Municipal Infrastructure Support Agent (MISA)

REPUBLIC OF SOUTH AFRICA

REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS AND PUMP STATION IN VILLIERS/QALABOTJHA – PHASE 1 (MIG SCHEDULE 6B)

TENDER NO. MISA/VWWTWPS/FS/007/2026/27

PROCUREMENT DOCUMENT

(Based on NEC3 Engineering and Construction Contract –Option B: Priced Contract with Bill of Quantities).

JUNE 2026

Issued by:

Chief Executive Officer
Municipal Infrastructure Support Agent (MISA)
1303 Heuwel Avenue
Riverside Office Park, Letaba House
Centurion, PRETORIA 0046
TEL: 012 848 5300

Name of Bidder: _____

Total Bid Price: _____

CONTENTS

THE TENDER

MISA/VWWTWPS/FS/007/2026/27

REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS AND PUMP STATION IN VILLIERS/QALABOTJHA – PHASE 1 (MIG SCHEDULE 6B)

Tender Procedure: Open Tender

Based on

- **MISA Supply Chain Management Policy dated 11 May 2023**
- **SANS 10845-1**, Construction procurement Part 1: Processes, methods and procedures
- **SANS 10845-2**, Construction procurement Part 2: Formatting and compilation of procurement documentation
- **SANS 10845-3**, Construction procurement Part 3: Standard conditions of tender
- **Standard for Uniformity in Construction Procurement (Board Notice 423 of 2009 Government Gazette No 42622 of August 2019), as termed as *SFU***.
- **Preferential Procurement Regulations 2022** *(Ref: government gazette no. 47452, dated: 04 November 2022 issued according to the preferential procurement policy framework act (PPPFA), act no. 5 of 2000)*

T1 Tendering Procedure

T1.1 Tendering notice and invitation to tender

Municipal Infrastructure Support Agent (MISA) hereby, invites tenders from Contractors for Refurbishment of the Wastewater Treatment Works and Pump Station in Villiers/Qalabotjha (MIG SCHEDULE 6B)

Bidders should have a CIDB contractor grading of **6ME** or higher.

Contracts will be based on the NEC3 Engineering and Construction Contract (Option B: Priced Contract with Bill of Quantities).

The project details are hereunder,

TENDER NO.	PROJECT NAME	COMPULSORY BRIEFING SESSION & SITE VISIT: PLACE, DATE & TIME	TENDER CLOSING DATE & TIME
MISA/VWWTWPS/FS/007/2026/27	**REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS AND PUMP STATION IN VILLIERS/QALABOTJHA – PHASE 1 (MIG SCHEDULE 6B)**	**Villiers Municipal Offices:** 23 Main Street, Villiers, 9840 **Thursday, 9th of July 2026** **at 11:00**	**22 July 2026** 11:00 AM All Bid Proposals to be submitted @ 1303, Heuwel Avenue, Riverside Office Park, Letaba House, Centurion, PRETORIA 0046 TEL: 012 548 3000

COMPULSORY briefing session and site visit will take place at the place and on the date and time shown above unless otherwise amended later. Representative(s) from MISA will meet prospective Bidders to provide details of the Contract.

The requirement of submissions is detailed in the Tender Data (Ref: T1.2 Tender Data). The bidders who satisfy the eligibility criteria as set in the tender documents (Ref: T 1.2 Tender Data) are to submit their tenders.

Bidders must note that by submitting bid proposal you give MISA permission to process or access bidders, members and its director's information in compliance with Protection OF Personal Information Act (POPIA).

Telegraphic, telephonic, telex, facsimile, e-mail and late tenders will not be accepted. Bidders must submit their tenders using only the tender documentation issued.

Tenders will be evaluated based on preferential procurement framework Act 5 of 2000 and on functionality as prescribed in the Preferential Procurement Regulation 2022.

Requirements for sealing, addressing, delivery, opening and assessment of tenders are stated in the Tender Data.

Issued by:

Municipal Infrastructure Support Agent

1303 Heuwel Avenue

Riverside Office Park, Letaba House

Centurion, PRETORIA 0046

TEL: 012 484 5300

T1.2 TENDER DATA

The conditions of tender are as contained in the latest edition of SANS 10845-3, *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 *and* as contained in **the Standard for Uniformity in Construction Procurement (Board Notice 423 of 2009 Government Gazette No 42622 of August 2019), as termed as *SFU***.

Each item of data given below is cross-referenced to the clause in **SANS 10845-3** to which it mainly applies.

Clause number	Tender Data
3.1	The employer is the **Municipal Infrastructure Support Agent (MISA)**, an entity within the South African Ministry for Cooperative Governance and Traditional Affairs (CoGTA), established in terms of Presidential Proclamation No. 29 of 2012.
3.3	The Tender documents issued by the employer comprise the documents listed on the contents page.
3.4	The Employer's Representative is: **Name:** Ms Mapatane Kgomo or Delegated Official **Physical Address**: 1303 Heuwel Avenue, Riverside Office Park, Letaba House, Centurion, Pretoria 0046 Private Bag X 105, Centurion 0046 **Telephone**: 012 848 5300 **Email**: tenders@misa.gov.za
3.5	The language of communications is English

Clause number	Tender Data
3.6	**ONLY** those bidders who satisfy the following **ELIGIBILITY CRITERIA** and who provide the required evidence in their tender submission, are eligible to submit tenders and have their tenders evaluated: 1. Only those bidders who are registered with the CIDB, or are capable of being so registered prior to the evaluation of submissions and have 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) of 25(7A) of the Construction Industry Development Regulations, for a CIDB **Grade 6ME or Higher class** of construction work are eligible to have their tenders evaluated, provide the proof of valid registration with CIDB. Joint ventures are eligible to submit tenders provided that, a. every member of the joint venture is registered with CIDB, b. the lead partner has a contractor grading designation of 6**ME or higher class** of construction work, or not lower than one level below the required grading designation in the class of works under consideration and possess the required recognition status. c. 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 for a **6ME 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. 2. Bidders must submit a valid CIDB Grading Certificate **(6ME or Higher)** or confirmation from CIDB 3. Attendance of the compulsory briefing meeting and site visit. 4. **Bill of quantities or Pricing schedule and or Form of offer/Total tender amount** shall not contain correction fluid on them. Any wrong entry, in case of correction, must be cancelled by a single stroke and initialled by the Authorised signatory. 5. Only Tenderers who have the following key human resources, with a minimum qualification of National Diploma or equivalent in mechanical or electrical engineering and the demonstration of a minimum of 5 years relevant experience in Water and Sanitation infrastructure (Attach proof of detailed CV and Qualification for each resource): Contracts Manager (Electrical or Mechanical Engineering qualification) Site Agent (Electrical or Mechanical Engineering qualification)
3.7	The arrangements for a compulsory clarification meeting and a site visit are as stated in the Tender Notice and Invitation to Tender (ref: T1.1). **No Tender will be considered unless the Bidder attends the compulsory briefing session and site visit.** Bidders/ their authorised representatives must sign the attendance register and detailed contacts in favour of the tendering entity therein. Addenda, if any, will be issued to the tenders only who attended the compulsory briefing sessions.
3.8	No alternative tender offer will be considered.

3.9	The employer's details and address for delivery of tender offers and identification details that are to be shown on each tender offer package are: **Location of the tender box:** Reception area of MISA Offices Municipal Infrastructure Support Agent's Office **Physical Address**: 1303 Heuwel Avenue, Riverside Office Park, Letaba House, 1st Floor, Centurion, Pretoria 0046 Private Bag X 105, Centurion 0046 **Telephone**: 012 848 5300 **Identification details on the Tender package(s):** 1. Name and Reference number of the tender, 2. Address of the employer, 3. Names of the tendering entity and the contact person, 4. Physical address and contact details of the Bidder, 5. Date of submission
3.9.1	Tender offer shall be submitted as **original**, **one copy of the original** and **one scanned copy of the original completed and signed tender documents.**
3.9.2	Telephonic, telegraphic, telex, facsimile or e-mailed tender offers will not be accepted.
3.9.3	The closing time for submission of tender is as stated in the Tender Notice and the invitation to Tender (ref: T1.1)
3.10	The tender offer validity period is 90 days, exclusive of the closing date but inclusive of the 90th day.
4.1	The employer will respond to requests for clarification received up to 7 working days before the tender closing time.
4.2	The employer shall issue an addendum until 10 working days before tender closing time.
4.3	The time and location for opening of the Tender offers are as detailed in the Tender notice and invitation to tender (ref: T1.1) or in any addendum thereafter if applicable.
SFU (4.3.1)	**Evaluation Criteria** The procedure for the evaluation of responsive tenders is **Functionality, Financial offer & Preference** as explained in the **CIDB**'S Standard for Uniformity in Construction Procurement August 2019 (clause 4.3.1). The procedure for the evaluation of responsive tenders is **detailed as follows:** **Phase 1:** Mandatory/eligibility and administrative requirements. **Phase 2:** Bidders must meet the minimum requirements outlined in the functionality criteria and score at least the minimum functionality points to be considered for further evaluation in Stage 3. Bidders which do not meet minimum functionality threshold **of 60 points** will then be rejected. **Phase 3:** Price and Specific goals (80/20 system)

PHASE ONE: RESPONSIVENESS TO THE MANDATORY/ELIGIBILITY CRITERIA, BID AND ADMINISTRATIVE REQUIREMENTS AND RULES:

Phase one: will be as per the eligibility requirements.

Other Conditions of Tender (Non eliminating, unless expressly mentioned in the document):

1. The bidder must be registered on the Central Supplier Database (CSD) prior the award
2. All bidder's tax matters must be in order prior award. Bidders' tax matters will be verified through CSD.
3. Should the bidder intend to sub-contract more than 25%, It is compulsory to submit a valid **B-BBEE Certificate issued by SANAS accredited Agency** OR a valid original or certified copy of a (CSC000) sector code sworn affidavit (for EMEs or QSEs) attested by a Commissioner of Oaths in terms of the Justices of the Peace and Commissioners of Oaths Act 16 of 1963 as amended for all proposed sub-contractors.
4. Verification Certificate indicating the relevant equivalent South African Qualification.

PHASE TWO: BIDDERS WHO PASS STAGE 1 WILL THEN BE EVALUATED ON FUNCTIONALITY CRITERIA, AS OUTLINED BELOW:

1. The bidder will be expected to submit substantial information (valid copies and detailed information as ordered) in order to claim points for each of the criteria or sub criteria set.
2. The bidder must demonstrate to the satisfaction of the Employer that it has sufficient skill and capacity to execute the works.
3. The form or the evaluation criteria and maximum score in respect of each of the criteria listed in 5.11.9.
4. A Tender scoring an average score below **60 points** in Functionality will be considered as DISQUALIFIED from evaluation and will be discarded from any further evaluation.
5. Non-submission or poorly completed schedule or incomplete information will result in a bidder losing points on Functionality. CVs which do not substantially detail relevant experience will also lead to a bidder losing points on Functionality. It is the responsibility of the bidder to ensure that all copies are clear and certified when the conditions require them to be so.
6. No second chance will be given to a bidder to submit some information after tender closure on this stage of evaluation i.e. functionality.

PHASE THREE: EVALUATION OF BIDS ON PRICE AND SPECIFIC GOALS IN LINE WITH PREFERENTIAL PROCUREMENT REGULATION 2022

During this phase, bid proposals that passed phase 2 will be further evaluated based on the Preferential Procurement Regulations 2022, will be used to evaluate this proposal as per the applicable threshold value

Bid proposals will be evaluated based on the 80/20 preference points system in accordance with the PPPFA Act (Act no.5 of 2000), where a maximum of 80 points will be awarded in respect of price and a maximum of 20 points will be awarded for specific goals.

Allocation of points

The following table shows allocation of points:

Criteria	Points
POINTS ON PRICE	**80**
SPECIFIC GOALS	**20**
TOTAL	**100**

a) A maximum of 80 points is allocated for **price** on the following basis:

80/20

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

Where:

Ps	=	Points scored for price of tender under consideration
Pt	=	Price of tender under consideration
Pmin	=	Price of lowest acceptable tender

b) A maximum of 20 points may be awarded to a Bidder for the specific goal specified for the tender.

c) The points scored for the specific goal must be added to the points scored for price and the total must be rounded off to the nearest two decimal places.

d) Subject to section 2(1)(f) of the Act, the contract must be awarded to the Bidder scoring the highest points.

e) Allocation of Points

SPECIFIC GOALS

The Employer reserves the right to apply other specific goals in accordance with PPR Regulations 2022 as contemplated in section 2(1)(d)&(e) of the PPPFA Act No 5 of 2000 which may include contracting with persons, or categories of persons, historically disadvantaged by unfair discrimination on the basis of race, gender and disability including the implementation of programmes of the Reconstruction and Development Programme as published in Government Gazette No. 16085 dated 23 November 1994.

The Specific goals will be allocated as per the table below:

The specific goals allocated points in terms of this tender	Number of points allocated (80/20 system)
Who are women (51% or more)	5
Who is a youth (18 to 35 years) (51% or more owned)	5
Location of enterprise (Free State Province)	5
B-BBBEE status level contributors from level 1 to 2 which are QSE or EME	5
Total scored points	**20**

Definitions

"Specific goals" means specific goals as contemplated in section2(1)(d) of the PPPFA Act which may include contracting with persons, or categories of persons, historically disadvantaged by unfair discrimination on the basis of race, gender and disability including the implementation of programmes of the Reconstruction of Development Programme as published in Government Gazette No.16085 date 23 November 1994

"Ownership "means the percentage ownership and control, exercised by individuals within and enterprise.

Means of Verification (Specific Goals)

Procurement Requirement	Required Proof Documents
Women	Identity document
Youth	Identity document
Location	Municipal bill/ Lease agreement/ Letter from local authority.
B-BBEE status level contributors from level 1 to 2 which are QSE or EME	Valid certificate/ sworn affidavit Consolidated BEE certificate in cases of Joint Venture Full CSD Report

	Failure on the part of a Bidder to submit proof of documentation required in terms of this tender to claim for specific goals with the tender, will be interpreted to mean that preference points for specific goals are not claimed.
5.1	**Functionality** **A Tender scoring below 60 points in Qualifying Criteria shall be considered as DISQUALIFIED for further evaluation and shall be discarded from evaluation.**

Qualifying criteria	Evaluation schedule	Maximum number of points
Bidder's Relevant Project Experience	Schedule 1	100
Maximum possible score for quality (M_s)		**100**

5.2	Tender offers will only be accepted if: 1. The bidder 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. 2. The bidder has not abused the Employer's Supply Chain Management System, or 3. The bidder has not failed to perform on any previous contract and has been given a written notice to this effect. 4. The bidder has demonstrated that they have capacity and capability to complete the works. 5. The bidder does not pose a risk to the employer such as not having capacity in the tendered project region. 6. The bidder does not pose commercial risk in relation to financial offers and market related rates. 7. The bidder has duly completed and signed the SBD 4, Incomplete or unsigned or poorly completed forms will lead to a bidder being declared nonresponsive. 8. the bidder is registered with the Construction Industry Development Board in an appropriate contractor grading designation. 9. the bidder/s is registered on CSD prior submitting bids (open tenders). Any prospective bidder found to have Tax matters not in order with SARS (verified through CSD) during the evaluation process (after being given an opportunity to rectify tax matters) will be eliminated and not be considered further in the process. Preferred bidder/s will be afforded an opportunity to rectify their tax affairs within 7 days. A bidder that fails to rectify its tax matters with SARS will be eliminated 10. A Resolution of signatory form has been completed and signed by director/s or a letter bearing a letterhead of the bidder has been attached (specific to this bid) to the bid submission, it must be duly signed by all directors and submitted the bid. Only a duly authorised official can sign the bid
5.3	The number of paper copies of the signed contract to be provided by the employer is one to the successful Bidder.
5.4	The additional conditions of tender are: Wherever a brand name is specified in this document (i.e. specifications, pricing schedule, bill of quantities or anywhere), the department requires an item similar/equivalent or better.
5.5	**Cancellation and re-invitation of tenders** MISA may, prior to the award of the tender, cancel the tender if- (a) due to changed circumstances, there is no longer a need for the services, works or goods requested, or (b) funds are no longer available to cover the total envisaged expenditure, or (c) no acceptable tenders are received, or

(d) Tender validity period has expired, or

(e) Gross irregularities in the tender processes and/or tender documents, or

(f) No market related offer received (after attempts of negotiation processes)

Where applicable, the decision to cancel the tender will be published in the CIDB website and in the Tender Bulletin or the media in which the original tender invitation as advertised.

TENDER AWARD

A. The tender obtaining the highest number of total points may be awarded the contract, unless the Employer decided otherwise (ref: T1.1 Tender notice and invitation to tender).

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

C. Point scored must be rounded off to the nearest 2 decimal places. *(If the value of the 3rd decimal place is 1 up-to 4, the points up to 2nd decimal place will be considered and if it is 5 up to 9, 1 will be added to the number at 2nd decimal place and the resulting point will be considered.)*

D. In the event that two or more Tenders have scored equal total point, the successful Bid must be the one scoring the highest number of **Specific Goals.**

E. However, in the event that two or more Tenders have scored equal point including equal **Specific Goals**, the successful tender must be the one scoring the highest points for **Functionality.**

F. Should two or more Tenders be equal in all respects, the award shall be decided by drawing of lottery by the Employer.

ADDITIONAL CONDITIONS OF TENDER

The additional conditions of Tender are:

A. Joint Venture

Tenders may form a joint venture acceptable to the Employer as detailed in the tender documents.

B. Costs incurred by Bidder

The Employer will neither be responsible for nor pay any expenses incurred or losses suffered by any Bidder in the preparation of the tender or in attending the compulsory briefing session in connection therewith.

C. Acceptance of Bid

The Employer does not bind itself to accept the lowest or any Tender or to furnish any reason for the acceptance or rejection of a tender. The employer reserves the right to accept the whole works or part of the works.

D. Withdrawal of Tender during validity or Failure in signing Contract Agreement at Award

Should a Bidder

a) Withdraw his Tender during the period of its validity, or

b) Give notice of his inability to execute the Contract or fail to execute the Contract, or

c) Fail to sign the Contract Agreement or furnish the required security/ insurance(s) within the period fixed in the Contract Data (ref: C1.2) in the Tender documents or any extended time agreed to by the Employer,

then the Bidder shall be liable for and pay to the Employer –

i. All expenses incurred in calling for fresh Tender, if it should be deemed necessary by the Employer to do so,

ii. The difference between Tender's tender and any less favourable tender accepted either by fresh tender being called or by another tender being accepted from those already received,

iii. Any escalation of the Final Contract Price resulting from any delay caused in calling for fresh tender or accepting another tender from those already received, as the case may be.

And the Employer shall have the right to recover such sums by set-off against any money which may be due or become due to the Bidder, under this or any other tender or Contract between the Employer and the Bidder, or against any guarantee or deposit which may have been furnished by or on behalf of the Bidder for the due fulfilment of this or any other tender or Contract between the Employer and the Bidder. Pending the ascertainment of the amount of the Bidder's liability to the Employer in terms of this Condition of Tender, the Employer may retain such monies, guarantee or deposit as security for any loss, which the Employer may sustain by reason of the Bidder's default.

Provided always that the Employer may exempt a Bidder from the provisions hereof, if it is of the opinion that the circumstances justify such exemption.

E. Repudiation of Tender or Invalidation of Contract

If the Employer is satisfied that the Bidder or any person is being an employee, partner, director, member or shareholder of the Bidder or a person acting on behalf of or with the knowledge of the Bidder has offered, promised or given a bribe or other gift or remuneration to any person in connection with obtaining or execution of a Contract,

a) has acted in a fraudulent or corrupt manner in obtaining or executing a Contract,

b) has approached an officer or employee of the Employer with the object of influencing the award of a Contract in the Bidder's favour,

c) has entered into any agreement or arrangement, whether legally binding or not, with any other person, firm or company:

d) to refrain from Tendering for this Contract,

e) as to the amount of the Tender to be submitted by either party,

f) has disclosed to any other person, firm or company other than the Employer, the exact or approximate amount of his proposed Tender except where the disclosure, in confidence, was necessary in order to obtain insurance premium and surety quotations required for the preparation of the Bid.

The Employer may, in addition to using any other legal remedies, repudiate the Bid or declare the Contract invalid should it have been concluded already.

F. South African Jurisdiction

The laws of the Republic of South Africa shall be applicable to each Contract created by the acceptance of a Tender and each Bidder shall indicate a place in the Republic and specify it in his Tender as his domicilium citandi et executandi where any legal process may be served on him.

Each Bidder shall bind her/ himself to accept the jurisdiction of the Courts of Law of South Africa.

G. Amendments to Tender by Employer

a) Arithmetical Errors

The Employer shall check and correct arithmetical errors for responsive Tenders in the following manner as per CIDB guideline (Ref: Practice # 2, version 1 – August 2006):

i. Where there is a discrepancy between the amounts in figures and in words, the amount in words shall govern.

ii. If the pricing (or bills of quantities or schedule of quantities or schedule of rates) apply and there is an error in the line item total resulting from the product of the unit rate and the quantity, the line item total shall govern, and the rate shall be corrected. Where there is an obviously gross misplacement of the decimal point in the unit rate, the line item total as quoted shall govern, and the unit rate shall be corrected.

iii. Where there is an error in the total of the prices either as a result of other corrections required by this checking process or in the bidder's addition of prices, the total of the prices shall govern and the Bidder will be asked to revise selected item prices (and their rates if bills of quantities apply) to achieve the tendered total of the Prices.

b) Imbalance in Tender Rates

In the event of there being Tendered rates or lump sums being declared by the Employer to be unacceptable to him because they are either excessively low or high or not in proper balance with other rates or lump sums, the Bidder may be required to produce evidence and advance arguments in support of the tendered rates or lump sums objected to. If, after submission of such evidence and any further evidence requested, the Employer is still not satisfied with the tendered rates or prices objected to, s/he may request the Bidder to amend these rates and prices along the lines indicated by him.

The Bidder will then have the option to alter and/ or amend the rates and lump sums objected to and such other related amounts as are agreed on by the Employer, but this shall be done without altering the total tendered sum.

T2 Returnable documents

T2.1 List of returnable documents

T2.2 RETURNABLE SCHEDULE

2.1 List of returnable documents

A. T2 Returnable Documents **Documentation to demonstrate eligibility to have tenders evaluated.**

The required documentation as listed in **Clause 4.1 of T1.2 Tender Data**, must be submitted along with the tender for determining the eligibility of the tender.

B. Returnable schedules required for tender evaluation purposes

The Bidder must complete the following returnable schedules as relevant, which are attached here with the tender documents.

1. SBD 1 - Invitation to Bid
2. SBD 4 - Declaration on Interest
3. SBD 6.1 – Preference Points claim form
4. Sworn Affidavits - A. EMEs or B. QSES

   B-BBEE Certificates for all other Bidders
5. CSD report Annexure
6. Tender's certificates Annexure
7. Resolution for Signatory
8. Certificate of Joint Ventures
9. Schedule 1: Experience of the Bidder

C. Other documents contained herein in the tender documents required for tender evaluation purposes as listed below.

1. Record of Addenda to Tender Documents

2. Proposed Amendments and Qualifications

D. Documentation that will be used for evaluation and to incorporate into the contract, if the tender offer resulted in an award

1. The offer portion of C1.1 Form of offer and acceptance

2. Part 2 of C1.2 Contract data relevant to Bidder

3. C2.2 Price List

T2.2 RETURNABLE SCHEDULES

1. PART A – INVITATION OF BID: SBD 1

YOU ARE HEREBY INVITED TO BID FOR REQUIREMENTS OF THE (*NAME OF DEPARTMENT/ PUBLIC ENTITY*)					
BID NUMBER:	**MISA/VWWTWPS/FS/007/2026/27**	**CLOSING DATE:**	**22 July 2026**	**CLOSING TIME:**	**11:00am**
DESCRIPTION:	**REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS AND PUMP STATION IN VILLIERS/QALABOTJHA (MIG SHEDULE 6B)**				

BID RESPONSE DOCUMENTS MAY BE DEPOSITED IN THE BID BOX SITUATED AT *(STREET ADDRESS)*
1303 Heuwel Avenue, Riverside Office Park, Letaba House
1st Floor, Centurion, Pretoria 0046

BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO:		TECHNICAL ENQUIRIES MAY BE DIRECTED TO:	
CONTACT PERSON	**Ms. Lumka Batyi**	CONTACT PERSON	**Mr. Ben Mabizela**
TELEPHONE NUMBER	**012 848 5300**	TELEPHONE NUMBER	**012 848 5300**
FACSIMILE NUMBER		FACSIMILE NUMBER	
E-MAIL ADDRESS	**tenders@misa.gov.za**	E-MAIL ADDRESS	**tenders@misa.gov.za**

SUPPLIER INFORMATION				
NAME OF BIDDER				
POSTAL ADDRESS				
STREET ADDRESS				
TELEPHONE NUMBER	CODE		NUMBER	
CELLPHONE NUMBER				
FACSIMILE NUMBER	CODE		NUMBER	
E-MAIL ADDRESS				
VAT REGISTRATION NUMBER				

SUPPLIER COMPLIANCE STATUS	TAX COMPLIANCE SYSTEM PIN:		**OR**	CENTRAL SUPPLIER DATABASE No:	MAAA

B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE	TICK APPLICABLE BOX] ☐ Yes ☐ No	B-BBEE STATUS LEVEL SWORN AFFIDAVIT	[TICK APPLICABLE BOX] ☐ Yes ☐ No

[A B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE ISSUED BY AGENCY ACCREDITED BY SANAS / SWORN AFFIDAVIT (FOR EMES & QSEs) MUST BE SUBMITTED IN ORDER TO QUALIFY FOR PREFERENCE POINTS FOR B-BBEE]

ARE YOU THE ACCREDITED REPRESENTATIVE IN SOUTH AFRICA FOR THE GOODS /SERVICES /WORKS OFFERED?	☐Yes ☐No [IF YES ENCLOSE PROOF]	ARE YOU A FOREIGN BASED SUPPLIER FOR **THE GOODS /SERVICES /WORKS OFFERED?**	☐Yes ☐No [IF YES, COMPLETE QUESTIONNAIRE BELOW]

QUESTIONNAIRE TO BIDDING FOREIGN SUPPLIERS

IS THE ENTITY A RESIDENT OF THE REPUBLIC OF SOUTH AFRICA (RSA)?	☐ YES ☐ NO
DOES THE ENTITY HAVE A BRANCH IN THE RSA?	☐ YES ☐ NO
DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA?	☐ YES ☐ NO
DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA?	☐ YES ☐ NO
IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION?	☐ YES ☐ NO

IF THE ANSWER IS "NO" TO ALL OF THE ABOVE, THEN IT IS NOT A REQUIREMENT TO REGISTER FOR A TAX COMPLIANCE STATUS SYSTEM PIN CODE FROM THE SOUTH AFRICAN REVENUE SERVICE (SARS) AND IF NOT REGISTER AS PER 2.3 BELOW.

PART B – TERMS AND CONDITIONS

TERMS AND CONDITIONS FOR BIDDING

1. BID SUBMISSION:

1.1. BIDS MUST BE DELIVERED BY THE STIPULATED TIME TO THE CORRECT ADDRESS. LATE BIDS WILL NOT BE ACCEPTED FOR CONSIDERATION.

1.2. **ALL BIDS MUST BE SUBMITTED ON THE OFFICIAL FORMS PROVIDED–(NOT TO BE RE-TYPED) OR IN THE MANNER PRESCRIBED IN THE BID DOCUMENT.**

2. TAX COMPLIANCE REQUIREMENTS

2.1 BIDDERS MUST ENSURE COMPLIANCE WITH THEIR TAX OBLIGATIONS.

2.2 BIDDERS ARE REQUIRED TO SUBMIT THEIR UNIQUE PERSONAL IDENTIFICATION NUMBER (PIN) ISSUED BY SARS TO ENABLE THE ORGAN OF STATE TO VERIFY THE TAXPAYER'S PROFILE AND TAX STATUS.

2.3 APPLICATION FOR TAX COMPLIANCE STATUS (TCS) PIN MAY BE MADE VIA E-FILING THROUGH THE SARS WEBSITE WWW.SARS.GOV.ZA.

2.4 BIDDERS MAY ALSO SUBMIT A PRINTED TCS CERTIFICATE TOGETHER WITH THE BID.

2.5 IN BIDS WHERE CONSORTIA / JOINT VENTURES / SUB-CONTRACTORS ARE INVOLVED, EACH PARTY MUST SUBMIT A SEPARATE TCS CERTIFICATE / PIN / CSD NUMBER.

2.6 WHERE NO TCS IS AVAILABLE BUT THE BIDDER IS REGISTERED ON THE CENTRAL SUPPLIER DATABASE (CSD), A CSD NUMBER MUST BE PROVIDED.

2.7 NO BIDS WILL BE CONSIDERED FROM PERSONS IN THE SERVICE OF THE STATE, COMPANIES WITH DIRECTORS WHO ARE PERSONS IN THE SERVICE OF THE STATE, OR CLOSE CORPORATIONS WITH MEMBERS PERSONS IN THE SERVICE OF THE STATE."

…… ……

Signature Date

…… ……

Position Name of bidder

2. SBD 4 - BIDDER'S DISCLOSURE

1. PURPOSE OF THE FORM

Any person (natural or juristic) may make an offer or offers in terms of this invitation to bid. In line with the principles of transparency, accountability, impartiality, and ethics as enshrined in the Constitution of the Republic of South Africa and further expressed in various pieces of legislation, it is required for the bidder to make this declaration in respect of the details required hereunder.

Where a person/s are listed in the Register for Tender Defaulters and / or the List of Restricted Suppliers, that person will automatically be disqualified from the bid process.

2. Bidder's declaration

2.1 Is the bidder, or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest[1] in the enterprise, employed by the state? **YES/NO**

2.1.1 If so, furnish particulars of the names, individual identity numbers, and, if applicable, state employee numbers of sole proprietor/ directors / trustees / shareholders / members/ partners or any person having a controlling interest in the enterprise, in table below.

Full Name	Identity Number	Name of State institution

2.2 Do you, or any person connected with the bidder, have a relationship with any person who is employed by the procuring institution? **YES/NO**

[1] the power, by one person or a group of persons holding the majority of the equity of an enterprise, alternatively, the person/s having the deciding vote or power to influence or to direct the course and decisions of the enterprise.

2.2.1 If so, furnish particulars:

……

……

2.3 Does the bidder or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest in the enterprise have any interest in any other related enterprise whether or not they are bidding for this contract? **YES/NO**

2.3.1 If so, furnish particulars:

……

……

3 DECLARATION

I, ……..…… the undersigned, in submitting the accompanying bid, do hereby make the following statements that I certify to be true and complete in every respect:

3.1 I have read and I understand the contents of this disclosure,

3.2 I understand that the accompanying bid will be disqualified if this disclosure is found not to be true and complete in every respect,

3.3 The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However, communication between partners in a joint venture or consortium[2] will not be construed as collusive bidding.

3.4 In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications, prices, including methods, factors or formulas used to calculate prices, market allocation, the intention or decision to submit or not to submit the bid, bidding with the intention not to win the bid and conditions or delivery particulars of the products or services to which this bid invitation relates.

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

3.5 There have been no consultations, communications, agreements or arrangements made by the bidder with any official of the procuring institution in relation to this procurement process prior to and during the

[2] Joint venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.

bidding process except to provide clarification on the bid submitted where so required by the institution, and the bidder was not involved in the drafting of the specifications or terms of reference for this bid.

3.6 I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids 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.

I CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 1, 2 and 3 ABOVE IS CORRECT.

I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME IN TERMS OF PARAGRAPH 6 OF PFMA SCM INSTRUCTION 03 OF 2021/22 ON PREVENTING AND COMBATING ABUSE IN THE SUPPLY CHAIN MANAGEMENT SYSTEM SHOULD THIS DECLARATION PROVE TO BE FALSE.

…… ……

Signature Date

…… ……

Position Name of bidder

3. SBD 6.1 – PREFERENCE POINTS CLAIM FORM

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

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

---

1. GENERAL CONDITIONS

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

- the 80/20 system for requirements with a Rand value of up to 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 bid is the 80/20 preference point system.

b) The 80/20 preference point system will be applicable in this bid. The lowest/ highest acceptable bid will be used to determine the accurate system once bids are received.

1.3 Points for this bid (even in the case of a bid 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 bid 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 bidder to submit proof or documentation required in terms of this bid to claim points for specific goals with the bid, 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 Bidder, either before a bid is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the organ of state.

2. DEFINITIONS

(a) **"Specific goals"** means specific goals as contemplated in section2(1)(d) of the PPPFA Act which may include contracting with persons, or categories of persons, historically disadvantaged by unfair discrimination on the basis of race, gender and disability including the implementation of programmes of the Reconstruction of Development Programme as published in Government Gazette No.16085 date 23 November 1994

(b) **"Ownership** "means the percentage ownership and control, exercised by individuals within and enterprise
(c) **"bid"** means a written offer in the
(d) **"bid"** 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 biding process or any other method envisaged in legislation,
(e) **"price"** means an amount of money bided for goods or services, and includes all applicable taxes less all unconditional discounts,
(f) **"rand value"** means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes,
(g) **"bid 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
(h) **"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

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

Where

Ps = Points scored for price of bid under consideration

Pt = Price of bid under consideration

Pmin = Price of lowest acceptable bid

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

$$Ps = 80\left(1 + \frac{Pt - P\,max}{P\,max}\right)$$

Where

Ps = Points scored for price of bid under consideration

Pt = Price of bid under consideration

Pmax = Price of highest acceptable bid

POINTS AWARDED FOR SPECIFIC GOALS

3.3. 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 bid. For the purposes of this bid the Bidder 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 bid:

3.4. 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 bid documents, stipulate in the case of—

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

(b) any other invitation for bid, that either the 80/20 or 90/10 preference point system will apply and that the lowest acceptable bid 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 bid and points claimed are indicated per the table below.

Note to bidders: The bidder must indicate how they claim points for each preference point system.)

The specific goals allocated points in terms of this bid	Number of points allocated (80/20 system)	Number of points claimed (80/20 system) (To be completed by the bidder)
Who are women (51% or more)	5	
Who is a youth (18 to 35 years) (51% or more owned)	5	
Location of enterprise (Free State Province)	5	
B-BBBEE status level contributors from level 1 to 2 which are QSE or EME	5	
Total scored points	**20**	

DECLARATION WITH REGARD TO COMPANY/FIRM

3.5. Name of company/firm…….

3.6. Company registration number: ……...

3.7. 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]

3.8. 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 bid, 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 biding 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 bidder 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 BIDDER(S)
SURNAME AND NAME:	……
DATE:	……
ADDRESS:	……
	……
	……
	……

4. SAMPLES OF GENERIC SECTOR CODERS SWORN AFFIDAVITS- A. EMES AND B. QSES (FOR BIDDERS WITH NO B-BBEE CERTIFICATES SWORN AFFIDAVIT - TEMPLATES

(IF APPLICABLE, CHOOSE THE CORRECT FORM AND COMPLETE)

NB: CHOOSE ONE i.e EME or QSE!!!!)

B-BBEE EXEMPTED AFFIDAVIT FOR EXEMPTED MICRO ENTERPRISES (EME)

I, the undersigned,

Full name & Surname	
Identity number	

Hereby declare under oath as follows:

1. The contents of this statement are to the best of my knowledge a true reflection of the facts.
2. I am a Member / Director / Owner of the following enterprise and am duly authorized to act on its behalf:

Enterprise Name:			
Trading Name (If Applicable):			
Registration Number:			
Enterprise Physical Address:			
Type of Entity (CC, (Pty) Ltd, Sole Prop etc.):			
Nature of Construction Business:	BEPs (Built Environment Professional)	Contractor	Supplier
Definition of "Black People"	As per the Broad-Based Black Economic Empowerment Act 53 of 2003 as Amended by Act No 46 of 2013 "Black People" is a generic term which means Africans, Coloureds and Indians – (a) Who are citizens of the Republic of South Africa by birth or descent, or (b) Who became citizens of the Republic of South Africa by naturalization- i. Before 27 April 1994, or ii. On or after 27 April 1994 and who would have been entitled to acquire citizenship by naturalization prior to that date		

3. I hereby declare under Oath that as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,

- The Enterprise is _____% Black Owned
- The Enterprise is _____% Black woman Owned
- The Enterprise is _____% Owned by Black Designated Group (provide Black Designated Group Breakdown below as per the definition in the table above)

o Black Youth % _____%

o Black Disabled % _____%

o Black Unemployed % _____%

o Black People living in Rural areas % _____%

o Black Military Veterans % _____%

Based on the Financial Statements/Management Accounts and other information available on the latest financial year-end of_____(DD/MM/YY), the annual Total Revenue was equal to/or less than the applicable amount confirmed **by ticking the applicable box below**.

Contractor / Consultancy	R10 million	
Supplier	R10 million	

If the turnover exceeds the applicable amount in the table above then this affidavit is no longer applicable and an EME certificate must be obtained from a rating agency accredited by SANAS or when applicable a B-BBEE Verification Professional Regulator appointed by the Minister of Trade and Industry.

 Please confirm on the table below the B-BBEE level contributor, **by ticking the applicable box.**

100% Black Owned	**Level One** (135% B-BBEE procurement recognition level)	
At least 51% Black Owned but less than 100% black owned	**Level Two** (125% B-BBEE procurement recognition level)	
Less than 51% black owned	**Level Four** (100% B-BBEE procurement recognition level)	

4. I know and understand the contents of this affidavit and I have no objection to take the prescribed oath and consider the oath binding on my conscience and on the owners of the enterprise which I represent in this matter.
5. The sworn affidavit will be valid for a period of 12 months from the date signed by commissioner.

