm beyond the affected area.

(d) Alternatively, if the pipe has not yet been installed, a section of sleeve may be placed over the defect and shrunk to at least 100 mm beyond each side of the defect.

15 POLYETHYLENE (MEDIUM DENSITY) COATING SYSTEM

15.1 STANDARDS

Reference is made to the latest issues of the following Standard Specifications:

AS	4321	Fusion bonded medium-density polyethylene – coating and lining for pipes and fittings.
AS	3894	Method 3: Determination of dry film thickness.
ASTM	D1693	Environmental stress cracking.
SABS ISO	1183	Plastics – Methods for determining the density and relative density of non-cellular plastics.
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after removal of previous coatings.
SABS method	1264	Cathodic dis-bonding test for pipeline coatings.
SABS ISO	2808	Paints and varnishes – Determination of film thickness.
SABS ISO	3270	Paints and varnishes and their raw materials – Temperatures and humidities for conditioning and testing.
SABS	1217	The production of painted and powder coated steel pipes.
SABS Method	767	Cleanliness of blast-cleaned steel surfaces for painting (pictorial standards).
SABS Method	769	Cleanliness of blast-cleaned steel surfaces for painting (dust and debris).
SABS Method	772	Profile of blast-cleaned steel surfaces for painting
SABS ISO	9000	Model for quality assurance in production and installation.

15.2 MATERIAL

Shall conform to AS 4321

15.3 APPLICATION

15.3.1 SURFACE PREPARATION

All surfaces to be coated shall be abrasive blast-cleaned in accordance with Section 7.

15.3.2 APPLICATION

The pipes and specials shall be heated in such a way as not to produce any deleterious contaminants on the surface to be coated.

The polyethylene compound shall be applied to obtain a smooth finished surface.

The coating shall not be post-heated by use of a torch or other flame treatment being applied directly to the coating.

15.3.3 TREATMENT

(a) Where the coating is terminated externally it shall be set back a nominal distance of 100 mm from the closest assembly weld point and sealed with a primer.

(b) Where the coating in the joint region terminates internally and the pipe is cement mortar lined, the mortar shall overlap by a minimum of 25 mm.

(c) The end coating be tapered over a distance not less than the coating thickness.

15.4 **TOLERANCES**

15.4.1 **COATING THICKNESS**

When determined with a magnetic thickness gauge in accordance with method 5 of SABS ISO 2808, the minimum coating thickness of the fusion bonded polyethylene applied to pipes and specials shall be as tabled below.

Coating And Lining Thickness

Pipe OD in mm	**Minimum coating thickness in mm**		
	Coating	Lining	Area at coupling
OD ≤ 273	1.6	1.0	0.8
273 < OD ≤ 508	1.8	1.0	0.8
508 < OD ≤ 762	2.0	1.0	1.0
762 < OD	2.3	1.0	1.0

15.5 **TESTING**

To be read in conjunction with paragraph 4.1, Quality Assurance.

15.5.1 **VISUAL INSPECTION**

The coating shall be smooth, glossy free from pinholes, excessive orange peel, bubbling or excessive runs or sags.

15.5.2 **THICKNESS**

When tested using a thickness gauge complying with AS 3894 Method 3, the minimum coating thickness of the FBPE shall be as specified in the above-mentioned table. On any pipe the minimum thickness may be up to 0,2 mm less than that specified in the table provided that the area of coating or lining with reduced thickness does not cover more than five (5) percent of the total pipe coating or lining area. Pipes with reduced thickness shall comprise not more than five (5) percent of the pipe coating order.

15.5.3 **ELECTRICAL INSULATION DEFECTS**

The total coated and lined surfaces of every pipe and fitting. Shall be tested in accordance with Appendix L of AS 4321. All holidays detected shall be repaired in accordance with clause 8 of AS 4321.

15.6 TEST REQUIREMENTS

15.6.1 TYPE TEST

15.6.1.1 GENERAL

Type tests shall be carried out at intervals of no greater than three (3) years and at any change in formulation or source of polyethylene compounds and at any change in application process.

15.6.1.2 POLYETHYLENE COMPOUND

The polyethylene compound to be used for coating, lining and repairs shall be type tested for thermal stability, water absorption, penetration resistance, tensile stress at yield , environmental stress-cracking resistance, density and impact resistance as specified in clauses 6.1.2.2 to 6.1.2.8 of AS 4321.

Test samples may be prepared in the laboratory or in the coating plant.
If the same formulation and source of polyethylene is used for both the coating and lining, then tests on the coating shall also qualify the lining. The impact resistance test is not required for the lining.

15.6.1.3 PRODUCTION TESTS

The coating and lining shall comply with the production test requirements specified in clauses 6.3.2 to 6.3.4 of AS 4321.

15.7 REPAIR METHODS

15.7.1 GENERAL

Where a holiday is located it shall be repaired to produce a continuous coating and lining. Damaged areas that pass the continuity test need not be repaired provided the coating or lining thickness remains greater than or equal to 1.0 mm.

The bare steel surface shall be prepared in such a way to produce a rust-free, clean, abraded surface. The adjacent FBPE coating or lining shall be tapered as specified in clause 5.4 of AS 4321.

All lining repairs shall be in accordance with clause 7.2 of AS 4321.

Where practicable the following coating repair methods shall be used:

(a) Fusion-bonded repairs as specified in clause 7.2 of AS 4321.

(b) Heat shrink sleeve repair.

(c) Hot gas welding repair (for the joint region shown in Figure 1 of AS 4321).

NOTES:

1. The repair methods outlined apply to repairs at the application plant only.

2. The Corrosion Engineer may specify a particular repair method (see Appendix A of AS 4321).

15.7.2 **REPAIR LIMITS**

The number of coating repairs (this includes repairs to the joint region, see Figure 1 of AS 4321) shall not exceed three per pipe or fitting. An allowance is made for up to six repairs per pipe or fitting provided that the number of pipes or fittings with this larger number of repairs does not exceed five (5) percent of a pipe coating order. The number of lining repairs shall not exceed three per pipe or fitting.

The area of any single coating repair shall not exceed 0.1 m², and the length of such repair shall not exceed 2 m in the longitudinal direction. The area of any single lining repair shall not exceed 5 000 mm².

15.7.3 **REPAIR TEST METHODS**

All repairs shall comply with the continuity test requirements of clause 6.3.3 of AS 4321.

16 **ELASTOPLASTIC POLYURETHANE COATING SYSTEM**

Two component solvent free elastoplastic polyurethane.

16.1 **STANDARDS**

Reference is made to the latest issues of the following Standard Specifications:

Manufacturer's data sheets/recommendation

SABS	1217	The production of painted and powder coated steel pipes.
SABS Method	767	Cleanliness of blast-cleaned steel surfaces for painting (pictorial standards).
SABS Method	769	Cleanliness of blast-cleaned steel surfaces for painting (dust and debris).
SABS Method	772	Profile of blast-cleaned steel surfaces for painting.
SABS Method	776	Adhesion of coatings (direct pull-off method).
SABS ISO	2808	Determination of film thickness.
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after removal of previous coatings.
SABS ISO	9000	Model for quality assurance in production and installation.

16.2 **MATERIAL**

16.2.1 **PRIMER**

The primer, supplied by the manufacturer of the coating material, shall be compatible with the coating material applied at the manufacturer's specified thickness within the specified over coating time.

16.2.2 **COATING**

The coating material shall be a solvent free two-component polyurethane hybrid based on a polyester type polyol and aromatic isocyanate. The cured coating shall comply with the following requirements:

(a) Tensile strength at 3 mm thickness - ASTM D 638 - not less than 15 MPa.

(b) Adhesion to primed steel - SABS Method 776 - not less than 10 MPa.

(c) Impact resistance (direct) - ASTM G 14 - not less than 9 Joules.

(d) Dielectric Strength - not less than 10 kV/mm.

(e) Elongation at break - not less than 25 %.

(f) Compressibility - not less than 25 MPa.

(g) Surface hardness of 5 mm thick sample - not less than 60 nor greater than 80 Shore 'D'.

(h) Water Vapour Permeability - not greater than 0,5 g/24 h/m²/mm².

(i) Cathodic dis-bonding - when tested in accordance with ASTM GB Method A, for 60 days, the dis-bonded area shall not exceed 500 mm².

16.2.3 **ADHESIVE**

Adhesive shall be a two component polyurethane adhesive designed to maximise adhesion between used polyurethane and freshly mixed polyurethane.

16.3 **APPLICATION**

16.3.1 **SURFACE PREPARATION**

(a) Contaminants shall be removed by an appropriate method such as with an organic solvent emulsion cleaner or a suitable detergent.

(b) All sharp edges shall be rounded off to a 2 mm radius. The prepared surfaces shall extend to the ends of the pipes and specials and around the edges for a width of at least 150 mm on the outside of the pipe.

For pipes and specials intended for butt welding the prepared surfaces shall extend to the pipe ends.

(c) The surface shall be blast-cleaned with a suitable abrasive to achieve a surface cleanliness of Sa 3 for lining and Sa 2½ for coating to ISO 8501-1, with an average surface profile of 50-100 micrometers (**µm**), in accordance with SABS method 772.

(d) Water soluble salts present in the steel after blast cleaning shall not exceed the values in paragraph 7.4.1. Should these values be exceeded, the steel shall be cleaned by washing with clean potable water or by water shrouded or water injected blast cleaning until the soluble salts are within the limits specified above. The steel shall then be allowed to dry, after which it shall be flash blast cleaned to achieve the required degree of cleanliness.