Deponent Signature:_____

Date: _____

_____

Commissioner of Oaths

Signature & stamp

Date: _____

B-BBEE EXEMPTED AFFIDAVIT FOR <u>QUALIFYING SMALL ENTERPRISES (QSE)</u>

Issued in terms of paragraph(s) 9.6 and 12.6 (Implementation Guide for PPR 2017) and Paragraph(s) 3.7 & 5.1 of NT Circular No. 5 of 2016/2017

I, the undersigned,

Full name & Surname	
Identity number	

Hereby declare under oath as follows:

1. The contents of this statement are to the best of my knowledge a true reflection of the facts.
2. I am a Member / Director / Owner of the following enterprise and am duly authorized to act on its behalf:

Enterprise Name:		
Trading Name (If Applicable):		
Registration Number:		
Enterprise Physical Address:		
Type of Entity (CC, (Pty) Ltd, Sole Prop etc.):		
Nature of Construction Business:	Supplier / Service provider	Consultancy services Supplier
Definition of "Black People"	As per the Broad-Based Black Economic Empowerment Act 53 of 2003 as Amended by Act No 46 of 2013 "Black People" is a generic term which means Africans, Coloureds and Indians – (a) Who are citizens of the Republic of South Africa by birth or descent, or (b) Who became citizens of the Republic of South Africa by naturalization- i. Before 27 April 1994, or ii. On or after 27 April 1994 and who would have been entitled to acquire citizenship by naturalization prior to that date	

3. I hereby declare under Oath that as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,

- The Enterprise is _____% Black Owned
- The Enterprise is _____% Black Female Owned
- The Enterprise is _____% Owned by Black Designated Group (provide Black Designated Group Breakdown below as per the definition in the table above)
  - o Black Youth % _____%
  - o Black Disabled % _____%
  - o Black Unemployed % _____%
  - o Black People living in Rural areas % _____%
  - o Black Military Veterans % _____%

Based on the Financial Statements/Management Accounts and other information available on the latest financial year-end of_____(DD/MM/YY), the annual Total Revenue was equal to/or less than the applicable amount confirmed **by ticking the applicable box below**.

Contractor / Consultancy services	R50 million	
Supplier	R50 million	

If the turnover exceeds the applicable amount in the table above then this affidavit is no longer applicable and an EME certificate must be obtained from a rating agency accredited by SANAS or when applicable a B-BBEE Verification Professional Regulator appointed by the Minister of Trade and Industry.

 Please confirm on the table below the B-BBEE level contributor, **by ticking the applicable box.**

100% Black Owned	**Level One** (135% B-BBEE procurement recognition level)	
At least 51% Black Owned but less than 100% black owned	**Level Two (**125% B-BBEE procurement recognition level)	

4. I know and understand the contents of this affidavit and I have no objection to take the prescribed oath and consider the oath binding on my conscience and on the owners of the enterprise which I represent in this matter.

5. The sworn affidavit will be valid for a period of 12 months from the date signed by commissioner.

Deponent Signature:_____

Date: _____

_____

Commissioner of Oaths

Signature & stamp

Date: _____

5. CSD REPORT ANNEXURE - PROOF OF REGISTRATION ON THE NATIONAL TREASURY CENTRAL SUPPLIER DATABASE (CSD REPORT)

(ATTACH HERE)

6. VALID CERTIFICATES OF A BIDDER

(ATTACH HERE)

7. RESOLUTION FOR SIGNATORY

A: CERTIFICATE OF AUTHORITY FOR SIGNATORY

Signatory for companies shall confirm their authority hereto by attaching a duly signed and dated copy of the relevant resolution of the board of directors to this form or on company letter head.

An example is given below:
"By resolution of the board of directors passed at a meeting held on _____

Mr/Ms_____, whose signature appears below, has been duly authorised to

sign all documents in connection with the tender for Contract No. _____

and any Contract which may arise there from on behalf of (Block Capitals) _____

_____

_____

SIGNED ON BEHALF OF THE COMPANY: _____
IN HIS/HER CAPACITY AS: _____
DATE:_____
SIGNATURE OF SIGNATORY: _____

WITNESSES:

DIRECTOR (NAMES)		SIGNATURE		
DIRECTOR (NAMES)		SIGNATURE		
DIRECTOR (NAMES)		SIGNATURE		
DIRECTOR (NAMES)		SIGNATURE		
DIRECTOR (NAMES)		SIGNATURE		
DIRECTOR (NAMES)		SIGNATURE		

If you cannot complete this form, attach a separate sheet (in a company letter head, project specific and signed by all directors):

8. CERTIFICATE OF AUTHORITY FOR JOINT VENTURES

This Returnable Schedule is to be completed by 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 and any contract resulting from it on our behalf.

PROJECT TITLE	**REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS AND PUMP STATION IN VILLIERS/QALABOTJHA (MIG SCHEDULE 6B)**
BID NUMBER	**MISA/VWWTWPS/FS/007/2026/27**

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

9. SCHEDULE 1: EXPERIENCE OF THE BIDDER (Total = 100 POINTS)

a) Requirements

The experience of the bidder as a company (as opposed to key staff members) in the construction or refurbishment of infrastructure, associated wastewater treatment works, construction of sewer pump stations, as a main contractor.

The projects shall be within the previous 10 years and must only include completed projects prior to closing date for submissions.

b) Points Scoring

Points will be allocated per project as per the table below,

Table : Project points allocation

No	Project Value	Points per Project
a)	R 3 000 000 – R6 000 000	**25 points (MAX 4X PROJECT)**
b)	R 6 000 001 – R9 000 000	**50 points (MAX 2X PROJECT)**
c)	R9 000 001 And Above	**100 points (MAX 1X PROJECT)**

(b) **Means of Verification:** Bidders are requested to submit practical completion/ completion certificates and corresponding appointment letters/Purchase Orders

- Appointment letters and Practical Completion or Completion certificates must be from the relevant municipality or organ of state and must indicate details of the contact person from the municipality or organ of state
- In cases where the municipality or organ of state made use of a consulting engineer (consultant), the appointment letter and completion certificate must clearly stipulate:
  (i) Form of Contract used at that time such as GCC, NEC, FIDIC etc
  (ii) The details of the project including description, tender number, contract amount, contractual dates and contract period.
  (iii) The name of the municipality or organ of state that is the client or employer.
  (iv) The details of the contact person from the municipality or organ of state
  (v) The practical completion or completion certificate must be signed by the Engineer, the Employer and the Contractor depending on the form of contract used.

(c) **Listing of Completed Projects**

Bidders are requested to list one and or up to a maximum of **four (4) highest value projects** including contactable references by completing **SCHEDULE OF COMPLETED PROJECTS** appended to this schedule on the next page.

SCHEDULE OF COMPLETED PROJECTS

No	Name and Brief Description of the Project	Value in Rands R'000	Date		Employer		
			Started	Completed	Name of employer	Contact Person	
						Name and Surname	Tel. No
1.							
2.							
3.							
4.							

MISA reserves the right to verify all information presented by the Bidder.
The undersigned, who warrants that he/she is duly authorised to do so on behalf of the enterprise, confirms that the contents of this schedule are within my personal knowledge and are to the best of my belief both true and correct.

Signed ---------- Date ----------

Name ---------- Position ----------

Enterprise name ----------

MUNICIPAL INFRASTRUCTURE SUPPORT AGENT

Reference no.: **MISA/VWWTWPS/FS/007/2026/27**

REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS AND PUMP STATION IN VILLIERS/QALABOTJHA – PHASE 1 (MIG SCHEDULE 6B)

The Contract

Based on

NEC 3:
Option B: Priced contract with bill of quantities

MUNICIPAL INFRASTRUCTURE SUPPORT AGENT

Reference no.: **MISA/VWWTWPS/FS/007/2026/27**

REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS AND PUMP STATION IN VILLIERS/QALABOTJHA – PHASE 1 (MIG SCHEDULE 6B)

C1 Agreements and Contract Data

C1.1 FORM OF OFFER AND ACCEPTANCE

OFFER

The *Employer*, identified in the Acceptance signature block, has solicited offers to enter into a contract for the provision of services as described in Part 1 of the Contract Data.

The Bidder, identified in the Offer signature block, has examined the documents listed in the Tender Data and addenda thereto as listed in the Returnable Schedules, and by submitting this Offer has accepted the Conditions of Tender.

By the representative of the Bidder, deemed to be duly authorised, signing this part of this Form of Offer and Acceptance, the Bidder 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.

Total Amount: ..... (in figure),

.....

.....

*.....***(in words).**

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 including the Schedule of Deviations (if any) to the Bidder before the end of the period of validity stated in the Tender Data, or other period as agreed, whereupon the Bidder becomes the party named as the *Contractor* in the conditions of contract identified in the Contract Data.

Signature(s) .....

Name(s) .....

Capacity .....

For the Bidder: .....

(Insert name and address of organisation)

Name & signature of witness ..... Date .....

ACCEPTANCE

By signing this part of this Form of Offer and Acceptance, the *Employer* identified below accepts the Bidder's Offer. In consideration thereof, the *Employer* shall pay the Consultant the amount due in accordance with the *conditions of contract* identified in the Contract Data. Acceptance of the Bidder's Offer shall form an agreement between the *Employer* and the Bidder 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 C1 Agreements and Contract Data, (which includes this Form of Offer and Acceptance)

Part C2 Pricing Data

Part C3 Scope of Work

Part C4 Site Information

and drawings and documents (or parts thereof), which may be incorporated by reference into the above listed Parts.

Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Returnable Schedules as well as any changes to the terms of the Offer agreed by the Bidder and the *Employer* during this process of offer and acceptance, are contained in the Schedule of Deviations attached to and forming part of this Form of Offer and Acceptance. No amendments to or deviations from said documents are valid unless contained in this Schedule.

The Bidder shall within two weeks of 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. 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 Bidder receives one fully completed original copy of this document, including the Schedule of Deviations (if any). Unless the Bidder (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.

Signature(s) ……

Name(s) Ms. Mapatane Kgomo

Capacity Chief Executive Officer

for the *Employer* 1303 Heuwel Avenue
Riverside Office Park, Letaba House
Centurion, PRETORIA 0046

Name & signature of witness ……..

……. Date: . . . . . .

Schedule of Deviations

1 Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

2 Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

3 Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

4 Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

5 Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

By the duly authorised representatives signing this agreement, the *Employer* and the Bidder 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 Bidder 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 bidder of a completed signed copy of this Agreement shall have any meaning or effect in the contract between the parties arising from this agreement.

C1.2 CONTRACT DATA

C1.2 CONTRACT DATA

The *Conditions of Contract* are the core clauses and the clauses for main Option B, dispute resolution option **W1** and Secondary options **X7, X13, X16, Z** of the NEC3 Engineering and Construction Contract (April 2013 edition) published by the Institution of Civil Engineers (ICE), copies of which may be obtained from Engineering Contract Strategies (+27) 011 803 3008

Each item of data given below is cross-referenced to the clause in the NEC3 Engineering and Construction Contract to which it mainly applies.

C1.2.1 Part One - Data provided by the *Employer.*

Clause		*Data*
1.	***General***	
10.1	*The Employer is*	Municipal Infrastructure Support Agent
	Physical Address:	1303 Heuwel Avenue Riverside Office Park
		Letaba House, Centurion, Pretoria, 0046
	Postal Address:	Private Bag X 105, Centurion, 0046
	Telephone:	012 848 5300
10.1	*The Project Manager is:* ***Mr. Godfrey Motsoeneng***	
		FLAGG Consulting Engineers (Pty) Ltd
	Physical Address:	6 Mark Street
		Frankfort,9830
	Postal Address:	P. O Box 864, Frankfort ,9830
	Telephone:	058 813 2173

10.1	*The Supervisor is:* ***Mr. Sizwe Kibido*** Physical Address: 6 Mark Street Frankfort,9830 Postal Address: P. O Box 864, Frankfort ,9830 Telephone: 058 813 2173
11.2 (1)	The Accepted Programme is the programme identified in the Contract Data or the latest accepted by the Project Manager. The latest accepted programme supersedes previously accepted programmes.
11.2 (13)	**REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS AND PUMP STATION IN VILLIERS/QALABOTJHA – PHASE 1 (MIG SCHEDULE 6B)**
11.2 (14)	The following matters will be included in the Risk Register. *None*
11.2 (15)	The *boundaries* of the sites are as per the proposed site layout and locality plan as per C3: Scope of Works.
11.2 (16)	The Site Information is in section Part C4: Site information of this tender document
11.2 (19)	The Works Information is in section Part C3: Scope of works of this tender document
12.2	The *law of the contract* is the law of the Republic of South Africa
13.1	The *language of this contract* is English
13.3	The *period of reply* is 2 weeks
2	**The Parties' main responsibility**
26.1	If the *Contractor* subcontracts work, he is required to submit a signed agreement with proposed Subcontractor detailing the proposed scope and exclusivity of the relationship and intention to get into a subcontracting agreement based on the NEC3 Engineering and Construction Subcontract should he be successful.
26.2	The Contractor must submit proposed Subcontractor with a **CIDB registration** (appropriate certificates to be submitted).
26.3	The conditions of contract for the Subcontractor shall be the NEC3 Engineering and Construction Subcontract Edition: 3 Reprinted with Amendments 2013, which is to be signed by both parties should the Contractor be successful.
3	**Time**
30.1	The *starting date* is **14 days** after the issuance of the appointment letter.
33.1	The *access* date is 14 days after the issuance of the appointment letter.
30.2	The *completion date* for the whole of the *services* is **Eight (8) months** after the issue of appointment letter.
31	The *Contractor* submits programme with the tender according to the *Scope*, considering the *starting date* and *completion date*, which will be adjusted, if need be, based on proposed duration in the programme through consultation.
32	The *Contractor* submits revised programme at intervals no longer than 4 weeks.
4	**Testing and Defects**
42	The *defects date* is **52 weeks** after Completion of the whole of the works.

43	The *defect correction period* is two weeks after completion of the whole of the works.
5	**Payment**
50.1	The *assessment interval* is monthly on or before the 20th day of each successive month.
51.1	The *currency of this contract* is the South African Rand.
51.2	Each certified payment is made within 30 days of the receipt of invoice.
51.3	The *interest rate* is the Prime lending rate of the *Employer's* Bank.
6	**Compensation events**
60.1 (13)	The place where the weather is to be recorded is Mafube Local Municipality and nearest weather station.
60.1 (13)	The weather measurements to be recorded for each calendar month are • The cumulative rainfall (mm) • The number of days with rainfall more than 7mm
7	**Title** No data required for this section of the *conditions of contract*.
70.2	**80%** of the value of materials on site could be claimed by the contractor. Proof of ownership of material and delivery notes must be provided for payment to be certified.
8	**Indemnity, Insurance and Liabilities**
84.1	The Contractor is to provide the insurances stated in the Insurance Table in Section 84.2
84.2	*The minimum amount of cover for insurance against the Contractor's liability for loss of or damage to property (except the works, Plant and Materials and Equipment) and liability for bodily injury to employees of the Contractor to or death of a person (not an employee of the Contractor) caused by activity in connection with this contract as prescribed in section 84.2 of the NEC 3 ECC*

Insurance against	**Minimum amount of cover or minimum limit of indemnity**	**Period following Completion of the whole of the services or earlier termination**
Loss of or damage of the works, Plant and Materials	The replacement cost, including the amount stated in the Contract Data for the replacement of any Plant and Materials provided by the Employer	Till the end of the *defects date*.
Loss of or damage to Equipment	The replacement cost	Till the end of the *completion date*.
Liability for loss of or damage to property (except the works, Plant and Materials and Equipment) and liability for bodily injury to or death of a person (not an employee of the Contractor) caused by activity in connection with this contract.	**R 5 million** without limit to the number of claims	Till the end of the *completion date*.
Liability for death of or bodily injury to employees of the *Consultant* arising out of and in	That which is prescribed by the Compensation injuries and Diseases Act No. 130 of 1993 as	Till the end of the *completion date*.

	the course of their employment in connection with this contract	amended and whatever the Consultant deems desirable in addition	

85.1	Before the starting date and on each renewal the Contract shall provide applicable insurance policies to the Project Manager for acceptance. The certificates are signed by the Contractor's insurer or insurance broker
86.1	The *Employer* provides no insurance cover.
9	**Termination** There is no Contract Data required for this section of the conditions of contract.
10	**Data for main Option clause**
B	**Priced Contract with Bill of Quantities**
Option W1	**DISPUTE RESOLUTION**
W1.2	The *Adjudicator* is the person selected by the Parties in terms of the relevant Z Clause from the Panel of NEC Adjudicators set up by ICE-SA, a Joint Division of the Institution of Civil Engineers and the South African Institution of Civil Engineering (see www.ice-sa.org.za).
W1.2	The *adjudicator nominating body* is the Chairman of ICE-SA, a Joint Division of the Institution of Civil Engineers and the South African Institution of Civil Engineering (see www.ice-sa.org.za).
W1.4	The *tribunal* is **arbitration**
W1.4	The *arbitration procedure* is as set out in the latest edition of Rules for the Conduct of Arbitrations published by the Association of Arbitrators (Southern Africa) or its successor body. The place where arbitration is to be held is to be Advised The person or organisation who will choose an arbitrator if the Parties cannot agree a choice or if the *arbitration procedure* does not state who selects an arbitrator, is the Chairman of the Association of Arbitrators (Southern Africa) or its successor body
Option X1	**Price adjustment for Inflation**
X1.1	**Contract Price Adjustments/Increases (CPA/CPI)** No CPA or CPI will apply for this contract
X1.1(a)	The *base date* for indices is: • for the annual rate for key person: the starting date for the contract. • for the adjustment to the total of Prices : the starting date of the project.
X1.1(c)	The proportions used to calculate the Price Adjustment Factor are:

proportion	linked to index for	Index prepared by
	People	Consumer Price Index: index numbers and year on year rates" for index as published in the Statistical Release, P0141 Table B of Statistics South Africa
	Equipment	Mining and construction plant and equipment price index for Lifting and handling equipment and parts thereof as published in the Statistical Release P0151.1 Table 4 of Statistics South Africa

	Plant and materials	Construction input price index (CIPI): material purchases by type of service for construction of buildings as published in the Statistical Release P0151.1 Table 2 of Statistics South Africa -
	Fuel (Diesel)	The diesel wholesale price for Zone 4A – Villiers published on the website www.energy.gov.za/files/petroleum_frame.html
0.15	Not Adjustable	
1.00		

The Price Adjustment Factor is not applied to:

- the special materials identified by the Contractor in the Package Order which are increased or decreased by the net amount of any documented variation incurred after the base date on the basis set out in such data, and
- specialist subcontracts where contracts are invited by the Employer's professional team on a fixed price basis

X2	**Change in the law**
X2.1	The *law of the project* is the law of the Republic of South Africa subject to the jurisdiction of the Courts of South Africa.
X7	The *delay damages* for completion of the whole of the works is **R2 000** per calendar day
Option X13	**Performance Bond**
X13	The amount of the performance bond is **10 %** of value of Contract
Option X16	**Retention**
X16	The retention percentage is **10%**
Z	***Additional Conditions of Contract*** The *additional conditions of contract* are
Z1	**Selection and appointment of the *Adjudicator*** A Party may at any time notify the other Party of the names of two persons he has chosen from the Panel of NEC Adjudicators set up by ICE-SA, a Joint Division of the Institution of Civil Engineers and the South African Institution of Civil Engineering (see www.ice-sa.org.za) whose availability to act as the *Adjudicator* the notifying Party has confirmed. The other Party selects one of the two persons chosen to be the *Adjudicator* within four days of receiving the notice, failing which the person chosen by the notifying Party will be the *Adjudicator.* The Parties appoint the selected *Adjudicator* under the NEC3 Adjudicator's Contract, April 2013.
Z2	**Tax invoices** **The *Contractor*'s invoice.** Delete the first sentence of core clause 51.1 and replace by: The Employer makes each payment within **thirty** days from the date of receipt (exclusive) of the *Contractor's* tax invoice from the Consultant showing the details, which this contract requires or, if a different period is stated in the Contract Data, within the period stated.

Z3	**Acts or omissions by mandatories** In terms of Section 37(2) of the Occupational health and Safety Act of 1993 (Act 85 of 1993), the *Contractor hereby* agrees that the *Employer* is relieved of any and all of its liabilities in terms of Section 37(1) of this Act in respect of any acts or omissions of the *Contractor* and his employees to the extent permitted by this Act, and that this contract comprises the written agreement between the *Employer* and the *Contractor* contemplated in section 37(2).
Z4	**Subcontractors** The *Contracto*r submits the name of each proposed subcontractor to the *Employer's* representative for acceptance. A reason for not accepting the subcontractor is that his appointment will not allow the Contractor to Provide the Works. The Contractor does not appoint a proposed subcontractor until the Project Manager has accepted him.
	Transfer of rights The *Employer* owns the *Contractor's* rights over material prepared for this contract by the *Contractor* except as stated otherwise in the Works Information. The *Contractor* obtains other rights for the *Employer* as stated in the Works Information and obtains from a subcontractor equivalent right for the *Employer* over the material prepared by the subcontractor. The *Contractor* provides to the *Employer* the documents which transfer these rights to the *Employer*

C1.2.2 PART TWO - DATA PROVIDED BY THE CONTRACTOR

The *Contractor* is advised to read the NEC3 Engineering and Construction (Third edition of June 2005) and the relevant Guidance Notes and Flow Charts, published by the Institution of Civil Engineers, in order to understand the implications of this Data, which is required. Copies of these documents may be obtained from Engineering Contract Strategies (telephone (27) 011 803 3008).

Each item of data given below is cross-referenced to the clause in the NEC3 Engineering and Construction Short Contract to which it mainly applies.

Clause	Data
10.1	*The Contractor is* Name: _____ Physical Address: _____ _____ Post Code: _____ Postal Address: _____ Post Code: _____ Telephone: _____ Fax: _____ Mobile: _____ Email: _____
11.2 (8)	The Direct fee percentage is _____
11.2 (8)	The subcontracted fee percentage is _____
11.2 (18)	The working areas are the site and _____
24.1	The *Contractor's* key persons are: 1 Name: Position in the Project Team: _____ Responsibilities: _____ Qualifications: _____ Experience: _____ Physical Address: _____ _____ Post Code: _____ Postal Address: _____ Post Code: _____ Telephone: _____ Fax: _____ Mobile: _____ Email: _____ (Please use separate pages referring to this clause for detailing this information for all *Contractor's* key persons)

11.2(14)	The following matters will be included in the Risk Register
11.2 (21)	The *bill of quantities* is …….
11.2 (31)	The tendered total of the Prices is ……..
52.1	The percentage for overheads and profit added to the Defined Cost for people is **. . . . . %**
52.1	The percentage for overheads and profit added to other Defined Cost is **. . . . . %**

MUNICIPAL INFRASTRUCTURE SUPPORT AGENT

Reference no.: MISA/VWWTWPS/FS/007/2026/27

REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS AND PUMP STATION IN VILLIERS/QALABOTJHA – PHASE 1 (MIG SCHEDULE 6B)

C1.3 SECURITIES: PERFORMANCE BOND

(to be reproduced exactly as shown below on the letterhead of the Surety)

{Insert name and registered address of the Contractor}

Date:

Dear Sirs,

PERFORMANCE BOND FOR CONTRACT NO.

With reference to the above numbered contract made or to be made between

{Insert registered name and address of the *Contractor*}

(the *Contractor*), for

{Insert details of the *works* from the Contract Data} (the *works*).

I/We the undersigned .....

on behalf of the Surety .....

of physical address .....

.....

and duly authorised thereto do hereby bind ourselves as Surety and co-principal debtors in solidum for the due and faithful performance of all the terms and conditions of the Contract by the *Contractor* and for all losses, damages and expenses that may be suffered or incurred by the *Employer* as a result of non-performance of the Contract by the *Contractor*, subject to the following conditions:

1. The terms *Employer*, *Contractor*, *works* and Defects Certificate have the meaning as assigned to them by the *conditions of contract* stated in the Contract Data for the aforesaid Contract.

2. We renounce all benefits from the legal exceptions "Benefit of Excussion and Division", "No value received" and all other exceptions which might or could be pleaded against the validity of this bond, with the meaning and effect of which exceptions we declare ourselves to be fully acquainted.

3. The *Employer* has the absolute right to arrange his affairs with the *Contractor* in any manner which the *Employer* deems fit and without being advised thereof the Surety shall not have the right to claim his release on account of any conduct alleged to be prejudicial to the Surety. Without derogating from the foregoing compromise, extension of the construction period, indulgence, release or variation of the *Contractor's* obligation shall not affect the validity of this performance bond.

4. This bond will lapse on the earlier of
   - the date that the Surety receives a notice from the *Employer* stating that the last Defects Certificate has been issued, that all amounts due from the *Contractor* as certified in terms of the contract have been received by the *Employer* and that the *Contractor* has fulfilled all his obligations under the Contract, or
   - the date that the Surety issues a replacement Performance Bond for such lesser or higher amount as may be required by the *Employer*.

5. Always provided that this bond will not lapse in the event the Surety is notified by the *Employer*, (before the dates above), of the *Employer's* intention to institute claims and the particulars thereof, in which event this bond shall remain in force until all such claims are paid and settled.

6. The amount of the bond shall be payable to the *Employer* upon the *Employer's* demand and no later than 7 days following the submission to the Surety of a certificate signed by the *Employer* stating the amount of the *Employer's* losses, damages and expenses incurred as a result of the non-performance aforesaid. The signed certificate shall be deemed to be conclusive proof of the extent of the *Employer's* loss, damage and expense.

7. Our total liability hereunder shall not exceed the sum of:

_____

R _____

8. This Performance Bond is neither negotiable nor transferable and is governed by the laws of the Republic of South Africa, subject to the jurisdiction of the courts of the Republic of South Africa.

Signed at ..... on this ..... day of ..... 20__

Signature(s)	
Name(s) (printed)	
Position in Surety company	
Signature of Witness(s)	
Name(s) (printed)	

MUNICIPAL INFRASTRUCTURE SUPPORT AGENT

Reference no.: MISA/VWWTWPS/FS/007/2026/27

REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS AND PUMP STATION IN VILLIERS/QALABOTJHA – PHASE 1 (MIG SCHEDULE 6B)

PART C2: PRICING DATA

INDEX

PART C2: Pricing Data

C2.1 PRICING INSTRUCTIONS

1 The Conditions of Contract, the Contract Data, the Specifications (including the Project Specifications) and the Drawings shall be read in conjunction with the Bill of Quantities.

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

Although the Bidder is at liberty to insert a rate of his own choosing for each item in the Bill, he should note the fact that the Contractor is entitled, under various circumstances, to payment for additional work carried out and that the Project Manager is obliged to base his assessment of the rates to be paid for such additional work on the rates the Contractor inserted in the Bill. Clause 8 of each Standardized Specification, and the measurement and payment clause of each Particular Specification, read together with the relevant clauses of the Project Specifications, all set out which ancillary or associated activities are included in the rates for the specified operations

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

4 Unless stated to the contrary, items are measured net in accordance with the Drawings without any allowance having been made for waste. The final design drawings and accompanying construction bill of quantities provided by the contractor and design engineer, will be approved by the assigned MISA project manager and will be required to facilitate implementation of the C.2.2 Schedule of quantities.

5 The amounts and rates to be inserted in the Bill of Quantities shall be the full inclusive amounts (Including disbursements) to the Employer for the work described under the project specifications. 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, disbursements, 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 Bill 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 Bill.

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

Should the Bidder group a number of items together and tender one sum for such group of items, the single tendered sum shall apply to that group of items 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 tendered rates, prices and sums shall, subject only to the provisions of the Conditions of Contract, remain valid irrespective of any change in the quantities during the execution of the Contract. **Therefore, the client also reserves the right to amend the scope of works by omitting specific priced items listed within the Schedule of Quantities and adjusting the contract value accordingly.**

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

Ordering of materials are not to be based on the Bill of Quantities, but only on information issued for construction purposes.

8 Provisional Sums in the schedule of quantities shall be utilised at the discretion of the Project Manager. In addition, provisional sums may be omitted entirely by the Project Manager if so required.

9 Those parts of the works to be constructed using labour-intensive methods **have been marked in the schedule of quantities with the letters LI in a separate column** filled in against every item so designated. The works, or parts of the works so designated are to be constructed using labour-intensive methods only. The use of plant to provide such works, other than plant specifically provided for in the scope of work, is a variation to the contract. The items marked with the letters LI are not necessarily an exhaustive list of all the activities which must be done by hand, and this clause does not over-ride any of the requirements in the generic labour intensive specification in the Scope of Works.

10 Where minimum labour intensity is specified by the design the contractor is expected to use his/her initiative to identify additional activities that can be done labour intensively in order to comply with the set minimum labour intensity target.

11 . Payment for items which are designated to be constructed labour-intensively (either in this schedule or in the Scope of Works) will not be made unless they are constructed using labour-intensive methods. Any unauthorised use of plant to carry out work which was to be done labour-intensively will not be condoned and any works so constructed will not be certified for payment.

12 For the purposes of this Bill 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 Standardized, Project or Particular Specifications
Quantity	:	The number of units of work for each item
Rate	:	The payment per unit of work at which the Bidder tenders to do the work
Amount	:	The quantity of an item multiplied by the tendered rate of the (same) item
Sum	:	An amount tendered for an item, the extent of which is described in the Bill of Quantities, the Specifications or elsewhere, but of which the quantity of work is not measured in units

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

mm	=	millimetre
m	=	metre
km	=	kilometre
km-pass	=	kilometre-pass
m^2	=	square metre
m^2-pass	=	square metre-pass
ha	=	hectare
m^3	=	cubic metre
m^3-km	=	cubic metre-kilometre
kW	=	kilowatt
kN	=	kilonewton
kg	=	kilogram
t	=	ton (1 000 kg)
%	=	per cent
MN	=	meganewton
MN-m	=	meganewton-metre
PC Sum	=	Prime Cost Sum
Prov Sum	=	Provisional Sum

Remeasurable contract

MUNICIPAL INFRASTRUCTURE SUPPORT AGENT

MUNICIPAL INFRASTRUCTURE SUPPORT AGENT

REFERENCE NO.: MISA/VWWTWPS/FS/007/2026/27

REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS AND PUMP STATION IN VILLIERS/QALABOTJHA – PHASE 1 (MIG SCHEDULE 6B)

C2.2 SCHEDULE OF QUANTITIES

All items in the Bill of Quantities include all the resources, materials, tools and equipment as well as labour required to execute the work to completion.

Where the Scope of Work requires detailed drawings and designs from the Contractor or other information to be provided, all costs associated therewith are deemed to have been provided for and included in the unit rates and sum amounts tendered under such items.

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
1		SECTION 1: PRELIMINARY AND GENERAL				
1,1	SABS 1200 A	FIXED COST ITEMS				
1.1.1	8.3.1	Contractual Requirements	Sum	1,00		
	SABS 1200 AB	Establish facilities on site				
	8.3.2.1	a) Facilities for Engineer				
1.1.2	PSAB 1	Survey equipment	Sum	1,00		
		Resident Engineer: Accommodation	Prov Sum	1,00	50 000,00	50 000,00
		As-built data collection by professional surveyor	Prov Sum	1,00	35 000,00	35 000,00
1.1.3		One Contract Notice Board	Sum	1,00		
	8.3.2.2	b) Facilities for Contractor				
1.1.4		Offices and stores, workshop, housing, ablution- and latrine facilities, plant and tools	Sum	1,00		
1.1.5		Water supply, electrical power, reticulation of water and access to site	Sum	1,00		
1.1.6	PS 10	Conformity with RDP requirements	Sum	1,00		
1.1.7	8.3.3	Additional Fixed Cost liabilities (particulars to be supplied)				
		i)	Sum	1,00		
		ii)	Sum	1,00		
		iii)	Sum	1,00		
1.1.8	8.3.4	Removal of site facilities	Sum	1,00		
1.1.9		Allowance for OHS & Environmental management	Prov Sum	1,00	60 000,00	60 000,00
1.1.10		Allowance for Accredited Training	Prov Sum	1,00	50 000,00	50 000,00
1,2	8.4	TIME RELATED ITEMS				
1.2.1	8.4.1	Contractual Requirements	Sum	1,00		
	8.4.2	Operate and maintain facilities on site				
	8.4.2.1	a) Facilities for Engineer for duration of construction (SABS 1200 AB)				
1.2.2	PSAB 1	Survey equipment and survey assistant	Sum	1,00		
1.2.3	PSAB 1	One Contract Notice Board	Sum	1,00		
	8.4.2.2	b) Facilities for Contractor for duration of construction				
1.2.4		Offices and stores, workshop, housing, ablution- and latrine facilities, plant and equipment	Sum	1,00		
1.2.5		Water supply, electrical power, reticulation of water and access to site	Sum	1,00		
1.2.6	8.4.3	Construction Supervision for the duration of the contract	Sum	1,00		
1.2.7	8.4.4	Company and head office overhead costs	Sum	1,00		
1.2.8	PS 10	Conformity with RDP requirements	Sum	1,00		
1.2.9	8.4.5	Additional Time Related Items (particulars to be provided)	Sum	1,00		
		i)	Sum	1,00		
		ii)	Sum	1,00		
		iii)	Sum	1,00		
1.2.10		Allowance for WULA, EIA & Environmental management	Prov Sum	1,00	60 000,00	60 000,00
1,3		TEMPORARY WORK				

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
1.3.1	8.8.1	Construction and maintenance of all access roads and work for the duration of the contract	Sum	1,00		
1,4		CONTROL TESTING				
1.4.1		Preliminary Sum allowed for laboratory tests by an independent laboratory when required by the Engineer	Prov Sum	1,00	30 000,00	30 000,00
1.4.2		Percentage add on to Item 1.5.1 for overheads, administration and profit	%	30000,00		
1,5		CLO for duration of contract	Prov Sum	1,00	75 000,00	75 000,00
1,6		Preliminary Sum allowed for laboratory tests by an independent laboratory when required by the Engineer	Prov Sum	1,00	15 000,00	15 000,00
1,7		Percentage add on to Item 1.5&1,6 for overheads, administration and profit	%	90000,00		
TOTAL SECTION 1						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
2		SECTION 2: MECHANICAL WORKS WWTW				
2.1		REACTOR (Sub clause C4.21.1)				
2.1.1		Submissions of detailed drawings for the equipment below for balancing tank	sum	1,00		
		Supply and install vertical shaft, non-clogging mixers rated at 2.2 kW for use in the Pre-Anaerobic Reactor. Each mixer shall have a shaft length of approximately 4,200 mm and be suitable for operation in a water depth of 4,800 mm. See project specification for material construction requirements.	No	1,00		
2.1.2		Supply and install vertical shaft, non-clogging mixers rated at 4.0 kW for the Anaerobic Reactor. Each mixer shall have a shaft length of approximately 4,200 mm and be suitable for continuous operation in a water depth of 4,800 mm. See project specification for material construction requirements.	No	2,00		
2.1.3		Supply and install vertical shaft, non-clogging mixers rated at 5.5 kW for the Anoxic Reactor. Each mixer shall have a shaft length of approximately 4,200 mm. See project specification for material construction requirements.	No	4,00		
2.1.4		Supply and install low-speed, fixed surface aerators rated at 30 kW for the Aerated Reactor. Each unit shall operate at a maximum speed of 56 RPM and be equipped with Hansen gearboxes or equivalent/better. The water depth in the reactor is 4,500 mm, with a vertical distance of 1,500 mm from the top of the concrete slab to the water surface. Aerators shall be fitted with motors suitable for operation on variable speed drives (VSD). Speed control shall be integrated with the dissolved oxygen (DO) control system. See project specification for material construction requirements.	No	2,00		
2.1.5		Supply and install low-speed, fixed surface aerators rated at 22 kW for the Aerated Reactor. Each unit shall operate at a maximum speed of 56 RPM and be fitted with Hansen gearboxes or approved equivalent. The aerators shall be suitable for a water depth of 4,500 mm, with a vertical distance of 1,500 mm from the top of the concrete slab to the water surface. Motors shall be compatible with variable speed drives (VSD) for integration with the plant's dissolved oxygen (DO) control system. See project specification for material construction requirements.	No	2,00		

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
2.1.6		Supply and install three (3) axial flow pumps rated at 7.5 kW each — comprising two (2) duty units and one (1) standby. Pumps shall be suitable for continuous operation in wastewater conditions. The contractor shall verify all dimensions and alignment of the existing structure on site prior to fabrication. Any required modifications to ensure a proper fit and seal between the draft tube and existing structure shall be included in the scope of supply. Contractor to coordinate with the civil works team and submit detailed installation and interface drawings for approval prior to manufacture. See project specification for material construction requirements.	No	3,00		
2.2		PUMPS AND FITTINGS				
		Pipes: See project specification for steel pipes that contractor should comply with.				
2.2.1		REACTOR FEED PUMPS C4.21.9)				
2.2.1.1		Supply and install three (3) self-priming sewage pumps (Gorman-Rupp), each fitted with an 11-kW motor operating via star/delta starter. Pumps shall be arranged in a duty and standby configuration. See project specification for pump duty. Pumps and motors shall be mounted on a common fabricated base plate, complete with flexible couplings and all required mounting hardware. Supply to include 100 mm stainless steel pressure gauges with chemi-seals installed on the discharge line of each pump.	No	3,00		
2.2.1.2		Supply and install an electromagnetic flow meter, 150mmØ, Endress+Hauser Promag W 400 or approved equivalent. Provide all necessary materials and labor to cut into the existing pipework within the pump station, including installation of couplings or equivalent approved pipe fittings to ensure secure, leak-proof connections. Contractor shall verify pipe dimensions and conditions on site prior to installation and submit detailed installation drawings for approval.	No	1,00		
2.2.1.3		Supply and install Ultra-sonic level control system for stopping and starting of the pumps.	sum	1,00		
2.2.2		RAS PUMPS SITUATED IN PLANT MAIN PUMP STATION (C4.21.10)				
2.2.2.1		RAS PUMPS: Supply and install two (2) self-priming sewage pumps (Gorman-Rupp), each fitted with an 11-kW motor operating via star/delta starter. Pumps shall be arranged in a duty and standby configuration. See project specification for pump duty. Pumps and motors shall be mounted on a common fabricated base plate, complete with flexible couplings and all required mounting hardware. Supply to include 100mm stainless steel pressure gauges with chemi-seals installed on the discharge line of each pump.	No	2,00		