(e) The surface shall be vacuum-cleaned or be blown clean with uncontaminated dry compressed air to remove dust and debris, in accordance with SABS method 769, to not greater than 0,3 percent.

(f) The clean pipe surfaces shall be coated within four (4) hours if the relative humidity is below 70 percent or within two (2) hours if the relative humidity is in the range of 70% to 85%.

No blast cleaning or coating application shall take place when:

(i) The ambient temperature is outside the range of 15 - 40°C or otherwise specified by the manufacturer;

(ii) The relative humidity is above 85 percent,

(iii) The surface temperature is less than 3°C above dew point.

16.3.2 **APPLICATION**

(a) Apply the primer specified in paragraph 16.2.1 to the manufacturer's specified thickness.

(b) Apply the solvent free polyurethane by means of an airless spray fitted with metering pumps. The Contractor shall demonstrate that the machine is delivering components in the correct mixing ratio.

16.4 **TOLERANCES**

(a) For mildly corrosive/abrasive conditions

The dry film thickness shall be 1.0 mm minimum.

(b) For corrosive/abrasive conditions

The dry film thickness shall be 3.0 mm minimum.

16.5 **TESTING**

To be read in conjunction with paragraph 4.1, Quality Assurance.

16.5.1 **VISUAL INSPECTION**

The coating shall be smooth, glossy, free from pin holes, excessive orange peel effect, bubbling or excessive runs or sags.

16.5.2 **DRY FILM THICKNESS**

Shall be inspected in accordance with SABS ISO 2808

16.5.3 **ELECTRICAL INSULATION DEFECTS (HOLIDAY) INSPECTION**

The coating shall be free from electrical insulation defects when tested with a high voltage holiday detector set at 5 kV and 15 kV for 1 mm and 3 mm dry film thickness respectively.

16.6 **REPAIR METHODS**

Since polyurethane systems are chemically cured, very thorough abrasion of damaged or defective coating is required to ensure an adequate physical bond.

16.6.1 **REPAIRS BEFORE FULL CURE [WITHIN SIXTEEN (16) HOURS OF APPLICATION OF LAST COAT]**

(a) The area to be over-coated shall be abraded with abrasive paper grade 220 to a uniform matt finish.

(b) The surface shall be vacuum-cleaned or be blown clean with uncontaminated dry compressed air to remove dust and debris.

(c) Apply brush grade polyurethane in as many coats as are required to achieve the specified thickness free of electrical insulation defects.

16.6.2 **REPAIRS AFTER FULL CURE [AFTER SIXTEEN (16) HOURS OF APPLICATION OF LAST COAT]**

(a) The area to be over-coated shall be abraded with abrasive paper grade 220 to a uniform matt finish.

(b) The surface shall be vacuum-cleaned or be blown clean with uncontaminated dry compressed air to remove dust and debris.

(c) Apply the coating manufacturer's adhesive primer only to the abraded surface.

(d) Between thirty (30) minutes and four (4) hours apply brush grade polyurethane in as many coats as are required to achieve the specified thickness free of electrical insulation defects.

17 CEMENT MORTAR LINING SYSTEM

17.1 STANDARDS

Reference is made to the latest issues of the following Standard Specifications:

SABS ENV	197-1	Cement: Composition, specification and conformity criteria.
SABS	1024	Welded steel fabric for concrete reinforcement.
SABS	1083	Aggregates from natural sources.
SABS	1200	Standardised specifications for civil engineering construction.
SABS	0100	Structural use of concrete.
SABS Method	551	Sodium and potassium contents of Portland cement.
SABS Method	769	Cleanliness of blast-cleaned steel surfaces for painting (dust and debris).
SABS Method	830	Chloride content of aggregates.
SABS Method	863	Compressive strength of concrete (including making and curing of the test cubes).
SABS Method	1245	Potential reactivity of aggregates with alkalis (accelerated mortar prism method)
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after removal of previous coatings.
SABS ISO	9000	Model for quality assurance in production and installation.
AWWA	C602	Cement-mortar lining of water pipelines - 4 inches (100 mm) and larger - in place.
BS	3148	Methods of test for water for making concrete (including notes on the suitability of the water).
SIS	05 59 00	Pictorial surface preparation standards for painting steel surfaces. (Swedish.)

17.2 MATERIAL

17.2.1 CEMENT

Cement shall be of type I with a class strength of 42,5 and shall be identified by CEM I : 42,5. The cement shall conform to SABS ENV 197-1.

The alkali content of the cement, when expressed as sodium oxide (Na_2O) equivalent, shall not be greater than 0,6 percent by mass of cement determined in accordance with SABS Method 551 or any other reduced value as determined by the Engineer, where:

% Na_2O equivalent = % Na_2O + (0,658 x % K_2O)

Cement shall be from the same source and shall be fresh. Cement shall be used strictly in the order of delivery. All cement in storage for longer than eight weeks and all cement in unsealed pockets shall be removed from storage and discarded.

Cement shall be stored in weather-proof bulk silos, or if in pockets, shall be stored in weather-proof sheds provided with damp proof floors at least 300 mm above ground level, stacked on pallets and covered with a waterproof membrane.

17.2.2 AGGREGATES

Both, the coarse aggregate (stone) and fine aggregate (sand) used in the manufacture of concrete or mortar shall conform to SABS 1083.

The aggregates shall be evaluated for potential alkali reactivity using SABS Method 1245.

The chloride content of the sand determined by SABS Method 830 shall not exceed 0,01 percent per mass.
Coarse aggregate shall be suitable for concrete subject to surface abrasion, and of the largest possible size that would allow placement of concrete without difficulty.

Within eight (8) weeks of award of contract, the Contractor shall submit to the Engineer the results of tests carried out on aggregates from the Contractor's proposed source by an independent and competent body. The Engineer reserves the right to take further samples of aggregates at any time from the Contractor's source or from his stockpiles and have same tested for compliance with the specification.

17.2.3 WATER

Water used for concrete, mortar or cement slurry shall be clean i.e. free from oil, acid, alkalis, vegetable and mineral matter.

The water shall generally conform to the recommendations in the appendix to BS 3148.

17.2.4 CONCRETE AND MORTAR

Concrete and mortar ingredients shall be batched by mass and shall be well mixed in mechanical mixers of good condition for a duration of not less than two (2) minutes.

There shall be no re-tempering of the mix after discharge from the mixer. Only fresh concrete and mortar shall be used and all concrete, mortar or cement slurries in a mixed state for longer than thirty (30) minutes shall be discarded.

No additives shall be used, except where approved by the Engineer in writing.

The minimum cement content per cubic metre of concrete shall be 400 kg.

Mortar shall be a mixture of one (1) part cement to two (2) parts fine aggregate, for linings of up to 15 mm thickness and one (1) part cement to three (3) parts fine aggregate for thicker linings. Mortar shall not be used for coatings.

Total water content shall be the minimum required to produce suitable consistency and shall not exceed fifty (50) percent by mass of cement content, allowance being made for the moisture content of aggregates.

150 mm cubes of concrete or mortar made and cured in accordance with SABS Method 863 shall have a minimum compressive strength of 30 MPa after twenty eight (28) days.

17.2.5 **WELDED STEEL FABRIC**

Welded steel fabric shall conform to SABS 1024, except that wire diameter and mesh sizes shall conform to this Specification.

17.3 **APPLICATION**

17.3.1 **LINING**

17.3.1.1 **THICKNESS**

The thickness of linings on pipes shall generally be as tabled below, except where specified to the contrary in the Schedule of Quantities or on the drawings.

Pipe OD in mm				Thickness of lining in mm		
				Nominal	Maximum	Minimum
	273,0	to	609,6	10	13	8
above	609,6	to	1 016	14	16	12
above	1 016,0	to	1 220	16	20	14
above	1 220,0	to	1 620	20	24	16

The thickness of lining on specials shall generally comply with the above, provided the minimum cover of mortar over reinforcement mesh shall not be less than 10 mm.

17.3.1.2 **SURFACE PREPARATION**

After bare pipes and specials have been tested and inspected for compliance with the applicable specification and after application of coating, if applicable, surface shall be prepared as follows:

(a) Weld spatter, loose rust and loose mill scale shall be removed by chipping and/or scraping.

(b) Deposits of grease, oil, bitumen or other contaminants shall be removed by scraping and wiping with rag soaked in white spirit or similar toxic free solvent.

(c) Other contaminants shall be removed by manual -, mechanical - or abrasive blast cleaning. The standard of cleaning shall not be less than grade St 2 or grade Sa 1 of ISO 8501-1, as appropriate.

(d) Residual dust and debris on the pipe surface shall be 0,5 percent maximum when tested in accordance with SABS Method 769.

17.3.1.3 **SHOP APPLIED LININGS - CENTRIFUGAL SPUN**

Within twenty four hours of having been grit blasted and provided the pipe surfaces are kept dry, free of dust, oil and other deleterious contaminants and provided ambient temperatures are above 20°C the pipe shall be transported to a suitable spinning machine. The coating, if applicable, shall be suitably protected against mechanical damage during the handling and spinning operation. Before being placed in the spinning machine, the pipe shall be suitably braced with external stiffening rings, which shall not be removed until the appropriate one of the following periods has elapsed from the time of placing of the lining:

(a) Seventy two (72) hours when water curing is used; and

(b) Thirty six (36) hours when steam curing is used.