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
2.2.2.2		Supply and install an electromagnetic flow meter, 150mmØ, Endress+Hauser Promag W 400 or approved equivalent. Provide all necessary materials and labor to cut into the existing pipework within the pump station, including installation of couplings or equivalent approved pipe fittings to ensure secure, leak-proof connections. Contractor shall verify pipe dimensions and conditions on site prior to installation and submit detailed installation drawings for approval.	No	1,00		
2.2.2.3		Supply and install Ultra-sonic level control system for stopping and starting of the pumps.	No	1,00		
2.2.3		WAS PUMPS (Sub clause C4.21.11)				
2.2.3.1		WAS PUMPS: Supply and install two (2) self-priming sewage pumps (Gorman-Rupp or approved equivalent), each fitted with a 7,5kW motor operating via DOL starter. Pumps shall be arranged in a duty and standby configuration. See project specification for pump duty. Pumps and motors shall be mounted on a common fabricated base plate, complete with flexible couplings and all required mounting hardware. Supply to include 100mm stainless steel pressure gauges with chemi-seals installed on the discharge line of each pump.	No	2,00		
2.2.3.2		Supply and install an electromagnetic flow meter, 150mmØ, Endress+Hauser Promag W 400 or approved equivalent. Provide all necessary materials and labor to cut into the existing pipework within the pump station, including installation of couplings or equivalent approved pipe fittings to ensure secure, leak-proof connections. Contractor shall verify pipe dimensions and conditions on site prior to installation and submit detailed installation drawings for approval.	No	1,00		
2.2.3.3		Supply and install Ultra-sonic level control system for stopping and starting of the pumps.	No	1,00		
2.2.3.4		Commissioning of this pump station in separate visit	No	1,00		
2.2.4		BIOFILTER RECYCLE PUMPS (Sub clause C4.21.12)				
2.2.4.1		Biofilter Recycle Pumps: Supply and install two (2) self-priming sewage pumps (Gorman-Rupp), each fitted with an 15kW motor operating via star/delta starter. Pumps shall be arranged in a duty and standby configuration. See project specification for pump duty. Pumps and motors shall be mounted on a common fabricated base plate, complete with flexible couplings and all required mounting hardware. Supply to include 100mm stainless steel pressure gauges with chemi-seals installed on the discharge line of each pump.	No	2,00		

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
2.2.4.2		Supply and install an electromagnetic flow meter, 150mmØ, Endress+Hauser Promag W 400 or approved equivalent. Provide all necessary materials and labor to cut into the existing pipework within the pump station, including installation of couplings or equivalent approved pipe fittings to ensure secure, leak-proof connections. Contractor shall verify pipe dimensions and conditions on site prior to installation and submit detailed installation drawings for approval.	No	1,00		
2.2.4.3		Supply and install Ultra-sonic level control system for stopping and starting of the pumps.	No	1,00		
2.2.5		ANOXIC RETURN PUMPS (Sub clause C4.21.13)				
2.2.5.1		ANOXIC RETURN PUMPS: Supply and install two (2) self-priming sewage pumps (Gorman-Rupp or approved equivalent), each fitted with a 7.5kW motor operating via DOL starter. Pumps shall be arranged in a duty and standby configuration. See project specification for pump duty. Pumps and motors shall be mounted on a common fabricated base plate, complete with flexible couplings and all required mounting hardware. Supply to include 100mm stainless steel pressure gauges with chemi-seals installed on the discharge line of each pump.	No	2,00		
2.2.5.2		Supply and install an electromagnetic flow meter, 150mmØ, Endress+Hauser Promag W 400 or approved equivalent. Provide all necessary materials and labor to cut into the existing pipework within the pump station, including installation of couplings or equivalent approved pipe fittings to ensure secure, leak-proof connections. Contractor shall verify pipe dimensions and conditions on site prior to installation and submit detailed installation drawings for approval.	No	1,00		
2.2.5.3		Supply and install Ultra-sonic level control system for stopping and starting of the pumps.	No	1,00		
2.2.6		CLEAR WATER PUMPS (Sub clause C4.21.14)				
2.2.6.1		CLEAR WATER PUMPS: Supply and install two (2) self-priming sewage pumps (Gorman-Rupp or approved equivalent), each fitted with an 11kW motor operating via Star/Delta starter. Pumps shall be arranged in a duty and standby configuration. See project specification for pump duty. Pumps and motors shall be mounted on a common fabricated base plate, complete with flexible couplings and all required mounting hardware. Supply to include 100mm stainless steel pressure gauges with chemi-seals installed on the discharge line of each pump.	No	2,00		

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
2.2.6.2		Supply and install an electromagnetic flow meter, 150mmØ, Endress+Hauser Promag W 400 or approved equivalent. Provide all necessary materials and labor to cut into the existing pipework within the pump station, including installation of couplings or equivalent approved pipe fittings to ensure secure, leak-proof connections. Contractor shall verify pipe dimensions and conditions on site prior to installation and submit detailed installation drawings for approval.	No	1,00		
2.2.6.3		Supply and install Ultra-sonic level control system for stopping and starting of the pumps.	No	1,00		
2.2.6.4		Commissioning of the works (All structures) in separate visit	No	1,00		
2.2.7		SMALL DRAINAGE PUMPS				
2.2.7.1		Submersible stainless-steel pumps, 1.5 kW duty 2 m3/h at 10m. Price shall include a reliable level control unit that shall stop and start the pumps.	sum	2,00		
2.2.7.2		40mm outlet stainless steel 304 piping, total length 18m with flanges, 4x 90 deg elbows, non-return valves and isolation RSV gate valves, fully installed with all necessary brackets.	sum	1,00		
2.3		CLARIFIERS (Sub clause C4.22.1)				
2.8.1		Service and refurbishment of the Peripheral driven clarifier bridge according to project specification.	No	1,00		
2.8.2		Replacement of clarifier drive motor (0.75kW)	No	1,00		
2.4		CHLORINATION (Sub clause C4.23)				
2.4.1		Remove old chlorine dosing equipment without interrupting the treatment plant. Include for temporary connections or staged work to minimise interruption to < 8 hours. Removed equipment to be delivered to client store (30km)	Sum	1,00		
2.4.2		Pigtails for 68 kg cylinders including gas	No	6,00		
2.4.3		Header pipe, vacuum regulator and condensate trap for a bank of 3 cylinders, incl manifold and trap heaters 220V	Sets	2,00		
2.4.4		Automatic change over panel	Sum	1,00		
2.4.5		Chlorine dosing units (duty and standby) that stop /start automatically (0-3 kg/h & 4kW motors). 4 cylinders on duty, 4 standbys, incl racking and chains	Sum	1,00		
2.4.6		All gas pressure and vacuum piping from changeover panel to chlorinator unit and injector including all fittings	Sum	1,00		
2.4.7		Chlorine solution piping from injector to point of application including all fittings and spray bar	Sum	1,00		
2.4.8		Air actuated cylinder valve closure system including all air piping and compressor plus controls. Air shall be supplied from the DAF compressors	Sum	1,00		
2.4.9		All chlorine piping supports	Sum	1,00		
2.4.10		Chlorine dosing room vent fans	Sum	1,00		

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
2.4.11		Safety signage	Sum	1,00		
2.4.12		Cylinder trolley	No	1,00		
2.4.13		Protective clothing (2 sets)	Sum	1,00		
2.4.14		Platform scales for cylinders	No	2,00		
2.4.15		Chlorine booster water pumps	No	2,00		
2.4.16		Suction and delivery pipework for chlorine booster water pumps to chlorine ejector, including puddle pipe for clear well connection, incl all booster water piping, pressure gauges, strainers, valves	Sum	1,00		
2.4.17		Chloring leak detection equipment with two sensors, outside siren and strobe.	Sum	1,00		
2.4.18		Ventilation fans with outside weatherproof switches mounted at door	Sum	1,00		
2.4.19		Safety shower and plumbing	Sum	1,00		
2.4.20		Special tools, spare lead washers and gas masks with 4 spare cannisters all in wall mount cabinet	Sum	1,00		
2.4.21		GRP wind direction indicator with s/s wall mount bracket	Sum	1,00		
2.4.22		Corrosion protection and painting of all equipment	Sum	1,00		
2.5		EXISTING BIOFILTER (Sub clause C4.24)				
2.5.1		Allow for the replacement of existing overhead spreader arms and allow for the supply, installation and commissioning of rotating self-propelled overhead spreader arms by specialists (Provisional sum)	Prov Sum	1,00	150 000,00	150 000,00
2.6		INLETWORKS (Sub clause C4.25.1)				
2.6.1		Supply, delivery, removal of existing unit, and installation of a new Channel Auger suitable for 4.5 ML/day flow capacity. Equipment to be installed in the existing concrete inlet works canal. Includes connection to existing power/control systems, alignment with existing flow channels, and commissioning.	Sum	1,00		
2.6.2		Supply, delivery, removal of existing unit, and installation of a new Degritter system for grit removal from incoming raw sewage. Unit to be fitted into existing concrete cone-shaped degritter structure. Includes interfacing with existing inlet/outlet pipework, integration with existing electrical/control infrastructure, and full testing and commissioning	Sum	1,00		
2.6.3		Supply, delivery, removal of existing unit, and installation of a new Grinder unit for Mechanical Screen to reduce solids in screened wastewater. Installation within the existing inlet works, including all necessary mechanical and electrical connections. To be compatible with upstream mechanical screen and downstream conveying equipment. Includes testing and commissioning.	Sum	1,00		

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
2.6.4		Supply, delivery, removal of existing unit, and installation of a new Grit Classifier for separation and dewatering of grit collected in the degritting process. To be installed adjacent to or within existing grit handling area, with all mechanical supports, electrical connections, and control interfaces included. Includes testing and commissioning	Sum	1,00		
TOTAL SECTION 2						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
3		SECTION 3: INSTRUMENTS AND ELECTRICAL				
3.1		NEW MAIN LOW VOLTAGE KIOSK NEW LV KIOSK 1				
		Supply and install new LV Kiosk complete with equipment, concrete foundation and earth spike.				
		Refer to single line diagram EE1877-SLD04				
3.1.1		New Kiosk 1 complete as specified. See drawing for specifications				
		Supply & install	No	1,00		
3.1.2		METERS				
		Supply and install kVA/kWh electronic Kamstrup Omni power CT meter complete CT's and test block in the Kiosk 1.				
3.1.2.1		Kamstrup Omni power CT complete as specified.				
		Supply Install	No	1,00		
3.2		NEW MCC DISTRIBUTION PANELS				
3.2.1		NEW MCC 01 - INLET WORKS				
		Supply and install new MCC 01 at the inlet works complete as specified. See drawing for specifications				
		Refer to single line diagram EE1877-SLD02				
		New MCC 01 complete as specified: see drawing for specifications				
		Supply install	No	1,00		
3.2.2		NEW MCC 02 - BALANCING PUMPS				
		Supply and install new MCC 02 in the balancing Pump Station complete as specified.				
		Refer to single line diagram EE1877-SLD03				
		New MCC 02 complete as specified: see drawing for specifications				
		supply Install	No	1,00		
3.3		NEW MCC 03 - RECIRCULATION PUMP STATION				
		Supply and install new MCC 03 in the Recirculation Pump Station complete as specified.				
		Refer to single line diagram EE1877-SLD01				
3.3.1		New MCC 03 complete as specified: see drawing for specifications				
		supply Install	No	1,00		
3.4		NEW MCC 04 - CHLORINE DOSING				
		Supply and install new MCC 04 in the Chlorine Dosing room complete as specified.				
		Refer to single line diagram EE1877-SLD04				
3.4.1		New MCC 04 complete as specified: see drawing for specifications				
		supply Install	No	1,00		
3.5		REMOVAL OF THE EXISTING MCC'S				
		Removal of the existing MCC's on site at the Villiers WWTW.				
		Refer to Annexure/Drawings				
3.5.1		Removal of the existing MCC's				
		Remove and store on site	No	4,00		

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
3.6		EMERGENCY STOP BOX				
		Supply and install emergency stop box on stainless steel pedestal to connect PVC/SWA/PVC cables including button near motor sets.				
		Refer to Annexure B				
3.6.1		Motor Equipment				
		supply Install	No	23,00		
3.7		METERS AND INDICATORS				
3.7.1		Ultra Sonic Level indicator complete				
		supply Install	No	1,00		
3.7.2		Electro Magnetic Flow Meter complete				
		supply Install	No	6,00		
3.8		LV CABLE RETICULATION				
		Refer to Annexure A				
3.8.1		120mm² PVC SWA PVC Copper 4-core cables in sleeves/trays/trenches.				
		Supply & Install	m	170,00		
3.8.2		Cable terminations for 120mm² PVC SWA PVC Copper 4-core cables including connection into panel.				
		Supply & Install	No	4,00		
3.8.3		95mm² PVC SWA PVC Copper 4-core cables in sleeves/trays/trenches.				
		Supply & Install	m	80,00		
3.8.4		Cable terminations for 95mm² PVC SWA PVC Copper 4-core cables including connection into panel.				
		Supply & Install	No	4,00		
3.8.5		35mm² PVC SWA PVC Copper 4-core cables in sleeves/trays/trenches.				
		Supply & Install	m	140,00		
3.8.6		Cable terminations for 35mm² PVC SWA PVC Copper 4-core cables including connection into panel.				
		Supply & Install	No	2,00		
3.8.7		25mm² PVC SWA PVC Copper 4-core cables in sleeves/trays/trenches.				
		Supply & Install	m	170,00		
3.8.8		Cable terminations for 25mm² PVC SWA PVC Copper 4-core cables including connection into panel.				
		Supply & Install	No	2,00		
3.8.9		16mm² PVC SWA PVC Copper 4-core cables in sleeves/trays/trenches.				
		Supply & Install	m	550,00		
3.8.10		Cable terminations for 16mm² PVC SWA PVC Copper 4-core cables including connection into panel.				
		Supply & Install	No	29,00		
3.8.11		6mm² PVC SWA PVC Copper 4-core cables in sleeves/trays/trenches.				

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		Supply & Install	m	280,00		
		Sub clause C4-12.2.1.14)				
3.8.12		Cable terminations for 6mm² PVC SWA PVC Copper 4-core cables including connection into panel.				
		Supply & Install	No	10,00		
3.8.13		4mm² PVC SWA PVC Copper 4-core cables in sleeves/trays/trenches.				
		Supply & Install	m	825,00		
3.8.14		Cable terminations for 4mm² PVC SWA PVC Copper 4-core cables including connection into panel.				
		Supply & Install	No	38,00		
3.8.15		2,5mm² 4-core Surfix BLACK in sleeves/trays for Emergency Stops				
		Supply & Install	m	1600,00		
3.8.16		Cable terminations for 2,5mm² Surfix 4-core cables in panel and E/S.				
		Supply & Install	No	37,00		
3.9		EARTH CONDUCTORS				
		Supply, install and connect LV cable earthing to MCC and Connection boxes in accordance with the specification using Insulated Standed Copper Earth Wire				
3.9.1		95mm² BCEW				
		Supply & Install	m	100,00		
3.9.2		35mm² BCEW				
		Supply & Install	m	140,00		
3.9.3		25mm² BCEW				
		Supply & Install	m	100,00		
3.9.4		16mm² BCEW				
		Supply & Install	m	160,00		
3.9.5		16mm² Insulated				
		Supply & Install	m	390,00		
3.9.6		6mm² Insulated				
		Supply & Install	m	280,00		
3.9.7		4mm² Insulated				
		Supply & Install	m	825,00		
3.10		CABLE TRENCHES & SLEEVES				
3.10.1		Excavations, 750mm deep, 450mm wide,Back fill, compact and make good of earth trenches.				
3.10.1.1		Soft material	m³	800,00		
3.10.1.2		Soft Rock (pickable)	m³			Rate Only
3.10.1.3		Rock	m³			Rate Only
3.10.2		Imported Bedding				
		Supply & Install	m³	29,00		
3.10.3		PVC Danger Tape				
		Supply & Install	m	1000,00		
3.10.4		110mm Diameter flexible electrical sleeves				
		Supply & Install	m	100,00		
3.10.5		50mm Diameter flexible electrical sleeves				

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		Supply & Install	m	100,00		
3.11		CABLE LADDERS, CABLE TRAYS AND WIRE MESH				
3.11.1		Hot-dip galvanized 400mm wide, 75mm high wire mesh, 5mm dia. wire installed against the floor/walls and supporting structure.				
		Supply & Install	m	40,00		
3.11.2		Hot-dip galvanized 200mm wide, 75mm high wire mesh, 5mm dia. wire installed against the floor/walls and supporting structure.				
		Supply & Install	m	50,00		
3.11.3		Hot-dip galvanized 100mm wide, 75mm high wire mesh, 5mm dia. wire installed against the floor/walls and supporting structure.				
		Supply & Install	m	150,00		
3.11.4		Hot-dip galvanized 50mm wide, 50mm high wire mesh, 4mm dia. wire installed against the floor/walls and supporting structure.				
		Supply & Install	m	100,00		
3.11.5		Pre-galvanized 76,2mm x 76,2mm channel complete with pre-galvanized cover.				
		Supply & Install	m	20,00		
3.12		25M SCISSOR MASTS - SITE LIGHTING				
		Supply, deliver to site, erection and commissioning of 25m Scissor mast complete as specified.				
3.12.1		25m Scissor mast complete with earthing DB, splitter box, maintenance kit, internal wiring and bracket for 8 x floodlights.				
		Supply & Install	No	1,00		
3.12.2		25MPa Concrete plinth with re-inforced steel complete as per the mast supplier's specifications. Allow for professional registered structural engineer to inspect and sign-off on the steel and provide lab test results for the concrete.				
		Supply & Install	No	1,00		
3.12.3		BEKA OmniBlast-1E-MIDI 412W Optic 5356 LED floodlights				
		Supply & Install	No	8,00		
3.13		BUILDING ELECTRICAL INSTALLATION				
3.13.1		20mm PVC conduit with saddles				
		Supply & Install	m	250,00		
3.13.2		2,5mm² Copper PVC insulated house wire				
		Supply & Install	m	750,00		
3.13.3		2,5mm² Copper PVC insulated earth wire				
		Supply & Install	m	375,00		
3.13.4		6mm² Copper PVC insulated house wire				
		Supply & Install	m	30,00		
3.13.5		4mm² Copper PVC insulated earth wire				
		Supply & Install	m	15,00		
3.13.6		1L/1W 16Amp Light switch in wallbox with steel cover.				
		Supply & Install	No	10,00		

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
3.13.7		16Amp Socket outlet, 1 x 3-pin + 1 x Euro in wallbox with steel cover.				
		Supply & Install	No	10,00		
3.13.8		20Amp IP65 Lockable isolator.				
		Supply & Install	No	4,00		
3.13.9		20Amp Double Pole isolator in wallbox with steel cover.				
		Supply & Install	No	4,00		
3.13.10		32Amp Double Pole isolator in wallbox with steel cover.				
		Supply & Install	No	1,00		
3.13.11		5Amp Unswitched Socket with PVC roundbox.				
		Supply & Install	No	10,00		
3.13.12		Photocell in PVC box with clear cover.				
		Supply & Install	No	1,00		
3.13.13		1200mm Vapour proof, IP65, 220V LED luminaire complete with 2 x 20W LED, 4000K lamps.				
		Supply & Install	No	24,00		
3.13.14		Round cheese cake LED 20W 220V 4000K bulkhead luminaires.				
		Supply & Install	No	4,00		
3.13.15		Round IP65 LED 20W 220V bulkhead with black trim ring.				
		Supply & Install	No	10,00		
3.13.16		Earthing and Bonding to comply with SANS10142-1	Sum	1,00		
3.14		SITE TESTING AND COMMISSIONING				
3.14.1		Site testing and commissioning of new installation and provide valid COC's for each Kiosk/DB/MCC.	Sum	1,00		
3.15		ANY ITEM(S) NOT SPECIFICALLY MENTIONED IN THESE SCHEDULES AND REQUIRED TO COMPLETE THE FULL SCOPE OF WORKS.				
		Tenderer to specify:				
3.15.2		Instillation of 500KVA Transformer supplied by client according to specification	Sum	1		
3.16		ELECTRICAL CONNECTION				
		Supply and install the incomer cable (4 core Aluminium 150 mm thick) from Transformer to the main panel including the meter box as per local Authority (specification), That will carry the load of 800 A	m	150,00		
		Supply & Install Solar powered 4 x Cameras (4MP AcusENSE IR40m 2,8mm IP67) WITH WIFI (Subscription 12 Month) signal at the wastewater Plant mounted on a 25m pole with two cameras pointing in strategic direction to protect staff and equipment. The repeater is to guarantee good WIFI signal for the cameras at the plant.	Sum	1,00		
TOTAL SECTION 3						

SUMMARY SCHEDULE OF QUANTITIES

SUB-TOTAL	DESCRIPTION	AMOUNT
1	Preliminary And General	
2	Mechanical Works WWTW	
3	Instruments and Electrical	
SUB-TOTAL		
15% VAT		
TOTAL TO BE CARRIED TO THE FORM OF OFFER AND ACCEPTANCE		

PART C3: SCOPE OF WORK

Index

PART C3: SCOPE OF WORK

C3.1 DESCRIPTION OF THE WORKS AND SERVICES

C3.1.1 Employers objectives

The project aim is to assist the Mafube Local Municipality with the implementation of a wastewater treatment works. MISA aims to appoint a suitable contractor to implement the above project.

C3.1.2 Background

Mafube Local Municipality is a Category B municipality situated within the Fezile Dabi District in the Free State Province of the Republic of South Africa.

The municipality plans to implement a wastewater treatment project commencing from the 2025/26 financial year (FY). Funding has been obtained by MIG for the Implementation.

C3.1.3 Overview of Scope of Works

This Phase of the Works entails the Refurbishment of the Qalabotjha WWTW by Installing the Electrical Components to the works-activated-sludge process" designed to treat the effluent to the prescribed DWA special standard to be released back to the Vaal River and combining Villiers and the industrial area with the Qalabotjha works. The refurbishment work will be done through two phases, and this tender is for the first phase funded through MIG Schedule 6B.

The scope of work in this tender for the **Phase 1** entails:

- The installation of Electrical and Mechanical components to the works(structures)
- New pumps at the recirculation pumping station at Qalabotjha WWTW
- Laying of Electrical cables,
- MCC PANELS
- Installation of NEW 500 Kva Transformer in WWTW

See (3.1.14 ENGINEERING) Below for full scope of works

- Project Implementation Plan
- Testing and Commissioning of installed meters (provide the test certification)
- Operation and Maintenance Manuals
- Training of Municipal Water and Sanitation staff
- As-Built Drawings
- Close out report

C3.1.4 Deliverables

a) All contractual obligations

b) Monthly progress reports

c) Project Implementation Strategy

d) Project Implementation Plan

e) Testing and Commissioning Reports and Certification

f) Operation and Maintenance Manuals
g) Trained Municipal Water and Sanitation staff
h) As-Built Drawings
i) Close out report

C3.1.5 Legislative Requirements

The contractor must conduct due diligence and will be responsible for obtaining all the required authorisations from the relevant authorities, not limited to the following, where the need may arise.

- General Authorisation (DWS)
- Environmental Scoping report
- Environmental Impact Assessment (if required)
- Any 'wayleaves' required (Local Municipality, SANRAL, etc.)
- Any Servitude requirements (Local municipality or Private)

C3.1.6 Location of the works

a) Municipal Locality Plan

The locality of the target area is shown in Figure 1,

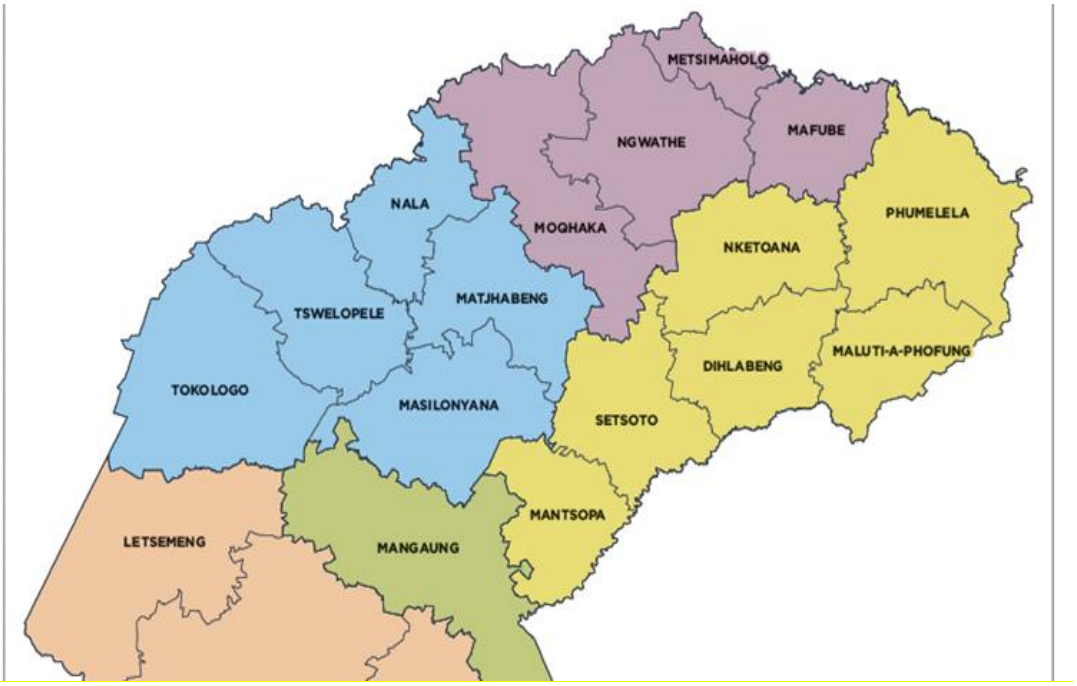
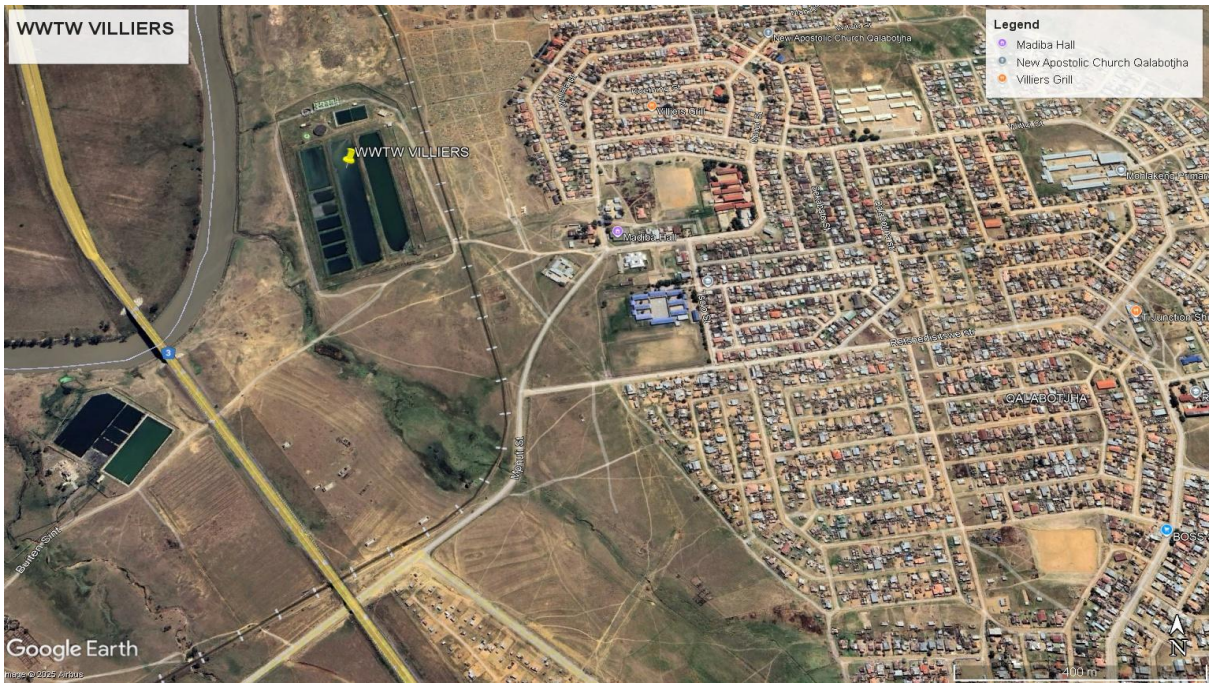


Figure 1: Mafube Local Municipality Locality Map

Further information pertaining the table above will be provided during the Briefing Session.

a) Map Showing WWTW Positions



C3.1.7 Time Frames

The estimated timeframe for completion of all the activities as described herein the C3: Scope of works is **Ten (10)** calendar months from the date of start of work.

C3.1.8 Project Management Structures

The Contractor will work strictly under the Project Management Team (PMT) led by the MISA Provincial Manager.

All other administrative-related issues will be managed by MISA. Payment certificates will be submitted to the MISA National Office in Pretoria through the MISA Provincial Manager after approval of completed works.

Progress reporting will be required per the payment certificate and should reflect progress on-site.

The role of Mafube Local Municipality will include:

a) Nominate a project technical official to be part of the project team
b) Assist in the identification of relevant officials to be trained for the Operation and maintenance of the asset produced by this project.
c) Acceptance of the asset to be produced by this project at the handover stage and include it in the asset register.
d) Budget for the operation and maintenance of the asset
e) Operate and maintain the asset
f) Mobilise the beneficiary communities for participation in the project implementation process
g) Assist in the appointment of a social facilitation structure, such as the Project Steering Committee and the Project Liaison Officer

C3.1.9 Facilities and Equipment to Be Provided by The Employer

The Employer shall provide no facility or equipment.

C.3.1.10 Facilities and Equipment to Be Provided by The Contractor

The contractor shall provide all equipment and facilities required to provide the services relating to the successful completion of the project.

C.3.1.11 Measure and payment

The P&Gs are to cover scheduled time-related items, scheduled fixed-charge and value-related items, and all compliance with the legislated OHS Act Requirements for the duration of the contract commencing from the date the Contractor establishes the site in line with the contract and terminating on the date of the final inspection of the Works. Furthermore, the Contractor will maintain all relevant information of workers and visitors to facilitate effective contact tracing, when required.

The P&Gs are also to include full compensation at the Service Provider's costs to provide a monthly stipend to the Community Liaison Officer (CLO) of R7,500 monthly and monthly airtime of R500 to complete all responsibilities required for the successful completion of the project. Additionally, this pay item will include full compensation for all PSC members to attend meetings for the duration of the contract at R200 per sitting per month.

C.3.1.12 Temporary Works

The rate shall cover all costs pertaining to the provision, erection, moving, re-erection and maintenance of all temporary barricades, temporary connections and terminations, signs, lights, flagmen, etc. as required, for the guarding and protection of the works, for the construction, trenching and backfilling, as well as for the later removal or the cleaning and tidying up thereof,

The rate shall also cover for making the necessary network arrangements and arrangements with regard to the moving and/or re-connection of existing cables and connections, as well as all other costs to accommodate the existing customers during construction.

C3.2 MANAGEMENT

C3.2.1 General

The Contractor shall:

a) Provide a fortnightly progress report covering the Scope of Work.

b) Be required to participate in regular progress meetings with the client and other stakeholders.

C3.2.2 Health and Safety

The Contractor shall manage health and safety in accordance with the latest edition of the MISA Occupational Health and Safety Specification for Construction Works Contracts.

C3.2.3 Completion strategy

a) The Contractor shall develop a completion strategy to minimise the correction of defects after Completion and to achieve Completion on or before the Completion Date. Such a strategy shall include a systematic approach to ensuring that employees and subcontractors search for defects as the work progresses, and programme their work in such a manner that defects are corrected ahead of Completion and sufficient time is allowed for commissioning.

b) The completion strategy should be framed around the systematic acceptance and / or testing of materials, plant, workmanship and subsystems as the works proceed in order to address issues ahead of completion and the allocation of tasks to ensure satisfactory completion.

C3.2.4 Programme

The additional information to be shown on the programme are the dates for submission of end of stage deliverables associated with the latest edition of the National Treasury Standard for Infrastructure Procurement and Delivery Management.

C3.2.5 Socio Economic Reporting

Reporting for this project will be done on a bi-weekly basis to the client's representative.

C3.2.6 Communications

All communications with the Employer which are made in terms of the contract should be made using the standard templates provided by MISA.

C3.2.7 Invoices

Invoices submitted shall be Tax invoices. The invoice shall comply with requirements, if any, established by the Employer.

Detailed payment certificates, clearly indicating progress on payment items shall be submitted for approval before any invoice shall be issued. Separate payment certificates shall be submitted for the engineering and construction deliverables. Payment will be according to actual verified progress.

MISA's Policy to process the Tax Invoice within 30 days of the approved submission.

C3.3 EXECUTIVE OVERVIEW SCOPE OF ELECTRICAL WORKS

The project comprises the following:

a) New Electrical Connection

The existing electrical connection has been vandalized. During the project, an application need to be issued to Rural Free State to supply and install a new 500kVA transformer with metering kiosk.

b) New Distribution Kiosk

Supply and install a new outdoor low voltage distribution kiosk complete with concrete plinth, equipment and with supply cables from the municipal connection point. See single line diagram EE1877-SLD04.

c) Inletworks

- Provide new MCC1 as per single line diagram **EE**1877-SLD02.
- Provide power and control cabling between the MCC and the new pumps and equipment.

d) Balancing Pump Station

- Provide new MCC2 as per single line diagram **EE**1877-SLD03.
- Provide power and control cabling between the MCC and the new pumps and equipment.

e) Chlorine Dosing

- Provide new MCC4 as per single line diagram EE1877-SLD04.
- Provide power and control cabling between the MCC and the new pumps and equipment.

f) Electrical Installation

- Provide complete new electrical installation for the buildings.

C3.3.1 Employer's objectives and purpose of the works

The Employer plans to upgrade the Treatment Works.

C3.3.1.1 Interpretation and terminology

The following abbreviations are used in this Works Information:

Abbreviation	Meaning given to the abbreviation
AFC	Approved for construction
PLC	Programmable Logic Controller
MCC	Motor Control Centre
CT	Current transformer
SCADA	SupeNision, Control and Data Acquisition

C3.3.2 ENGINEERING AND THE CONSTRUCTION 'S DESIGN

***C3.3.2.1 Employer's* design**

The Employers' design is limited to the following:

- Single line diagrams.
- Layout of buildings and equipment

C3.3.2.2 Parts of the *works* which the *Contractor* is to design

The Contractor is responsible for the detail design of the following:

- MCC's
- Basic motor control

C3.3.2.3 Procedure for submission and acceptance of *Contractor's* design

The Contractor shall as a minimum submit the following for approval:

- Dimensional drawings showing the dimensions of equipment supplied by the contractor.
- Wiring diagrams of the MCC's.
- Schematic layouts of the control system.

C3.3.2.4 As-built drawings, operating manuals and maintenance schedules

Three copies of the complete instruction manuals inclusive of all drawings for the operation and maintenance of the equipment shall be handed over to the Engineer.

Two memory sticks containing the following shall also be handed over to the Engineer:

- A soft copy of the complete instruction manual and drawings
- Setting files for all relays and meters
- Relay and meter software for communication to the relays and meters.

C3.3.3 PROCUREMENT

C3.3.3.1 People

Minimum requirements of people employed on the Site Refer to main contract documents.

BBBEE and preferencing scheme Refer to main contract documents.

Subcontracting

Mandatory manufacturers

Equipment and material to comply with the specifications and need to be presented to the Engineer for approval.

C.3.3.3.2 Sub-contractors

The Contractor shall not be permitted to cede or assign the Contract or any part thereof without the prior written approval from the Engineer.

- The Contractor shall not enter any sub-contract without the prior approval from the Employer, which approval shall not unreasonably be withheld. The sub-contractor, in respect of whom approval is so granted and his/her employees or workmen, shall for all the intentions and purposes of the Contract, be deemed to be workmen of the Contractor
- Approval given in terms of subcontracting shall not relieve the Contractor of any responsibilities, duty and or obligations imposed upon him by the Contract, and the Contractor shall in particular be and remain to be solely liable and responsible for all acts, omissions, negligence or breaches of contract on the part of the assignee or any of his/her employees, and for all acts, omissions or negligence of any sub-contractor or any of his/her employees.

Plant and Materials

Quality

Only new, good quality materials shall be used and where applicable materials must comply with the specifications of the South African Bureau of Standards or the British Standards Specifications. Wherever possible S.A. manufactured materials must be used

C3.3.3.3 Plant & Materials provided "free issue" by the *Employer*

The Employer will not provide any plant or equipment.

The existing installed equipment, removed by the Contractor, must be delivered to the Employer's dedicated store area.

C3.3.3.4 Spares and consumables

Spare parts as detailed in Section 6 of this Works Information will be supplied.

C3.3.3.5 Tests and inspections before delivery

The whole of the materials used in the Project shall be subject to such inspection and test at the manufacturer's works as prescribed in the appropriate material standards required in the specific clauses of the Contract or the Engineer may direct from time to time as the work proceeds.

The manufacturer shall perform all tests as prescribed by IEC or other standards applicable to the equipment. In addition to these tests the manufacturer shall perform the tests specified in the manufacturer's own factory standard for quality control.

The Engineer reserves the right to witness any or all tests and the Contractor shall inform the Engineer at least 7 days in advance of any tests which will be performed.

The cost of such inspection and tests, including the provision and use of test equipment, with a quantified number of visits by the Engineer shall be included in the Tender Price.

If, due to the Contract work and/or component materials not complying with this specification, further tests are necessary, the Contractor shall pay all additional costs which may be incurred in re-testing.

The approval by the Engineer of the results of such inspection and tests shall not relieve the Contractor of his obligations under the Contract for the satisfactory performance of the plant and materials.

During the execution of the Contract, test specimens, if required by the Engineer, shall be taken from the materials for the purpose of check tests or analyses by Independent Authorities. Such specimens shall be prepared for testing and forwarded at the expense of the Contractor to the Testing Authorities selected by the Engineer.

The Contractor shall deliver to the Engineer three copies of the test certificates covering all tests. In case the original certificate is not in the English language, three copies of a translation into English of the certificate plus one copy in the original language shall be delivered to the Engineer.

As a minimum, Factory Acceptance Tests shall be performed on the following:

- MCC's
- Miniature substation

C3.3.4 CONSTRUCTION

C3.3.4.1 Temporary works, Site services & construction constraints

C3.3.4.1.1 Employer's Site entry and security control, permits, and Site regulations.

No restriction on access to the site shall be placed on persons involved with the construction of the Works, but personnel must comply with the security and safety requirements of MAFUBE Local Municipality.

Movement on the Site must be limited to construction areas to prevent unnecessary damage to the environment or existing services. The making good of any damage caused by non-observance of such restrictions will be for the Contractor's account. MAFUBE Local Municipality may issue identification cards to the Contractor's staff at its own cost. These ID cards must be worn on the person at all times when he/she is on Site. The Contractor must keep the Employer informed of staff changes. The Contractor must ensure that each ID card issued, is returned to the Employer.