End gauge rings shall be securely attached to the pipe ends to control the lining thickness, to act as stop end to prevent mortar leakage and to stiffen and hold the pipe ends round.

Each pipe shall be rotated in a spinning machine with its axis horizontal during and for a suitable period after the placing of the lining. The speed of rotation shall be such as to produce a uniform distribution of the cement mortar over the interior surfaces of the pipe.

Sufficient mortar to line completely one pipe to the appropriate nominal thickness specified in paragraph 17.3.1.1 shall be mixed in one batch, and it shall be of such consistency as to minimise segregation during spinning. The mortar shall be placed in the pipe immediately after mixing and before initial set has taken place, and in a manner providing uniform longitudinal distribution of the batch from end to end of the pipe.

As soon as the mortar lining has achieved a uniform thickness over the whole interior surface of the pipe, the speed of rotation shall be increased to a speed that will compact the mortar and is not less than 1 peripheral speed of 17 metres per second. The required speed shall be maintained for such a period as will give the maximum density of mortar and smoothness of surface, and sufficient bonding to permit removal of the pipe from the machine without injury to the lining.

The ends of the lining shall be finished uniform and square or slightly bevelled as required in paragraph 17.3.1.8.

All water and laitance expelled during spinning shall be removed in such a manner that the surface of the lining is smooth, level and true.

After the lapse of a suitable period after spinning (as determined by experiment), the spun lining shall be given a steel trowelled or smoothing bar finish. A second trowelling may be necessary to remove all laitance and produce a smooth and hard finished surface. The Colebrook-White (k) friction value shall be not more than 0,13 mm.

17.3.1.4 **IN-SITU APPLIED LININGS**

(a) Standard

Shall be carried out generally in accordance with the provisions of the latest issue of AWWA C602 for "Cement-Mortar Lining of Water Pipeline - 4 in (100 mm) and larger - In Place", subject to the modifications, amendments and amplifications in this Specification.

(b) Curing

The contents of clauses 4.7.2, 4.7.3, 8.7.2 and 8.7.3 of AWWA C602 shall be deleted and shall be replaced by: "Curing by Contractor. The Contractor shall be responsible for careful curing of the mortar lining until the pipeline has been handed over to the Department."

(c) Length of uninterrupted lining

Tenderers shall state in tenders the maximum length of lining which they are prepared to undertake between any two consecutive points of access and under what circumstances they would require this length modified. This factor will be taken into account when assessing the comparative economic merits of tenders.

(d) Methods of lining

For pipe sizes up to 500 mm nominal bore, the "Tate system" of lining is permissible. The "Perkins system" of lining by means of a suitable machine that travels through the pipe and distributes mortar by high velocity centrifugal spraying, followed by a trowelling device, shall be permissible for all pipe sizes.

Tenderers shall submit full details of the system to be employed with special reference to methods of pre-cleaning of surfaces and delivery of mortar to the spraying head.

17.3.1.5 **LINING OF SPECIALS**

Bends, tees and other specials that cannot be lined by machine shall be manually lined. In case where the nominal diameter exceeds 600 mm the lining shall be reinforced by steel mesh tack-welded to the inside of the pipe in such a way that it is not in contact with the pipe except where welded. The steel mesh shall be of 2,5 mm diameter steel wire at 100 mm by 50 mm, or equivalent spacing. The minimum cover over the mesh shall be 10 mm.

17.3.1.6 **FINISH**

The lining shall be well finished with a smooth surface free from excessive laitance and surface irregularities. Projections exceeding a height of 1,5 mm shall be removed by trowelling before the concrete has set, or by grinding after the lining has cured.

The thickness of the laitance, if any, shall not exceed ten (10) percent of the thickness of the lining, or 1,25 mm, whichever is less.

The effective surface roughness of the lining when measured in terms of the Colebrook-White "K" friction coefficient for lining surface effective roughness shall be guaranteed by the suppliers and shall not be more than 0,13 mm when actually measured in the field after completion of the pipeline. No rougher surface will be acceptable.

17.3.1.7 **CURING**

(a) Water curing

Immediately after the placing of the concrete, the pipe shall be so sealed as to prevent loss of contained water, and the concrete shall be kept continuously moist for a period of at least seven (7) days or, in the case of an in-situ applied lining, until the pipe has been handed over to the Purchaser. During this period steps shall be taken, when necessary, to prevent the temperature of the steel shell falling below 2°C.

(b) Steam curing

Pipes that have shop applied linings, and that have not been coated with bitumen or coal tar may be steam cured.

Immediately after application of the concrete lining, the ends of the pipe shall be completely sealed. After the lined pipe has been standing for not less than two (2) hours, steam shall be injected into it so as to raise the temperature at a rate not exceeding 28°C per hour until the temperature of the lining is within the range 55-70°C.

Steaming shall continue for a further six (6) hours, the temperature of the lining being maintained within the range specified. Steaming shall be discontinued and the pipes shall remain sealed for a further two (2) days from the time that the temperature of the pipe has fallen to ambient. During this period precautions shall be taken to prevent the temperature of the steel falling below 2°C.

During the curing cycle, excluding the two (2) day holding period, the temperature of at least one pipe out of that day's production, shall be recorded by a suitable automatic recording instrument. If the temperature record reveals that the requirements set out above have not been achieved, then the pipes shall be subjected to the full period of water curing as specified in paragraph 17.3.1.7(a).

(c) General

Concrete lined pipes shall not be moved or transported for a period of twenty one (21) days after the date of lining.

17.3.1.8 **PIPE ENDS**

Where lining takes place before welding, i.e. not in-situ but on site or in the shop, the following shall apply:

(a) For flanged pipes and specials and pipes intended for jointing by couplings, concrete lining shall be ended flush with pipe ends with a 6 mm bullnosing of edges by means of a nosing tool.

(b) For pipes to be butt welded, the lining shall terminate 100 mm from the internal end of each pipe and the end of the lining shall be bevelled to form an angle of approximately 85 degrees between the clear end of the pipe barrel and the lining end.

The unlined circumferential strip of grit blasted surface shall be temporarily protected between the works and the site with a coat of (red or a different colour to the lining/coating) weldable primer.

17.3.2 **COATING**

17.3.2.1 **THICKNESS**

The thickness of coatings on pipes and specials shall generally be as tabled below, except where specified to the contrary elsewhere in these documents.

Pipe OD in mm			Thickness of coating in mm		
			Nominal	Maximum	Minimum
	273,0	to 609,6	16	18	14
Above	609,6	to 1 016	20	22	18
Above	1 016,0	to 1 220	25	25	22
Above	1 220,0	to 1 620	30	30	25

17.3.2.2 **COVER TO REINFORCEMENT**

Nominal coating thickness in mm	Minimum cover to reinforcement in mm
16	10
20	14
25	18
30	20

17.3.2.3 **SURFACE PREPARATION**

Paragraph 17.3.1.2 shall apply.

17.3.2.4 **APPLICATION**

(a) Stiffening rings

End gauge rings shall be securely attached to the pipe ends to control the coating thickness, to act as stop end to prevent mortar spillage at pipe ends and to stiffen and hold pipe ends round.

(b) Reinforcement

The coating shall be bonded to the pipe surface and shall be reinforced by 2,5 mm diameter round steel wire wound spirally around the total length of the pipe and tack-welded to the pipe surface. The pitch between windings shall not exceed 40 mm. Alternatively, the reinforcement shall consist of 2,5 mm thick, 100 mm by 100 mm steel mesh wrapped around the pipe and tack-welded to the surface. Except where welded, the reinforcement shall not be in contact with the pipe surface.

(c) Cement slurry

Within twenty four (24) hours of having been grit blasted and provided the pipe surfaces are kept dry, free from dust, oil and other deleterious contaminants and provided ambient temperatures are above 2°C on a rising thermometer, the pipe surfaces and reinforcement shall be coated with a slurry consisting of approximately ten (10) litres of water to twenty (20) kilograms of cement. No more of the pipe surface shall be coated at any time than what can be covered with cement mortar immediately without the cement slurry drying out.

(d) Concrete application

Immediately after application of the cement slurry and while the cement slurry is still wet, concrete shall be applied by impact, or under vibration, or by hand plastering where mechanical means of application are not possible.

(e) Finish

The finished coating shall be firm and dense, shall adhere rigidly to the outside of the pipe and the thickness of laitance shall not exceed 1,25 mm. The coating shall furthermore be free from pinholes, craters, cracks, laminations and other imperfections.

(f) Curing

Upon completion of the coating operation and until the coating has set sufficiently to allow the pipe to be handled and transported to the curing site without damage to the coating, the coated pipe shall be fully protected from wind, rain, direct sunlight and against loss of moisture from the coating.

(i) Water curing: As soon as the coating has set sufficiently for the pipe to be handled, the coating shall be kept continuously moist by continuous water spraying for a period of at least 7 days. During this period steps shall be taken to prevent the temperature of the steel shell from dropping below 2°C.

(ii) Steam curing: paragraph 17.3.1.7(b) shall apply, except that steam curing shall continue for 6 hours before end stiffeners and gauging rings are removed. Steam curing shall thereafter continue for a further twelve (12) hours or alternatively, after six (6) hours of steam curing, the co atings may be water cured by continuous water spraying for at last five (5) days.

17.3.2.5 **PIPE ENDS**

For pipes and specials intended for jointing by flexible couplings, the coating shall be terminated 250 mm from pipe ends with a 6 mm radius bull-nosed outer edge.