Movement within the Site of Works is restricted to existing roads and actual construction areas to prevent unnecessary damage to the environment, existing services, structures, trees and where practical to the gardens. The making good of any damage caused by non-observance of such restrictions will be for the Contractor's account.

Any vehicle used to transport and/or equipment on Site, shall not exceed the maximum permissible axles loading as allowed under the Provincial regulations

C3.3.4.1.2 Restrictions to access on Site, roads, walkways and barricades

All deliveries that will obstruct portions of the roadways or public routes for any period of time are to be restricted to a minimum. No queuing of delivery vehicles will be permitted on any part of the route to the project site. All logistics affecting operations are to be approved by the relevant Local Municipality Managers.

C3.3.4.1.3 People restrictions on Site; hours of work, conduct and records

Contractors are limited to their actual site establishment areas and places of work and under no circumstances will materials, equipment, tools, cooking or any other disturbance be allowed in public areas

Contractor's employees are to be clearly identifiable.

C3.3.4.1.4 Title to materials from demolition and excavation

The Contractor has no title to materials from demolition and excavations.

C3.3.4.1.5 Cooperating with and obtaining acceptance of Others

The Employer has various contracts in progress and the Contractor may be required to adjust his program and activities to coordinate with others.

C3.3.4.1.6 Contractor's Equipment

The Contractor shall as part of his reporting includes a list of Contractors Equipment and material on site. The list shall include Registration numbers, serial numbers, whether it is rented with the provider's details.

C3.3.4.1.7 Site services and facilities

The site as detailed on the drawings will be available to the Contractor for the execution the Works. Limited power and water will be available. The Contractor will be responsible for his own waste disposal. The Contractor shall be responsible for the supply on site of his own telephone or cellular phone.

Existing cable trenches and cable ladders and trays are to be utilized for cable routes where possible. The Contractor is to open cable trenches and include the cost in his rates. All cable trench covers are to be returned to their positions, all covers damaged or broken by the Contractor is to be replace by the contractor at his costs. All cable trays and ladders are to be tidied after cable installation.

C3.3.4.1.8 Facilities provided by the *Contractor*

The Contractor shall erect and maintain at his costs his own covered storage and office that he may require. The yard shall be fenced by the Contractor and maintenance of the yard will be his responsibility. The yard shall be kept in a clean and tidy condition at all times to the satisfaction of the Engineer. On completion of the Project, all structures and installations shall be removed from site, to the satisfaction of the Engineer.

C3.3.4.1.9Underground services, other existing services, cable and pipe trenches and covers

The Contractor shall make himself acquainted with all existing works.

The Contractor shall be liable for all damage and breakage to other services. Repair will be done by adequately qualified personnel or contractors. If the damages or breakage is not repair / replaced to the satisfaction of the Engineer within a reasonable time, the Engineer shall be entitled to appoint another Contractor to repair such damage or breakage and debit the account of the Contractor. All damages and breakages are to be reported to the Engineer.

C3.3.4.1.10 Control of noise, dust, water and waste

The contractor shall keep noise to a minimum.

The site is to be maintained in a reasonable state of tidiness at all times.

Rubble may not be accumulated on site. Suitable skips are to be provided for the works.

The Contractor will ensure the proper handling and carting away of spoil material, and the cleaning of ablution areas set aside for the use of the contractor's staff.

C3.3.4.1.11 Training and technology transfer

The Contractor is to provide hands-on training on the equipment during installation.

C3.4.4 MANAGEMENT AND START UP.

C3.4.4.1 Management meetings

Regular monthly meetings of a general nature may be convened and chaired by the *Project Manager.*

Meetings of a specialist nature may be convened as specified elsewhere in this Works Information or if not so specified by persons and at times and locations to suit the Parties, the nature and the progress of the *works.* Records of these meetings shall be submitted to the *Project Manager* by the person convening the meeting within five days of the meeting.

All meetings shall be recorded using minutes or a register prepared and circulated by the person who convened the meeting. Such minutes or register shall not be used for the purpose of confirming actions or instructions under the contract as these shall be done separately by the person identified in the *conditions of contract* to carry out such actions or instructions.

C3.4.4.2 Documentation control

All correspondence between the Contractor, Consultant and the Employer shall be performed in an organized manner as defined below.

In this context, by correspondence is meant:

a) E-mail

All correspondence originating from a sub-contractor shall first be dealt with and coordinated by the Contractor and submitted as the contractor's correspondence.

For the purposes of distribution and archiving, a correspondence of any type shall not deal with a mixture of various subjects. This refers to both technical and commercial items, i.e. where practical, each technical and commercial subject shall be dealt with in separate correspondence.

All correspondence shall bear the Project Title and the Contract Number.

Furthermore, all correspondence shall bear the date of issuance, in DD.MM.YYYY format.

a) **LETTERS**

For official correspondence with contractual and/or financial implications, letters shall normally be used.

The Contractor shall address all his letters to the Consultant. The original shall be submitted to the Consultant and a copy to the Employer.

Letters to the Contractor shall usually be submitted by the Consultant, with a copy to the Employer. Should the Employer wish to write directly to the Contractor, he shall copy to the Consultant.

c) **E-MAIL**

For ease of communication, e-mail will be the preferred medium for "normal" communication. However, any communication which the originator regards as Official and "for the record" needs to be on a letterhead, signed and either faxed and/or submitted in hard copy to the recipient. Hence, in the case of a dispute, e-mailed correspondence shall not ipso facto be accepted as proof of error free communication. However, an e-mail shall be considered a valid document only once receipt has been acknowledged or after a response has been received.

The onus is on the sender either scan confidential information or use Portable Document Format (.pdf).

Forms such as Payment Certificates and Invoices shall always either be scanned in or transmitted in .pdf files.

C3.4.4.3 Health and safety risk management

The Contractor shall comply with the Employer's health and safety requirements as contained in the main contractor's document.

The Contractor shall submit with this Tender, a complete Health and Safety Plan for this project, for the Employer's approval.

The Employer and the Contractor hereby agree, in terms of the provisions of any relevant legislation governing safety or health, that the Contractor as an employer in its own right and in its capacity as

contractor for the execution of the works, shall have certain obligations and that the following arrangement shall apply between them to ensure compliance by the contractor with the provisions of the legislation, namely:-

(a) The Contractor undertakes to acquaint the appropriate officials and the employees of the contractor with all relevant provisions of relevant legislation and the regulations promulgated in terms thereof, and

(b) The Contractor undertakes that all relevant duties, obligations and prohibitions imposed in terms of the relevant legislation and regulations will be fully complied with, and

(c) The Contractor hereby accepts sole liability for such due compliance with the relevant duties, obligations and prohibitions imposed by the relevant legislation and regulations and expressly absolve the Employer and the Employer's Consulting Engineers from being obliged to comply with any of the aforesaid duties, obligations and prohibitions in respect of the work included in the contract.

(d) 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 relevant legislation and regulations pursuant to work performed on behalf of the employer and shall, on written demand, provide full details in writing of such investigation, complaint or criminal charge.

The Contractor shall furthermore comply with all the Employer's requirements for security and safety. An active accident prevention programme should be maintained. A responsible person shall be appointed, and he is to co-operate fully with the Engineers Representative in all matters pertaining to accident prevention.

The Contractor shall comply with:

- The Occupational Health and Safety Act, 1993, and all regulations.
- The Construction Regulations, 2003.
- The Contractor undertakes not to do, or not to allow anything to be done which will contravene any of the provisions of the Act, Regulations or Safety and Operating Procedures

When apparatus is in commission or is to be commissioned:

- The Contractor shall ensure that a team member on site of the Contractor is authorized as a Responsible Person.
- The Contractor shall ensure that the Responsible Person shall supervise the works at all times and be available to take permits where necessary.

The Employer may, at any stage during the duration of this contract, be entitled to:

- do safety audits at the Contractor's premises, its work-places and on its employees;
- refuse any employee, sub-contractor or agent of the Contractor access to its premises if such person has been found to commit any unlawful act or any unsafe working practice or is found to be not authorized or qualified in terms of the Act
- issue the Contractor with a work stop order should the Employer become aware of any unsafe working procedures or conditions or any non-compliance with the Act, Regulations and Procedures referred to above by the Contractor or any of its employees, sub-contractors or agents.
- No extension of time will be allowed as a result of any action taken by the Employer in terms of the above and the Contractor shall have no claim against the Employer as a result thereof.
- An authorized Employer's representative will be on site for regular site visits to monitor the Contractor's implementation of health, safety and quality Standards.
- The works to be enclosed with chevron barricade tape supplied and installed by the Contractor and set out by the Employer.
- The Contractor shall be responsible for all expenses incurred to ensure adherence to Health and Safety Regulations as stipulated above.
- The Contractor shall comply with all the requirements of the CONSTRUCTION REGULATIONS.
- The Contractor shall adhere to the applicable standards and procedures attached to this contract.

C3.4.4.4 Environmental constraints and management

The Contractor shall comply with the environmental criteria and constraints stated in the Employer's EMS included in the main contractor's document.

C3.4.4.5 Quality assurance requirements

a) The Contractor needs to submit a quality plan indicating the control points for quality to ensure that the works are done according to specification.

b) The Contractor shall control his activities and processes in such a way as to ensure compliance with the Employer's Specifications and Standards. He shall carry out, as a minimum requirement all the tests laid down in the specifications and shall submit all the test results to the Employer.

c) The Employer's Specifications and Standards, as indicated in this document, are requirements of this contract.

d) The Contractor shall be responsible for the relevant Quality Assurance Requirements to be imposed on his sub-contractors and suppliers of materials in terms of the above standards.

e) The Contractor shall submit with this Tender, a complete list of sub-contractors, he

intends to make use of for this project, for the Employer's approval. The Contractor will not appoint any sub-contractor without the acceptance of the Employer.

f) Only new, good quality materials may be used and where applicable materials must comply with the specifications of the South African Bureau of Standards or IEC Specifications.

C3.4.4.6 Programming constraints

- All outages shall be performed when the demand on the Plant is at its lowest and may result in work done outside of normal working hours or weekdays.
- During the execution of this contract, the existing 11kV and 400V networks will remain in full operation. It is of the utmost importance that the Contractor shall make due allowance for the co-ordination of his program with the operation of the network.

Any anticipated delays or problems experienced with the execution of construction activities shall immediately be brought to the attention of the Engineer.

No standing time or extension of time will be allowed due to bad co-ordination and/or programming by the Contractor and should his action cause unplanned outages, then he will be accountable, therefore.

C.3.4.4.7 Invoicing and payment

The statement to be submitted by the Contractor in terms of Clause 10 of the GCC 2010 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.

For the purpose 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 submit to the Engineer one (1) set of A4 paper copy of such adjusted statement, together with a copy of the electronic digital computer file thereof.

Where retention money is applicable to a Contract, the retention money shall be deducted on the invoice from the total amount for work done and then the Value Added Tax (VAT) added to calculate the total amount payable on the invoice.

If penalties are payable, they will be deducted prior to the addition of (VAT) but after the calculation of retention money.

Tax invoices shall be submitted for each interim payment claim. The Contractor shall submit a provisional invoice with his/her payment claim as soon as possible after the date of measurement. Once agreement has been reached with the Engineer on the value of the certificate, the Contractor shall submit an original invoice on which payment will be made. The format will be discussed in the month preceding the first claim and to be resolved before the first payment is made.

The Contractor shall address the tax invoice to Employer and include on each invoice the following information:

Name and address of the Contractor and the Project Manager;

The contract number and title; Contractor's VAT registration number; The Employer's VAT registration number

Description of work done by cross reference to Project Manager's certificate;

Total amount invoiced excluding VAT, the VAT and the invoiced amount including VAT;

C3.4.4.8 Provision of bonds and guarantees

The form in which a bond or guarantee is required by the conditions of contract (if any) to be provided by the Contractor is given in Part 1 Agreements and Contract Data, document C1.3, Sureties.

The Employer may withhold payment of amounts due to the Contractor until the bond or guarantee required in terms of this contract has been received and accepted by the person notified to the Contractor by the Project Manager to receive and accept such bond or guarantee. Such withholding of payment due to the Contractor does not affect the Employer's right to termination stated in this contract.

C3.4.4.9 Training workshops and technology transfer

The operation of all the equipment supplied under this contract shall be demonstrated at length to the local maintenance personnel.

Further training requirements are included in the main contractor's document.

C3.5 GENERAL REQUIREMENTS

C3.5.1 Management requirements

a) The Contractor shall in providing the Works observe all statutes, by-laws and associated regulations and industry norms established in relevant South African national standards published in terms of the Standards Act of 2008 or standards recommended by professional associations.

C3.5.2 Construction requirements

The Contractor shall only incorporate in the works materials (substances that can be incorporated into the works), products (items manufactured or processed for incorporation into the works), components (products manufactured as distinct units to serve a specific function or functions) and assemblies (set of related components attached to each other) which are:

a) Fit for their intended purpose, and

b) Capable of fulfilling required functions under intended use conditions or when in use, with planned maintenance, under the influence of the environmental actions or as a result of a self-ageing process for a period of time within industry-accepted norms.

MUNICIPAL INFRASTRUCTURE SUPPORT AGENT

Tender no.: **MISA/VWWTWPS/FS/007/2026/27**

PROJECT: APPOINTMENT OF A CONTRACTOR FOR THE REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS AND PUMP STATION IN VILLIERS/QALABOTJHA - PHASE 1 (MIG SCHEDULE 6B)

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PART C4: DETAIL TECHNICAL SPECIFICATION

C4 GENERAL

C4.1 Supply of Material

The onus is on the Contractor to order material well in advance to ensure timely delivery. No extension of time shall be allowed for late delivery of material due to orders not placed in time.

C4.1.1 Standards

In view of the fact that this installation is to be operated and maintained by MAFUBE Local Municipality it is a condition of this contract that the standard of workmanship and quality of materials will be subject to the approval of the Engineer and MAFUBE Local Municipality who are finally responsible for the operation and maintenance of the system. All correspondence in this regard shall however be directed to the Engineer and the final approval will only be granted by him.

C4.1.2 Outages

Power outages will be required to perform many of the tasks involved on this project. Outages are to be planned allowing sufficient notice to the Employer and in compliance with any reasonable stipulations required. Liaison with the Engineer, Employer, other contractors and the supply authority is compulsory.

C4.1.3 Items for Approval

Where the specification refers to a specific brand name or "similar and equivalent" or "Other approved type" and alternative equipment is offered in lieu of that specified then written approval must be obtained from the Engineer before such equipment is installed.

In certain cases the contractor may be required to submit samples and where necessary, tests will be performed to establish the quality of the material offered.

C4.1.4 Off-Loading, Stacking and Liability for Breakages

The Contractor will be required, at his own expense, to make all arrangements for off- loading and carefully stacking all plant and materials delivered under this contract on the Site of the Works. The off-loading and stacking shall be carried out strictly in accordance with the requirements of the Engineer so as to permit a thorough and careful examination and testing of all items for breakages, fractures, etc.

Plant and materials shall be stored on site at the cost of the Contractor who shall be fully responsible for its protection against theft or damage by water, weather, fire and any other interference until such time as it is erected and installed, put into satisfactory operation and accepted by the Employer as complete.

C4.1.5 Storage

Facilities for extended storage on site for plant and materials may not always be available and the contractor shall therefore make his own arrangements for any off-site storage, which may be required for plant, and materials, which become available before delivery to the Site and installation thereof can commence. No additional payment will be allowed for off-site storage.

C4.1.6 Supply to Remain Operative

During the execution of this contract, the existing 11/22kV and 400V networks will remain in full operation. It is of the utmost importance that the Contractor shall make do allowance for the co-ordination of his program with the operation of the network.

Any anticipated delays or problems experienced with the execution of construction activities shall

immediately be brought to the attention of the Engineer.

No standing time or extension of time will be allowed due to bad co-ordination and/or programming by the Contractor and should his action cause unplanned outages, then he will be accountable therefore.

C4.1.7 Design and Standardisation

All equipment offered shall be products of recognized and experienced manufacturers and shall be proven equipment of the same basic design and size similar to that which has been in successful continuous operation for at least three years preferably under similar climatic conditions. Proven plant reliability and high availability are of prime importance and the attention of the Tenderer is drawn to these particular requirements.

All material used shall be of the best quality and of the class most suitable for working under the conditions specified and shall withstand the variations of temperature and atmospheric conditions arising under operating conditions without distortion or deterioration or the setting up of undue stresses in any part and also without affecting the strength and suitability of the various parts for the work which they have to perform. No welding, filling or plugging of defective parts will be permitted without the sanction in writing of the Engineer.

Corresponding parts liable to renewal shall be interchangeable. When required by the Engineer, the Contractor shall demonstrate this quality.

All apparatus shall operate without producing undue vibration and with the least practicable amount of noise.

Cast iron shall not be used for chambers of oil-filled apparatus or for any part of the equipment which is under over-pressure or subject to impact stresses except where it can be shown that service experience has been satisfactory with the grade of cast iron and the duty proposed.

Operating boxes, cubicles and similar enclosed compartments forming part of auxiliary equipment shall be adequately ventilated to restrict condensation, and suitable anti- condensation heaters shall be provided. All contactor and relay coils and other parts shall be suitably protected against corrosion.

All mechanisms shall, when necessary, be constructed of stainless steel, brass or gunmetal to prevent sticking due to rust or corrosion.

All taper pins used in any mechanism shall be of the split type.

All rubbing or wearing surfaces shall be machine surfaced. Joints employing a gasket material shall be so constructed that the packing is maintained under sufficient compression in all parts so that an efficient joint can be made without the use of jointing compounds. Gasket material shall be of the minimum thickness necessary and of applicable composition for the site conditions.

All apparatus shall be designed to exclude vermin and insects from entering the equipment.

C4.1.8 Nuts, Bolts and Washers

Nuts and bolts in metric sizes shall be used. Bolts and studs for electrical connections shall preferably be of brass M6 size. Alternatively size MS may be used, but these must be of stainless steel, phosphor bronze or high tensile brass.

Nuts and pins shall be locked in position with lock nuts or lock washers, or other devices if approved. Lock washers shall not be used above M24 size except when a spring type is specially approved.

In steel constructions no bolt or stud shall project through its nut by more than approximately 10 mm or four threads whichever is the less, except for terminals and relay stems.

Bolts, nuts and washers on outdoor equipment shall be of non-corroding material where they are in contact with non-ferrous parts in conductor clamps and fittings and elsewhere if specially required.

Suitable special spanners shall be provided for bolts and nuts which are not properly accessible by means of an ordinary spanner.

All steel bolts of any one diameter on a structure shall be of the one grade of steel.

C4.1.9 Tools

The Contractor shall supply in lockable boxes, for the Employer's use, all special tools that may be required for assembly, dismantling and adjustments to the equipment. The tools shall be unused and in new condition at the time of handover.

C4.1.10 Packing of Material

Packing shall give adequate protection to the enclosed materials against mechanical damage during transport to its final destination, including rough handling during sea, rail and road transport and transition from one mode of transport to another.

Packing should preferably be stout close-boarded wooden cases of adequate thickness, suitably braced and banded and lined internally with water resistant material. Cases transported or stored on open decks shall be roofed with asphalted felt.

Certain types of outdoor equipment may be crated, provided that adequate protection of vulnerable parts is assured. All pipe flanges shall be fitted with wooden covers not less than 40 mm larger in diameter than the flange.

Steelwork sections and similar items may be bundled provided that the ends are adequately protected and the enclosing bands or wires are robust.

Indoor electrical equipment must be enclosed in welded polythene envelopes inside packing cases and the envelopes shall be evacuated or have a desiccant inside.

All items in cases or crates shall be secured so that they are not free to move and cannot work loose in transport. If rotating parts are shipped within their bearings or mountings they must be adequately braced and restrained to prevent relative movement. Loose items shall be placed in bags in a case, each bag having stitched onto it a metal label indicating the number and nature of its contents. Where a filler material is used in a case to restrict movement or provide additional protection it shall be non-hygroscopic.

All surfaces liable to corrosion shall be thoroughly cleaned and special steps adapted to the nature of the materials and the time interval between packing and unpacking shall be taken to prevent corrosion.

Steps shall be taken to ensure that insulated materials cannot be damaged by moisture, moulds, insects or rodents. Items that include materials liable to be damaged by moisture shall be packed in hermetically sealed containers in which silica gel, or some other approved desiccant has been inserted.

C4.1.11 Abandoning and Clearing of Site

The stage encompasses the following and it should be noted that the actions detailed below are required for the substation to be taken over by the Employer:

(a) The final handing over of the works to the Employer, together with all marked up "Record" drawings, all spares included in this contract and all auxiliary equipment required for the operation of the works.

(b) Three copies of the complete instruction manuals and drawings for the operation and maintenance of the equipment shall be handed over to the Engineer. A CD will also be handed over containing the manuals and drawings and all setting files and equipment software packages.

(c) The operation of all the equipment supplied under this contract shall be demonstrated at length to the local maintenance personnel.

(d) All spares should be properly packaged and labelled and should be handed over to Employer or his representative and signed confirmation of receipt thereof, obtained.

(e) It should be noted that this contract will not be regarded as complete until this stage of the works has been adequately finalized.

(f) The attendance of the final inspection on completion and prior to handing over of the works.

(g) Removal of the site office and store, if erected and disconnection of any temporary service utilized.

(h) The site shall be cleaned and any excess material waste, refuse and rubble resulting from the construction activities removed and any damage incurred made good.

C4.1.12 Damage to other Services

The Contractor shall be held liable for all damage to other services and if such damage is not repaired to the satisfaction of the Engineer within a reasonable period the Engineer shall be entitled to appoint another contractor to repair such damage and debit the account of the contractor. It is essential that the contractor should liaise with the Engineer, local authority, Transnet, Telkom, etc. in order to avoid such damage.

To facilitate the identification of services-test holes must be hand excavated using rounded spades. Approved trial holes will be paid at schedule rates except where such holes form a part of the final trench in which case they will be measured in the run unless it is essential to backfill the holes prior to excavating the final trench.

Where live cables are exposed during trench excavation the cables shall be protected to the satisfaction of the Engineer.

C4.2 SETTING OF PROTECTIVE DEVICES AND CONTROLS

All protective devices installed throughout shall be correctly adjusted by the Contractor to the approval of the Engineer before any circuit is energized. The contractor is required to obtain all data necessary for establishing the correctness of the settings. Where doubts exist the Engineer's confirmation is to be sought. Data with regard to all commissioning documentation and diagrams of all control, alarm and indication circuits are to be provided for approval prior to their installation. These diagrams shall include:

(a) Wiring diagram
(b) Schematic wiring diagram
(c) Device operating sequence diagram
(d) Operational narrative of the control and protective devices.

The correct operation of all such circuits as well as of all interlocks is to be verified on site in the presence of the Engineer or his authorised Representative.

C4.2.1 Preliminary Testing of Major Equipment

All items of major equipment are, where feasible, to be factory tested prior to delivery to site, and results of such tests, in a format to be agreed in advance, are to be produced before the equipment is delivered.

All such tests are to be in accordance with the relevant codes of practice, and with any other requirements as set out in this document.

C4.2.2 Completion of Installation

Before the commencement of any test or commissioning procedures, the Contractor is to ensure that all nuts and bolts are securely fastened, and that paintwork on all items supplied has been touched up where damage has occurred.

C4.2.3 Unacceptable Tests and Abortive Handovers

Should the Employer find at the time of hand over that work is defective to the extent that they have to return for further inspections and the handover aborted, then the Employer reserves the right to claim expenses in whole or part from the Contractor.

C4.2.4 Labelling, Signage and Fire Extinguishing Equipment

All new switchgear and equipment installed in switchboards, plus isolator boxes, cables, etc., shall be clearly labelled to approval or as specified.

All installations must be provided with the proper caution, first aid and danger signage in accordance with the OHS Act and SANS 10142-1 (The Wiring Code).

A fire extinguisher of appropriate size and suitable for extinguishing electrical fires must be wall mounted in the MCC building.

C4.2.5 Training of Institutional Staff

Where applicable, the Contractor must allow for the training of Institutional Staff in the setting up and operation of the various items of equipment supplied under this contract.

C4.3 CONTRACTORS WORKS INFORMATION

General

Motor Control Centers

C4.3.1 General Requirement

Special care must be taken where motors are equipped with "KLIXON" type over-temperature protection to prevent the motor from auto re-starting after an alarm condition. All motor protection alarms, as listed above, shall latch and shall have to be manually reset before motors can be re-started.

The Contractor shall ensure that the circuit breakers specified and the motor protection devices fitted are suitably rated for the motors installed. Motor protection must at least protect the motor against: Overload, Under-load, Phase Failure, Phase Imbalance, Over Voltage, Under Voltage and Over Temperature.

Control

Where specified, a motor starter panel shall be capable of operating the motor in manual and remote mode. In manual mode the motor shall be operated from the panel front and in remote mode control of the motor will be wired to a set of terminals for SCADA control functionality. (No remote services allowed)

Variable Speed Drives

VSD's shall be equipped with the following inputs and outputs as a minimum:

- Variable speed input of 4-20m A for remote control
- Variable speed control for local control.
- Start and stop control.
- Run, overload, status and VSD watch dog outputs

C4.3.2 Motor Control Centres (MCC)

The manufacture, delivery to site, installation, testing, commissioning and handing over of new MCC's as detailed on drawings EE1877-SLD01-SLD04, Annexure A and MCC Data, Annexure B, including the following general equipment:

C4.3.4.1 Commissioning, Testing and Documentation

On completion of the entire installation or any particular section thereof, as may be decided by the Engineer, test shall be carried out before commissioning, in full accordance with the current edition of the "Code of Practice for the Wiring of Premises", the manufacturers and/or the SABS specifications, in the presence of the Engineers or his authorized Representative.

The contractor should note that where applicable at least the following tests must be carried out:-

(a) Phase rotation tests
(b) Insulation test
(c) Continuity test

(d) Earth termination test
(e) Earth resistance test
(f) Any further tests as deemed necessary by the Engineer.

All instrumentation necessary for testing shall be provided by the Contractor.

The results of the above tests must be clearly recorded, signed and handed to the Engineer or his authorized Representative together with the Certificate of Compliance or any such form of forms required by the local supply authority or Engineer.

The Engineer requires at least the following:

(a) Certificate of Compliance.
(b) Schedule of protection and control settings.
(c) Set of schematic wiring and function diagrams.
(d) Drawings of the installation marked "As Built" and signed.
(e) Operating and maintenance instructions on equipment.
(f) Guarantees ceded to the Employer.

Once the Engineer has inspected the complete installation and satisfied himself that all testing has been completed and the contract is complete in all aspects, can the Employer be approached in writing, with the above documentation, with a view to arrange a hand-over inspection.

C4.3.4.2 Information required with Tender

All relevant information and pamphlets of the equipment offered, with technical specifications etc., shall be included in the tender as well as the following information.

(a) Block diagrams showing the layout of the system offered.
(b) A "statement of compliance" that clearly indicates where the system offered deviates from this specification and what the implications are. Without this statement it shall be assumed that there are no deviations.
(c) All other pamphlets and information called for in this specification.

C4.4 CABLES, TERMINATIONS AND JOINTS

C4.4.1 General

Cable shall be delivered on strong, durable, purpose made wooden drums clearly marked with manufacturing data.

Cable lengths where scheduled are for tendering purposes only, any variation between scheduled and actual lengths will be allowed for at schedule rates. Reasonable

allowances have been made to the estimated lengths in the Schedule of Tender Items for cable, ends, circuits, etc., but payment will only be made for actual lengths of cables installed. Excess cable will not be taken over by the Employer.

It is essential that the actual cable lengths required shall be checked on site before orders are placed, as no joints will be permitted, except where lengths exceed the drum length.

C4.4.2 Terminations and Joints

The complete termination and/or jointing kit shall be supplied by Raychem or equivalent, packed in a container that is marked for the type of cable insulation and construction as well as the voltage range for which the materials are suitable.

An illustrated set of instructions for the installation of the materials shall accompany every kit.

The joints and terminations shall make minimal, if any, use of insulation or stress relieving tapes. The use of electrical stress control and insulating tubing that is shrunk onto the termination or joints, are preferred above other methods.

The shrinkable and other materials used for the terminations and joints shall be of a high quality and shall retain their electrical and mechanical properties without deterioration.

Where a cross-over of conductors is required a purpose made spacer for the conductors shall be installed.

Terminations shall be made of a material that gives lasting protection against ultraviolet radiation.

At terminating, the cores shall be completely covered with a shrunk-on protective layer against surface tracking, ultraviolet radiation and weathering.

Outdoor terminations shall be designed to prevent flashover under wet or contaminated conditions. This shall be achieved with shrunk-on insulating spacers and rain sheds.

Where cables are cut and not immediately made off, the ends are to be sealed to prevent water ingress without delay.

Termination and joints will be made by a suitably qualified, experienced and certified cable jointer only.

C4.4.3 Laying of Cables and Excavations

C4.4.3.1 Handling

The storage, transportation, handling and laying of cables shall be according to first class practice, and the Contractor shall have adequate and suitable equipment and labour to ensure that no damage is done to cables during such operations.

Twisted, kinked or cables damaged in any way will be rejected.

Cables shall be removed from the drum in such a way that no twisting, tension or mechanical damage is caused, and must be adequately supported at short intervals during the whole operation.

Particular care must be exercised where it is necessary to draw cables through pipes and ducts, to avoid abrasion, elongation or distortion of any kind.

The ends of such pipes and ducts shall be sealed to approval of the Engineer after the drawing in of the cables.

Cables shall not be bent through a radius smaller than that recommended by the manufacturer or stipulated in SANS 0142.

C4.4.3.2 Surface and on Cable Trays

Cables shall always be laid in a workmanlike fashion according to generally accepted standards and shall be installed as specified and as prescribed in the Wiring Code of Practice.

Cables shall be fixed and supported by means of Pressure shoe and screw type clamping devices (which

shall not damage the cable) and shall never be laid over any sharp edges without suitable protection against damage.
No cable shall be bent to a radius of less than that specified in the Wiring Code of Practice or by the manufacturer as relevant.

Notwithstanding the above, all cable clamping devices must be as Approved.
Cables to be marked on both ends and joints to correspond with the wiring diagrams with "Critchley K-type" cable markers or metal bands with embossed lettering. The Critchley carrier strip is to be long enough to hold 9 digits unless otherwise specified.

C4.4.3.3 Cables in Ducts

Cables in specially made concrete or other ducts or trenches shall be laid to the same standards and requirements as specified in "Cables - General" and "Underground cables". Cables in ducts shall be firmly fixed to the bottom or sides of the duct, to ensure that the cables will remain straight and parallel as installed. Cables shall not lie on top of one another.

C4.4.4 Cables on Cable Racks and Trays

Cables on cable racks or cable trays shall be laid to the same standards and requirements as specified in "Cables - General".

C4.4.5 Cables in Vertical Riser Ducts

Cables in vertical riser ducts shall be secured with proper cable clamps or cleats and pressure shoes.

In rising ducts cable supports equal to Sankeystrut P2000 channels shall be installed and the cables shall be fixed to these channels by means of clamps similar to Sankeystrut K series.

Where the channel is damaged or cut, filed or shaped, the affected portion shall be given a coat of red lead or other anticorrosive paint. All painting must be complete before the running of cables.

C4.4.6 Cable Clamps

All cable clamps used for securing cables shall be subject to the approval of the Engineer.

C4.4.7 Termination/Ends

Cable terminations throughout the system shall follow the same phase rotation and colour code.
Densil paste shall be used at all aluminium core cable connections.
Aluminium cables shall not be directly connected to copper cables, terminals, busbars, etc.
Tinned lugs and finings suitable for connecting aluminium to copper shall be used. The costs for the supply of lugs, terminals and all other fittings shall be included in the prices for the installation of cables.

Low voltage cables shall be terminated by the following methods: Clamps

One piece cable clamps with rear pressure shoes mounted on Unistrut P4000 bar can be used to clamp the cables. The armouring shall be bolted to earth bars by means of suitable lugs.

Glands

Steel wire armoured cable ends shall be made off in glands as prescribed by the manufacturers, of correct size and complete with neoprene shrouds. The armouring shall be clamped between substantial tapered cones which form an integral part of the gland, secured by lock nuts to give a proper earth connection.

Glands shall be used for all cables to be terminated outdoors, with neoprene shrouds and suitable heat-shrink covers. Where the cable enters an outdoor box the gland shall be provided with a neoprene washer to seal off the hole.

Compression Glands

Compression type glands shall be used where specified, for armoured cables where the armouring can be taken through the gland to be bolted to an earth bar.

Cable ends shall be made off in compression type glands as prescribed by the manufacturers, of correct size and complete with neoprene shrouds.

The armouring together with the cable cores shall be brought through the gland and the cable shall be properly clamped by means of cable gland neoprene rings.

The armouring of the cable shall be connected to an earth bar by means of a suitable tinned cable ring.

The compression type gland shall be used for all Strip Aluminium Armoured Cables.

Cable ends shall be long enough for the making off of cable ends into cable through joint boxes and/or cable end boxes. Excessive waste shall be avoided by the Contractor.

C4.4.8 Excavations

The excavation of cable trenches shall be carried out by the Contractor, along the routes and in the servitudes as indicated on site.

The bottom of the trench shall be level and clear and the bottom and sides shall be free from rocks, stones, or other objects liable to cause damage to the cable.

All MV (11/22 kV) cables shall be laid at a depth of at least 1000 mm below final finished ground level.

All LV (400V) cables shall be laid at a depth of at least 750 mm below final finished ground level.

Where the nature of the ground does not permit the excavation of cable trenches to the specified depth, the matter shall be referred back to the Engineer whose decision shall be final.

The Contractor must take all necessary precautions to prevent trenching work being in any way a hazard to the public and to safeguard all structures, roads, railways, sewers, works or other property from any risk of subsidence and damage.

Volumetric measurements for excavations will be done for hard rock and boulder rich material. Trenches in soft material will be measured on a cost per meter of trench basis.

No guarantee can be given that blasting will not be necessary. This item shall be the full responsibility of the Contractor and he shall be required to adhere to all laws, regulations and by-

laws regarding this type of work, no blasting shall be allowed without permission of the Engineer. The cost of blasting shall be an extra to the contract once approved by the Engineer.

Trenches shall not be less than 450 mm wide for one or two cables, and the width shall be increased where more than two cables are to be laid together so that the cables may be placed at least 150 mm apart throughout the run.

The minimum acceptable trench dimensions are as follows:

4.4.8.1 Two MV Cables 1000 mm D x 500 mm W
4.4.8.2 One MV + LV Cable 1000 mm D x 450 mm W
4.4.8.3 Two MV + LV Cables 1000 mm D x 750 mm W
4.4.8.4 Two LV Cables 750 mm D x 450 mm W
4.4.8.5 Three LV Cables 750 mm D x 450 mm W
4.4.8.6 Four LV Cables 750 mm D x 450 mm W

C4.4.9 Cable Warning Tape

4.4.9.1 One MV Cable 1000 mm D x 450 mm W

A yellow PVC cable warning tape shall be installed on top of the hard bedding, i.e. at least 300mm above the cable.

C4.4.10 Backfilling and Bedding

The trench shall be straight with no kinks and all loose stones shall be removed before a layer of 150mm sifted bedding sand is installed. The cable will be carefully laid on top of this bedding and the Engineer will inspect the installation at this stage. After approval, a further covering of 150mm sifted bedding sand will be placed on top of the cable after which the trench will be backfilled

Backfilling after bedding and laying of concrete slabs, where applicable and warning tape, where applicable, is to be carried out with a proper grading of material to ensure settling without voids, and the material is to be properly compacted after the addition of every 150 mm layer. The material used for backfilling is to be the in-situ material excavated from the trench, when such material is of sufficient grade to meet the Engineer's requirements. If the excavated soil is found to be unsuitable as backfill material the contactor shall obtain suitable backfill.

Suitable backfill shall be an approved material free from all rubbish, litter, vegetable matter of any type or form and also free from all rocks or clods of material which cannot be broken down to a maximum dimension of 100mm. It shall have a plasticity index not exceeding 15 and shall be obtained from an approved source. If the material is of

gravelly nature, it shall contain sufficient well graded fines evenly distributed among the larger particles so that all voids will be filled during compaction.

The contractor shall be responsible to remove all excess ground left over after trenches have been back filled. He will ensure that the surface is left in the same condition in which it was handed to him.

Backfilling may not commence until the entire trench has been inspected and measured, where necessary by the Engineer, and the route recorded by the Contractor.

C4.4.11 Compaction of Fill

The compaction of the 150mm thick layers is to be done with an approved vibrating plate

compactor, weighing not less than 250kg or more than 450kg. In no case may the Contractor use a heavier compactor.

For sand the compaction shall not be less than 100% of the maximum density obtained from the modified AASHTO test for the type of sand. For other approved material the minimum Compaction shall be 93% of the maximum density obtained from the modified AASHTO density test for this material.

C4.4.12 Cable Markers

Cement or concrete cable markers shall be provided at road and rail crossings at changes of direction and at intervals not exceeding 50m on straight runs.

Cable joints shall also be marked.
Cement or concrete cable markers shall be of a high strength mixture of cement or concrete formed into a truncated pyramid at last 450mm high, 150mm x 150mm at the top and 250mm x 250mm at the bottom.

The cable markers shall be installed in the centre of the cable trench, with the top of the cable marker being 100mm above the final finished ground level.

Indicator plates are not needed as symbols shall be used. Joints shall be marked with a cross (X) and arrows shall be used to indicate the direction of change. These symbols may be cast or cut into the concrete cable marker and then painted yellow.

The position of cable markers is to be accurately indicated on the "As Built" drawings.

C4.4.13 Testing

Testing to ensure correct phase rotation and phase colours shall be conducted by the contractor and witnessed by the Engineer.

LT cables shall be tested using a 1OOOV Megger.

C4.4.14 Protection and Metering Cables

The contractor is to supply all cables, cable identification, tags, glands, ferrules, numbered ferrules, lugs and strapping. Any additional brackets, fasteners etc. for fixing the cable shall be supplied and installed by the contractor.

The termination of these cables includes the making *off,* glanding, bunching cores neatly, attaching all number ferrules and lugs and connecting to the correct terminals.

The cable cores are to be properly terminated with the correct "lipped blade lug" and only lugs supplied by "Bowthorpe-Hellerman-Deutsch" shall be used. Crimping shall be done with the proper ratched isolating lug crimper.

RSF1 terminals	-	2,5mm^2 wire use blue lug FVWSAH-2 4,0mm^2 wire use yellow lug FVWSAH-5,5
SAK terminals		2,5mm^2 wire use blue lug FVWSAH-2,5B30

All cables must be marked at both cable ends according to the cable numbers as indicated in the wiring schedule. These marks will be permanently attached with either letter punched copper labels or durable, high quality UV protected plastic cable markers and tenderers should allow for these costs in their tender prices.

C4.5 LOW VOLTAGE DISTRIBUTION BOARDS, SWITCHBOARDS AND CONTROL PANELS SWITCHGEAR

C4.5.1 GENERAL

This specification provides for the design, manufacture, delivery, installation, testing and commissioning of low and medium-voltage distribution boards for voltages up to 660V AC and 500V DC.

Low voltage distribution boards, switchboards and control panels shall be provided and installed as indicated on the drawings and as specified in the specification and schedules.

Distribution and switchboards offered must comply with these specifications, the drawings and schedules and shall comply with the relevant parts of SANS 1180 (Electrical Distribution Boards).

As it is not intended to penalise a Contractor on account of distribution boards offered, it is essential that the costs of all distribution boards be indicated in the Schedules in order to facilitate the determination of costs of alternatives.

The Contractor shall note the dimensions of the rooms or openings in which the panels will be mounted and also the dimensions of the access routes and doors. Panels shall be so constructed that they may be taken through the doors after doors have been placed in position.
Contractor shall level, fix all distribution boards to the satisfaction of the Engineer.

The Contractor shall note sizes and positions of cable trenches and vertical shafts and shall include in his tender all supporting steel work to straddle trenches and vertical shafts to support distribution boards securely.

C4.5.2 STANDARDS AND PROTECTION

Equipment shall be in accordance with the applicable SABS specifications and Codes and with this Specification.

Selection of materials, finishes, equipment, etc shall also be based on the conditions where the boards and equipment are to the installed, e.g. corrosive, hot, wet, damp, dusty, etc.

Boards, equipment and materials which are exposed to sunlight shall be coated with a UV resistant surface finish.

C4.6 CONSTRUCTION AND FINISHES

C4.6.1 General

The type of board (i.e. flush, surface, floor standing) and position is described in detail in the drawings and/or in the Schedules of Particulars. Boards shall be constructed as indicated on the relevant general arrangement drawings, if applicable.

All boards shall be installed at the specified height, with the top edge of the tray not exceeding 2000mm above finished floor level.

Lifting eyes shall be provided on large boards and shall be manufactured in modular sections so that they may be easily transported and then assembled in position on site.

Cables and conduit entry is to be as indicated on drawings or as required by their locations.

Glanding and terminating cubicles and busbar chambers are to have screwed or bolted covers. Quick release covers will not be acceptable.

The gauge of the metal shall be suitable for the size of board and construction employed. Suitable bracing shall be employed to ensure adequate stiffness of panels, etc.

Barriers running the full height and depth of each board shall be provided between adjacent panels.

C4.6.2 Gland Plates for Cables

A suitable gland plate shall be provided in the cable glanding compartment of each tier of the board.

Gland plates shall be bolted down in sections not wider than 600mm and have a minimum thickness of 3mm. Any gland plate shall be removable without interfering with the adjoining gland plates.

Gland plates shall be a minimum of 400mm from cable terminals.

Where cable gland plates are drilled or punched on site for cable entry, the gland plates shall be straightened if deformed during these operations.

Gland plates must be positioned to suit cable entry and termination.

A cabling through or duct shall be provided from the glanding compartment to each cubicle or piece of equipment to allow for the running of the cables, both power and control.

All wiring, connections, instruments and other equipment shall be mounted inside the board and not on the outside, unless otherwise specified. Wood or artificial wood products shall not be used inside switchboards as mounting for terminals or partitions. Sidanyo, Delaron, or equal not less than 6mm thick, or other materials as prescribed or approved by the Engineer shall be used.

Space for 30% future expansion on mccb's and CFS units and 50% future expansion on contactors, time switches and isolators shall be allowed on all boards in addition to any spare accommodation indicated on the diagrams unless otherwise specified.

C4.6.3 Free-standing Boards

Free-standing boards shall be of the free-standing pedestal type with or without doors as specified and shall be so designed as to enable the boards to be extended without undue difficulty.

Boards shall comply with BS 5486 : 1977 (Factory Built Assemblies of Low Voltage Switchgear).

The boards shall be constructed of minimum 1,6mm sheet steel suitably stiffened and reinforced by a 2mm sheet metal framework and shall be complete with all equipment, internal wiring and labelling.

C4.6.4 Flush and Surface-mounted Boards

Both flush and surface-mounted boards shall consist of an architrave frame which shall carry the chassis for equipment, panel and door and a bonding tray onto which the architrave frame shall be secured.

Distribution boards shall comply with SANS 1180 : Part I and II as applicable.

Bonding trays for flush-mounted boards shall be designed to be built into the wall, shall have expanded metal spot-welded to the rear and sufficient metal straps on the sides and shall be strong enough to carry the weight of the wall above it.

The tray shall be galvanised.

C4.6.4.1 Weather-proof Construction

Weather-proof construction shall be effected by double-turn construction of the architraves with flanged doors and bolt-on panels.

C4.6.4.2 Extendibility

The boards shall be extendible and have an initial spare cubicle capacity of 10% or as specified on the drawings.

C4.6.4.3 Standby Power Section

The section of a board accommodating circuits on a standby supply shall be mechanically and electrically separated from the normal section.

All panels associated with the standby section shall be clearly labelled and identified, and shall be painted as specified on the drawings.

Sufficient removable panels shall be provided to afford access to all equipment for maintenance, service and replacement purposes.

The back panels where specified shall be of similar construction to the front panels.

C4.6.4.4 Clearances

Sufficient space shall be left inside panels for incoming and outgoing cable connections and for interconnections and control wiring, taking into account the sizes and quantities of cables and wires involved.

Equipment on boards may be installed butting. Undue cramping of equipment and wiring shall, however, not be permitted and the following minimum clearances must be maintained:

Clearance of not less than 75mm between sides, top and bottom of architrave and any equipment mounted on the chassis.

Clearance of not less than 75mm between rows of equipment (measured between terminals).

C4.6.4.5 Doors

Doors shall be provided as required and prescribed. Where doors of sheet steel finished in the colour specified are required, they shall be manufactured of the same gauge material as the remainder of the panels.

Doors shall be suitably braced to ensure stiffness and shall have smooth, flat finish.

Door hinges shall be heavy-duty and shall be constructed to permit easy removal of doors. Piano hinges are not acceptable.

Where hinges are used they shall preferably be concealed. If a surface mounted hinge is used it shall be chromium plated. Provision shall be made for adjustment of hinges to facilitate lining up of distorted doors.

Locks shall be Yale type and shall have master key facilities for the entire installation and separate key facilities for each board. Two individual keys shall be provided with each board and four master keys shall be provided for the entire installation.

Doors shall be fitted with approved handles and spring-loaded catches without locks where specified.

Doors shall be fitted with approved handles and square key locks where specified.

C4.6.4.6 Removable panels

Panels of sheet steel, finished in the colour specified, shall be suitably finished, with machine-punched slots to allow for flush mounting of equipment.

C4.6.4.7 Dust and Vermin Proofing

All boards shall be completely vermin proofed.

No holes other than those required for cable or conduit entry shall be allowed. Should extra holes be required for temporary installations, these holes shall be

suitably blocked off on the removal of these temporary installations.

Where doors or removable covers are situated and are required to be dustproofed, they shall be dustproofed by means of a minimum 10mm thick non-perishable gasket, resistant to deterioration from heat, chemicals and moisture and capable of being compressed to half its original thickness.

Where doors are flush fitting, gaskets shall be glued to the fixed flange.

In the case of projecting doors, gaskets shall be glued to the door and not the associated framework.

Similarly suitable gaskets shall be used wherever push-buttons, indicator lights, isolator handles, etc. pass through a door or panel.

Switchgear shall be vermin-proof both in the service and isolated positions.

Ventilation

Boards fitted with heat generating equipment shall be arranged to prevent heat building up to a temperature which could damage any of the equipment or cabling on the board.

C4.6.4.8 Painting and Protection

The interior of all board and panel cases shall be finished in any one of the following finishes as specified or as approved.

C4.6.4.9 Labelling

All statutory safety warning notices shall be in both the official

languages. All boards shall be labelled as shown on the drawings

and approved.

Black letters on white background shall be used for all normal labels and red letters on white or yellow background for danger notices.

The main isolating switch or switches shall be clearly labelled in accordance with the regulations.

Size and origin of supply cables and busbars shall be clearly labelled on all boards.

All grouped single, double and three pole circuit breakers on distribution boards shall be properly labelled, indicating number of circuit controlled.

All equipment situated inside the board, e.g. contactors, relays, fuses, timers and time switches shall be clearly marked, indicating function, circuit controlled and fuse rating.

The board designation label shall be fitted at the top centre of the board. Individual labels are to be fitted to each compartment door and corresponding fixed portion of rear panel (if accessible).

All circuit labels shall be the same size for boards or similar equipment supplied under this Contract.

Labels shall be white/black/white composition engraved traffolite secured by self-tapping screws or channelling.

Letter size: Main label - 20 mm, other labels - 6 mm.

Labels on power cables shall be attached with approved type plastic adjustable clips.

The labels for power cables shall be provided with holes for the clips to pass through for fastening. Each power cable label shall be fastened with at least two clips.
A legend card, covered by removable 2mm thick transparent acrylic plastic ("PERSPEX") or equivalent panel, shall be installed on the inside of the door of the boards or cubicles and circuits shall be designated on this card.

Accessories

Any special door keys (in duplicate), special tools, slinging eye bolts and foundation bolts, shall be supplied with each board.

C4.7 WIRING AND EQUIPMENT REQUIREMENTS

C.4.7.1 General

Switchgear, control gear, motor control gear, etc. shall be positioned and installed as indicated on the relevant drawings or as approved.

The gear shall be installed so that it is positioned squarely on its supporting steelwork, i.e. "lined up" in both the vertical and horizontal planes.

All auxiliaries (relays, timers, etc.) shall be mounted in the same cubicle as their associated motor starter.

All motor ammeters shall have a suitable overload scale to cater for motor starting currents. The motor full load value shall be indicated by a red line on the scale.

Each main incomer shall be equipped with ammeters, voltmeters and selector switches as specified on the drawings.

All equipment contained within the switchboards shall be designed to operate continuously at its maximum specified rating under the stated service and atmosphere conditions.

C.4.7.2 Interchangeability of Equipment

Similar and equivalent equipment and auxiliary equipment shall be identical and interchangeable in all respects. It shall be possible to replace any equipment with any similar and equivalent equipment under this Contract.

Where any specific type and make of equipment is used, the whole of this Contract

shall be carried out with that specific make and type of equipment to ensure uniformity of appearance and complete interchange ability.

C4.7.3 Busbars

Busbars shall be installed in all boards and may be installed either horizontally or vertically and in main boards shall be run in a separate compartment, isolated from the rest of the board.

terminations onto busbars and interconnections shall be bolted with cadmium-plated high tensile bolts, washers, spring washers and nuts.

Spacing of busbars shall be calculated in accordance with SANS 784, but shall not be less than 50mm.

Busbars shall be mounted on substantial porcelain or other approved insulators. Bare conductors must be so spaced that with all clamps, lugs and lead-offs in position, the spacing between any conductor and earth shall not be less than 40mm.

Connections to the busbars must be effected by means of the correct clamps or lugs with soldered connections or with connections crimped with the correct equipment.

Busbars shall each be identified by means of 100mm long painted (or other approved) phase colouring bands spaced not more than 300mm apart.

The following colours shall be used:

Number of Phases	Phase Colour	Neutral Colour	Earth Colour	Special Purpose Colour
1	Red	Black	Green/Yellow	Orange
2	Red and White	Black	Green/Yellow	Orange
3	Red,White and Blue	Black	Green/Yellow	Orange

Where busbars are mounted horizontally the longer dimension shall be in the vertical plane. The busbars shall be designed to withstand the mechanical and thermal stresses of any possible short-circuit that could occur at that point in the system.

Rating of busbars shall not exceed 1.55A/mm^2 for copper and 1.0A/mm^2 for aluminium.

A solid copper earth bar with sufficient ways for all the earth conductors and 50% spare space shall be provided in an easily accessible position near the cable gland tray.

Where small leads are connected directly onto the busbars, such as voltmeters, fuses, etc., they shall be provided with a 20 ampere fuse mounted at the busbar and a 2 ampere at the piece of equipment.

Busbar chambers and droppers shall be segregated from each other. Also busbars shall be completely screened from any other compartment by removable bolted covers. Furthermore, the busbar supports shall divide the busbar chamber into discrete sections.

All busbar contact surfaces shall be tinned.

All bracing and other insulating material shall be non-hydroscopic.

Droppers from the busbars to the terminals of fuses or isolators must be of adequate section for the maximum rating of the isolator irrespective of the circuit rating. Colour coding will be as for main busbars. All droppers shall be fully insulated.

C4.7.4 Wiring

All internal wiring to the boards shall be carried out in PVC insulated to SANS 150 having a minimum of 7 strands per conductor, 660/1000 volt graded and colour coded to BS 158.

All terminals used shall be in accordance with the relevant clause of this specification.

All wiring shall be neatly grouped and laced. Wiring shall not be run at random but shall follow board construction features as far as is possible.

Only wires of the same phase shall be grouped or bunched together.

No excessive bunching of wiring, which will impair the current carrying capacity will be accepted.

All wiring is to be kept free and away from any exposed terminals or other un-insulated current carrying parts.

No joints will be allowed in internal wiring, and all connections to busbars or earth bars shall be made with tinned copper cable lugs soldered or crimped to the ends of the conductors and bolted to busbars by means of cadmium-plated high tensile steel bolts and nuts provided with spring washers.

Connections to terminals shall suit the connectors used, but in any case terminal clamp screws shall not bear directly on the conductor.

Crimp lugs or ferrules shall be used on all conductors exceeding 10mm^2.

Wiring of any one cubicle shall not run through other cubicles unless the wiring is run in conduit or ducting.

Wires shall be clearly marked at all termination points in accordance with the numbering of the wiring diagram, by means of numbered ferrules, or other approved method.

When the board main switch is switched off, no live incoming or other wiring shall be accessible. The incoming terminals must be screened. Where connections are taken from the incoming side of the main switch, they shall be covered by a screen marked "isolate Feeder before Removing Screen". If any circuits are energised from other sources, clear warning notices to that effect shall be fined and such terminals shall be clearly marked.

Control circuit wiring shall be run in PVC trunking where feasible and elsewhere in a strapped harness with sufficient slack at panel doors. PVC trunking with slotted sides shall be used.

Where control circuits are interlocked for sequence control the interlocking circuits shall be made through auxiliary contacts on the circuit isolator to prevent live feed back in panels that are isolated.

C4.7.5 Lamp Test Circuits

A lamp test circuit shall be provided for each board if specified.

C4.7.6 Alarm Circuits

Wiring to the numbered terminal strip shall be provided as indicated on the drawings or as specified for remote alarm and indication functions.

C4.7.7 Earthing

All boards shall be fitted with earth bars.

Free-standing boards shall be fitted with a continuous full length earth busbar. All sections of the board and all equipment on it shall be earthed.

Hinged doors having electrical equipment mounted on them shall be earthed to the board by means of a flexible earth strap.

C4.7.8 Terminals

Terminal assemblies shall consist of a metal mounting rail onto which terminal modules are fixed.

For cables up to and including 1Omm^2, clamp type terminals may be provided, but the type where the clamp screws bear directly on the conductor will not be accepted.

For conductors exceeding 1Omm^2, terminal modules suitable for crimping lugs or ferrules shall be used.

Terminal modules shall have rigid insulating barriers between poles to provide an adequate creepage path for use at 440V between adjacent poles for 380V application.

The terminals of the modules shall be large enough to accommodate the cable sizes specified.

All terminals shall be clearly marked in accordance with the working

drawings and wiring diagrams and as approved.

Additional spare terminals shall also be provided as specified or indicated on the drawings for the purpose of looping additional remote circuits, with a minimum of 20%.

C4.7.9 Lightning Arresters

Lightning arresters shall conform to SABS 171, shall bear the SABS mark, and shall be solidly earthed directly onto the main earth bar by means of a copper strap.

C4.7.10 Workshop Drawing

Workshop drawings indicating the following shall be approved by the Engineer before manufacture commences:

Boards - General

4.7.10.1 Front, side and back elevations of the boards

4.7.10.2 Typical sections through the boards

4.7.10.3 Construction details

4.7.10.4 Dimensions and construction details of board

4.7.10.5 Colour of board sections

4.7.10.6 Placing of switchgear on boards

4.7.10.7 Detail and position of legend card holder

4.7.10.8 Details and position of schematic drawing holder

4.7.10.9 Wording, position, size and colours of name strips and notices

U) Assembly and holding down details of each board

(k) Full schematic wiring diagrams showing terminal wire and component numbers and circuit designations.

Busbars

(a) Current rating

(b) Fault current rating

(c) Positions and spacings of busbars and access to busbars

(d) Dimensions of busbars

(e) Details, positions and spacing of supports

(f) Type of material of busbars and supports

(g) Busbar identification

Switchgear

(a) Minimum fault capacity of switchgear

(b) Type and manufacture of switchgear used

(c) Current and voltage transformer ratio and

VA-ratings Meters

(a) Maximum capacity of meter in A, V, kWh, etc.

(b) Type and manufacture of meter

(c) Full scale of meter

(d) Multiplication factor, if applicable.

All wiring diagrams and symbols used shall be in accordance with DIN or other approved and nationally or internationally acceptable Standards.

As-Built Drawings and Manuals

1. Instruction manual shall be complete with all relevant drawings to enable the switchgear, relays and other equipment to be dismantled and serviced, including:

(a) Descriptive pamphlets for each contactor, switch, isolator, fuse, fuse switch, timer, relay etc. installed.

(b) Names and addresses of suppliers and manufacturers of the equipment installed.

(c) Type test data for equipment installed.

One print of the drawing relevant to a board shall be placed in a plastic holder in the board or, where specified, mounted framed behind glass on a wall near the board.

C4.7.11 Installation and Erection

The boards shall be properly fixed to the floors or supporting steelwork.

The Contractor shall note sizes and positions of cable trenches and vertical shafts and shall include in his tender all supporting steelwork to straddle trenches and vertical shafts to support boards securely.

Steelwork supporting the switchgear shall be installed and positioned as indicated on the relevant drawings or as approved. The steelwork shall be painted as specified before the gear is installed. No gear shall be installed until the steelwork has been formally inspected and approved by the Engineer.

The prices for the erection of distribution boards shall include the making off and terminating of all cables and wires unless these are separately indicated for pricing.

The boards shall be properly earthed to the substation and/or building earthing system.

When aluminium core cables are used, suitable tinned copper or aluminium lugs with Densal paste shall be used for the terminations.

The Contractor will be required to balance the load as equally as possible across multiphase supplies. Balancing of loads across the three phases must be finally approved by the Engineer after commissioning.

The costs for the supply and delivery of the erection tools, materials, equipment

and consumables shall form part of the price for the erection of the boards.
All board finishes shall be made good to the satisfaction of the Engineer before final handover.

C4.7.12 Inspections, Tests and Commissioning

Each board and its components shall be subjected at the Manufacturer's works to the routine tests, called for in the appropriate SABS and BS Specifications and this Specification.
The following tests shall be performed on all circuits:

4.7.12.1 Full operational tests of opening and closing each circuit breaker and the contactor from their respective protection relays and control devices inclusive of sequence controls were required.
4.7.12.2 Pressure tests between phases and between phases and earth.
4.7.12.3 Primary injection test of all protective relays.
4.7.12.4 Secondary injection test of motor overload devices.
4.7.12.5 Pressure test of all secondary wiring at 2kV for one minute.
4.7.12.6 Polarity tests of current.

C4.8 AIR CIRCUIT BREAKERS

The air circuit breakers shall be of the three-pole with-drawable type suitable for the service voltage and fault capacity of the system.
The breakers shall be fitted with both an adjustable thermal type overload protective device and an adjustable magnetic type short circuit protective device. All devices shall be direct acting. Both trip units shall be replaceable by units of different ratings.

The circuit breaker shall be arranged for trip-free manual closing and manual electrical tripping.
Interlocking shall be provided to ensure that the breaker is fully isolated before access to any live terminals can be obtained.
The breakers shall be horizontally with-drawable allowing full maintenance and tests without the breaker having to be removed from the withdrawal mechanism.

Air circuit breakers shall have facilities for padlocking in the off position.
Interlocking shall be incorporated to allow the breaker to be operated in the withdrawn maintenance/test position, also to prevent the breaker from being closed unless fully in the engaged or test position and from being moved when the mechanism is closed.
Special equipment shall not be required to remove the circuit breaker from its withdrawal mechanism for transporting. If special equipment is required the cost

must be included in the circuit breaker price and be provided with the board.
The circuit breaker shall be fitted with a mechanically operated ON/OFF position indicator.

All non-current-carrying metal parts of the circuit breaker shall be solidly interconnected and connected to an earth contact which shall engage with a copper plate connected to the main earth bar of the switchboard, and the arrangement shall be such that the circuit breaker frame is earthed before the breaker contacts engage with the live fixed contacts.
Lockable safety shutters shall be provided to screen the fixed contacts and shall operate automatically with the movement of the circuit breaker.

C4.9 LOW VOLTAGE MOULDED CASE CIRCUIT BREAKERS (MCCB'S) AND ISOLATORS

All moulded case circuit breakers shall comply with SANS 156. All MCCB's shall be of flush panel mounting type with inverse current time delay overload characteristics and instantaneous short circuit characteristics. MCCB's shall have hydraulic/magnetic or thermal/magnetic overcurrent releases.
Single-pole circuit breakers used as double or triple-pole circuit breakers are not acceptable unless overload releases are internally coupled.

MCCB's shall be selected for the fault rating at the point of installations, but with fault ratings of 5 kA or less, MCCB's of fault current interrupting rating of 5 kA shall be installed. Smaller fault ratings will not be accepted.

Neutral bars associated with each bank of MCCB's shall be positioned below each bank and shall be wired in the same sequence as the MCCB's above.
Where spare space for MCCB's are called for, dummy MCCB's shall be used and not blank-off covers.

C4.9.1 Moulded Case Isolators

All isolators shall be of the "load, break, fault make" type, and shall be fitted with a green operating lever (or other approved colour) to distinguish isolators from circuit breakers.

C4.9.2 Earth Leakage Protection Units (Up To 100A)

All earth leakage relays shall comply with SANS 767 (Earth leakage Protection Units) Part I.
The sensitivity of units shall be as specified in the Project Specification.

C4.10 PANEL MOUNTED SWITCHES AND SELECTOR SWITCHES (For control and

metering function)

All switches and selector switches shall be capable of breaking the full load and closing onto a full system fault.

Voltmeter selector switches for a three-phase 50 Hz system must be so arranged that voltages between phases and phases to neutral, can be read, (including OFF), must be of the break-before-make type, must be fitted with a switch position plate on the panel face. Positions must be suitable for panel mounting with indicating plate.

Ammeter selector switches shall be of the make-before-break type with one "off' and three "metering" positions. When in the "off" position the metering circuits shall be connected to suitable burden resistors.

The voltmeter or ammeter selector switch shall be mounted directly adjacent to the associated meters.

C4.11 TIME SWITCHES

The contacts shall be silver-to-silver or other approved contacts rated at 20 ampere with a reserve of 8 hours minimum.

All time switches to be daily programmable with minimum 3 x 30 minute minimum duration variable "on" and "off' contact segments.

The whole mechanism is to be totally enclosed. Type 1

A suitable 24-hour night and day astronomical dial with hour indicator and two adjustable strikers, one "off' and one "on" controlling one set of changeover contacts, must be provided, except where otherwise specified.

Time switches shall be provided with "day off" facilities. Type 2

Type 2 time switches shall be similar to Type 1 specified above, but without the astronomical dial. Still with "day off" facilities, however.

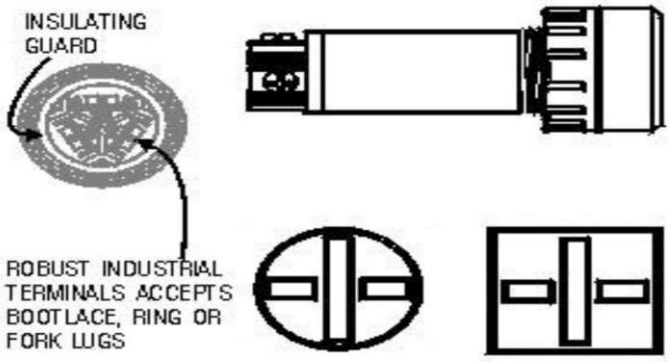
Type 3

Type 3 shall be similar to Type 2 specified above, but without "weekend off' facilities. Type 4

Moulded case type suitable for rail mounting in a distribution board and shall be equal to that manufactured by Heineman of Fuchs.

C4.11 INDICATOR LAMPS

All indicating lamps and lamp holder assemblies shall be suitable for continuous operation at the maximum site ambient temperature. The LED type with more than



one **LED** will be preferred (See figure below).

To reduce heating and fouling of the panels, lamps, which are continuously alight, shall have the minimum consumption consistent with the good visibility of indications in a brightly-lit room.

Colours of indicator lights shall be in accordance with in VOE 0113/12.73 and IEC Publication 204: 1965.

C4.12 PANEL TYPE INDICATING INSTRUMENTS

All instruments shall comply with the requirements of BS 89 for instruments of industrial grade accuracy and of the 96mm square flush mounted type.

Multi-function display meters shall be provided that display voltage, current, apparent power, real power, reactive power, power factor and energy. Current inputs shall be 5 or 6 ampere instruments or as approved.

The meter shall provide maximum demand registering, having an integrating lag of 15 minutes and instantaneous indication for all parameters.

Ammeter scales shall be direct reading with a full-scale read-out corresponding to approximately 120% of the rated circuit current. Full load rating shall be indicated with a red line on the scale plate.

Each parameter shall be marked with the appropriate phase to which it is displaying mounted in groups of three in a horizontal line.

The instrument shall be fitted with a RS485 port for simultaneous remote monitoring of all parameters.

C4.13 LV CURRENT TRANSFORMERS

Current transformers for the LV switchgear shall be of the ring type for load currents of 50 A and larger, with the primary wound type for applications smaller than 50 A. All CT's shall comply with the requirements of BS 3938 of 1973.

Current transformers for indication circuits shall be Class 1 rated in accordance with BS 3938 of 1973 dependent upon primary current. For metering applications up to primary current 200 ampere use Class 1; 200-600 ampere use Class 0,5 and 600 ampere and above use Class 0,2.

The current transformer for all outgoing circuits shall have a suitable VA-rating to match the VA-rating of the circuit.

Each current transformer shall be provided with a robust mounting bracket and proper terminal studs on the circumference of the coil for the connections.

A name plate shall be fixed to each current transformer on the circumference of the coil in such a position that it can be easily read from outside the board after removal of the

access panels. The name plate shall clearly indicate class, rating, ratio and the function of the current transformers.

The current transformers shall be mounted on rigid supports, or fixed securely to busbars. If fixed direct to busbars, the busbar must be provided with a short removable segment to facilitate future replacement.

All current transformers shall be earthed through a removable earth link.

C4.14 INSPECTIONS, TESTS AND COMMISSIONING

C4.14.1 GENERAL

The Engineer may call for the inspection or testing of all or any goods forming the subject of the Contract. The Engineer may be present or represented at any of the tests carried out at any stage during the manufacture or installation.

The Engineer reserves the right to inspect equipment in the manufacturer's works before despatch and provision should be made for this in the programming.

The Contractor shall be responsible for arranging all the tests as specified, at the appropriate times.

The Contractor shall inform the Engineer in writing at least 7

days: before commencement of tests in the factory

before despatch from the factory

before commencement of site tests and/or commissioning.

The Engineer reserves the right to attend or not to attend any of the inspections, tests or commissioning. Whether the Engineer attends these or not, written reports and test results shall be submitted to the Engineer.

The Contractor shall replace any portion of the installation which does not meet with the requirements of the Wiring Code or this Specification or the local bye-laws as may be found by test or inspection. Such replacement shall be done at his own cost.

C4.14.2 TYPE TESTS

Single copies of all type test certificates shall be submitted with the tender, or as soon as possible thereafter.

C4.14.3 ROUTINE TESTS

Four copies of all routine test certificates shall be supplied:

as soon as possible after testing in the factory and in any case not later than the delivery of the equipment to site

as soon as possible after testing on site or commissioning and in any case before handover.

C4.14.4 SPECIAL TESTS

Special tests shall be carried out as specified for specific materials, equipment or installations.

C4.14.5 TESTS AND INSPECTIONS BY LOCAL AUTHORITIES

The entire installation shall be tested after completion in accordance with the Wiring Code and any applicable by-laws of local authorities.

The Contractor shall assist the inspectors of the local authorities during any tests carried out by them and shall supply tools, instruments and consumables for testing purposes.

The Engineer reserves the right to be present at any tests and the Contractor shall inform the Engineer of all tests to enable him to be present if he so desires.

The Engineer may perform similar tests at any time and the Contractor shall render all assistance and shall provide all tools and instruments which may be required for such tests.

The work specified in this document shall not be considered to have been completed until a clearance certificate for the electrical installation has been issued by the installation inspectors of the responsible authorities.

C4.14.6 TESTING OF CIRCUITS FOR OPERATION

All protective devices shall be correctly set by the Contractor before any circuit is energised, and the Contractor is required to obtain all necessary data for ensuring the correctness of the setting.

No circuit shall be energised until it has been tested in accordance with the regulations and with this document.

No motor shall be run until the equipment is in a safe and satisfactory condition for running.

C4.14.7 OPERATIONAL AND CAPACITY TESTS

In hazardous areas the Contractor shall ensure that compliance with SABS 086 is re-established for all enclosures, glands, etc. after completion of inspection and tests before commissioning.

Full operational tests shall be carried out on all equipment, accessories, power and control circuits, mechanical and electrical interlocks, relays, overloads, under-voltage release mechanisms, other protective relays and mechanisms, fused switches, local and remote interlocking, tripping, protective and supervisory equipment, phase rotation, motor rotation directions, earthing, etc.

Tests to demonstrate the capacity specified or offered and general operating characteristics of all apparatus, etc., shall be made under the direction of the Engineer at time of final inspection under conditions imposed by him.

C4.14.8 COMMISSIONING

Commissioning of equipment and systems shall not be undertaken A damage to the equipment, systems and the building could result due to incomplete and incorrect installation work.

Commissioning procedures as stipulated by the suppliers and manufacturers of equipment shall be strictly adhered to.

The entire control system shall be adjusted and placed into operation by the control system supplier. Re-adjustments necessary to accomplish the specified results shall be carried out at no additional cost during commissioning and up to formal handover to the Employer.

The commissioning of specialised equipment such as centrifugal refrigeration machines. boilers, vacuum pumps, air compressors, etc. shall be undertaken by equipment suppliers.

All safety protection systems shall be fully commissioned, and set points properly checked out and adjusted, before equipment shall be allowed to run for commissioning purposes. The responsible commissioning Engineer shall be present to supervise the operation and adjustment of the equipment during the entire commissioning stage.

C4.14.9 ACCEPTANCE TESTS

After completion, either in a part or as a whole the complete installations shall be subject to acceptance tests by the Engineer. The Contractor shall assist the Engineer during any test carried out and must supply tools and instruments for testing purposes.

C4.14.10 TEST AND COMMISSIONING INSTRUMENTS, LABOUR AND CONSUMABLES, ETC.

All labour, power, fuel, dummy loads and all instruments and appliances that may be required for the tests and commissioning shall be provided by the Contractor.

Test instruments used to demonstrate capacities and characteristics specified or offered shall be tested for accuracy by an approved laboratory or by the manufacturer and certificates showing degree of accuracy shall be furnished to the Engineer.

If gauges, thermometers, etc., which are to be left permanently installed are used for tests, they shall not be installed until just prior to the tests to avoid possible changes in calibration.

C4.14.11 TEST AND COMMISSIONING CERTIFICATES AND RECORDS

The Engineer reserves the right to attend or not to attend any of the inspections, tests or commissioning. Whether the Engineer attends these or nor, written reports and test results shall be submitted to the Engineer.

All certificates shall be in English.

All test and commissioning forms shall be completed in rough or final form during these operations.

All test certificates are to be countersigned by the Engineer as "witnessed" or "accepted" or "seen".

Four copies of test and commissioning certificates shall be handed over to the Engineer.

Handover of the certificates and records is a prerequisite for handover of the installation.

C4.14.12 CURRENT TRANSFORMER TESTS

C4.14.12.1 General

The type and routine tests called for in IEC 60185 (BS 3938) and IEC 60044 shall be carried out as specified, excepting where modified in this subsection.

C4.14.12.2 Type Tests

(a) **Type tests previously performed**

If evidence is available of type tests previously performed on identical current transformers which meet the Employer's requirements, this may be accepted instead of these tests.

(b) **Additional type tests**

The following are required as additional type tests for protection current transformers:

(a) a magnetization curve that shall include the knee point of the curve;

(b) the secondary winding resistance referred to 75°C; and

(c) the secondary leakage reactance in the case of high-reactance current transformers. This shall be determined by the Berghahn method or other approved method, in which case details shall be submitted.

C4.14.12.3 Routine Tests

(a) **Secondary insulation and polarity tests**

In addition to the specified tests, a final check on the secondary circuit insulation and the polarity of each current transformer, in relation to the associated equipment, shall be carried out before dispatch.

A test voltage of 2kV r.m.s. shall be applied for 1 min between the external terminals of each secondary winding, or section thereof and earth; any other winding, core, frame and case (if any) all being connected together and to earth.

(b) **Impulse tests**

The current transformer shall be in position and connected as in service during the impulse tests carried out on equipment with which they are associated. All current transformers shall be short-circuited and earthed during the test.

(c) **Accuracy of protection current transformers**

The following measurements shall be recorded:

i. in the case of Class X current transformers, the exciting current shall be measured with the secondary voltage applied to the secondary winding.

ii. the secondary winding resistance referred to 75°C.

All current transformers shall be short-circuited in the factory before dispatch.

C4.14.12.4 Test Certificates

The records of all tests and measurements specified in IEC 60185 (BS 3938) including previous type tests and the corresponding current transformer serial numbers, shall be attached to the test records required for the equipment with which the current transformers are associated.

C4.15 PVC INSULATED MULTICORE CABLE TESTS

The cable sizes should be checked against cable schedules or cabling diagrams.

Checks on cable glanding arrangements shall be carried out.

Checks to be made on fuse type or breaker type and sizes.

The following routine tests shall be carried out on every length of cable without breakdown:-

(a) Voltage test - Every length of installed cable shall be tested for 5 minutes at 3 kV rms a.c. between conductors and between each conductor and the armour, which shall be earthed. The voltage shall be increased gradually and maintained at the full value for 5 minutes.

(b) Insulation resistance - After completion of the voltage test the insulation resistance between each conductor and the remaining conductors in the cable which shall be connected to the armour shall be measured and shall be not less than 18 megohms per 1000 m at 20 °C for 2.5 mm^2 cross sectional area conductors. Static equipment, which may be damaged by the test voltage, shall be shorted out.

(c) Conductor resistance - The d.c. resistance of each conductor shall be measured.

(d) Armour resistance - The d.c. resistance of the armour shall be measured.

C4.16 BATTERY CHARGER AND BATTERY TESTS

The following is to be tested/verified:

(a) Erection of the battery, battery stand and charger equipment with the cable connections and fuses.

(b) The insulation to earth of the complete installation.

(c) The battery polarity and capacity.

(d) The charger to confirm the charger's ability to recharge the battery if discharged, also the chargers ability to maintain the float charge of the battery, and not to overcharge the battery.

(e) The "low voltage" and "high voltage" alarms.

(f) Record the specific gravity and cell voltage of the battery when fully charged and also the battery test apparatus.

C4.17 ON LOAD TESTING OF EQUIPMENT

In view of the hazards inherent in these tests, they are to be carried out under the direct supervision of the Engineer and/or the Employer.

Operation and stability tests are required for on load commissioning of unit type protection, tap changers, etc.

These tests are to be made after the protective gear has been placed in service to ensure that all connections and test links have been replaced and test leads removed as well as to confirm the integrity of the CT circuits. Where necessary, voltage readings should be taken at the terminals on each relay to ensure that loop connections between the relay are complete.

Special attention should be paid to broken delta voltages and residual current circuits where zero voltage or current respectively may not proof of the completeness of the circuit.

C4.18 WORK TESTS

The approval by the Engineer of the results of inspection and tests shall not relieve the Contractor of his obligations under the contract for the satisfactory performance of the testing and commissioning.

The Engineer reserves the right to call for further tests, which are in his opinion necessary to confirm satisfactory performance. Tests shall as far as possible simulate site conditions.

Routine tests will be required on all equipment as described in this Section.

Except where otherwise indicated, all electrical tests shall be carried out at rated frequency with an approximately sinusoidal waveform.

All instruments shall be approved by the Engineer and if required shall be calibrated at the Contractor's expense.

C4.19 SITE TESTS

The site test program shall confirm that the installation complies with the following: "The equipment, as supplied and erected, shall be satisfactory within the appropriate limiting conditions as defined in the various Contract Specifications".

On completion of these tests it shall be possible for the installation to be taken over and put to work without any further attention.

C4.19.1 Procedure

A program of tests shall be agreed between the Contractor and the Engineer, in conjunction with the erection and commissioning program.

Details of the tests to be carried out shall be agreed between the Contractor and the Engineer and the Contractor shall provide a complete set of test forms, which shall be approved by the Engineer, before testing commences.

A test form listing general checks shall be provided for each item of equipment. The test forms shall show the type of equipment being tested and serial number or other identifying mark. Provision shall be made on the form for recording all the test results.

The Contractor shall record the results of the test clearly, on the approved from and with clear references to the equipment and items to which they refer, so that the record can be used as the basis for maintenance tests during the working life of the equipment. Four copies of site test result records shall be provided by the Contractor to the Engineer as soon as possible after completion of the tests.

No tests as agreed under the program of tests shall be waived except upon the instruction or agreement of the Engineer in writing.