For pipes to be butt welded, the coating shall terminate 100 mm from pipe ends and the ends of coatings shall be bevelled to form an angle of approximately 85 degrees between the clear end of the pipe barrel and the end face of the coating.

The unlined circumferential strip of grit blasted surface shall be temporarily protected between the works and the site with a coat of (red or a different colour to the lining/coating) weldable primer.

17.3.2.6 **REPAIR OF DEFECTS**

Paragraph 17.6.1 shall apply.

17.4 TOLERANCES

The thickness of linings and coatings shall be as given by paragraphs 17.3.1.1 and 17.3.2.1 respectively.

17.5 TESTING

To be read in conjunction with paragraph 4.1, Quality Assurance.

17.5.1 LINING

17.5.1.1 VISUAL INSPECTION

(a) Shop applied lining

The cured lining in every pipe and special shall be inspected visually for defects before the pipe leaves the factory, but not sooner than twenty one (21) days after application of the lining.

The lining shall have a smooth, steel floated appearance and shall have no projections exceeding a height of 1,5 mm above immediate lining surface.

Slight surface crazing and hair cracks shall be permissible. All cracks into which a suitable metal depth gauge with a probe of 1,5 mm diameter can be inserted to a depth of half the minimum specified thickness of the lining shall be considered a defect and shall be repaired as described in paragraph 17.6.1 of this specification.

(b) In-situ Lining

Visual inspection of the finished lining shall include the provision of a camera mounted on a suitable trolley which shall be so arranged as to make exposures at intervals of approximately twenty (20) metres throughout the lined pipe.

Accurate records including exposure serial numbers and the relative pipe chainages shall be kept by the Contractor. All records and exposures shall become the property of the Employer.

The Contractor shall supply all equipment, facilities and chemicals required for the processing of films. A full description of the equipment and method proposed shall be submitted with tenders.

Exposures of any completed section of lining shall be processed and be made available immediately after processing. The Engineer may order repeat exposures at any point in the line due to the lack of good definition, lighting, focus or because a defect in the lining is suspected. Repeat exposures shall be to the account of the Contractor. Repeat exposures to clarify suspected defects however, shall, if the suspected defects prove acceptable or non-existent, be to the account of the Department.

17.5.1.2 DESTRUCTIVE TESTING

(a) Thickness of lining and cover to reinforcement

On the first pipe lined and thereafter on one pipe selected at random out of every day's production and after completion of curing, chisel down to bare steel base a representative section of area at least 0,25 square metres of the lining. The area shall contain the weld bead.

Measure distance between steel base and surface of concrete, top of weld bead and surface, and reinforcement mesh to surface of concrete, with a suitable dial gauge or micrometer to an accuracy of 0,1 mm. Take not less than five (5) readings for each pipe and record all readings, the mean of readings, the maximum and the minimum readings.

Repair lining as described in paragraph 17.6.1. Should thickness not fall within the specified ranges, a further two pipes out of the day's production shall be tested. If thickness of any of the two pipes or specials tested shall fail the requirements, the lining of all pipes and specials in that day's production may be rejected.

(b) Water absorption

On first pipe and thereafter on one pipe selected at random out of every day's production, chisel out approximately 0,2 cubic metres of cured lining in as large chunks as possible. Dry sample in oven at 100°C to constant mass. Allow to cool to room temperature and determine dry mass to the nearest gram. Immerse sample in clean water for twenty four (24) hours. Withdraw sample, remove excess surface water and determine saturated mass to the nearest gram.

$$\text{Water absorption } \% = \frac{\text{Saturated mass - Oven dry mass}}{\text{Oven dry mass}} \times 100$$

Water absorption shall not exceed 6 percent.

(c) Concrete strength

Prepare, cure and test in accordance with SABS method 863, three 150 mm cubes daily of mortar sampled out of a single batch of mortar selected at random from batches mixed for every day's production. Standard of acceptance shall be in accordance with clause 5.8 of SABS 0100, Part II.

17.5.1.3 **CONTRACTOR'S AND ENGINEER'S INSPECTIONS**

Paragraphs 1.4 and 3.1 of DWS 2020 shall apply.

17.5.2 **COATING**

17.5.2.1 **VISUAL INSPECTION**

The cured coating in every pipe and special shall be inspected visually for defects before leaving the factory, but not sooner than twenty one (21) days after application.

The finished coating shall be firm and dense, shall adhere rigidly to the outside of the pipe and the thickness of laitance shall not exceed 1,25 mm.

The coating shall be free from pinholes, craters, cracks, and laminations, although slight surface crazing and hair cracks shall be permissible.

All cracks into which a suitable depth gauge with a probe of 1,5 mm diameter can be inserted to a depth of half the minimum specified thickness, shall be considered a defect and repaired as described in paragraph 17.6.1.

17.5.2.2 **DESTRUCTIVE TESTING**

Paragraph 17.5.1.2 shall apply, except that lining shall be read as coating.

17.5.2.3 **CONTRACTOR'S AND ENGINEER'S INSPECTIONS**

Paragraphs 1.4 and 3.1 of DWS 2020 shall apply.

17.6 REPAIR METHODS

17.6.1 REPAIR OF DEFECTS

All defective concrete shall be removed and the surrounding area of concrete chipped back to a position where the concrete is firmly bonded to the steel.

The edges of the firm surrounding concrete shall be bevelled to form an angle of 85 degrees with the portion of pipe barrel under repair.

The pipe surface shall be cleared from all signs of concrete and dust.

The pipe surface and surrounding concrete shall then be given one coat of cement/water grout and the fresh mortar applied by hand while the grout coat is still wet. The mortar shall be of the same mix and consistency as the lining.

The repair area shall be built up to the full thickness of the lining, care being taken to ensure complete filling of the bevelled edges with the mortar.

The repaired areas shall be covered by damp hessian, which shall be kept continuously wet for seven (7) days after completion of repair.

C3.5: MANAGEMENT

C3.5.1 MANAGEMENT OF THE WORKS

C3.5.1.1 Applicable SANS and SANS Standards

The SANS 1200 Standardized Specifications listed in C3.4.1.1 are applicable.

C3.5.1.2 Particular/Generic Specifications

Not applicable.

C3.5.1.3 Methods and Procedures

(a) Maintenance of access and streets

Not applicable.

(b) Blasting operation

Not applicable.

(c) Normal working hours

Normal working hours shall be from 07h00 until 17h00 on weekdays from Monday to Friday. It shall be from 07h00 until 13h00 on Saturdays.

Work on other days will only be allowed after written approval has been granted by the Engineer.

(d) Interference with municipal staff and operations

The Contractor shall ensure that none of his staff interfere in any way with any municipal staff member or their functions in any way.

Any person ignoring this shall be removed permanently from site, all at the expense of the Contractor.

(e) Access for other contractors

The Contractor shall provide reasonable access to other Contractors carrying out work on the site from time to time, as and when such access is required. The Contractor is entitled to request reasonable notification of at least 24 hours before access by others is required.

The contractual responsibilities of the Contractor shall remain in full force in spite of the other Contractors having access to the site.

(f) Giving notice of work to be covered up

The Contractor shall give the Engineer at least 48 hours notice prior to a request for examination of materials or work to be covered up. This request must be made in the request book on site.

Should such a request be made and upon inspection the Engineer found that the works or materials are not yet ready for inspection, the Contractor shall reimburse the Engineer within 30 days of invoice for all expenses incurred as a result.

(g) Sequence of the works

The Contractor shall arrange with the Technical Department of the Municipality and the Engineer the sequence of the works to ensure the surrounding residents are fully informed.

C3.5.1.4 Quality plans and control (Testing)

Refer to Section C3.4.2.5(b).

C3.5.1.5 Environmental Management Plan (EMP)

The contractor shall comply with the following, but not limited to, environmental requirements. These requirements are supplementary to the latest amended OHS Act.

(a) Demarcation of the site

For the purpose of the EMP, the site shall be demarcated into two distinct areas, viz.;

(i) The construction camp comprising all buildings, hostels, offices, lay down yards, vehicle wash areas, fuel and material storage area, batching areas and other infrastructure that is required for the running of the job.

(ii) The working area in which construction activities are permitted to take place. No infrastructure, permanent lay down or storage areas shall be established in this working area unless specified in the project specification or prior approval is obtained from the Engineer.

(b) Construction camp

The Contractor shall provide the Engineer with a plan showing the positions of all buildings, yards, vehicle wash areas, batching areas and other infrastructure for approval by the Engineer at least ten (10) days prior to the commencement date.

(c) Fencing of site

If a temporary fence is required, the Contractor shall erect and maintain such a fence (demarcating the boundary of the working area, construction camp and access roads) to the satisfaction of the Engineer.

This fence shall be erected before the commencement of any other work on site. The fence shall be removed after completion of the project and the site reinstated to its original state.

(d) Workshops

All workshops shall be located inside the demarcated construction camp area as approved by the Engineer prior to establishment. The workshop shall have a smooth impermeable concrete floor sloped to one side where oil is trapped in an oil trap or sump to contain any spillages of substances such as oil.

Waste material shall be disposed of in accordance with the national, regional and local by-laws regulations and by-laws. The waste shall be regularly removed and disposed of at an approved site.

(e) Eating areas

The Contractor’s employees shall eat in a designated eating area indicated on the drawing approved by the Engineer. The Contractor shall provide adequate shade and provide scavenger proof and waterproof refuse bins. Cooking will only take place in this area on well maintained gas cookers with fire extinguishers present. Open fires other than the gas cookers shall not be allowed.

(f) Watchmen

The Contractor shall have a watchman present on site during non-working hours and on holidays to ensure the safety of plant and materials on site.

(g) Ablution facilities

The exact location of toilets shall be approved by the Engineer. The Contractor shall provide the toilets and maintain and service it on a daily basis. The toilets shall be kept clean. Regular inspections shall be conducted by the Engineer. Burial of waste on site is strictly forbidden. Leaking or broken toilets shall be removed and replaced immediately by the Contractor.

(h) Solid waste

"Solid waste" refers to construction debris, chemical waste, tins, cans, paper, wrappers, excess concrete, waste timber, etc.

The Contractor shall establish a waste control and removal system. He shall submit a method statement to the Engineer for approval prior to commencement.

Appropriate solid waste containers shall be provided for the storage of waste. The containers shall be water proof. The waste shall be removed on a regular basis to prevent the accumulation of waste on site and disposed of at an approved waste site.

(i) Wastewater

Water shall be used sparingly on site. Where possible, wastewater shall be recycled. A wastewater management plan shall be submitted to the Engineer for approval 10 days prior to the commencement date.

The management plan shall detail the expected extent of the contamination of each wastewater stream and how the Contractor plans to deal with it.

Wastewater shall be prevented from flowing into the Olifants River.

(j) Fuel storage area

Fuel shall be stored on site in a depot at a location as agreed with the Engineer. The Contractor shall ensure that liquid fuels are stored in tanks with lids. The tanks shall be placed on a sloped smooth concrete surface with an oil trap on the lower end to collect any spillage.

Fuel shall be kept under lock at all times.

(k) Concrete batching area

Cement and concrete is hazardous to the environment due to the high pH of the material and the chemicals it contains.

The Contractor shall furnish to the Engineer for approval a method statement for the mixing of concrete. Concrete shall not be mixed directly on the ground. Care must be taken to ensure that wastewater and contaminated material is collected and disposed of correctly.

(l) Equipment maintenance and storage

All equipment and vehicles shall be kept in good working order and serviced regularly. Leaking equipment shall be repaired immediately or removed from site. Where possible, maintenance and service shall take place only in the workshop. Permission must be obtained from the Engineer if the aforementioned cannot be adhered to.

The Contractor shall demarcate an area in which the equipment and vehicles may be stored. The location shall be approved by the Engineer.

(m) Materials handling, use and storage

The Contractor is responsible to ensure that all material suppliers are aware of the EMP's restrictions and conditions. The Contractor shall be held responsible should deliveries not comply with the EMP requirements.

The Contractor shall comply with all relevant national, regional and local legislation with regard to the transport, use and disposal of hazardous material.

The Contractor shall furnish to the Engineer a list of all hazardous materials to be used on site, together with the handling, storage and disposal procedures of the materials. This information shall be available to all personnel on site.

The location of the hazardous material store shall be within the demarcated construction camp area. The location shall be approved by the Engineer.

Where possible, the Contractor shall ensure that the refuelling of vehicles takes place only at the fuel storage area in the construction camp. If this is not possible, the Contractor shall obtain permission from the Engineer to refuel at any other place. Contaminated material and wastewater at the refuelling area shall be contained and disposed of correctly.

(n) Emergency procedures

The Contractor shall ensure that emergency procedures for the following situations are submitted for approval to the Engineer;

Fire – the Contractor shall inform the relevant authority immediately as soon as a fire starts. The Contractor shall ensure that his staff and subcontractors are fully aware of the procedures to be followed in the event of a fire.

Spillages – the Contractor shall ensure that his staff and subcontractors are fully aware of the procedures to be followed in the event of a spillage. The Engineer must be informed immediately about a spill. The Contractor shall ensure that the necessary materials and equipment is on site to deal with spills and leaks. The cleanup of spills and leaks shall be for the account of the Contractor.

(o) Care of surrounding areas

The Contractor shall ensure that no contamination of or damage to the surrounding areas or watercourses shall occur as a result of any of his activities during construction.

C3.5.1.6 Planning and programming

The programme to be furnished by the Contractor to the Engineer for approval shall be in the form of a Gantt chart. The critical path shall be indicated in red.

C3.5.1.7 Other Contractors on site

No other pipe construction contractors will be on site unless approved by the engineer.

C3.5.1.8 Recording of weather

The Contractor shall record the weather conditions on a daily basis in the site diary. Rainfall figures and strong wind which could delay the Works shall be noted and recorded.

C3.5.1.9 Format of communications

All communication regarding the Contract shall be channelled through the Engineer or his representative in writing.

C3.5.1.10 Planning and programming

Management meeting shall be held monthly on site for the duration of the project on dates to be agreed upon.

C3.5.1.11 Daily records

Daily records of plant, personnel, materials, etc., shall be kept daily by the Contractor and noted in the site diary (triplicate format) to be supplied by the Contractor before commencement date of the project.

C3.6: HEALTH AND SAFETY

C3.6.1 HEALTH AND SAFETY REQUIREMENTS AND PROCEDURES

Before starting work on site, the Contractor shall present to the Engineer his Health and Safety Plan for approval. He shall also appoint a health and Safety Officer in writing and give a copy of the letter of appointment to the Engineer.

The Health and Safety Specification is attached as Appendix B and must be referred to when compiling the Health and Safety Plan.

(a) Construction Regulations, 2014

The Contractor shall be required to comply with the Occupational Health and Safety Act, 1993: Construction Regulations, 2014 (the regulations) as promulgated in Government Gazette No 25207 and Regulation Gazette No 37305 of 7 February 2014. Non-compliance with these regulations, in any way whatsoever, will be adequate reason for suspending the Works.

The proposed type of work, materials to be used and potential hazards likely to be encountered on this Contract are detailed in the Project Specifications, Schedule of Quantity and Drawings, as well as in the Employers' Health and Safety Specifications (regulation 5(1)) of the Construction Regulations 2014.

The Contractor shall in terms of regulation 6(1) provide a comprehensive health and safety plan detailing his proposed compliance with the regulations, for approval by the Employer.

The Contractor shall at all times be responsible for full compliance with the approved plan as well as the Construction Regulations and no extension of time will be considered for delays due to non-compliance with the abovementioned plan or regulations.

Payment items are included in the Schedule of Quantities to cover the Contractor's cost for compliance with the OHS Act and the abovementioned regulations.

C3.6.2 PROTECTION OF THE PUBLIC

The site is accessible to the general public. The Contractor shall ensure that all personnel entering the construction site is fully informed about the dangers, dos and don’ts on the site. The Contractor shall ensure that non-construction personnel are protected within the guidelines of the OH&S Regulations.

C3.6.3 BARRICADES AND LIGHTING

All excavations, into which a person may fall, shall be securely barricaded at all times in accordance with the requirements of the applicable OH&S Regulations.

C3.6.4 TRAFFIC CONTROL ON ROADS

The Safety Officer shall take full responsibility for the traffic control in and around the site. The personnel on site shall be fully informed and trained by the Safety Officer regarding the construction traffic and general traffic control.

C3.6.5 MEASURES AGAINST DISEASE AND EPIDEMICS

No specific measures have to be taken against disease and epidemics on site.

C3.6.6 AIDS AWARENESS

All construction personnel shall be given an Aids Awareness briefing session by the Safety Officer.

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

CONTRACT NO: COM91/2023

FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

PART C4 SITE INFORMATION

PART C4: SITE INFORMATION

CONTENTS

C4.1 NATURE OF GROUND AND SUBSOIL CONDITIONS

C4.1.1 NATURE OF GROUND

All work will be executed below ground surface in an existing concrete lined structure. Ground conditions for this tender will not be applicable.

C4.1.2 SUBSOIL CONDITIONS

Existing Drainage pump control the inflow of Subsoil water (seepage) water.

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

CONTRACT NO: COM91/2023

FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

APPENDIX A: OCCUPATIONAL HEALTH AND SAFETY SPECIFICATIONS

OCCUPATIONAL HEALTH AND SAFETY SPECIFICATIONS

CONTENTS

PARTICULAR SPECIFICATIONS

SECTION OHS: OHSA 1993: HEALTH AND SAFETY SPECIFICATION

OHS 1 SCOPE

This specification covers the health and safety requirements to be met by the Contractor to ensure a continued safe and healthy environment for all workers, employees and subcontractors under his control and for all other persons entering the site of works.

This specification shall be read with the Occupational Health and Safety Act (Act No 85 and amendment Act No 181) 1993, and the corresponding Construction Regulations 2014, and all other safety codes and specifications referred to in the said Construction Regulations **and the COVID-19 Occupational Health and Safety Measures in Workplaces, COVID-19(C19 OHS), 2020**.

In terms of the OHSA Agreement in Section (C1.4) of the Contract document, the status of the Contractor as mandatory to the Employer (client) is that of an employer in his own right, responsible to comply with all provisions of OHSA 1993, the Construction Regulations 2014 and **COVID-19(C19 OHS), 2020**.

This safety specification and the Contractor's own Safety Plan, the Construction Regulations 2014 as well as **COVID-19(C19 OHS), 2020**, shall be displayed on site or made available for inspection by all workers, employees, inspectors and any other persons entering the site of works.