C4.19.2 Engineer's Obligations

The Engineer shall have the right to witness all tests. In cases where the Engineer fails to attend at any time or place duly appointed and the Contractor proceeds in the Engineer's absence, the Contractor shall, if so required by the Engineer, carry out repeat tests. If the original and repeat tests are satisfactory all reasonable expenses, which the Contractor has incurred in re-testing, will be borne by the Employer. If the re-testing is unsatisfactory, the costs will be borne by the Contractor.

Where overall tests are involved requiring more than one Contractor's co-operation, the test program shall be coordinated by the Engineer.

If he so desires, the Employer may nominate his representative(s) to accompany the Contractor during testing. The Contractor shall be advised by the Engineer of the proposed date when any item of equipment is to be made alive for the first time, in order that the Contractor may be present.

C4.19.3 Records of Equipment Checks and Tests

Immediately after completion of the tests, the Contractor shall hand to the Engineer a readable copy of the test results taken on site. These results shall be recorded in Test Schedules.

Four fair copies of Test Result and checks shall be prepared by the Contractor, and forwarded to the Engineer.

The following data shall be recorded for each piece of equipment tested:- the Contact Number; substation, the circuit or section, the Contractor's signature and the Engineer's acceptance.

General details of the plant should be recorded, including serial numbers, ratings, manufacturer's names.

C4.19.4 Wiring

Insulation Resistance Tests at 500 V DC are to be carried out on all a.c. and d.c. protection, control, alarm and indication circuits to ensure that wiring is in satisfactory condition. It is desirable to measure the insulation of all circuits before proceeding with other tests and it is essential that all a.c. and d.c. wiring associated with protective gear is proved, relay contacts and auxiliary contacts, etc. be closed, as necessary, to ensure this. The following tests should be carried out:-

4.19.4.1 Insulation resistance of current transformer circuits.

4.19.4.2 Insulation resistance of voltage transformer circuits.

4.19.4.3 Insulation resistance of d.c. circuits.

4.19.4.4 Insulation resistance of d.c. circuits.

4.19.4.5 Insulation resistance between CT and VT circuits.

4.19.4.6 Insulation resistance between d.c. and VT circuits.

4.19.4.7 Insulation resistance between d.c. and CT circuits.

When measuring the insulation resistance to earth of individual circuits, all the other circuits should be normal e.g. earth link closed and d.c. circuits normal. This will ensure that the insulation of a circuit is satisfactory, both to earth and to all other circuits.

When testing the d.c. wiring, it may be necessary to remove the battery earth fault alarm from the circuits. If this is done, the battery should be earthed via a high resistance for example a voltmeter to earth during testing.

Static equipment, which may be damaged by the application of test voltages, may have the appropriate terminals shorted.

Inter - relay, inter - unit and cubicle wiring carried out at Site is to be checked to the appropriate circuit and/or wiring diagram. Where it is found necessary during pre-commissioning work to effect site modifications to the secondary wiring, site copies of the appropriate schematic and wiring diagrams are to be suitably amended and agreed with the Engineer in all circumstances before the circuit is commissioned.

Loop resistance measurements are to be made on all CT circuits associated with circulating current-type protection. These values are necessary to establish the operating characteristics of the protective scheme and should be checked against the manufacturers' calculated figures. Separate values are required for CT and lead burdens and all measurements are to be recorded on lead resistance diagrams. Pilot impedance and phase angle measurements shall be made on pilot cables to be used with unit type protection.

Mechanical Inspection of Relays

All relays are to be examined, care being taken before opening relay cases to ensure that no foreign matter can fall inside. The room should be as dust - free as possible. Checks must be made to ensure that relays comply with the following:-

Contacts are clean and have adequate wipe.

All contacts make simultaneously.

The resetting times are within prescribed limits for the relay.

Flag mechanisms operate in correct sequence with respect to contacts.

Relay cover glass and gasket provide effective seal

Labeling and phase colours are correct.

Labeling and phase colours are correct.

4.19.4.8 CT shorting and d.c. isolating contacts or switches in withdrawal relay cases operate satisfactorily.

It is not recommended that moving coil type relays are interfered with manually unless a defect is revealed by secondary injection.

C4.19.5 Secondary Injection of Protection Circuits

Secondary injection is to be carried out on all a.c. relays, using voltage and current of sinusoidal waveform. The use of "tailor made" proven test equipment may be necessary.

Secondary current and voltage measurement are normally to be made by an instrument of known accuracy conforming to the relevant IEC Recommendation.

Except in the case of long time earth fault elements the minimum operating current for induction disc type relays should not exceed 130% of relay setting and these relays should not start their timing function at a current equal to or less than the relay setting. For long time earth fault elements the minimum operating current should not exceed 110% of the relay setting and the time function should not start at a current equal to or less than 75% of the relay setting at the highest time - multiplier setting and at a current setting of 100% for relay with a 50% - 200% range, 40% for relays with a 20% - 80% range, and 25% for relays with a 10% - 40% range. Where applicable, the operate and reset values for attracted armature relays are to be taken at design settings only.

For circulating current protection employing high impedance voltage operated relays, the points of injection for relay voltage setting tests should be across the relay and stabilizing resistance. The fault setting for this type of protection is to be established by secondary injection, where it is impracticable to ascertain this value by primary injection. Injection is to be made across the appropriate relay bus wires with all associated relays, setting resistors, and CT's connected.

C4.19.6 Tests on DC Circuits

Tests are to be carried out to ensure that:-

4.19.6.1 The polarity of d.c. incoming supplies to panels, cubicles, etc. is correct.

4.19.6.2 All relays, which either perform a tripping function, or control a tripping or measuring function in a protective scheme operate at 60% normal volts. This test is to be carried out as an overall test at reduced voltage.

4.19.6.3 All relays other than those specified in (a) above operate at standing battery voltage.

4.19.6.4 All protective and tripping relay and where applicable all control, alarm and indicating relays, correctly operate the appropriate indicators and auxiliary relays.

4.19.6.5 All functional links, fuses, auxiliary switches, changeover switches etc., provide the design isolation and are correctly labeled.

C.4.20 STANDARDS AND CODES OF PRACTICE

C4.20.1 CONTRACTUAL & LEGAL (SOUTH AFRICA):

i) **SAICE General Conditions of Contract (GCC 2015)** – Conditions of contract for construction works. (GCC 2004 may apply if specifically mandated by the Employer).
ii) **Occupational Health and Safety Act 85 of 1993** – Framework legislation.
iii) **Construction Regulations, 2014** – Duties of client, principal contractor, safety files, permits.
iv) **Electrical Installation Regulations, 2009** – Certification and compliance of electrical installations.
v) **Driven Machinery Regulations, 2015** – Lifting, hoisting and driven equipment.
vi) **Pressure Equipment Regulations & SANS 347** – Classification and control of pressure equipment, incl. chlorine cylinders.
vii) **Hazardous Chemical Agents Regulations, 2021** – Labelling, SDS, monitoring, training, aligned with GHS (SANS 10234).
viii) **Red Book (CSIR Guidelines for Human Settlement Planning & Design)** – Municipal services and urban infrastructure planning reference.

C4.20.2 CIVIL AND STRUCTURAL

i) Guidelines for Human Settlement Planning and Design (“Red Book”, CSIR).
ii) SANS 1200 series: Standardized Specifications for Civil Engineering Construction (all relevant parts including earthworks, concrete, structural steelwork, pipe trenches, etc.).
iii) SANS 2001 series (where applicable as replacements for SANS 1200).
iv) SANS 10100: Concrete design and construction.
v) SANS 10162: Structural steel design.

C4.20.3 PIPES, FITTINGS AND VALVES

i) SANS 719: Welded low-carbon steel pipes for aqueous fluids.
ii) AWWA C200: Steel water pipe (spiral/longitudinal welded).
iii) AWWA C210 / C213: Liquid-epoxy and fusion-bonded epoxy coatings for steel pipe.
iv) AS 4321: Fusion-bonded medium-density polyethylene coating/lining (only where specifically called for).
v) SANS 4427: Polyethylene pipes for water supply.
vi) SANS 966-1: UPVC pressure pipe for potable water.
vii) SANS/SABS 1123: Flanges.
viii) SANS 664 / SANS 665: Valves for waterworks.

C4.20.4 MECHANICAL EQUIPMENT

i) ISO 9906: Pump performance acceptance tests.
ii) ISO 5199: Centrifugal pump construction requirements.
iii) ISO 20816 (ex ISO 10816): Mechanical vibration limits for pumps, aerators and mixers.
iv) SANS 10298: Gas chlorination installations.
v) ISO 8501 / ISO 12944: Surface preparation and corrosion protection of steel structures.
vi) SANS 121 / ISO 1461: Hot-dip galvanizing.

C4.20.5 ELECTRICAL AND INSTRUMENTATION

i) SANS 10142-1: Wiring of premises (low-voltage installations).
ii) IEC 60034 series: Rotating electrical machines (ratings, performance, efficiency).
iii) IEC 60529: Degrees of protection (IP codes).
iv) IEC 61800-5-1: Adjustable speed drive systems (safety).
v) ISO 4064 / OIML R49: Electromagnetic flowmeter accuracy and verification.

C4.20.6 WELDING AND QA

i) ISO 9606-1: Qualification of welders (fusion welding of steels).
ii) ISO 14731: Welding coordination requirements.
iii) ISO 9712: Qualification and certification of NDT personnel.

C4.20.7 CORROSION AND PROTECTIVE COATINGS

i) ISO 12944: Corrosion protection of steel structures by protective paint systems.
ii) ISO 8501: Surface preparation standards for steel substrates.
iii) SANS 121 / ISO 1461: Hot-dip galvanizing.

C4.21 DESIGN & SPECIFICATIONS

C4.21.1 MECHANICAL EQUIPMENT

Vertical Shaft Mixer – Pre-Anaerobic Reactor (1 x 2.2 kW duty)

- **Duty:** Vertical shaft, non-clogging mixer for continuous mixing in raw wastewater within the Pre-Anaerobic Reactor.
- **Motor:** 2.2 kW, 380 V ±10%, 3-phase, 50 Hz, S1 duty, IP55, Class F insulation. DOL starter.
- **Shaft:** Approx. 4,200 mm, designed for operation at 4,800 mm water depth, Mild steel (low-carbon steel), dynamically balanced.
- **Impeller:** Mild steel (low-carbon steel), dynamically balanced, non-clogging, hydraulically efficient.
- **Seals:** Cartridge mechanical seal, SiC/SiC faces, Viton elastomers.

- **Bearings:** Heavy-duty, sealed-for-life or grease-lubricated, L10 life >50,000 hrs, suitable for axial and radial loads.
- **Coatings:** All wetted parts to be grit-blasted to SA 2½ and coated with a multi-layer epoxy system to a minimum 400 µm DFT, consisting of zinc-rich primer, high-build epoxy intermediates, and epoxy/PU topcoat suitable for wastewater immersion.
- **Testing:** Vibration levels ≤4.5 mm/s RMS (ISO 10816), noise ≤85 dBA @ 1 m.
- **Documentation:** Shop drawings, O&M manuals, and commissioning test reports.

C4.21.2 Vertical Shaft Mixer – Anaerobic Reactor (2 x 4.0 kW duty)

- **Duty:** Continuous mixing in Anaerobic Reactor.
- **Motor:** 4.0 kW, 380 V ±10%, 3-phase, 50 Hz, S1 duty, IP55, Class F, DOL starter.
- **Shaft & Impeller:** As per 2.2.1.1.
- **Seals & Bearings:** As per 2.2.1.1.
- **Coating:** As per 2.2.1.1
- **Testing:** As per 2.2.1.1
- **Documentation:** As per 2.2.1.1

C4.21.3 Vertical Shaft Mixer –Anoxic Reactor (4 x 5.5 kW duty)

- **Duty:** Heavy-duty continuous mixing in Anoxic Reactor.
- **Motor:** 5.5 kW, 380 V, 3-phase, 50 Hz, S1 duty, IP55, Class F, DOL starter.
- **Shaft & Impeller:** As per 2.2.1.1.
- **Seals & Bearings:** As per 2.2.1.1.
- **Coating:** As per 2.2.1.1
- **Testing:** As per 2.2.1.1
- **Documentation:** As per 2.2.1.1

C4.21.4 Surface Aerator – Pre-Anoxic Tank (2 x 30 kW duty)

- **Duty:** Low-speed, fixed surface aerator for oxygen transfer and mixing.
- **Motor:** 30 kW, 380 V, 3-phase, 50 Hz, IP55, Class F, S1 duty, VSD starter.
- **Speed:** ≤56 RPM.
- **Gearbox:** Hansen or equivalent heavy-duty parallel shaft, service factor ≥1.5, oil-bath lubricated.
- **Impeller:** Mild steel (low-carbon steel), dynamically balanced.
- **Coatings:** All wetted parts to be grit-blasted to SA 2½ and coated with a multi-layer epoxy system to a minimum 400 µm DFT, consisting of zinc-rich primer, high-build epoxy intermediates, and epoxy/PU topcoat suitable for wastewater immersion
- **Mounting:** Galvanized bridge/support with walkway access and safety rails.
- **Bearings:** Spherical roller, regreasable, L10 >100,000 hrs.
- **Controls:** DO / VSD integrated. On/Off. Speed control by oxygen concentration input. 4-20mA. 4A = 40% speed. 20mA = max speed.

- **Protection:** Torque overload trip and high vibration shutdown interlock.
- **Performance:** Oxygen transfer efficiency ≥1.8 kg O_2/kWh.

C4.21.5 Surface Aerator – Reactor Tank (2 x 22 kW duty)

- **Duty:** Low-speed, fixed surface aerator for oxygen transfer and mixing.
- **Motor:** 22 kW, 380 V, 3-phase, 50 Hz, IP55, Class F, S1 duty, VSD starter.
- **Speed:** ≤56 RPM.
    - **Gearbox:** Hansen or equivalent heavy-duty parallel shaft, service factor ≥1.5, oil-bath lubricated.
- **Impeller:** Mild steel (low-carbon steel), dynamically balanced.
    - **Coatings:** All wetted parts to be grit-blasted to SA 2½ and coated with a multi-layer epoxy system to a minimum 400 µm DFT, consisting of zinc-rich primer, high-build epoxy intermediates, and epoxy/PU topcoat suitable for wastewater immersion
- **Mounting:** Galvanized bridge/support with walkway access and safety rails.
- **Bearings:** Spherical roller, regreasable, L10 >100,000 hrs.
    - **Controls:** DO / VSD integrated. On/Off. Speed control by oxygen concentration input. 4-20mA. 4A = 40% speed. 20mA = max speed.
- **Protection:** Torque overload trip and high vibration shutdown interlock.
- **Performance:** Oxygen transfer efficiency ≥1.8 kg O_2/kWh

C4.21.6 Axial Flow Pumps (3 × 7.5 kW; 2 Duty + 1 Standby)

- **Duty:** Axial flow circulation pumps for reactor/balancing tank.
- **Duty Point:**
- **Motor:** 7.5 kW, 380 V, 3-phase, 50 Hz, IP55, Class F, continuous duty, DOL starter.
- **Construction:** Mild steel (low-carbon steel), dynamically balanced casing and impeller, draft tube 500 mm, replaceable shaft sleeve.
- **Coatings:** All wetted parts to be grit-blasted to SA 2½ and coated with a multi-layer epoxy system to a minimum 400 µm DFT, consisting of zinc-rich primer, high-build epoxy intermediates, and epoxy/PU topcoat suitable for wastewater immersion
- **Bearings:** Heavy-duty thrust and guide bearings, L10 life >50,000 hrs.
- **Seals:** Cartridge mechanical seals, SiC/SiC.
- **Mounting:** Existing draft tube arrangement, contractor to verify all dimensions.
- **Accessories:** Guide columns, discharge elbow, lifting beam and chain hoist.
- **Testing:** Hydraulic performance, vibration <4.5 mm/s, alignment check.

C4.21.7 Commissioning – Reactors & Balancing Tank

- **Scope**: Commissioning of mixers, aerators, and axial flow pumps.
- **Procedure**: Functional rotation checks, vibration/noise testing, insulation resistance testing, VSD/DO system integration, load tests, and final process performance test.
- **Documentation**: OEM commissioning certificates, vibration records, O&M manuals, as-built drawings.
- **Training:** On-site training session for operators on operation and maintenance procedures.

C4.21.8 General Mechanical Requirements

- All equipment shall comply with **IEC/ISO standards** and **SANS requirements**.
- All carbon steel shall be protected with a **minimum 300 µm DFT epoxy system** for wastewater service or as specifically specified under the item section.
- Factory Acceptance Test (FAT) certificates to be submitted prior to delivery.
- Site Acceptance Test (SAT) to be performed for all equipment.
- Max allowable vibration: **≤ 4.5 mm/s RMS**.
- Max noise: **≤85 dBA @ 1 m**.
- Contractor to provide:
  - Complete O&M manuals and as-built drawings.
  - Warranty: **12 months from commissioning**.

C4.21.9 Reactor Feed Pumps (3 × 11 kW)

- **Duty:** Self-priming sewage pumps for reactor feed service, arranged 2 duty + 1 standby. 1 Duty pumps act as an aerator for the balancing tank by circulating sewage in tank.
- **Duty Point:** Q = 195m3/hr, H = 5.5m
- **Motor:** 11 kW, 380 V, 3-phase, 50 Hz, S1 duty, IP55, Class F insulation, star/delta starter, VSD compatible.
- **Pump Construction:**
  - Casing: Ductile iron ASTM A536 65-45-12, epoxy-coated internally and externally (300 µm DFT).
  - Impeller: Semi-open, multi-vane, ductile iron or bronze, replaceable, capable of handling solids without clogging.
  - Shaft Sleeve: Replaceable stainless-steel sleeve.
  - Seal: Cartridge mechanical seal, carbon/ceramic with Buna-N elastomers (SiC/SiC with Viton optional).
  - Bearings: Heavy-duty ball bearings, oil-lubricated, L10 life >50,000 hrs.
  - Maintenance: Pump fitted with removable inspection cover plate for clearance adjustment without disturbing pipework.
- **Mounting:** Pump and motor on common baseplate with flexible coupling and guard.

- **Instrumentation:** 100 mm stainless steel pressure gauge with chemical seal.
- **Flow Meter:** 150 mm electromagnetic, PTFE lined, ±0.5% accuracy.
- **Controls:** Automatic start/stop by ultrasonic level controller in wet well (local control panel).
- **Testing:** Hydrostatic test, **laser alignment**, performance test under duty point.

C4.21.10 RAS Pumps – Main Pump Station (2 × 11 kW)

- **Duty:** Self-priming sewage pumps for Return Activated Sludge pumps, arranged duty + standby.
- **Duty Point:** Q = 195m3/hr, H = 4.5m
- **Motor:** 11 kW, 380 V, 3-phase, 50 Hz, S1 duty, IP55, Class F, star/delta starter.
- **Pump Construction:** As per Item 2.2.1.9.
- **Instrumentation:** 100 mm stainless steel pressure gauge with chemical seal.
- **Flow Meter:** 150 mm electromagnetic, PTFE lined, ±0.5%
- **Controls:** Automatic start/stop by ultrasonic level controller in wet well (local panel).
- **Mounting:** Baseplate-mounted with flexible coupling and guard.
- **Testing:** Hydrostatic test, **laser alignment**, performance test under duty point.

C4.21.11 WAS Pumps (2 × 2.2 kW)

- **Duty:** Self-priming sewage pumps for Waste Activated Sludge pumps, arranged duty + standby.
- **Duty Point:** Q = 30m3/hr, H = 3.5m
- **Motor:** 2.2 kW, 380 V, 3-phase, 50 Hz, S1 duty, IP55, Class F insulation, DOL starter.
- **Pump Construction:**
  - Casing: Ductile iron epoxy-coated.
  - Impeller: Semi-open ductile iron or bronze, replaceable.
  - Shaft sleeve, bearings, seal, and inspection cover as per Item 2.2.1.9.
- **Instrumentation:** 100 mm stainless steel pressure gauge with chemical seal.
- **Flow Meter:** 150 mm electromagnetic, PTFE lined, ±0.5%
- **Controls:** Automatic start/stop by ultrasonic probe or float switches (local panel).
- **Testing:** Hydrostatic test, **laser alignment**, performance test under duty point.

C4.21.12 Biofilter Recycle Pumps (2 × 15 kW)

- **Duty:** Self-priming sewage pumps for Biofilter recycle duty, arranged duty + standby.
- **Duty Point:** Q = 150m3/hr, H = 7.0m
- **Motor:** 15 kW, 380 V, 3-phase, 50 Hz, S1 duty, IP55, Class F, star/delta starter.
- **Pump Construction:** As per Item 2.2.1.9.
- **Instrumentation:** 100 mm stainless steel pressure gauge with chemical seal.
- **Flow Meter:** 150 mm electromagnetic, PTFE lined, ±0.5%.

- **Controls:** Automatic start/stop by ultrasonic level controller in wet well (local panel).
- **Mounting:** Baseplate with flexible coupling and guard.
- **Testing:** Hydrostatic test, **laser alignment**, performance test under duty point.

C4.21.13 Anoxic Return Pumps (2 × 7.5 kW)

- **Duty:** Self-priming sewage pumps for Anoxic return pumps, arranged duty + standby.
- **Duty Point:** Q = 75m3/hr, H = 4.5m
- **Motor:** 7.5 kW, 380 V, 3-phase, 50 Hz, S1 duty, IP55, Class F insulation, DOL starter.
- **Pump Construction:** As per Item 2.2.1.9.
- **Performance:** Sized to return anoxic recycle flow, preventing sludge settlement.
- **Instrumentation:** 100 mm stainless steel pressure gauge with chemical seal.
- **Flow Meter:** 150 mm electromagnetic, PTFE lined, ±0.5%.
- **Controls:** Automatic start/stop by ultrasonic level controller in wet well (local panel).
- **Testing:** Hydrostatic test, **laser alignment**, performance test under duty point.

C4.21.14 Clear Water Pumps (2 × 11 kW)

- **Duty:** Self-priming sewage pumps for Clear water pumps, arranged duty + standby.
- **Duty Point:** Q = 195m3/hr, H = 5.5m
- **Motor:** 11 kW, 380 V, 3-phase, 50 Hz, S1 duty, IP55, Class F insulation, star/delta starter.
- **Pump Construction:** As per Item 2.2.1.9, with bronze or ductile iron impeller acceptable for clear water duty.
- **Mounting:** Baseplate-mounted with flexible coupling, guard, and vibration isolators.
- **Instrumentation:** 100 mm stainless steel pressure gauge with chemical seal.
- **Flow Meter:** 150 mm electromagnetic, PTFE lined, ±0.5%.
- **Controls:** Local ultrasonic level control panel for pump automation.
- **Testing:** Hydrostatic test, **laser alignment**, performance test under duty point.

C4.22 CLARIFIERS

C4.22.1 Service and Refurbishment of Peripheral Driven Clarifier Bridge

- **Scope:** Refurbishment of the complete clarifier drive system and bridge, including inspection, mechanical servicing, replacement of worn components, protective coating, alignment checks, and recommissioning.
- **Mechanical Components:**
  - Inspect and overhaul drive gearbox, drive shaft, couplings, sprockets, wheels, and end carriages.
  - Replace worn bearings, bushes, seals, chains, sprockets, and couplings with OEM or approved equivalent spares.

- Provide **torque overload protection device** (shear pin, torque limiter, or electronic load monitor).
- All drive units to be fitted with **flexible couplings** and guards; shafts aligned with **laser alignment** equipment.

- **Structural Components:**
  - Blast-clean all exposed steelwork to ISO 8501-1 Sa 2.5.
  - Apply approved **3-coat epoxy paint system**, minimum 300 µm DFT, suitable for immersion and wastewater environment (ISO 12944 C5).
  - Inspect, tighten, or replace corroded bolts, nuts, and fasteners.
  - Repair/replace damaged or corroded walkway panels, handrails, and toe boards.
  - All safety rails to be recoated with **high-visibility epoxy paint**.
- **Underwater Steelwork:**
  - Scum baffles, weir plates, and submerged scraper arms to be refurbished or replaced in **stainless steel 316L**.
  - Epoxy coat all remaining submerged carbon steel (min. 300 µm DFT).
- **Lubrication & Maintenance:**
  - Lubricate all moving parts using OEM-approved lubricants.
  - Extend grease lines to walkway level for safe future servicing.
- **Electrical & Safety Systems:**
  - Inspect and refurbish cabling, junction boxes, and flexible connections.
  - Verify correct operation of **emergency stop systems, limit switches, and interlocks**.
- **Testing & Commissioning:**
  - Alignment and free rotation check of bridge.
  - Functional operation of drive unit under full torque load.
  - Final test report with photographic records and list of replaced/serviced items.
- **Documentation:**

  Submit a refurbishment report including observations, torque test results, and recommendations for future maintenance.

C4.22.2 Replacement of Clarifier Drive Motor (0.75 kW)

- **Motor:**
  - 0.75 kW, 380 V, 3-phase, 50 Hz, S1 duty, IP55, Class F insulation.
  - High-efficiency IE3 motor.
  - DOL starter with overload protection.
- **Coupling:** Flexible coupling with guard, aligned using **laser alignment** equipment.
- **Mounting:** Weatherproof drive housing, outdoor duty, minimum IP55.
- **Protection:** Motor to be fitted with thermal overload relay and torque overload interlock.

- **Testing:** Direction of rotation check, insulation resistance test, vibration measurement.
- **Commissioning:** Integration into clarifier drive system, functional test under torque load, and certification of performance.

C4.23 CHLORINATION

It is proposed to dose chlorine gas at the chlorine contact channels shown on the drawings. The dosing equipment is to be installed in the Chlorination Building provided. The chlorine equipment will be sized to dose a maximum of 3ppm at peak flow. The turn down ration on the flow controllers are high, so the dosing range will be 0.1 ppm to 3 ppm.

The installation shall be based upon gaseous abstraction from 70kg cylinders and shall comprise separate "Pressure" and "Vacuum" rooms.

Chlorine storage and dosing equipment shall be located in "Pressure" and "Vacuum compartments. The motive water pumps and MCC shall be located in the pump room as indicated on the drawings.

Provision shall be made for chlorination at the following points:

- Post-chlorination after the filters.

A Chlorinator shall be provided for post- chlorination which shall be of similar capacity. A common standby chlorinator shall be provided for the post chlorination.

All materials shall be suitable for the intended purpose.

The minimum chlorine installation requirements shall be:

A. "Pressure Room"

- Pipe manifold to accommodate a DUTY/STANDBY bank of 70kg cylinders. Each bank will consist of 3 No. * 70kgcylinders each side of the auto change-over unit. The manifolds shall incorporate heated drip tubes to prevent condensation.
- One each manifold, near the end of the manifold before the automatic change-over device will be a vacuum regulator installed rated for 1kg/h dosing
- The pipe manifolds shall terminate with an end plug to enable periodic purging of the line using nitrogen.
- 1 No. nitrogen cylinder 30 kg.
- Each "pigtail" shall have an isolating valve on each end to prevent chlorine loss during cylinder change.
- A safety shut down valve system shall be installed on each of the operational cylinders, both on the duty and standby manifolds. The safety valves shall be of pneumatic type

suitable for use on gaseous chlorine, energized from a dedicated compressed air accumulator to enable the duty cylinders to be shut down in the event of a chlorine leak even if there is a power failure. The plug valve shall be equipped to indicate valve status on SCADA. The safety valves will be MANUALLY reset by hand once the alarm has been cleared.

- The manifolds shall be plumbed into an "auto-change-over".
- Two scales shall be provided, each of to handle a 70kg chlorine drum on each of the manifold. The display unit of the scales shall be equipped with 4-20 mA output to the PLC for indication. Each of the scales should be able to ZERO on empty bottles to indicate only the actual weight of the gas inside each chlorine drum.
- The room shall be equipped with 2No suitably rated fans which shall discharge externally at an elevated level (2m above roof) via a vermin and weather-proof PVC duct. The fans will operate on timer based. The fans will be operational on intervals for a set period of time. During High level alarm from the leak detectors, the fans shall shut down. The philosophy followed here will be containment.

B. "Vacuum Room"

- 2 No. (duty: 1 standby) chlorine chlorinators are required for the installation; each sized for 2 kg/h. The chlorinators shall be equipped with 4-20mA inputs to enable "proportional to flow" control. The chlorine dosage rate shall be remotely input. The chlorinators shall be 220V 50Hz rated.
- Two (1) 4kg/h ejector will be installed, one for post-dosing
- 1Duty: 1standby (400V) motive water pump system with a duty to suit. In order to size the motive water pumps, tenderers may assume that the available pressure at dosing points are 0.5bar backpressure minimum.
- Motive water PVC pipework shall be 50mm minimum and shall include for suction and delivery isolating valves, in-line strainers and delivery non-return valves and ejectors based upon the Contractor's design.

Chlorine Safety Equipment

The following minimum safety equipment shall be installed at the chlorine dosing facility:

- Chlorine leak detector sensors complete with analyzer (2No); one located in the pressure room and one located in the vacuum room. The chlorine detector shall trigger an audible alarm and visual alarm located at the chorine house, close the plug valves on duty cylinders.
- Foot activated safety shower (1No) complete with a water supply from the potable

- water elevated tank.
- Eye bath (1 No).
- Two sets of approved breathing apparatus for emergency use.
- Two ammonia torches.
- Safety signage in order to ensure compliance as a major hazardous installation.

C4.24 EXISTING BIOFILTER

C4.24.1 REPLACEMENT OF OVERHEAD SPREADER ARMS

- **Scope:** Removal of existing spreader arms and installation of new rotating, self-propelled overhead spreader arms suitable for biofilter application.
- **Duty:** Even distribution of settled sewage over the biofilter medium bed.
- **Capacity:** Sized for **4.5 ML/day** WWTW flow capacity.
- **Construction:**
  - Spreader arms fabricated from **Carbon Steel**, designed for wastewater service.
  - Bearings: Heavy-duty, self-lubricating type, sealed for life.
  - Drive nozzles designed for jet propulsion using hydraulic energy from incoming wastewater.
  - Nozzles replaceable, with interchangeable inserts for flow calibration.
- **Balancing:** Arms dynamically balanced to minimise vibration during rotation.
- **Mounting & Support:** Designed to integrate with existing biofilter central column and bridge structure.
- **Installation:** Contractor to align new arms with central column and verify smooth rotation prior to commissioning.
- **Testing & Commissioning:** Functional rotation test at full design flow; performance test to demonstrate even distribution over full bed area.
- **Documentation:** Shop drawings, O&M manuals, and test certificates to be provided prior to handover.

C4.25 INLET WORKS

C4.25.1 Channel Grinder and Auger

- **Scope:** Supply, delivery, removal of existing unit, and installation of a new combined channel grinder and auger, sized for **4.5 ML/day** flow.
- **Duty:** Shredding of rags and fibrous material, conveying screenings via auger to disposal chute.
- **Construction:**
  - Grinder cutters manufactured from **hardened stainless steel (minimum 400 HB)**.
  - Auger flights from **stainless steel 304/316**, wear-resistant, with replaceable liners.
  - Frame: Hot-dip galvanised or 316 SS.

- **Motor & Drive:**
  - Grinder motor: Sized as per duty (minimum 5.5 kW recommended).
  - Auger motor: Sized for conveying capacity, approx. 2.2–3.0 kW.
  - Motors: 380 V, 3-phase, 50 Hz, IP55, Class F, S1 duty.
- **Controls:** Local control panel with overload protection and emergency stop.
- **Verification:** Contractor to confirm channel dimensions prior to fabrication and installation.
- **Commissioning:** Functional test with raw sewage to verify shredding and conveyance.

C4.25.2 Degritter System

- **Scope:** Removal of existing degritter and installation of new grit removal system into existing cone-shaped degritter structure.
- **Duty:** Separation of grit and heavy solids from incoming sewage prior to biological treatment.
- **Capacity:** Sized for **4.5 ML/day** flow.
- **Construction:**
  - Tank fabricated from epoxy-coated mild steel or 316 SS.
  - Screw classifier/airlift mechanism in **304/316 stainless steel**.
  - Wear parts replaceable.
- **Motor & Drive:**
  - Screw classifier motor: 1.5–2.2 kW, 380 V, 3-phase, 50 Hz, IP55, S1 duty.
- **Controls:** Automated grit removal cycle with adjustable timer and manual override.
- **Installation:** Contractor to ensure leak-tight connections to existing inlet/outlet pipes.
- **Commissioning:** Performance test to confirm grit removal efficiency ≥95% for particles ≥200 µm.

C4.25.3 Grinder Unit for Mechanical Screen

- **Scope:** Supply, delivery, removal of existing unit, and installation of new grinder unit downstream of mechanical screen.
- **Duty:** Shredding of screenings to protect downstream pumps and processes.
- **Construction:**
  - Cutting elements fabricated from hardened stainless steel.
  - Housing fabricated from 316 SS.
- **Motor & Drive:**
  - 5.5–7.5 kW motor, 380 V, 3-phase, 50 Hz, IP55, S1 duty.
- **Controls:** Integrated with screen control panel, with overload trip, auto-reverse on jam detection.
- **Commissioning:** Verification with raw sewage flow, demonstrating shredding efficiency.

C4.25.4 Grit Classifier

- **Scope:** Supply, delivery, and installation of new grit classifier for dewatering separated grit.
- **Duty:** Receiving grit slurry from degritter, washing, and dewatering before disposal.
- **Construction:**
  - Conveyor screw fabricated from 316 SS with wear-resistant liners.
  - Tank fabricated from epoxy-coated mild steel or 316 SS.
- **Motor & Drive:**
  - 1.5–2.2 kW, 380 V, 3-phase, 50 Hz, IP55, S1 duty.
- **Controls:** Automatic start/stop linked to degritter operation.
- **Commissioning:** Test with grit slurry to confirm dryness ≥90% solids removal.

C4.26 WWTW INTERCONNECTED PIPELINES

The interconnecting pipelines will consist of the following:

- 400mm Ø HDPE CL PN 8 PE 100 – Length = 100m

See drawing F0061-02-A101 for details.

C4.27 CONCRETE:

All water retaining structure shall have a cube strength of 35 MPa at 28 days. All other structures shall have a cube strength of 30 MPa at 28 days. The concrete shall be rendered workable (75mm slump) through selections of the correct cement / water ratio required by the aggregate or by the use of an approved plasticizer. The concrete shall contain a minimum of 350 kg of OPC per m³ for imperviousness and durability.

The following admixtures shall be used for all water retaining structures:

- CHRYSO®Fuge B (or similar approved product) renders mortar and concrete highly resistant to capillary action and reduces, or even eliminates, infiltration of water under pressure. The fine particles contained in in the admixture combines with the lime in cement to form water repellent particles. These obstruct the capillary action within concrete and prevent water from penetrating.
- CHRYSO® Fibrin XT (or similar approved product) is a monofilament polypropylene fibre that reduces the occurrence of plastic shrinkage and plastic settlement cracking, whilst enhancing the surface properties and durability of hardened cementitious products. This would also improve the impact resistance of the concrete and by inhibiting the plastic shrinkage cracks in turn makes the concrete less permeable.
- CHRYSO®Cure Acrylic (or similar approved product) Curing plays an important role on strength development and durability of concrete. Curing takes place immediately after concrete placing and finishing, and involves maintenance of desired moisture and

temperature conditions, both at depth and near the surface, for extended periods of time.

- Dura.®flex (or similar approved product) is a ready to use flexible slurry based on a special synthetic resin dispersion and a blend of selected cements mixed with carefully graded aggregate.

C4.28 REINFORCING STEEL:

High tensile (450 MPa) reinforcing steel with be installed in all structural members (roof, wall, floor) to counter and limit crack formation to tolerable levels.

C4.29 FOUNDATIONS:

Excavations will be founded on suitable material as indicated by the engineer and on the drawings. Over excavation will be backfilled with 10 MPa concrete to blinding level.

C4.30 PIPELINES

C4.30.1 HDPE Pipes

C4.30.2 General

- Material: High Density Polyethylene (HDPE), PE100, Class as specified.
- **Pipe lengths: 12 m (standard supply length)**
- Joint type: Butt fusion welded on site
- Design working pressure: As specified.
- External protection: Not required (HDPE corrosion resistant)
- Internal protection: Not required
- UV protection: Pipes stored outdoors shall be carbon-black UV stabilised (per SANS 4427) or protected from direct sunlight
- Galvanic isolation: Not required

C4.30.2.2 Applicable Standards

- SANS 4427 (Parts 1–5): Polyethylene (PE) pipes and fittings for water supply
- SANS 2001-DP2: Construction works – Installation of buried thermoplastic pipelines
- SANS 10125: Welding and welder qualification for thermoplastics
- SANS 1601: Marking of plastic pipes
- SANS 10252-1: Water supply installations (if potable water)

C4.30.2.3 Pipe Properties

- Manufactured from PE100 resin
- Suitable for liquids at 0–40 °C
- Nominal pressure ratings: PN4–PN16 as per SANS 4427

C4.30.2.4 Bending Radius

- Minimum cold bend radius: 30 × OD (15 m for 500 mm pipe)
- With engineer's approval: 25 × OD (for SDR ≥ 17)

C4.30.2.5 Jointing

- Butt fusion welding for ≥ 110 mm OD, per SANS 10125
- Welders to hold valid certification
- Fusion machines must have automated data logging (heat, time, pressure)
- Alternative methods:
  - Electrofusion up to 400 mm
  - Compression fittings up to 110 mm
  - Stub + flange or mechanical couplings as specified

C4.30.2.6 Marking

Indelible markings at ≤ 1 m intervals:

- Manufacturer's name
- Outside diameter and SDR rating
- Material designation (PE100)
- PN rating
- Batch number and production date
- Reference to SANS 442

C4.30.2.7 Testing

- Factory: Pipes tested per SANS 4427 (hydrostatic strength, creep rupture, dimensions)
- Site hydrostatic testing:
  - As per SANS 2001-DP2
  - Test pressure = 1.5 × PN (24 bar for PN16)
  - Maintain 2 hours minimum
  - Acceptance: no visible leaks, pressure drop within allowable limits
  - Results to be submitted to the Engineer

C4.31 STEEL PIPES

C4.31.1 General

- Material: Mild steel pipe, SANS 719 or API 5L, Grade X42/300WA
- Minimum wall thickness: per SANS 719
- Weld inspection: minimum 10% RT (radiography); Engineer may increase. UT or MPI may also be used.
- Flanges: SANS 1123, Table 1600/3 (PN16) unless otherwise noted
- Quality Control Plan (QCP) to be submitted and approved before manufacture
- Galvanic isolation: Required between stainless steel and carbon steel (Novus or approved kits)
- Surface preparation: Sandblast to SA 2.5 (ISO 8501-1)
- Coatings:
  - Internal: Fusion bonded epoxy lining (min. 300 µm DFT, SANS 1217)
  - External: Fusion bonded epoxy or epoxy + polyurethane enamel (UV-resistant for exposed pipes)
- QA records to include: blast profile, salt content, humidity/temp, DFT of coatings
- Hold points: Minimum 3 external inspections during manufacture
- Transport & storage: Pipes to be supported to prevent coating damage
- Fasteners:
- Hot dip galvanized fasteners (SANS 121) with washers both sides
- Stainless fasteners only for stainless pipework
- Flexible couplings:
- Slip-on type (e.g. Viking Johnson), without centre register
- To comply with BS 534 or EN 14525
- Cleaned and coated as per project specifications

C4.31.2 Fittings, Specials and Pipework

- Manufacture: SANS 719 and SANS 1123
- Pressure rating: PN16 or as stated on the drawings. The drawing shall prevail.
- Bends: Medium radius unless shown otherwise
- Coatings:
  - Inside buildings/pump stations: Fusion bonded epoxy inside and out
  - Exposed sections: Hot dip galvanising (external) + epoxy lining (internal)
  - Puddle pipes: Stainless steel 316, pickled and passivated
- Fasteners:
  - Hot dip galvanized fasteners (SANS 121) with washers both sides
  - Stainless fasteners only for stainless pipework
- Flexible couplings:

- Slip-on type (e.g. Viking Johnson), without centre register
- To comply with BS 534 or EN 14525
- Cleaned and coated as per project specifications

C4.32 FLOW MEASUREMENT:

Flow will be measured at the following points:

Pump Stations:

On the delivery side of all pumps an electromagnetic type meter will be installed in the pipework and flow recorded and relayed to the electronic device. The meter to be installed shall be a Endress+Hauser Promag W 400 or similar approved will be acceptable.