The following are possible risks associated with this project:

- Please insert the risks associated with the project here

Additional risks may arise from specific methods of construction selected by the Contractor which are not necessary covered in the above.

OHS 2 DEFINITIONS

For the purpose of this contract the following shall apply:

Employer" where used in the contract documents and in this specification, means the Employer as defined in the General Conditions of Contract and it shall have the exact same meaning as "**client**" as defined in the Construction Regulations 2014. "**Employer**" and "**client**" is therefore interchangeable and shall be read in the context of the relevant document.

(a) "**Contractor**" wherever used in the contract documents and in this specification, shall have the same meaning as "**Contractor**" as defined in the General Conditions of Contract.

In this specification the terms "**principal contractor**" and "**contractor**" are replaced with "**Contractor**" and "**subcontractor**" respectively.

For the purpose of this contract the **Contractor** will, in terms of OHSA 1993, be the mandatory, without derogating from his status as an employer in his own right.

(b) "**Engineer**" where used in this specification, means the Engineer as defined in the General Conditions of Contract. In terms of the Construction Regulations the Engineer may act as agent on behalf of the Employer (the client as defined in the Construction Regulations).

OHS 3 TENDERS

The Contractor shall submit the following with his tender:

(a) a documented Health and Safety Plan as stipulated in Regulation 7 of the Construction Regulations. The Safety Plan must be based on the Construction Regulations 2014 and **COVID-19(C19 OHS), 2020** and will be subject to approval by the Employer;

(b) a declaration to the effect that he has the competence and necessary resources to carry out the work safely in compliance with the Construction Regulations 2014;

(c) a declaration to the effect that he made provision in his tender for the cost of the health and safety measures envisaged in the Construction Regulations.

(d) Failure to submit the foregoing with his tender, will lead to the conclusion that the Contractor will not be able to carry out the work under the contract safely in accordance with the Construction Regulations.

OHS 4 NOTIFICATION OF COMMENCEMENT OF CONSTRUCTION WORK

After award of the contract, but before commencement of construction work, the Contractor shall, in terms of Regulation 3, notify the Provincial Director of the Department of Labour in writing if the following work is involved:

(a) the demolition of structures and dismantling of fixed plant of height of 3,0m or more;

(b) the use of explosives;

(c) construction work that will exceed 30 days or 300 person-days;

(e) excavation work deeper than 1,0m; or

(f) working at a height greater than 3,0m above ground or landings.

The notification must be done in the form of the pro forma included under Section T2 (Forms to be Completed by Tenderer) of the tender document.

A copy of the notification form must be kept on site, available for inspection by inspectors, Employer, Engineer, employees and persons on site.

OHS 5 RISK ASSESSMENT

Before commencement of any construction work during the construction period, the Contractor shall have a risk assessment performed and recorded in writing by a competent person. (Refer Regulation 9 of the Construction Regulations 2014).

The risk assessment shall identify and evaluate the risks and hazards that may be expected during the execution of the work under the contract, and it shall include a documented plan of safe work procedures to mitigate, reduce or control the risks and hazards identified.

The risk assessment shall be available on site for inspection by inspectors, Employer, Engineer, subcontractors, employees, trade unions and health and safety committee members, and must be monitored and reviewed periodically by the Contractor.

OHS 6 APPOINTMENT OF EMPLOYEES AND SUBCONTRACTORS

6.1 Health and Safety plan

The Contractor shall appoint his employees and any subcontractors to be employed on the contract, in writing, and he shall provide them with a copy of his documented Health and Safety Plan, or relevant sections thereof. The Contractor shall ensure that all subcontractors and employees are committed to the implementation of his Safety Plan.

6.2 Health and safety induction training

The Contractor shall ensure that all employees under his control, including subcontractors and their employees, undergo a health and safety induction training course by a competent person before commencement of construction work. No visitor or other person shall be allowed or permitted to enter

the site of the works unless such person has undergone health and safety training pertaining to hazards prevalent on site.

The Contractor shall ensure that every employee on site shall at all times be in possession of proof of the health and safety induction training issued by a competent person prior to commencement of construction work.

OHS 7 APPOINTMENT OF SAFETY PERSONNEL

7.1 Construction Supervisor

The Contractor shall appoint a full-time **Construction Supervisor** with the duty of supervising the performance of the construction work.

He may also have to appoint one or more competent employees to assist the construction supervisor where justified by the scope and complexity of the works.

7.2 Construction safety officer

Taking into consideration the size of the project and the hazards or dangers that can be expected, the Contractor shall appoint in writing a full-time or part-time **Construction Safety Officer** if so decided by the client. The Safety Officer shall have the necessary competence and resources to perform his duties diligently.

Provision shall be made by the Contractor in his rates, to cover the cost of this dedicated construction safety officer appointed after award of the contract.

7.3 Health and safety representatives

In terms of **Section 17 and 18 of the Act (OHSA 1993)** the Contractor, being the employer in terms of the Act for the execution of the contract, shall appoint a **health and safety representative** whenever he has more than 20 employees in his employment on the site of the works. The health and safety representative must be selected from employees who are employed in a full-time capacity at a specific workplace.

The number of health and safety representatives for a workplace shall be at least one for every 100 employees.

The function of health and safety representative(s) will be to review the effectiveness of health and safety measures, to identify potential hazards and major incidents, to examine causes of incidents (in collaboration with his employer, the Contractor), to investigate complaints by employees relating to health and safety at work, to make representations to the employer (Contractor) or inspector on general matters affecting the health and safety of employees, to inspect the workplace, plant, machinery etc. on a regular base, to participate in consultations with inspectors and to attend meetings of the health and safety committee.

7.4 Health and safety committee

In terms of Sections **17 and 18 of the Act (OHSA 1993)** the Contractor (as employer), shall establish one or more **health and safety committee(s)** where there are two or more health and safety representatives at a workplace. The persons selected by the Contractor to serve on the committee shall be designated in writing.

The function of the health and safety committee shall be to hold meetings at regular intervals, but at least once every three months, to review the health and safety measures on the contract, to discuss incidents related to health and safety with the Contractor and the inspector, and to make recommendations regarding health and safety to the Contractor and to keep record of recommendations and reports made by the committee.

7.5 Competent persons

In accordance with the Construction Regulations the Contractor has to appoint in writing **competent persons** responsible for supervising construction work on each of the following work situations that may be expected on the site of the works.

(a) Risk assessment and induction training as described in Regulation 9 of the Construction Regulations;

(b) Fall protection as described in Regulation 10;

(c) Structures described in Regulation 11;

(d) Temporary works described in Regulation 12;

(e) Excavation described in Regulation 13;

(f) Demolition work described in Regulation 14;

(g) Tunneling as described in Regulation 15;

(h) Scaffolding as described in Regulation 16;

(i) Suspended platforms as described in Regulation 17;

(j) Rope Access Work as described in Regulation 18;

(k) Material hoists as described in Regulation 19;

(l) Bulk mixing plant as described in Regulation 20;

(m) Explosive actuated fastening device as described in Regulation 21;

(n) Cranes as described in Regulation 22;

(o) Construction vehicle and mobile as described in Regulation 23;

(p) Electrical installations and machinery of construction sites as described in Regulation 24;

(q) Use and temporary storage of flammable liquids on construction sites as described in Regulation 25;

(r) Water environments as described in Regulation 26;

(s) Housekeeping and general safeguarding on construction sites as described in Regulation 27;

(t) Stacking and storage on construction sites as described in Regulation 28;

(u) Fire precautions on construction sites as described in Regulation 29, and

(s) Construction employees' facilities as described in Regulation 30.

A competent person may be appointed for more than one part of the construction work with the understanding that the person must be suitably qualified and able to supervise at the same time the construction work on all the work situations for which he has been appointed.

The appointment of competent persons to supervise parts of the construction work does not relieve the Contractor from any of his responsibilities to comply with **all** requirements of the Construction Regulations.

OHS 8 RECORDS AND REGISTERS

In accordance with the Construction Regulations the Contractor is bound to keep records and registers related to health and safety on site for periodic inspection by inspectors, the Engineer, the Employer, trade union officials and subcontractors and employees. The following records and registers must be kept on site and shall be available for inspection at all times.

(a) A copy of the OHSA 1993 Construction Regulations 2014;

(b) A copy of this Health and Safety Specification;

(c) A copy of the Contractor's Health and Safety Plan (Regulation 7);

(d) A copy of the Notification of Construction Work (Regulation 4);

(e) A health and safety file in terms of Regulation 5(1)(b) with inputs by the Construction Safety Officer (Regulation 7(1));

(f) A copy of the risk assessment described in Regulation 9;

(g) A full protection plan and the corresponding records of evaluation and training of employees working from elevated positions as described in Regulation 10;

(h) Drawings pertaining to the design of structures (Regulation 11(1)(c)) and formwork and support work structures (Regulation 12) must be kept on site;

(i) Pronouncement of the safety of excavations must be recorded in a register to be kept on site (Regulation 13);

(j) A copy of the certificate of the system design for suspended platforms (Regulation 17(2)(b));

(k) A notice must be affixed around the base towers of material hoists to indicate the maximum mass load, which may be carried at any one time by material hoists (Regulation 19(5));

(l) Maintenance records of material hoists and inspection results must be kept in a record book to be kept on site (Regulation 19(8));

(m) A record of any repairs to or maintenance of a batch plant must be kept on site (Regulations 20(8));

(n) A warning notice must be displayed in a conspicuous manner when and wherever an explosive powered tool is used (Regulation 19(2));

(o) A register for recording of findings by the competent person appointed to inspect construction vehicles and mobile plant (Regulation 23(1)(k)).

OHS 9 CONTRACTORS RESPONSIBILITIES

For this contract the Contractor will be the mandatory of the Employer (Client), as defined in the Act (OHSA 1993), which means that the Contractor has the status of employer in his own right in respect of the contract. The Contractor is therefore responsible for all the duties and obligations of an employer as set out in the Act (OHSA 1993) and the Construction Regulations 2014.

Before commencement of work under the contract, the Contractor shall enter into an agreement with the Employer (Client) to confirm his status as mandatory (employer) for the contract under consideration.

The Contractor's duties and responsibilities are clearly set out in the Construction Regulations 2014 and are not repeated in detail but some important aspects are highlighted hereafter, without relieving the Contractor of any of his duties and responsibilities in terms of the Construction Regulations.

(a) Contractor's position in relation to the Employer (Client) (Regulation 5)

In accordance with Section 4 of the Regulations, the Contractor shall liaise closely with the Employer or the Engineer on behalf of the Employer, to ensure that all requirements of the Act and the Regulations are met and complied with.

(b) The Principal Contractor and Contractor (Regulation 7)

The Contractor is in terms of the definition in Regulation 1 the equivalent of Principle Contractor as defined in the Construction Regulations, and he shall comply with all the provisions of Regulation 7.

Any subcontractors employed by the Contractor must be appointed in writing, setting out the terms of the appointment in respect of health and safety. An independent subcontractor shall however provide and demonstrate to the Contractor a suitable, acceptable and sufficiently documented health and safety plan before commencement of the subcontract. In the absence of such a health and safety plan the subcontractor shall undertake in writing that he will comply with the Contractor's safety plan, the health and safety specifications of the Employer and the Construction Regulations 2014.

(c) Supervision of construction work (Regulation 8)

The Contractor shall appoint the safety and other personnel and employees as required in terms of Regulation 7 and as set out in OHS 7 above. Appointment of those personnel and employees does not relieve the Contractor from any of the obligations under Regulation 7.

(d) Risk assessment (Regulation 9)

The Contractor shall have the risk assessment made as set out in paragraph 7 above before commencement of the work and it must be available on site for inspection at all times. The Contractor shall consult with the health and safety committee or health and safety representative(s) etc. on a regular basis to ensure that all employees, including subcontractors under his control, are informed and trained by a competent person regarding health hazards and related work procedures.

No subcontractor, employee or visitor shall be allowed to enter the site of works without prior health and safety induction training, all as specified in Regulation 7.

(e) Fall protection (Regulation 10)

Fall protection, if applicable to this contract shall comply in all respects with Regulation 8 of the Construction Regulations.

(f) Structures (Regulation 11)

The Contractor will be liable for all claims arising from collapse or failure of structures if he failed to comply with all the specifications, project specifications and drawings related to the structures, unless it can be proved that such collapse or failure can be attributed to faulty design or insufficient design standards on which the specifications and the drawings are based.
In addition, the Contractor shall comply with all aspects of Regulation 11 of the Construction Regulations.

(g) Temporary works (Regulation 12)

The Contractor will be responsible for the adequate design of all formwork and support structures by a competent person.
All drawings pertaining to formwork shall be kept on site and all equipment and materials used in formwork, shall be carefully examined and checked for suitability by a competent person.

The provisions of Regulation 12 of the Construction Regulations shall be followed in every detail.

(h) Excavation work (Regulation 13)

It is essential that the Contractor shall follow the instructions and precautions in the Standard Specifications and Project Specifications as well as the provisions of the Construction Regulations to the letter as unsafe excavations can be a major hazard on any construction site. The Contractor shall therefore ensure that all excavation work is carried out under the supervision of a competent person, that inspections are carried out by a Professional Engineer or Technologist, and that all work is done in such a manner that no hazards are created by unsafe excavations and working conditions.

Supervision by a competent person will not relieve the Contractor from any of his duties and responsibilities under Regulation 13 of the Construction Regulations.

(i) Demolition work (Regulation 14)

Whenever demolition work is included in a contract, the Contractor shall comply with all the requirements of Regulation 14 of the Construction Regulations. The fact that a competent person has to be appointed by the Contractor does not relieve the Contractor from any of his responsibilities in respect of safety of demolition work.

(j) Tunneling (Regulation 15)

The Contractor shall comply with Regulation 15 wherever tunneling of any kind is involved.

(k) Scaffolding (Regulation 16)

The Contractor shall ensure that all the provisions of Regulation 16 of the Construction Regulations are complied with. [Note: Reference in the Regulations to “Section 44 of the Act” should read “Section 43 of the Act”].

(l) Suspended platforms (Regulation 17)

Wherever suspended platforms will be necessary on any contract, the Contractor shall ensure that copies of the system design issued by a Professional Engineer are submitted to the Engineer for inspection and approval. The Contractor shall appoint competent persons as supervisors and competent scaffold erectors, operators and inspectors and ensure that all work related to suspended platforms are done in accordance with Regulation 17 of the Construction Regulations.

(m) Rope Access Work (Regulation 18)

Where rope access work is required on the construction site, the Contractor shall comply with Regulation 18.

(n) Material Hoists (Regulation 19)

Wherever applicable, the Contractor shall comply with the provisions of Regulation 19 to the letter.

(o) Batch plants (Regulation 20)

Wherever applicable, the Contractor shall ensure that all lifting machines, lifting tackle, conveyors, etc. used in the operation of a batch plant shall comply with, and that all operators, supervisors and employees are strictly held to the provisions of Regulation
20. The Contractor shall ensure that the General Safety Regulations (2003), the Driven Machinery Regulations (Government Notice R295 of 26/2/1988) and the Electrical Installation Regulations (Government Notice R2271 of 11/10/1995) are adhered to by all involved.

In terms of the Regulations, records of repairs and maintenance shall be kept on site.

(p) Explosive powered tools (Regulation 21)

The Contractor shall ensure that, wherever explosive-powered tools are required to be used, all safety provisions of Regulation 21 are complied with.

It is especially important that warning notices are displayed and that the issue and return of cartridges and spent cartridges be recorded in a register to be kept on site.

(q) Cranes (Regulation 22)

Wherever the use of tower cranes becomes necessary, the provisions of Regulation 20 shall be complied with.

(r) Construction vehicles and mobile plant (Regulation 23)

The Contractor shall ensure that all construction vehicles and plant are in good working condition and safe for use, and that they are used in accordance with their design and intended use. The vehicles and plant shall only be operated by workers or operators who have received appropriate training, all in accordance with all the requirements of Regulation 23.

All vehicles and plant must be inspected on a daily basis, prior to use, by a competent person and the findings must be recorded in a register to be kept on site.

(s) Electrical installation and machinery on construction sites (Regulation 24)

The Contractor shall comply with the Electrical Installation Regulations (Government Notice R2920 of 23 October 1992) and the Electrical Machinery Regulations (Government Notice R1953 of 12 August 1993). Before commencement of construction, the Contractor shall take adequate steps to ascertain the presence of, and guard against dangers and hazards due to electrical cables and apparatus under, over or on the site.

All temporary electrical installations on the site shall be under the control of a competent person, without relieving the Contractor of his responsibility for the health and safety of all workers and persons on site in terms of Regulation 24.

(t) Use of temporary storage of flammable liquids on construction sites (Regulation 25)

The Contractor shall comply with the provisions of the General Safety Regulations (2003) and all the provisions of Regulation 25 of the Construction Regulations to ensure a safe and hazard-free environment to all workers and other persons on site.

(u) Water environments (Regulation 26)

Where construction work is done over or in close proximity to water, the provisions of Regulation 26 shall apply.

(v) Housekeeping on Construction sites (Regulation 27)

Housekeeping on all construction sites shall be in accordance with the provisions of the environment Regulations for workplaces (Government Notice R2281 of 16 October 1987) and all the provisions of Regulation 27 of the Construction Regulations.

(w) Stacking and storage on construction sites (Regulation 28)

The provisions for the stacking of articles contained in the General Safety Regulations (2003) as well as all the provisions Regulation 28 of the Construction Regulations shall apply.

(x) Fire precautions on construction sites (Regulation 29)

The provisions of the Environmental Regulations for Workplaces (Government Notice R2281 of 16 October 1987) shall apply.

In addition, the necessary precautions shall be taken to prevent the incidence of fires, to provide adequate and sufficient fire protection equipment, sirens, escape routes etc. all in accordance with Regulation 29 of the Construction Regulations.

(y) Construction employees' facilities (Regulation 30)

The Contractor shall comply with the construction site provisions as in the Facilities Regulations (2004), the provisions of Regulation 30 of the Construction Regulations and **the COVID-19 Occupational Health and Safety Measures in Workplaces COVID-19 (C19 OHS), 2020.**

(z) Non-compliance with the Construction Regulations 2014

The foregoing is a summary of parts of the Construction Regulations applicable to all construction projects.

The Contractor, as employer for the execution of the contract, shall ensure that all provisions of the Construction Regulations and **the COVID-19 Measures in Workplaces** applicable to the contract under consideration are complied with to the letter.

Should the Contractor fail to comply with the provisions of the Regulations 3 to 30 as listed in

Regulation 33 **and COVID-19 (C19 OHS),2020,** he will be guilty of an offence and will be liable, upon conviction, to the fines or imprisonment as set out in Regulation 33.