Open channel flow measurement:

- At inletworks.

Open channel flow measurement will be done via the installation of an ultrasonic measuring device installed in the channel. A venture flume will be constructed and calibrated. Levels will be recorded with a sonar sensor and relayed to an electronic recording device. A meter Sumpi FM or similar approved will be acceptable.

C4.33 PENSTOCKS, WEIRS & FLAP GATES

C4.33.1 Design Parameters

Gates shall be robustly constructed and ribbed horizontally or vertically as required to ensure that stresses in all structural member and the skinplate do not exceed the limits specified in DIN Spec 19704 for hydraulic structures, and that no undue deflections occur. Design calculations shall be produced if required. Leakage rates shall conform to the requirements of AWWA Spec. C501.

All manufacture shall be carried out in accordance with the QA procedures laid down in ISO 9002 (SABS 0157 Part II).

C4.33.2 General

Gates shall be suitably guided throughout their travel, shall not jam, and shall be held uniformly against the frame faces by means of fixed retainers of low-friction thermoplastic material (H.D.P.E.).

Frames shall be fabricated from angle or channel sections, and provided with adequate anchors for firm fixing in position.

Seals shall be of the pressure-actuated “J” music note or lip type, and shall seal on smooth faces on the frame. Invert seals on channel and flush invert gates to be rectangular section-compression type.

C4.33.3 Operating Gear

Lifting spindles shall be adequately sized and guided so that they will not buckle under compression when the gate is closed, and rising spindles must be provided with a screwed stop collar, which can be locked in position, to prevent excessive compression.

Spindles shall have machine-cut threads of trapezoidal section, working in bronze nuts. Rising types shall be protected by easily removable cover tubes.

For manual operation, handwheels shall be of sufficient diameter to ensure that the maximum force exerted on the rim shall not exceed 150 Newtons, and where necessitated by the lifting force, suitable gearing must be provided.

Where electric actuation is required, the actuator shall be adequately sized to operate the gate through its full travel, within the manufacture's recommended operating time, and shall have a torque rating of minimum 125% of calculated required torque.

C4.33.4 Materials of Construction

Gates	:	Stainless steel (304L)
Frames	:	Stainless steel (304L)
Seals	:	Neoprene
Pedestals	:	Mild steel
Wall brackets	:	Stainless steel (304L)
Spindle guides	:	Bronze
Spindles	:	Stainless steel (304)
Cover tubes	:	Clear P.V.C. - Mild or stainless steel?
Fasteners (assembly)	:	Stainless steel (304)
Anchor studs and nuts	:	Stainless steel (304)

C4.33.5 CORROSION PROTECTION

Mild steel and cast-iron	:	Fusion bonded epoxy powder coating. (Red oxide)
Stainless steels	:	Pickle and passivate

C4.34 PIPELINE INSTALLATION AND ALIGNMENT

C4.34.1 Trench excavations and vertical alignment**:**

The soils along the route are classified as "soft to intermediate to hard" excavation to an average depth of 1,9m below surface. Test hole excavation was executed along ent entire route. Conventional earth moving equipment would suffice for the excavation of the pipe trench over the bulk of the route. A powerful machine and blasting would however be necessary within the south western portion of the route along the route to the end at the surge chamber.

The pipeline will be installed with the cover over the pipe between 0,9m and 1,2m with an average of 1,0m.

The lower portion of the residual norite compacts well to an average maximum dry density of 1974kg/m^3 at an average optimum moisture content of 10.8%. The average compatibility factor of this soil is 0.23 and falls within the SABS limits for bedding material (except for flexible pipes that may be subject to waterlogged conditions after laying), but requires extra care in compaction.

The turf and top portion of the residual norite is too clayey for use as bedding and should only be used for rehabilitation purposes. The lower portion of the residual norite often contains zones of rock or hard gravel.

All excavations should have proper sidewall protection to ensure safety of workers. Seepage may result in the destabilising of the soils above the seepage and special precautions may be required. The unfavorable orientation of slickensiding within the “turf” towards the excavation face could result in unstable excavation faces. The contractor is responsible for the implementation of suitably designed support systems.

The topsoil, i.e. the top 150mm of the profile containing organic matter should be stockpiled separately and be used for rehabilitation purposes on completion of the backfill.

C4.34.2 Stream Crossing:

The pumping main crosses a stream ±400m up the route and the pipe will be aligned (vertical and horizontal) such that the pipe – 48m steel is carried over the stream on reinforced concrete piers. A further stream crossing 6m side occurs ±350m up the road and the stream is lined with reinforced concrete to carry the (steel) pipe.

C4.34.3 Anchorage:

Thrust blocks shall be constructed where changes of direction occur.

The pipeline will be anchored at all manholes with puddle flanges cast into the walls.

C4.34.4 Depth of Cover:

Unless otherwise shown on the drawings or required in terms of the project specifications the permissible tolerance limits shall be as follows:

a) Cover above pipe : Plus or minus 1000 mm

b) Clearance between pipelines : 1000 mm minimum

C4.34.5 Road Crossings:

No special care at road crossings is required.

C4.34.6 Bnding, Buckling, Deflections:

No bending, buckling or deflections shall be allowed on steel pipelines.

C4.34.7 Electrical Specification

See annexure B for electrical specification.

Wherever any reference is made to the South African Bureau of Standards (SABS) in either the Bill of Quantities or the document, this reference shall be deemed to read “SANS standard”

The following SANS specifications are also applicable to this contract:

SANS 1921 (2004):	Construction and Management Requirements for Works Contracts
Part 1:	General Engineering and Construction Works
Part 2:	Accommodation of Traffic on Public Roads Occupied by the Contractor
Part 3:	Structural Steelwork
Part 6:	HIV/AIDS Awareness
SANS 10396: 2003:	Preferential Construction Procurement Policies using Targeted Procurement Procedures
SANS 1914-1 to 6 (2002):	Targeted Construction Procurement
SANS 1921-1 (2004):	Construction and Management Requirements for Works Contracts
Part 1:	General Engineering and Construction Works and where accommodation of traffic is involved

The Bidder is expected to be in possession of a copy of the Standard Specifications. The successful Bidder will be required to provide a full set of the applicable standard specifications at the commencement of the Contract which is to be kept available on site at all times.

Copies of the “Standardised Specification for Civil Engineering Construction” SANS 1200 are available from the:
South African Bureau of Standards
Private Bag X191
Pretoria, 0001

MUNICIPAL INFRASTRUCTURE SUPPORT AGENT

Tender no.:: **MISA/VWWTWPS/FS/007/2026/27**

PROJECT: APPOINTMENT OF A CONTRACTOR FOR THE REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS AND PUMP STATION IN VILLIERS/QALABOTJHA.

PART C4 : SITE INFORMATION

C4.1 LOCALITY PLAN

VILLIERS/QALABOTJHA WWTW

OHS OCCUPATIONAL, HEALTH AND SAFETY

SECTION A: INTRODUCTION

1.1 Introduction to the Health and Safety Specification

The Construction Regulations (7 February 2014, R.84) places the responsibility on the Client to prepare a baseline risk assessment and a suitable, sufficiently documented and coherent site-specific Health & Safety Specification, which informs the appointed contractor of all the health & safety requirements pertaining to the associated works on the construction site as well as risks not successfully eliminated during design.

1.2 Purpose of the Risk Assessment

The purpose of the risk assessment is to identify risks and hazards to which persons may be exposed.
Base line risk assessment prepared by Agent of the Client attached. - Annexure 1

1.3 Purpose of the Health and Safety Specification

The purpose of the Health and Safety Specification is to assist in achieving compliance with the Occupational Health & Safety Act 85/1993 and the promulgated Construction Regulations (7 February 2014, R.84) to manage health and
safety risks and to reduce incidents and injuries. This specification shall act as the basis for the drafting of the construction Health & Safety Plan by the Principal Contractor and all subsequent Health & Safety Plans by Contractors.

The Health and Safety Specification sets out the intention of the Client and Designer. It also includes arrangements made by the Client, Health and Safety Agent or consulting Project Manager to ensure that the parties involved in the project cooperate and co-ordinate their activities, to remove or minimize the risks to health and safety of those who are involved in the construction project, or who may be affected by the work activities.

This document sets out the requirements, under a number of sections of Health and Safety Legislation, for the successful health and safety management of the project by the Principal Contractor in accordance with the requirements set out in this Health and Safety Specification. The Principal Contractor will be expected to integrate his own health and safety policy and arrangement documents into their Health & Safety Plan.
The format is in line with the requirements of Regulation 5. of the Construction Regulations (7 February 2014, R.84), for a Health and Safety Plan to be developed before the commencement of construction.

1.4 Implementation of the Health and Safety Specification

The Construction Health and Safety Plan must be handed to the appointed Health and Safety Agent prior to the commencement of works. The Principle Contractor must submit the signed “Acknowledgement of receipt” (- Annexure 2) of this Health and Safety Specification on the date of issue or return to the Client or their representative with tenders. No Principle Contractor may commence with construction work until their Health and Safety Plan has been reviewed and approved by the appointed Health and Safety Agent.

1.5 Health and Safety Targets

The following health and safety targets have been set for achievement during the period of this project.

- The achievement, by the Principal Contractor, of an incident-free project, as far as possible, with the prevention of all incidents, and the achievement of a nil “lost time injury” rate.
- The workforce’s co-operation in ensuring that health and safety is everybody’s responsibility.
- A proactive approach to health and safety by the construction management team.
- That safe working will be a condition of employment in all contractors’ organizations.

1.6 DEFINITIONS

"CLIENT" Shall mean Municipal Infrastructure Support Agent

“H&S” Health, Safety & Environment

“Contractor” Refer to the Mandatory who is employed on the Project and includes his own sub-contractors who he further employs.

“Employer” Means any person who is employed by or works for an employer and who receives or is entitled to receive any remuneration or who works under the direction or supervision of that employer.

“Mandatory” Includes an agent, a Contractor or a subcontractor for work, but without derogating from his status in his own right as an employer or a user.

“Principal Contractor”

Is the main Contractor, joint venture partners or consortium who employs or provides work on the Project.

“Project” Refers to the contract and has reference to the premises or any part thereof where the work which has been contracted for is to be performed.

1.7 Reference Documents, Standards and Related Procedures Health and Safety

- The Occupational Health and Safety Act (No. 85 of 1993) and Regulations there under
- The Construction Regulations (7 February 2014)
- All other relevant Health and Safety Legislation
- Method statements supplied by consultant or designer
- National Building Regulations
- SANS 10089-2 & 3, SANS 10085, SANS 10108, SANS 10400, SANS 1200, SANS 10142
- JBCC

1.8. Costing Health and Safety

It is the responsibility of the Principle Contractor to make sufficient provision for OHS requirements and the following should be taken into consideration:

- Training:

First Aid

Safety Rep

Scaffold Erectors

All Operators

Safety Officer

- Equipment and PPE:

Clothing

Safety Shoes

Gloves

Respiratory masks

Goggles/safety glasses

Road signs

Symbolic Safety Signs

First Aid equipment, kit and box.

Fire extinguishing equipment

Safety Harnesses

- Medical fitness certificates for all employees – Const. Reg. (7 February 2014)

SECTION B: HEALTH AND SAFETY PROJECT SPECIFIC SPECIFICATIONS

1. OBJECTIVE

This agreement in entered into by the parties in order to identify and stipulate the arrangements and procedures between the Client and Contractor in order to ensure that the Contractor and their sub-contractors comply with all the H&S requirements along with all applicable legislation on the Project.

1.1 INSURANCE

1.1.1 The Contractor and its subcontractors warrant that they have the following insurance cover which shall remain in force whilst on the Project, or which shall remain in force for the duration of the contractual relationship between the Client and Principal Contractor, which ever period in the longest;

a) Compensation Registration covering all occupational injuries and diseases and the cover must be paid up for the duration of the Project. Proof of this cover must be provided to the Principal Contractor in the form of a Letter of Good Standing from either the Compensation Commissioner or relevant insurance fund managers.

b) Adequate Public Liability insurance cover in relation to the work undertaken.

c) Any other insurance cover that will adequately make provision for any losses and/or claims arising from its subcontractors and/or their respective employees and/or omissions whilst on the Project.

1.2 ADMINISTRATION

1.2.1 The Contractor shall ensure that it always has an updated copy of the applicable legislation on the Project and that this copy is accessible to all employees. The Principal Contractor will also keep an updated copy on the Project for viewing by any Contractor.

1.2.2 The Contractor and its subcontractors shall ensure that a H&S File is implemented and maintained for the duration of the Project. This file must contain all relevant documentation pertaining to H&S related issues such as, appointments, risk assessments, accident procedures, incident investigations, training records, registers, check lists, safety meeting minutes and other H&S related documentation.

1.2.3 All comments contained in this section require specific measures to be incorporated into the construction Health and Safety Plan. The Principal Contractor may not allow work to commence on site before an adequate construction Health and Safety Plan is developed. The plan must contain the method statements, procedures, and scope of works for the project. Further risk assessments and method statements must be carried out where the works may change, due to design changes. The construction phase Health and Safety Plan, developed by the Principal Contractor must also take into account current health and safety legislation and associated codes of practice.

1.2.4 The Contractor and its subcontractors shall also permit a representative from the Principal Contractor to view and inspect the file from time to time as determined by the Project requirements.

1.3 SUPERVISION / APPOINTMENTS

1.3.1 The Contractor and its subcontractors shall ensure that all work performed is done under the supervision of trained and competent persons.

1.3.2 The Contractor and its subcontractor shall appoint a Construction Manager in terms of the applicable legislation. This appointed person will be responsible to ensure that all H&S requirements are implemented and adhered to on the Project.

1.3.3 Attached to this agreement is a blank copy (-Annexure 3) of a standard Construction Manager appointment form, which must be completed and submitted with this agreement.

1.3.4 The Contractor's appointed Construction Manager will also be required to attend all scheduled H&S meetings of the Project.

1.3.5 The Contractor and its subcontractors shall further ensure that all other legislative appointments are implemented and maintained for the duration of the Project and that those employees appointed have the necessary training and experience to meet those requirements.

TRAINING

1.3.6 The Contractor and its subcontractors shall ensure that all its employees are adequately trained and experienced to perform their work. Where semi-skilled employees are employed, adequate supervision must be available to maintain standards of work and to ensure compliance with H&S standards on the Project.

1.3.7 The Contractor and its subcontractors shall ensure that all employees undergo a formal H&S Induction prior to commencing on the Project. Proof of this induction must be submitted along with this agreement.

1.3.8 The Contractor and its subcontractors shall ensure that all its employees are in possession of valid licences and / or certificates of the correct code where machinery or plant is utilised. Proof of these licences and / or certificates will be kept in the Contractors H&S File.

1.4 ACCIDENT PROCEDURES

1.4.1 The Contractor and its subcontractors shall ensure that a sufficient number of trained first aiders are available on site for the duration of the Project. The number and Level of training will be determined by legislative and Project requirements. A guideline however may be a Level 1 trained first aider at all times on site during construction work.

1.4.2 The Contractor and its subcontractors shall ensure that suitable first aid facilities are provided for the work to be performed. The number of first aid facilities and type of equipment will also be determined by the legislative and Project requirements.

1.4.3 Should the Contractor or it subcontractors utilize the Principal Contractors first aid facilities then this needs to be agreed upon in writing. Cost of first aid equipment will then be charged to the Contractor at the discretion of the Principal Contractor.

1.4.4 The Contractor and its subcontractors shall ensure that a suitable Accident Procedure is drawn up for the duration of the Project. This Accident Procedure must be submitted to the Principal Contractor and must contain the names of all emergency contact persons and contact numbers.

1.4.5 The Contractor will be responsible to inform the (relevant authorities i.e. Department of Labour,etc) of any Serious or Reportable Incidents which may occur in terms of the applicable legislation. All correspondence to the (Relevant Authorities) regarding these incidents must be copied and submitted to the Principal Contractor.

1.4.6 The Contractor shall ensure that a monthly report is submitted to the Principal Contractor and shall contain the following:

a) Man-hours worked for the relevant month (including subcontractors)
b) No of work-related injuries for the relevant month.

1.5 HEALTH & SAFETY REPRESENTATIVES

1.5.1 The Contractor and its subcontractors shall ensure that an adequate number of health and safety representatives are appointed and trained, as per the requirements of the applicable legislation and / or Project H&S requirements. As a guideline one Health and Safety Representative should be appointed for every 20 employees.

1.5.2 The Contractor and its subcontractors shall ensure that regular internal H&S meetings are conducted and attended by the appointed Health & Safety Representative. The frequency of these meetings must be determined by the work activities performed along with the duration of the Project, however at least once a month.

1.5.3 The Contractor and its subcontractors shall keep record of these meetings in the H&S File along with the attendance records.

1.5.4 The Contractor Supervisor or his Health and Safety Representative will attend the main Project H&S meetings.

1.6 MEDICAL FITNESS CERTIFICATES

1.6.1 The Contractor must ensure that all his or her employees have valid medical certificates of fitness specific to the construction work to be performed and issued by an occupational health practitioner.

1.7 MACHINERY

1.7.1 The Contractor and its subcontractors shall ensure that all the plant, machinery and equipment they wish to utilize on the Project is of sound order and fit for the purpose for which it is intended and that it complies with all applicable legislative requirements.

1.7.2 The Contractor and its subcontractor shall ensure that all plant, machinery or equipment is suitably guarded by means of insulation, fence, screening, or guarding. Further to this, all safety equipment in relation to plant, machinery or equipment is in a suitable and working condition.

1.7.3 The Contractor and its subcontractor shall ensure that all employees operating or utilising such plant, machinery or equipment are suitably trained, experienced and are aware of the dangers involved.

1.7.4 The Contractor and its subcontractors shall not permit uncertified employees from working on moving or electrically alive machinery. Isolation Procedures shall be adhered to by all.

1.7.5 Devices to start and stop machinery must be clearly labelled and in working order on al plant, machinery and equipment. Warning signs of relevant dangers must also be clearly visible.

1.8 HOUSEKEEPING / CLEANLINESS

1.8.1 The Contractor and its subcontractor shall ensure that the area where the work is performed is at all times maintained to reasonably practicable levels of cleanliness. Further to this the following must be addressed:

a) adequate care is taken to ensure correct storage and stacking of articles and material,
b) regular refuge removal is maintained,
c) the working area around machinery is clean and demarcated.
d) no articles or material are disposed from any height without the necessary precautions taken.

1.8.2 The Principal Contractor reserves the right to clean up after any Contractor who fails to adhere to these housekeeping requirements and to charge the Contractor accordingly.

1.9 GENERAL H&S REQUIREMENTS

The Contractor and its subcontractors shall ensure that:

1.9.1 All employees are issued with the appropriate PPE and that they are trained in the correct use thereof.
1.9.2 Employees are medically certified to work on height and to operate Plant and Machinery.
1.9.3 All security measures implemented on the Project are adhered to and that random searching may be carried out.
1.9.4 All signs and notices implemented on the Project are adhered to and not damaged in any way.
1.9.5 Suitable firefighting equipment is made available and employees are trained in the safe use thereof.
1.9.6 No large volumes of flammable substances are stored and suitable precautions are taken to store those that are.
1.9.7 Suitable measures are in place with regards to sanitation, changing facilities, eating facilities, and drinking water.
1.9.8 Measures are taken to reduce any environmental impairment with regards to noise, ground, air and water pollution.
1.9.9 Suitable lighting is provided in all darkened working areas.
1.9.10 No employees are permitted to enter / work on the Project while under the influence of any intoxicating substances.

1.9.11 No machinery, article, substance, plant or PPE belonging to the Principal Contractor is used without permission.

1.9.12 No illegal immigrants are employed by the Contractor or subcontractor while on the Project.

Without derogating from the generality of the above requirements and notwithstanding the applicable legislation the Contractor and its subcontractors shall ensure the following:

a) The provision of a safe and healthy working environment,
b) The provision of safe and healthy systems of work, plant and machinery,
c) The identification of the prevalent hazards to health and safety and the precautionary measures to be taken,
d) The provision of the necessary information, instructions and training,
e) The enforcement of the established precautionary measures,
f) Informing employees on their scope of authority,
g) Informing employees on their scope of authority,
h) Making employees conversant with the identified hazards and precautionary measures,
i) Ensuring that no employee is victimized because of adhering to these requirements.

The Client reserves the right to request immediate correction of any non-compliance identified in terms of this agreement by any Contractor and its subcontractors during the performance of the work on the Project. The Client further reserves the right to stop any work that does not comply with the H&S standards and without the cost to the Client. This agreement places the onus on the Principal Contractor to contact the Client/Agent in the event of the inability to perform as per this agreement.

1.10. ADDITIONAL REQUIREMENTS

Compliance to the Occupational Health and Safety Act 85 of 1993 or other applicable Legislative Requirements, is a legal requirement and all Contractors and subcontractors are required to adhere with the Legislation and its regulations to avoid prosecution by the Authorities. Over and above the Legal requirements, Contractors will be required to comply with the specific requirements of this document and client H&S requirements.

Contractors will provide to the Principal Contractor, before work commences, a written Health, Safety and Environmental Plan, which is to be approved by the Principal Contractor. The Contractor shall ensure the implementation and adherence to the Health, Safety and Environmental Plan by its Employees and subcontractors.

The Principal Contractor will ensure that all subcontractors employed on the Project maintain H&S files and submit such documentation to the Contractor on completion of their contract. Subcontractor H&S files will be handed over to the Principal Contractor by the Contractor on the completion of the contract work performed by the Contractor.

The Client/Agent reserves the right to stop any Contractor or his subcontractor from performing his activities if the Contractor or his subcontractors is found not adhering to the specified H&S Plan, contravening any Legal requirements, or not adhering to the Clients H&S Specifications for Contractors, or if the Contractor or his subcontractor is found performing his work activities unsafely.

1.10.1 Requirements

Contractors are responsible to comply with the Legislation and Contractual Requirements of the Principal Contractor and Client. However various systems will be implemented to ensure compliance by all Contractors on the Project. Contractors will be included in al H&S meetings and will receive copies of all H&S related documentation pertaining to their operations. Routine inspections and monthly audits will include Contractor operations. Formal action will be taken against Contractors failing to comply with the Project H&S requirements. The formal action could lead to financial implications and / or permanent removal from the Project.

1.10.2 Mandatory Agreement / Contractor Specification – Section 37(2)- **Annexure 4**

This document is deemed to be accepted once it has been issued unless written response is received within 5 (five) working days of issue. Contractors are required to sign this Contractor Safety Specification, which includes the Mandatory Agreement (OHS Act 85 of 1993 – Section 37(2)

Agreement) with the Principal Contractor. This Agreement covers various aspects such as Insurance, Administration, Supervision, Training, Accident procedures, H&S Representatives, First Aid, Housekeeping and General H&S requirements. Contractors will not be allowed to commence work, unless both Parties have signed this Agreement, and all required documentation is on site.

- Annexure 5

1.10.3. Contractor Supervisor Appointment & Functions

Attached to this Mandatory Agreement is a blank Construction Manager (– CR8(1)] Appointment Form. The Contractor shall appoint a trained and competent person in writing to oversee their respective operations. As with this Mandatory Agreement no work will commence until the Appointment form is received and the appointed person is qualified to be the Construction Manager for the Contractor on the Project.

1.11 GENERAL ADMINISTRATION

1.11.1 Letter of Good Standing – Compensation Commissioner (COID Act 130 of 1993).

The Contractor will supply an updated copy of their Letter of good Standing with either WCA or FEMA to the Client before work commences on the Project. Therefore, all employees who may be injured or suffer any disease associated with the work activities, will be covered in terms of the COID Act 130 of 1993.

1.11.2 Notification of Construction Work

As standard procedure, formal written Notification of all new Projects in the Republic of South Africa are submitted to the Department of Labour. Copies of the notification are kept on the Project H&S file. Additional copies are available on request. The Principal Contractor will do this notification.

1.11.3 Monthly Project Man-hour & Injury Report

The Contractor is required to submit a formal Monthly Report of the Hours worked and Injuries sustained to the Clients Agent.

1.11.4 Safety File

The Contractor will have and maintain a H&S file where all administrative requirements will be kept. At the end of the Contractor's contract the Contractor will hand over his completed H&S file to the Principal Contractor who will submit all documentation to the client.

The Construction Health and Safety Plan should include details of the following:

- The positioning of the site access and egress points to ensure that any nuisance or risk to the occupants of the building and adjacent properties is minimised and controlled. This should be away from the adjacent occupied and sensitive premises.
- The location of temporary site accommodation to ensure that adjacent sensitive properties are not subjected to any nuisance arising from the use of the facilities.
- The location of unloading, layout and storage areas to reduce and minimise excessive manual handling of construction materials, damage to building and adjacent property and the security of the plant, equipment and materials.
- Requirements to maintain access for emergency service vehicles during works are necessary as well as the temporary relocation of existing firefighting equipment.
- The planning of traffic and pedestrian routes to ensure adequate protection for members of the public and site employees and operations.
- The use of suitable barriers, signs and the appointment of a flag person should be adopted to provide the required level of protection.
- The arrangements for the reception of prospective visitors.
- The site emergency plan should be taken into consideration when developing the Principle Contractor's own emergency plan.

The following should be contained in the Contractors H&S File:

- □Copy of the Occupational Health and Safety Act (85 of 1993)
- □Updated Letter of Good Standing with WCA or FEM - Const. Reg. 7(1)(c)(iv)
- □Clients Safety Specification
- □Risk Assessments
- □Fall Protection Plan
- □Environmental Management Plan
- □All Policy's
- □All notices issued by DoL.

Records specific to the Project:

- □Risk Assessments - Const Reg. 9
- □Fall Protection plan - Const Reg. 10
- □Mandatory Agreement - Sect. 37
- □Safety Inductions of Employees - Const Reg. 7(7)
- □Incident Recording & Investigation - GAR 9(1)

- Incident Reports - GAR 8(1)
- Health and Safety Rep. Inspections - Sect. 18
- Issue of PPE - GSR 2
- Safety Meeting Minutes - Sect. 19
- Letter of Good Standing from FEM or WCA - Const. Reg. 7(1)(c)(iv)
- Safety Toolbox Talks - Sect. 8, Const Reg.9(3)
- First Aid Box Contents - GSR 3(3)(a)
- First Aid Treatments - GSR 3(1)
- Training certificates of employees and Medical fitness certificates for employees working at heights.
- Training certificates and Operator Medical certificates for Operators of Plant, Machinery and Vehicles
- Medical fitness certificates issued by an Occupational Health Practitioner- Const. Reg. 7(8)
- Registers (as per list under section for Registers)

Appointments

- Appointment of Manager - Sect 16(2)
- Construction Manager - Const Reg. 8(1)
- Assistant Construction Manager - Const Reg. 8(2)
- Risk Assessor - Const Reg. 9(1)
- Fall Protection Supervisor / Planner - Const Reg. 10(1)(a)
- First Aider - GSR 3(4)
- Incident Investigator - GAR 9(2)
- Health and Safety Representative - Sect. 17(1)
- Electrical Machinery Operator/Inspector - Const Reg. 24(e)
- Scaffold Supervisor - Const Reg. 16(1)
- Formwork Supervisor - Const Reg. 10(a)
- Fire Equipment Inspector - Const Reg. 27(h)
- Construction Vehicle Operator / Inspector - Const. Reg. 23(1)(d),(k)
- Stacking Supervisor - Const. Reg. 28(a)
- Lifting Tackle Inspector - DMR 18
- Material Hoist Inspector - Const Reg. 19(8)
- Lifting Machine Inspector - DMR 18
- Demolition Supervisor - Const Reg. 14(1)

1.11.5 Registers & Checklists.

In order to ensure that all plant, equipment, systems and procedures are maintained in accordance to Legislative requirements, formal inspection Registers and Checklists have to be compiled. These Registers and Checklists are then complete by the appointed persons, who are designated in writing.

The completed forms are kept on the Contractors H&S file and then archived after Project completion.

The following is a list of Registers and Checklists required to be completed for the applicable activities and at intervals as per the requirements of the Occupational Health and Safety Act 85 of 1993:

- Portable Electrical Equipment
- Hand Tools
- Construction Vehicle
- Scaffolding
- Form & Support work.
- Fire Extinguishers
- Construction Vehicles and Mobile Plant Equipment
- Explosive Power Tools
- Hazardous Chemical Substances
- Cranes
- Slings, Chains & Hooks (Lifting Tackle)
- Compressors
- Ladders
- Hoists
- Gas Welding / Flame Cutting
- Safety Belt / Safety Harnesses
- Distribution Boards
- First Aid Boxes
- Contact details with certified ID copies of all workers on site
- List of all subcontractors on site with contact details CEO and Construction Manager on site.

1.12 SAFETY INDUCTION AND IDENTIFICATION

1.12.1 The Contractor will ensure that all his employees and visitors will first go to the Principal Contractors Project Safety Officer or Site Agent for a Site Safety Induction or will explain and have the General H&S Induction form signed by all employees / Visitors, before the persons will be allowed onto the Construction Site. The Contractor will keep a copy of all the signed General H&S Induction forms on his H&S file and will issue the Principal Contractor with copies of all signed forms within 24 hours of new employees or visitors arriving on site. Failure to comply will result in a fine imposed onto the Contractor.

1.12.2 The Contractor will first take new employees to the Principal Contractor Project Safety Officer or Site Agent for a Site Safety Induction or will explain and have the form signed by the new employee, before the employee will be allowed to start work.

1.12.3 The Contractor will ensure that his employees are issued with some sort of identification i.e. Contractor name on Overalls, Hardhats or ID cards will be acceptable

1.13 RISK ASSESSMENTS AND SAFETY TALKS (TOOLBOX TALKS)

1.13.1. Base line Risk Assessment compiled by Client Agent attached. Contractor must compile and document the necessary Work Procedures and Method Statements that would control the activities to a degree that would be compliant with legislation and the requirements of this specification.

1.13.2 The Contractor must perform Risk Assessments of hazards and risks associated with the scope of work relevant to the Contractors appointment, shall be assessed, safe methods of work identified; safe working conditions and a healthy work environment will be provided.

The following risk assessments by the Principle Contractor are to be considered:

- All task-oriented risks – particularly working from height, services decommissioning and/or modification, etc.
- Equipment risks
- Physical risks
- Chemical risks
- Ergonomic risks

The following method statements and/or procedures must be available before work starts on site:

- Establishment of site welfare, first aid and emergency procedures (fire and security, etc).
- Welfare facilities to take into account demolition and/or contaminated soil removal if required.
- Noise and dust control during construction process.
- Arrangements for emergency fire, security and first aid facilities.
- Arrangements for emergency service vehicles access to the premises.
- Traffic management arrangements to protect site staff, public and road traffic from construction works and when loading and offloading of materials and equipment.
- Protection to overhead and underground services.
- Arrangements for dealing with emergency situations, particularly during demolition, deep excavations, overhead and underground services.
- Public protection arrangements.
- Method statement for demolition of structures including fall protection and/or asbestos handling plans.
- Contaminated waste materials handling (health and environmental issues) and records of waste removal.
- Selection and maintenance of plant and equipment.
- Selection of competent contractors.

Following a high-level risk assessment done in terms of risks posed by construction activities to the Client, customers or staff, and 3rd party assets, members of the public and the environment, the recommendations therein need to be included in the Principal Contractor's Health and Safety Plan as follows:

- Proper hoarding of demolition and construction area (sound construction, height & safety distance from works)
- Danger tape around all excavations

- Visible signage (e.g.” No unauthorised entry”, “Warning construction in progress”) and access control for demolition and construction area.
- All construction vehicles and plant to be properly maintained with daily inspections/checks done.
- Safe routes established for pedestrian and vehicular traffic.
- Use of competent contractors with competent supervisors.
- No night work by contractors
- All employees to wear reflective vests when working close to public roads or where plant and vehicle movement take place.
- Hard hat area declared with visible signage.
- Structures adequately supported during demolition and construction.
- Induction training of all contractors and visitors
- Lifting equipment to be of suitable design to carry load and offloading operations supervised.
- All scaffolding erected as per SANS 10085.
- Emergency response measures to be adapted to accommodate construction works.
- Certificate of safe installation issued by electrical contractor before demolition and after commissioning.
- Traffic control for construction area. Person controlling traffic or working close to traffic to wear hi-visibility jacket/vest.
- Underground services to be identified within area of excavation works and necessary precautions established prior to commencement of works.
- Hand excavation done if underground services cannot be determined.
- Permit to work system to be used with supervision by safety officer, when required.
- Contaminated soil stockpiled on prepared surface as per Environmental Management Plan
- Segregation and disposal of contaminated soil to be done under controlled conditions as per Environmental Management Plan
- Asbestos removed and disposed of by an accredited contractor.
- Machinery maintained as per OHS Act and manufacturer's spec.
- All machinery and vehicles to be isolated at the end of each day and located within the hoarding if not removed from site.

1.13.3 All Risk assessments shall be communicated to the employees of the Contractor by the Contractor before work starts.

1.13.4 When activities change the Contractor will be required to revise the risk assessment to suit the changed conditions and re communicate the revised risk assessment with the employees.

1.13.5 Copies of all risk assessments will be issued to the Principal Contractors Project Safety Officer or Site Agent for review and these will include copies where the Contractor’s employees have signed confirmation of receiving the risk assessment information.

1.13.6 The Contractor is required to have a Weekly Safety Talk (Toolbox Talk) with his employees to inform them of safety issues related to their scope of work. The employees of the Contractor will sign acknowledgement of receiving the training and copies of the documents shall be kept on the Contractor H&S File and copies will be issued to the Principal Contractor Project Safety Officer or Site Agent.

1.13.7 Risk Assessor Appointment & Functions. The risk assessment process will be co-ordinated by a Contractor Appointed Risk Assessor. This person will oversee all risk assessments. Further to the above, the Contractor will ensure that all Appointed Contractor Supervisors convey the information on the risk assessment to the respective work crews and the contractor employees sign an Attendance Register.

1.14 APPOINTMENTS – SUPERVISORY

1.14.1 All legal and client requirements regarding appointments will be adhered to on the Project. In all cases the person being appointed will have the necessary training and / or experience for the appointed position.

1.14.2 The Contractor will have an H&S Appointment Structure in place. The CEO will delegate certain responsibilities down to appointed employees; however, he will remain ultimately responsible.

1.14.3 Delegation of Duties – Section 16(2). The Contractor CEO will appoint his Managing Director and Contracts Director who will oversee that all legal, client and company H&S requirements are implemented, adhered to, and enforced.

1.14.4 Construction Work Manager CR8 (1). The Contractor will appoint a Construction Manager for the contract to supervise the construction process and thus ensuring that all legal, client and company H&S requirements are implemented, adhered to, and enforced. The appointed person will have the authority to appoint all other persons as may be required on the Project.

1.14.5 Assistant Construction Managers CR8 (2). Assistant Construction Managers may be appointed to assist the Construction Manager. Although their duties will be the same as the Construction Work Supervisor, the Construction Manager will remain accountable for any supervisory duty which the Assistants fails to conduct.

1.15 PROJECT H&S OFFICER

1.15.1 Requirements CR8 (5). Contractors shall co-operate with such an appointed Principal Contractor Project Safety Officer and will adhere to his / her requests and recommendations.

1.15.2 Appointment & Functions. The function of the Project Safety Officer is to assist advice and enforce all H&S issues related to the Project. The duties of the Project Safety Officer will include but will not be

limited to stop any Contractor who in his / her opinion works unsafely or poses a threat to any other person.

1.15.3 Monthly Inspection Report. The appointed Principal Contractor Project Safety Officer will be required to formally inspect the Project on a monthly basis and all findings will be recorded and distributed to the all appointed supervisors, client and or client agents, contracting companies and relevant Divisional H&S Departments. The Principal Contractor Safety Officer will also be required to do monthly audits on the Contractor Safety files and H&S Plans.

1.16 H&S REPRESENTATIVES & COMMITTEE MEMBERS

1.16.1 OHS Act 85 of 1993 – Sect 17 & 19. As per the legal requirements, the Contractor will appoint H&S Representatives & H&S Committee Members on the Project. These persons will be nominated by the Contractor workforce and will thus represent the workforce in all H&S related issues. A minimum of one H&S Representative will be appointed for every 20 employees. All H&S Representatives will be members of the Project H&S Committee and will meet on a monthly basis with the Project management to discuss H&S related issues.

1.16.2 Appointments & Functions. The appointed H&S Representatives and Committee Members shall be formally trained in their functions and responsibilities. These will also be clearly defined on their appointment forms.