***The Contractor is advised in his own interest to make a careful study of the Act, the Construction Regulations and the COVID-19 (C19 OHS),2020 as ignorance of the Act and the Regulations will not be accepted in any proceedings related to non-conformance to the Act and the Regulations*.**

OHS 10 MEASUREMENT AND PAYMENT

10.1 Principles

It is a condition of this contract that Contractors, who submit tenders for this contract, shall make provision in their tenders for the cost of all health and safety measures during the construction process. All associated activities and expenditure are deemed to be included in the Contractor's tendered rates and prices.

(a) Safety personnel

The Construction Supervisor, the Construction Safety Officer, Health and Safety Representatives, Health and Safety Committee and Competent Persons referred to in clauses 7.1 to 7.5 shall be members of the Contractor's personnel, and no additional payment will be made for the appointment of such safety personnel.

(b) Records and Registers

The keeping of health and safety-related records and registers as described in paragraph 8 is regarded as a normal duty of the Contractor for which no additional payment will be considered, and which is deemed to be included in the Contractor's tendered rates and prices.

AGREEMENT IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT NO 85 OF 1993

THIS AGREEMENT is made between.....

(hereinafter called the EMPLOYER of the one part, herein represented by:

……
…
……
…
……
…
……

in his capacity as:

……..

AND:

(hereinafter called the CONTRACTOR) of the other part, herein represented by

……
…
……
…
……
…
……

in his capacity as:

…….. duly

authorized to sign on behalf of the Contractor.

WHEREAS the CONTRACTOR is the Mandatory of the EMPLOYER in consequence of an agreement between the CONTRACTOR and the EMPLOYER in respect of

CONTRACT:.....

AND WHEREAS the EMPLOYER and the CONTRACTOR have agreed to enter into an agreement in terms of the provisions of Section 37(2) of the Occupational Health and Safety Act No 85 of 1993, as amended by OHSA Amendment Act No 181/1993 (hereinafter referred to as the ACT);

NOW THEREFORE the parties agree as follows:

1. **The CONTRACTOR undertakes to acquaint the appropriate officials and employees of the CONTRACTOR with all relevant provisions of the ACT and the regulations promulgated in terms thereof.**

2. The CONTRACTOR undertakes to fully comply with all relevant duties, obligations and prohibitions imposed in terms of the ACT and Regulations: Provided that should the EMPLOYER have prescribed certain arrangements and procedures that same shall be observed and adhered to by the CONTRACTOR, his officials and employees. The CONTRACTOR shall bear the onus of acquainting himself/herself/itself with such arrangements and procedures.

3. The CONTRACTOR hereby accepts sole liability for such due compliance with the relevant duties, obligations, prohibitions, arrangements and procedures, if any, imposed by the ACT and Regulations, and the CONTRACTOR expressly absolves the EMPLOYER and the Employer’s CONSULTING ENGINEERS from being obliged to comply with any of the aforesaid duties, obligations, prohibitions, arrangements and procedures in respect of the work included in the contract.

4. The CONTRACTOR agrees that any duly authorised officials of the EMPLOYER shall be entitled, although not obliged, to take such steps as may be necessary to ensure that the CONTRACTOR has complied with his undertakings as more fully set out in paragraphs 1 and 2 above, which steps may include, but shall not be limited to, the right to inspect any appropriate site or premises occupied by the CONTRACTOR, or to take such steps it may deem necessary to remedy the default of the CONTRACTOR at the cost of the CONTRACTOR.

5. The CONTRACTOR shall be obliged to report forthwith to the EMPLOYER any investigation, complaint or criminal charge which may arise as a consequence of the provisions of the ACT and Regulations, pursuant to work performed in terms of this agreement, and shall, on written demand, provide full details in writing of such investigation, complaint or criminal charge.

Thus signed at .....for and on behalf of the **CONTRACTOR**

on this the …… day of ……..……..…… 20……

SIGNATURE: .....

NAME AND SURNAME: .....

CAPACITY: .....

WITNESSES: 1. .....

2. .....

Thus signed at .....for and on behalf of the **EMPLOYER** on this

the …….. day of ……..…… 20……

SIGNATURE: .....

NAME AND SURNAME: .....

CAPACITY: .....

WITNESSES: 1. .....

2. .....

CONTRACTOR'S HEALTH AND SAFETY DECLARATION

In terms of Clause 4(4) of the OHSA 1993 Construction Regulations 2014 (referred to as "the Regulations" hereafter), a Contractor may only be appointed to perform construction work if the Employer is satisfied that the Contractor has the necessary competencies and resources to carry out the work safely in accordance with the Occupational Health and Safety Act No 85 of 1993 and the OHSA 1993 Construction Regulations 2014.

To that effect a person duly authorised by the tenderer must complete and sign the declaration hereafter in detail.

Declaration by Tenderer

1. I the undersigned hereby declare and confirm that I am fully conversant with the Occupational Health and Safety Act No 85 of 1993 (as amended by the Occupational Health and Safety Amendment Act No 181 of 1993), and the OHSA 1993 Construction Regulations 2014.

2. I hereby declare that my company has the competence and the necessary resources to safely carry out the construction work under this contract in compliance with the Construction Regulations and the Employer's Health and Safety Specifications.

3. I propose to achieve compliance with the Regulations by one of the following:

(a) From my own competent resources as detailed in 4(a) hereafter:.....***Yes / No**

(b) From my own resources still to be appointed or trained until competency is achieved, as detailed in 4(b) hereafter: .....***Yes / No**

(c) From outside sources by appointment of competent specialist subcontractors as detailed in 4(c) hereafter:.....***Yes / No**

(***** = *delete whatever is not applicable*)

4. Details of resources I propose:

(Note: Competent resources shall include safety personnel such as a construction supervisor and construction safety officer as defined in Regulation 8, and competent persons as defined in Regulations 9-29, (all or individual regulations) as applicable to this contract)

(a) Details of the competent and qualified key persons from my company's own resources, who will form part of the contract team:

NAMES OF COMPETENT PERSONS	POSITIONS TO BE FILLED BY COMPETENT PERSONS

(b) Details of training of persons from my company's own resources (or to be hired) who still have to be trained to achieve the necessary competency:

(i) By whom will training be provided? .....

(ii) When will training be undertaken? .....

(iii) List the positions to be filled by persons to be trained or hired: .....

.....

.....

(c) Details of competent resources to be appointed as subcontractors if competent persons cannot be supplied from own company:

Name of proposed subcontractor: .....

Qualifications or details of competency of the subcontractor: .....

5. I hereby undertake, if my tender is accepted, to provide, before commencement of the works under the contract, a suitable and sufficiently documented Health and Safety Plan in accordance with Regulation 7(1) of the Construction Regulations, which plan shall be subject to approval by the Employer.

6. I confirm that copies of my company's approved Health and Safety Plan, the Employer's Safety Specifications as well as the OHSA 1993 Construction Regulations 2014 will be provided on site and will at all times be available for inspection by the Contractor's personnel, the Employer's personnel, the Engineer, visitors, and officials and inspectors of the Department of Labour.

7. I hereby confirm that adequate provision has been made in my tendered rates and prices in the schedule of quantities to cover the cost of all resources, actions, training and all health and safety measures envisaged in the OHSA 1993 Construction Regulations 2014, and that I will be liable for any penalties that may be applied by the Employer in terms of the said Regulations (Regulation 33) for failure on the Contractor's part to comply with the provisions of the Act and the Regulations.

8. I agree that my failure to complete and execute this declaration to the satisfaction of the Employer will mean that I am unable to comply with the requirements of the OHSA 1993 Construction Regulations 2014, and accept that my tender will be prejudiced and may be rejected at the discretion of the Employer.

SIGNATURE: ..... DATE: .....….....

(of person authorised to sign on behalf of the Tenderer)

PRO FORMA NOTIFICATION FORM IN TERMS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT 1993, CONSTRUCTION REGULATIONS 2014

[This form must be completed and forwarded, prior to commencement of work on site, by all Contractors that qualify in terms of Regulation 3 of the Construction Regulations 2014, to the office of the Department of Labour]

NOTIFICATION OF CONSTRUCTION WORK

1. (a) Name and postal address of principal contractor.

(b) Name and tel. pf principal contractor's contact person:

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2. Principal contactor's compensation registration number:

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3. (a) Name and postal address of client :

(b) Name and tel. no of clients contact person or agent:

---

4 (a) Name and postal address of designer (s) for the project:

(b) ----------

5. Name and telephone number of principal contractor's sub- ordinate supervisor on site appointed in terms of Regulation 8 (1).

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6. Name /s of principal contractor's sub- ordinate supervisor on sire appointed in terms of Regulation 8 (2)

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7. Exact physical address of the construction site or site office:

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8. Nature of the construction work:

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9. Expected commencement date:

---

10. Expected completion date:

---

11. Estimated maximum number of persons on the construction site.

Total:_____ Male:_____ Female _____

12. Planned number of contractors on the construction:

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13. Name (s) of contractors already selected.

Principal Contractor	Date
Client's Agent (where applicable)	Date
Client	Date

CITY OF MBOMBELA

DEPARTMENT NAME: TECHNICAL SERVICES

CONTRACT NO: COM91/2023

FOR

REFURBISHMENT OF SADDLEBACK TUNNEL (MECHANICAL)

APPENDIX B: DRAWINGS FOR TENDER PURPOSES