1.16.3 Monthly Inspection Report. Each H&S Representative is required to complete a formal inspection report for their respective work areas. These reports are then tabled at the monthly safety meetings for review, however should the need arise a H&S Representative may at any time complete an inspection report and forward it directly onto the appointed Construction Manager. These monthly reports are kept in the Contractor Safety File and then archived after the completion of the Project.

1.17 H&S MEETINGS

1.17.1 Monthly H&S meetings with all H&S Representatives and other committee members will be conducted for the contract. Depending on the scope of work, monthly H&S Contractor meetings will also be conducted to discuss H&S related matters.

1.17.2 The Project H&S meetings are formalised with a standard agenda; however, each Project may adapt the standard agenda to meet either client requirements or joint venture requirements.
Minutes must be kept for each meeting and distributed to each member. As will all H&S documentation these are filed on the Principal Contractor Safety files for viewing by either client or officials from the Department of Labour.

1.17.3 All persons attending H&S meetings are required to sign a standard attendance register as proof of attendance.

1.17.4 Contractor Supervisor Meetings. It might be required by the Client/ Agent to have a safety meeting with the supervisors of the Contractors when the need arises or if the Client/Agent sees fit to have meetings.

1.18 ACCIDENT PROCEDURES

1.18.1 Standard Accident Procedure. Fully equipped first aid boxes along with applicable signage must be placed in prominent areas on the Project. All accident investigations will be conducted by either the Project Contractor Safety Officer, appointed investigator or appointed Contractor H&S Representative.

1.18.2 First Aider Appointment & Functions. The Contractor will appoint a trained Level 1 First Aider. A minimum of one trained First Aider with his First Aid Box must be available for every 50 employees. Each trained First Aider must be appointed in writing and responsibilities should be in writing on the appointment form.

1.18.3 Name List of First Aiders. To promote the awareness of the trained First Aiders, their names and work areas shall be displayed in all prominent areas.

1.18.4 Emergency Evacuation Procedure. A Standard Emergency Evacuation Procedure must be developed by the Contractor in accordance with the Emergency Evacuation Procedure of the Principal Contractor. A Client's specific Evacuation Procedure will take preference over the standard evacuation procedure. Details of the Emergency Evacuation Procedure will be displayed in all prominent work areas.

1.18.5 To promote the awareness of the emergency numbers the lists will also be displayed in all prominent areas.

1.18.6 Employees Report of Accident Forms. In the unfortunate case of a person being injured and requiring medical attention the standard "Employers Report of Accident" form will be completed accordingly. Sufficient blank copies will be kept at the Contractors offices. As per the accident procedures copies will be sent to the medical practitioner and relevant company Head Office. A copy will also be kept on the Contractor Safety file.

1.18.7 Investigation Form (Annexure 1). Each incident involving medical attention from either a doctor or hospital will be fully investigated on an Annexure 1 form. This form entails input from all parties namely the investigator, H&S Committee and Project management. Each investigation will be reviewed at the monthly H&S meeting. Once actioned the Annexure 1 form will be kept on the Contractor H&S file. If required the client will be notified immediately and a copy handed over.

1.18.8 Serious & Reportable Incidents. The Contractor will immediately inform the Client/Agent and the Principal Contractor of any serious or fatal accidents which occur. In the case of Fatality, the Contractor will also inform the Authorities (Department of Labour and SAPS) for their investigation.

2. CONSTRUCTION ACTIVITIES

2. 1 Portable Electric Tools

No Contractor will allow any employee to work with unsafe or damaged portable electric tools. All tools will be inspected before it is issued to employees. Any Contractor who does not conform to this requirement will be fined and the tool confiscated until it is made safe to use by the Contractor. All rotating parts will be sufficiently guarded to protect employees. Tools may only be used by competent / trained persons.

2. 2 Scaffolding

No Contractor will allow any employee to work on unsafe or damaged scaffolding. Scaffolding will be inspected daily and after inclement weather by a competent appointed person.

No work will be allowed on scaffolds during inclement weather conditions. Scaffolds will be fitted with a sign at the access to the Scaffold to indicate if it is safe or unsafe to use. Scaffolds will be constructed to SANS 10085 standards and OHS Act 85 of 1993 regulations.

2. 3 Ladders

No Contractor will allow any employee to work on unsafe or damaged ladders. No person will be allowed to stand and work on the last 2 rungs of any ladder. When the ladder is longer than 3 m then another person will hold the ladder in place at the bottom and the ladder will also be tied to a solid structure at the top where possible. Ladders will be inspected visually before shifts starts and monthly on a register.

2. 4 PPE (Personal Protective Equipment)

Compulsory PPE is Hardhats, Safety boots and overalls. Any other PPE required will be determined by the Risk Assessment. PPE will be issued to employees free of charge and a signed register will be kept by the Contractor to prove that PPE has been issued to the employee. Only full body harnesses will be allowed to be used by employees who are working on any unprotected heights. These harnesses must carry the SABS stamp of approval. PPE will comply with relevant SABS and OHS Act 85 of 1993 regulations.

2. 5 Fall Protection Plan

A detailed fall protection plan will be submitted by the Contractor to the Client for approval. A competent person will be appointed in writing to control and oversee all work being conducted by the Contractor.

All employees working on heights will be required to undergo a Medical Fitness test with an Occupational Health Practitioner, every 12 months as per the OHS Act 85 of 1993, Construction Regulations. Contractors working on heights will take precautions to prevent tool and equipment from accidentally falling from heights onto persons below. Where it can be prevented no person will work above other employees unless there is sufficient guarding protecting the employees below.

2. 6 Housekeeping

Housekeeping of the Contractors work area will be the responsibility of the Contractor. Housekeeping will be done throughout the day to prevent any material or tool obstructing the walkways of the employees.

Cleaning of the work area will be done throughout the day and a final clean-up near the end of the shift. If the contractor does not comply with the daily cleaning of this area, the Clients Agent reserves the right to hire a cleaning team and to charge the Contractor for the cost of the cleaning team.

2. 8 Stacking and Storage

Lay down areas will be kept neat and tidy. Areas will be barricaded and all equipment, material or tools will be stored neatly inside this area. Stacking of equipment or material will be one on level solid surfaces. Overhanging of material will not be allowed.

Flammable liquids will be stored in a well-ventilated storeroom with a Fire extinguisher placed on the outside of the store. Gas cylinders will be secured in a trolley while work is being done on the site and will remain upright at all times. Gas cylinders will be stored upright inside a well-ventilated area, empty and full cylinders will be stored apart from one another. The Torch, pipes and regulators will be stored detached from the cylinders and will be kept in a storage box.

2. 9 Operators of Machinery

Operators of machinery will be required to complete a daily pre-start checklist before work commences. Operators must be in possession of a valid Medical Certificate issued by an Occupational Health Practitioner and the operator will be in possession of a Competency Certificate for the machine he / she operates. Drivers of trucks or any other Vehicle or Plant travelling on Public Roads must also be in possession of a valid PDP licence. It will remain the responsibility of the Operator of a Vehicle / Plant /Machine to report all oil leaks to the supervisor and to have the Vehicle / Plant / Machine fixed as soon as possible. Where there are Life Threatening Faults the Vehicle / Plant / Machine will not be used until it has been sufficiently repaired.

2. 10 Cranes and Lifting equipment

Cranes and Lifting equipment will comply with OHS Act 85 of 1993, Driven Machinery Regulations (DMR)18. Operators of mobile cranes must be in the possession of a valid PDP licence, medical certificate and training certificate. Mobile cranes must have a valid load test certificate and must be inspected monthly by a competent person on register. All lifting equipment / tackle must have a valid load test certificate and will be inspected monthly by a competent person on register. At no stage will gas cylinders be lifted by a crane unless the cylinders are in a cradle designed to carry equipment. Cranes will be directed by a Banks man / Supervisor with sufficient communication with the crane. It will remain the responsibility of the operator to ensure that the loads are not slewed over other employees and that the mobile crane slew is barricaded with tape while the crane is in operation. Where there is a Life-Threatening Fault, the Crane Operations will not start until the faults have been sufficiently repaired and the Crane was issued with a certificate to prove the crane has been fixed and where applicable, a new load test was conducted.

2. 11 Flame cutting and welding

Gas cylinders will be in a trolley while work is being done on site and will remain upright at all times. Gas cylinders will be stored upright inside a well-ventilated area, empty and full cylinders will be stored apart from another. The Torch, pipes and regulators will be stored detached from the cylinders and will be kept in a storage box. Electric welders will have insulated electrical cables, electrodes and an effective earth system. Areas where welding is taking place must be barricaded with welding screens and sufficient warning signs have to be erected to protect other employees from the glare and sparks. Operator will be trained and experienced in welding. A Fire extinguisher will be in the area of work where any spark producing activity takes place. Contractors who fail to comply with legal regulations and the stipulations of this document will face legal action which can be instituted by the Principal Contractor or the Client.

2. 12 Eating facilities and storage

Every Contractor will be required to have a sheltered eating facility with storage space for food.

2. 13 Edge Protection

The Principal Contractor must ensure that all exposed edges and openings are guarded and demarcated at all times until permanent protection has been erected. The Principal Contractor's risk assessment must include these items: protection of decking edges, finished floor slab or platform edges, stairways, floor penetrations, roof work and all other openings and areas where a person may fall. No exposed edges and other openings will be tolerated.

2. 14 Demolition Work

Demolition work will be done under supervision of a competent person. No floor or part thereof will be overloaded with debris or material in such way to make it unsafe. Adequate shoring or extra support will be used to prevent any accidental collapse of the structure being demolished. Safe means of access shall be provided by the Contractor. All waste and debris will be removed from site as soon as possible. The demolition area shall be well barricaded with relevant warning sings displayed on the barricading to prevent any unauthorised person to enter the demolition area. Dust will be minimized to an acceptable standard. When working with Compressors and Jack Hammers, the Contractor will ensure that all couplings are safeguarded with safety chains to the couplings. All service lines will be detected before the work starts and all service lines will be secured by competent persons before work commences.

2. 15 Form- & Support Work

Work will be done under supervision of a competent supervisor who has been appointed in writing.

Before work commences drawings will be issued to the Principal Contractor. Decks will be erected in a systematic way and will at no time endanger any persons working on the deck. Handrails will be placed around the edges of the temporary or permanent decks. Safe access will be provided and fall protection will be used as per the Contractor's Risk assessment / Fall protection plan. No material will be thrown from any height.

2.16 Steel Assembling & Placing

Area where assembly takes place must be demarcated. When working at heights employees must be issued with safety harnesses and other PPE required as per the risk assessment. The correct tools must be used for the work to be done. When handling steel, beware of the cutting edges of steel and be aware of other people. When lifting steel with a crane the load must be well balanced.

2.1.17 Explosive actuated fastening devices and powered tools.

All operators will be trained by a competent company and will be appointed in writing. The operator will receive a training certificate which has to be forwarded to the Client/Agent. The “Gun” and the Cartridges will be stored in a lockable storage facility and will be stored separately.

2. 18 OHS Act 85 of 1993

This document does not replace any regulations or any part of the OHS (Occupational Health and Safety Act) Act 85 of 1993 but does conform to the requirements of the OHS Act 85 of 1993 Construction Regulations. The Client shall provide a Health and Safety Specification to the Principal Contractor and the Principal Contractor will issue such information to the employed Contractors on the construction Project. As an Employer, the Contractor remains responsible to ensure compliance with the OHS Act 85 of 1993 and is regulations.

2. 19 Non-Conformances

Any Contractor employee who is found not adhering to the Client H&S procedures, Contractor H&S Plan or OHS Act 85 of 1993 or who is observed doing unsafe acts or contributing to creating unsafe conditions will be issued with Site Instruction. Contractor employees will also be reprimanded as per the Company HR procedures, a first transgression constitutes a verbal warning, a second transgression constitutes a written warning, and a third transgression constitutes a full disciplinary hearing as per the Company Hr Procedures. Any Life-threatening unsafe act or condition must be treated as Gross Neglect of Company Safe Rules and Procedures and a Disciplinary Hearing shall be conducted to determine the root cause of the incident and the appropriate action which must be taken to rectify the unsafe situation or prevent future incidents from occurring. Copies of the Non-Conformance Report and disciplinary procedures must be kept on record.

Copies of all Non-Conformance Reports must be kept in the Project H&S File for references.

3. ORGANISATIONAL ARRANGEMENTS

3.1. Site Rules

The Principal Contractor’s organisational arrangements for health and safety on the project must include that of other contractors and sub-contractors involved. Site rules must be developed by the Principal Contractor to ensure that the restrictions, outlined in this Health and Safety Specification, are met.

In particular, arrangements and site rules must be developed to ensure that construction works do no put at risk the health and safety of any person.

The Principal Contractor must demonstrate a management structure for ensuring health and safety cooperation and coordination between all parties to the contract. This will include the development of a communications strategy between the appointed Principal Contractor, Contractors, Client, Health and Safety Agent, Design Team and consulting Project Manager. The Principal Contractor must ensure that an effective chain of communication exists, clearly showing that all levels of employees engaged on the contract participate in the communication process for health and safety concerns. Regular meetings will be established between the parties where health and safety performance will be discussed. Minutes must be kept and distributed for action following the conclusion of each meeting. Emergency and incident procedures must be developed and clearly co-ordinated between parties involved.

A security strategy must be developed by the Principal Contractor who must then communicate and coordinate the strategy to all parties to the contract.

3.2. Continuing Liaison

Procedures for liaison to continue between all parties throughout the project should include the particular points listed below. All unforeseen eventualities which may occur during construction and which affect previously recognized health and safety issues or resources should be reported to the Clients Health and Safety Agent and consulting Project Manager. The Principle Contactor's appointed Construction Manager, Health and Safety Representative and/or Construction Safety Officer will consult with the workforce on health, safety and environmental matters through committee meetings, site meetings, contractor meetings, toolbox talks or verbally if so required. The Client or Designer will inform the Principle Contractor and Health and Safety Agent of all new designs, which may affect health and safety.

Information which will be relevant for inclusion in the health and safety file, should be collated, and should include information from Contractors. Arrangements should be made by the Principal Contractor with other contractors to ensure any information required for the health and safety file, which is generated by the contractors' work, is stored and passed to the Principle Contractor prior to completion of the project.

The basic information, which will be relevant for inclusion in the health and safety file, should be passed to the Client. This should include but is not limited to the following:

- General details of the materials used in the construction process
- Details of the plan and equipment supplied and fitted
- Service details – gas, water, electricity, communications (telephone, cable, TV, etc)
- Specific maintenance details or requirements (plant, equipment, fixtures and fittings – where applicable)
- Suppliers' brochures for health and safety information (use, maintenance and repairs)
- All Agreements, Safety Committee minutes and nominated competent individuals, etc.
- All training records – i.e. special training needs, induction and visitor inductions.
- Construction Health and Safety Plan
- All inspections and audits conducted
- Medical fitness certificates for all workers issued by an Occupational Health Practitioner

3.3. Responsibilities

3.3.1. The Client

The Client will ensure adequate information is available to all parties, to ensure they can perform their duties under the requirements of this document and relevant statutory legislation. The Client will appoint a competent Design Team, Project Manager, and after tender submittance, a competent Principal Contractor. The Client may also appoint a Health and Safety Agent who will carry the responsibilities of the said client. The Client may amend, vary or terminate these appointments as appropriate.

3.3.2 Design Team

The Design Team will be represented by consultant contact person, who will also be appointed Project Manager on this project. The Design Team is responsible for ensuring that the design is, as far as is reasonably possible, risk-free to persons constructing, maintaining or removing the structure. They are also responsible to make available all relevant risk information about the design and loading of structures, including suspended platforms, anticipated hazards or dangers and all method and sequencing of processes (with special conditions), to the Principle Contractor. The designer must also conduct a final inspection and issue a certificate.

3.3.3. Client's H&S Agent

The Client may appoint a Health and Safety Agent for the Project who will, on behalf of the Client, be responsible for implementing the Client's requirements for health and safety on the project. The Health and Safety Agent is also responsible for co-coordinating the Design Team, with reference to the design risk assessment process.

3.3.4. Principal Contractor

The Principle Contractor will develop and deliver the construction phase Health and Safety Plan and will further develop the plan prior to any construction work being undertaken and during the construction phase itself. The detailed Health and Safety Plan will set out clearly the Principal Contractor's management systems for managing health and safety on the contract in accordance with the Client's health and safety requirements set out in this document, the designer's risk information and any relevant health and safety legislation.

The Health and Safety Plan will be kept up to date by the Principal Contractor to include other contractors' and sub-contractors' risk control management information. The Principal Contractor will co-operate with the Client, Health and Safety Agent or Project Manager in all aspects of complying with the duties laid upon them by the OHS Act, its Regulations and specifically the Construction Regulations (7 February 2014).

Generally, the Health and Safety Policy and construction Health and Safety Plan will be to specify site rules such as the wearing of personal protective equipment and no alcohol or drugs, etc on site.

3.3.5. Contractors and Sub-Contractors

Each contractor and sub-contractor will be required to co-operate with the Principal Contractor and provide information on risk assessments, method statements, etc. for inclusion in the Health and Safety Plan prepared by the Principal Contractor. In addition, each contractor and sub-contractor will comply with the site rules and any reasonable instructions formulated by the Principal Contractor, in accordance with current relevant health and safety legislation. Contractors and sub-contractors will provide adequate information to the Principal Contractor, who in turn will collate this information for inclusion in the health and safety file documentation.

ANNEXURE 1. Baseline Risk Assessment.

Project: ROAD / WATER

Ref.	ACTIVITY	HAZARD	RISK	MEASURES REQUIRED
	Site establishment	Heavy lifting	Injuries and strains	Procedures Equipment Training PPE
		Traffic and moving vehicles	Injuries crushing, strains, death.	Traffic Management Training
		Dust	Inhalation	Procedures PPE
		Snakes and spiders	Poisonous bites can cause death	Procedures Emergency plan
2.	**Offloading equipment and materials**	Heavy lifting	Injuries strains	Procedures Equipment Training PPE
		Collapsing loads	Injuries crushing, strains, death.	Procedures Training PPE
		Traffic and moving vehicles	Injuries crushing, strains, death.	Traffic Management Training
3.	**Excavations**	Traffic and moving vehicles	Injuries crushing, strains, death.	Traffic Management Training
		Collapsing side walls	Injuries crushing, strains, death.	Procedures Training PPE
		Dust	Inhalation	Procedures PPE
		Noise	Hearing impairment	Procedures PPE
		Open edges	Falling into or from causing injuries and death.	Procedures Equipment Training PPE

Ref.	ACTIVITY	HAZARD	RISK	MEASURES REQUIRED
		Moving Plant	Injuries crushing, strains, death.	Traffic Management Procedures Training
4.	**Back Filling and Layer work**	Traffic and moving vehicles	Injuries crushing, strains, death.	Traffic Management Training
		Dust	Inhalation	Procedures PPE
		Noise	Hearing impairment	Procedures PPE
		Moving Plant	Injuries crushing, strains, death.	Traffic Management Procedures Training
		Pedestrians and children	Injuries crushing, strains, death.	Traffic Management Procedures Training
5.	**Paving packing**	Ergonomic constrains	Injuries and pain	Procedures and training
		Sun and Heatstroke	Dehydration and death	Procedures PPE Providing Drinking Water
		Traffic and moving vehicles	Injuries crushing, strains, death.	Traffic Management Training
6.	**Compacting**	Traffic and moving vehicles	Injuries crushing, strains, death.	Traffic Management Training
		Dust	Inhalation	Procedures PPE
		Noise	Hearing impairment	Procedures PPE
		Moving Plant	Injuries crushing, strains, death.	Traffic Management Procedures Training
		Traffic and moving vehicles	Injuries crushing, strains, death.	Traffic Management Training
7.	**Kerb laying**	Heavy lifting	Injuries and strains	Procedures Equipment Training PPE
		Ergonomic constrains	Injuries and pain	Procedures and training
		Sun and Heatstroke	Dehydration and death	Procedures PPE Providing Drinking Water
		Traffic and moving vehicles	Injuries crushing, strains, death.	Traffic Management Training
		Dust	Inhalation	Procedures PPE
		Noise	Hearing impairment	Procedures PPE
		Moving Plant	Injuries crushing, strains, death.	Traffic Management Procedures

Ref.	ACTIVITY	HAZARD	RISK	MEASURES REQUIRED
				Training
8.	**Presence of visitors and members the public**	Moving plant and equipment	Injuries crushing, strains, death	Procedures Traffic Management Training
		Falling equipment	Injuries and death.	Procedures Equipment Training PPE
		Dust	Inhalation	Procedures PPE
		Noise	Hearing impairment	Procedures PPE
		Collapsing structures and support	Injuries crushing, strains, death.	Procedures Equipment Training PPE
9.	**Brickwork**	Heavy lifting	Injuries and strains	Procedures Training PPE
		Ergonomic and posture	Strains and injuries	Procedures Training PPE
		Collapsing structures	Injuries crushing, strains, death.	Procedures Equipment Training PPE
10.	**Plumbing and Storm water installation**	Cutting grinding	Cuts, bruises and injuries	Procedures Equipment Training PPE
		Dust	Inhalation	Procedures PPE
		Noise	Hearing impairment	Procedures PPE
11.	**Moving Vehicles and plant**	Traffic accidents	Injuries crushing, strains, death.	Traffic Management Procedures Training

ANNEXURE 2

ACKNOWLEDGEMENT OF RECEIPT

This document must be completed by the bidding Principal Contractor and all Contractors pricing work on this Project.

Acknowledgement of receipt:

I, _____representing_____

Principal Contractor /Contractor / Employer have satisfied myself with the content of the Health and Safety Specification and shall ensure that the Principal Contractor / Contractor and its personnel comply with all obligations / requirements in respect thereof.

Signature_____ Date_____

Principal Contractor / Sub Contractor

Signature_____

Date_____

Client/Agent_____

Signature _____

Date_____

ANNEXURE 3

PRINCIPAL CONTRACTOR CONSTRUCTION MANAGER FORM

I, _____, of (company name) _____,
do hereby appoint _____ being a full-time employee on the
_____ project, with the duty of CONSTRUCTION MANAGER.

You are appointed in terms of the, OHS Act 85 of 1993 – CR 8(1), your area of responsibility is as follows;

_____

Your duties will include but no be limited to:

- Ensuring that all company safety, health and environmental procedures along with any specific client requirements are implemented and adhered to.
- Ensuring that all applicable legislative requirements are implemented and complied with.
- Ensuring that only authorised persons gain access to the construction premises and associated areas.
- Ensuring that all persons are made aware of the hazards associated with their work and that all reasonable measures are implemented to reduce these risks.
- Ensuring that all construction activities are carried out under the control and supervision of competent supervisors.
- Ensuring that all plant and machinery is in a safe working condition and that only trained and authorised persons utilize such items.
- Ensuring that the necessary personal protective equipment made available and used by the appropriate persons.
- Ensuring that all contractors adhere to the health and safety requirements of the contract.
- Ensuring that all injuries and incidents are reported and investigated in the appropriate manner and that suitable measures are implemented to prevent re-occurrences.
- Ensuring that all reasonable steps are taken to ensure the health and safety of all persons employed on the contract and of those who are affected by the construction operations.
- You are to take all reasonable steps to ensure the health and safety of all persons associated with this designation.
- This appointment also entrusts you to assist and advise all employees in ensuring adherence to company and statutory health, safety and environmental requirements. Please familiarise yourself with these requirements and report all deviations and areas of non-compliance, which you cannot rectify to me directly.

SIGNATURE _____

DESIGNATION_____

DATE_____

ACCEPTANCE OF DESIGNATION_____

ANNEXURE 4

AGREEMENT WITH MANDATORY

In terms of Section 37 (1) and (2)
WRITTEN AGREEMENT ENTERED INTO AND BETWEEN

_____

(Herein after referred to as the “CLIENT”)

AND

_____

(Herein after referred to as the Contractor)

Each page as well as each change made to be initialled.

DEFINITION OF MANDATORY:

Includes an agent, a Contractor or Sub-Contractor for work, but without derogating from his status in his own right as an Employer or User.

SECTION 37 (1)

Whenever an employee does or omits to do any act which it would be an offence in terms of this Act for the employer or such employee or a user to do or omit to do, then, unless it is provided that: -

(a) in doing or omitting to do that act the employee was acting without the connivance of permission of the employer or any such user;

(b) it was not under any condition or in any circumstances within the scope of the authority of the employee to do or omit to do an act, whether lawful or unlawful, of the character of the act or omissions charged, and

(c) all reasonable steps were taken by the Employer or any such user to prevent any act or omission of the kind in question.

The employer or any such user himself shall be presumed to have done or omitted to do that Act, and shall be liable to be convicted and sentenced in respect thereof; and the fact that he issued instructions forbidding any act or omissions of the kind in question shall not, in itself, be accepted as sufficient proof that he took all reasonable steps to prevent the act or omission.

SECTION 37 (2)

The provision of subsection (1) shall *mutates mutandis* apply in the case of a mandatory of employer or user, except if the parties have agreed in writing to the arrangements and procedures between them to ensure compliance by the mandatory with the provisions of this Act.

ACCEPTANCE BY MANDATORY

In terms of Section 37 (2) of the OHS Act 85 of 1993,

I _____

Representing (Contractor Company Name) _____

responsible for carrying out (describe activity) _____

at the (contract/site name) _____

undertake to ensure that the requirements and provisions of the OHS Act and Construction Regulations are complied with.

_____ _____

Section 16 (2) for Sub-Contractor Date

_____ _____

Clients Agent Date

Annexure 5

APPOINTMENT

CONSTRUCTION REGULATION 5 (1) (k)

In terms of the above-mentioned regulation:

The Contractor shall submit the following for approval before commencement of any construction work and shall commence with activities only after approval:

1. Letter of Good Standing.CR. 7(1)*(c)*(iv)
2. Health and Safety file with Health and Safety plan.CR 7.(1)
3. Required appointment letters of relevant responsible persons with proof of competency.CR 8
4. Risk assessment of anticipated activities to be performed on this project. CR 9

I,_____ representing

_____ (Client), appoint:

_____

(Contractors company name)

to carry out the work of

_____

(Describe activity)

By this appointment:

- Your company must ensure that all relevant documentation as required by _____(The Client) Projects Fall protection plan is included.

CONSTRUCTION PROJECT: _____

Appointment period:

From_____Until_____

ACCEPTANCE

I, _____ representing_____ (Contractors company name) accept this appointment. I am familiar with Occupational Health and safety Act and Construction Regulations as well as the associated duties and responsibilities of this appointment.

SIGNATURE: _____ DATE: _____

Subcontractor representative

SIGNATURE: _____

OHS 5 COVID-19

OHS 5.1 Introduction.

This specification is developed with the objective to Manage Health and Safety on the construction site with the emphasis on Health and preventing the spread and infection of and with the Corona virus.

This Specification is additional to the site-specific H&S Specification and do not reduce or change the contractor's responsibility regarding Health and Safety management on site.

Due to the rapid changing situation this Specification shall be updated and amended as more information and other more conclusive measures are identified and verified.

This specification is subject to all relevant legislative notices regarding the COVID 19 Pandemic and the regulations issued by the South African Government.

OHS 5.2 Objective:

This specification is aimed at maintaining the health and wellbeing of all employed/working on the construction site and related activities as well as all people who might be affected by the construction process where the contractor have any influence or authority.

OHS 5.3 Purpose of this specification:

This specification is a direct response to the current challenges in the work place in regard to the COVID 19 Pandemic and measures to be implemented in order to resume and continue work in an as safe manner as possible and to prevent the spread of infections associated with COVID 19.

OHS 5.4 Covid-19 Risk Assessments:

COVID 19 Risk Assessments have been developed and are attached for reference see Addendum 1C19.

The Risk Assessments are based on current knowledge and available information.

General best practices in line with Government and WHO (World Health Organisation) guidelines propagated as control and mitigation.

OHS 5.5 Management Plan and Protocols for Managing Construction operations during COVID 19 Pandemic:

The Client shall provide a plan with protocols and measures to be implemented. This plan shall cover all aspects that needs to be addressed with instructions, checklists and procedures/protocols to be followed and managed in order to be compliant with current Government notices and regulations issued.

The Contractor shall inform the client of any shortcoming or other issues rendering the plan inefficient or non-compliant.

OHS 5.6 Implementation of Specification and record keeping:

The Principal contractor shall implement this plan and keep records of all:

- Communications and awareness
- Training done
- Inspections
- Protocols implemented and managed

OHS 5.7 Management and Responsibility

The Principal Contractors Construction Manager CR.8 (1) shall manage this plan with the assistance of his Safety Officer and a dedicated “COVID 19 Coordinator”

OHS 5.8 Management in relation to construction activities

In addition to providing PPE as per Risk assessments for H&S Management the contractor shall provide sanitation and wash facilities with soap and water.

Supervisors shall manage work in with social distancing in mind. When work need to be done that require close proximity between workers, the number of workers shall be limited at that activity and appropriate PPE shall be issued to prevent the spreading and possible contamination of infection.

The contractor shall provide additional overalls in order for workers to wash their overalls on a daily basis.

Contractor to implement a cleaning routine for all surfaces that can be contaminated.

All work areas, offices to be cleaned daily and all waste to be removed. Registers to be kept of all cleaning and disinfecting on site.

OHS 5.9 Compliance Monitoring

The Clients H&S Agent shall monitor and audit all measures and implemented protocols as required by Government Notices and the relevant Regulations.

Failure to abide by these standards and the guidelines set by Government shall result in the shutdown of the site or parts of it. Non-conformance can also lead to prosecution.

The Client has a duty under the Disaster Management Act to report any contraventions to the relevant Authorities.

Site:		**Contractor Sec 16(2)/Project Manager**	
Project:		**Done by:**	
Contractor:		**Date:**	
Team:			

Risk Rating		SEVERITY / CONSEQUENCE				
		1. Negligible	2. Minor	3. Moderate	4. Serious	5. Major
LIKELIHOOD	1. Very Unlikely	1	2	3	4	5
	2. Unlikely	2	4	6	8	10
	3. Possible	3	6	9	12	15
	4. Likely	4	8	12	16	20
	5. Probable	5	10	15	20	25

1-6 LOW	May be acceptable. Due care to be employed and situation reviewed to see if risk can be reduced further.
7-14 Medium	Possible Precarious situation only allowed to proceed with proper supervision. All available measures employed to reduce Raw Risk.
15-25 High	Situation Critical and cannot be allowed to proceed. Reassess situation continuously to determine best implementable measures for Risk mitigation.

SITUATIONS:	
1.	Someone entering the workplace already infected with CV19
2.	Someone becomes ill within the workplace
3.	Contaminated workplace
4.	Proximity, workplace gatherings (social distancing)
5.	General Ignorance
6.	Self-isolation
7.	Transport and Travel (Travelling across district borders)
8.	Symptomatic or exposed employee(s)
9.	Presenteeism
10.	First Aid Training / CPR Manikin
11.	Lack of accurate information / a failure to disseminate information
12.	Accommodation
13.	Welfare facilities
14.	Plant and Equipment
15.	Consequence Management

Nr	HAZARD				INITIAL RISK			CONTROLS		RESIDUAL RISK	
	Hazard Description	Risk	Health/Safety Influenced		Hazard Severity	Likeli -hood	Risk Rating	List Controls Required	Hazard Severity	Likeli -hood	Risk Rating
1.	Someone entering the workplace with CV19	Passing the virus on to other employees, causing illness and possible death	Health Safety	5	3	15	• Symptomatic individuals will not be allowed entry. • Hygiene requirements (handwashing etc.) and symptoms of CV19 included with Induction. • CV19 Information posters placed in accessible locations in the workplace	3		1	3

2.	Someone becomes ill within the workplace	Workers contracting CV19 by any means, causing illness and possible death	Health Safety	5	3	**15**	• Worker removed to a designated area at least 2 metres away from other people. • The individual will be sent home and advised to follow Governmental guidance. • Workplace decontaminated following accepted standards. • Relevant PPE to be issued	5	1	**5**

Nr	HAZARD			INITIAL RISK			CONTROLS	RESIDUAL RISK		
	Hazard Description	Risk	Health/ Safety Influenced	Hazard Severity	Likeli - hood	Risk Rating	List Controls Required	Hazard Severity	Likeli -hood	Risk Rating
3.	Contaminated workplace	Workers catching CV19 due to contaminated surfaces, causing illness and possible death	Health Safety	5	2	**10**	• Formal cleaning regime introduced (Employees cleaning equipment and facilities more often). • Hand sanitisers to be been placed in readily accessible locations. • Extra hygiene requirements enforced. • Multi-use handtowels not allowed for drying hands. • Relevant PPE to be issued	5	1	**5**
4.	Physical Proximity during workplace gatherings	Workers catching CV19 due to working closely with infected colleagues, causing illness and possible death	Health Safety	5	3	**15**	• Social Distancing policy implemented. All work areas and activities been evaluated for the possibility of implementing social distancing (no handshaking, deferring large meetings etc.) • Provision of suitable and sufficient PPE;	5	1	**5**

Nr	HAZARD			INITIAL RISK			CONTROLS	RESIDUAL RISK		
	Hazard Description	Risk	Health/ Safety Influenced	Hazard Severity	Likeli - hood	Risk Rating	List Controls Required	Hazard Severity	Likeli -hood	Risk Rating
							• Demarcation and spacing of queueing areas;			

5.	General Ignorance	Workers unaware of risks from CV19 and become infected, causing illness and possible death	Health Safety	5	3	**15**	• A formal training program implemented to cover risks, symptoms and control measures. Attendance to all sessions mandatory with attendance registers kept on file as proof.	5	1	**5**
6.	Self-isolation of workers	Workers unaware of the need to (or how to) self-isolate, causing further spread of disease and possible death	Health Safety	5	3	**15**	• A formal training program implemented educate workers on control measures, including self-isolation. Attendance to all sessions mandatory with attendance registers kept on file as proof.	4	1	**4**
7.	Transport and Travel (Travelling across District borders borders)	Travelling across district borders and afterwards returning "Maximum allowed capacity exceeded; No facilities for sanitising vehicles and passengers; No additional protective measures available, e.g. face masks;	Health Safety	5	2	**10**	• Adhere to general travel ban by SA Government. • Implement alternatives to travel - postpone trips or hold meetings via video conferencing. • Selection and provision of transport services compliant	5	1	**5**

Nr	HAZARD			INITIAL RISK			CONTROLS	RESIDUAL RISK		
	Hazard Description	Risk	Health/ Safety Influenced	Hazard Severity	Likeli - hood	Risk Rating	List Controls Required	Hazard Severity	Likeli -hood	Risk Rating
							requirements. • Policy and procedures and rules for travel, where possible to limit the use of public transport, or to arrange selective methods of transport, • ongoing toolbox talks and supply of cloth masks to be worn when travelling or moving on and off site. • Vehicles maintained at 70% capacity or less. • Vehicles sanitised between trips; hand sanitiser provided for passengers.			

8.	Symptomatic or exposed employee(s)	Workers are symptomatic of CV19 or has been in close contact with someone with CV19, causing further spread of disease and possible death.	Health Safety	5	3	**15**	• If worker is unfit for work, they will be booked off sick as per normal policy. • Symptomatic employees will be sent home. • Colleagues who came in contact with symptomatic workers will be informed of symptoms and advised to contact a doctor for guidance. • Working from home will be considered. • Relevant PPE to be issued	5	1	**5**
9.	Presenteeism	A worker catches CV19 because a colleague continues working despite being unwell, causing further spread of disease and possible death	Health Safety	5	3	**15**	• Workers coming in contact with symptomatic ones will be informed of symptoms and advised to contact a doctor for guidance. • Workplace will be decontaminated following Governmental guidance: • Relevant PPE to be issued	5	1	**5**

10.	First Aid Training / CPR Manikin	Workers exposed to CV19 due to providing First Aid in the workplace or during CPR Training on Mannequin, causing further spread of disease and possible death	Health Safety	5	2	**10**	• Proper training of First Aid staff • Use of correct equipment while giving First Aid • Maintaining proper mannequin hygiene • Relevant PPE to be issued	5	1	**5**
11.	Lack of accurate information / a failure to disseminate information	Employees unaware of risks from CV19 get infected due to lack of awareness of control measures, causing further spread of disease and possible death	Health Safety	5	3	**15**	• A designated person will be appointed to monitor CV19 by signing up for immediate news updates and monitoring relevant Websites and News outlets. • A risk communication plan will be implemented, ensuring timely updating/ sharing of information with all internal & external stakeholders	5	1	**5**
12.	Accommodation	Social density - inability to maintain social distancing, Cross contamination from the lack of social distancing, shared utilities and belongings,					• Policy and method statement for accommodation and to be reviewed • Sleeping and dining quarters to allow for			

		shared ablutions, cross infection among inhabitants and cleaning, catering staff					minimum 1.5m space between persons; • Dedicated bedding, towels, utensils, soaps etc.; • Individual facilities for safe keeping; • Individual, segregated facilities for storage of laundry; • Procedures and rules of occupancy and cleaning; • Induction and primary health promotion to be done regularly. • Isolation area to be available should anyone display symptoms, and safe removal for testing. • Food to be served wrapped and available individually.			
13.	Welfare facilities	Social density - inability to maintain social distancing in, Cross contamination from the lack of social distancing, shared utilities and belongings, shared					• Updating of policy, method statements • limiting of personnel on site to minimum number required to maintain control and management.			

		ablutions, cross infection among inhabitants and cleaning staff					• Implement and maintain cleaning and disinfecting progamme. • Site rules for social distancing to 1.5m. • Use technology to avoid close proximity between individuals where possible			
14.	Plant and Equipment	No facilities for sanitising vehicle/plant and operators /drivers; No additional protective measures available, e.g. face masks;					• Only operator/driver allowed in cab • ongoing toolbox talks and supply of cloth masks to be worn when travelling or moving on and off site. • Vehicles maintained at 70% capacity or less; • Plant/Vehicles sanitised between trips; hand sanitiser provided for passengers.			
15.	Consequence Management						• Revision of policy, method statements and HIRA. • Supervisor/CCO must ensure that workers are updated daily with all the relevant COVID 19 information through			

							DSTIS/Toolbox talks, notices etc.. • Supervisor/CCO must ensure that site is updated daily with all the relevant COVID 19 information. • Workers should be updated with new information daily. • Management must ensure that company disciplinary procedures are in place. • All employees should have knowledge of the company disciplinary procedures. • Work stoppage/site closure where non-compliance exists.			

C.Acknowledgement and Approval

END OF SECTION