



TENDER NO: 2021/031

**Design, supply, install, commission of air-cooled MV and LV motors at Groenkloof Pump Station.**

**VOLUME 1 – Tendering Procedures and Returnable Documents**

**Issued by:**

Umgeni Water  
310 Burger Street  
Pietermaritzburg

**Tender Queries:**

Contact Name: Nosipho Mkhize  
Telephone : 033 341 1062.

**Name of Tenderer:** \_\_\_\_\_

**National Treasury CSD Number:** \_\_\_\_\_

Tip-Offs Anonymous Hotline:	Appeals/Objections
<p>Report unethical conduct at Umgeni Water on:</p> <p>Toll Free Number: 0800 864 463 Email: <a href="mailto:umgeniwater@whistleblowing.co.za">umgeniwater@whistleblowing.co.za</a> Toll Free Fax: 0800 212 689 Postal: Freepost KZN665, Musgrave, 4062 SMS: 33490 Online: <a href="http://www.whistleblowing.co.za">www.whistleblowing.co.za</a></p> <p><i>Stop theft / fraud / dishonesty / bribery / blackmail / intimidation, and remain anonymous.</i></p>	<p>Persons aggrieved by tender award decisions taken by Umgeni Water, may lodge an appeal within <b>7 days</b> of the date of the intention to award advertisement.</p> <p>UW shall only consider written appeals/objections clearly stating reasons for appeal directed to:</p> <p>The Supply Chain Management Office, Attention: Supply Chain Management Email: <a href="mailto:appeals@umgeni.co.za">appeals@umgeni.co.za</a></p>

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For information use only

**Tender Number:** 2022/031

**Tender Title:** Design, supply, install, commission of existing of water cooled motors at Groenkloof to be replaced by air cooled motors, including a suitable HVAC system.

### T1.1 TENDER NOTICE AND INVITATION TO TENDER

Umgeni Water is a state owned business enterprise and it operates within the South African legislative parameters of the Water Services Act 108 of 1997, Public Finance Management Act 1 of 1999 and Public Audit Act 25 of 2004.

Competent and experienced Contractors are invited to Tender for the following:

Design, supply, install, commission of existing of water-cooled motors at Groenkloof to be replaced by air cooled motors, including a suitable HVAC system and six months

In addition to the Eligibility Criteria specified in Clause F2.1 of the tender document, tenderers are required to fulfil the following:

Qualification and Association affiliation required EB/EP 4

In addition to the evaluation criteria specified in clause F2.1 of the Tender document, Tenderers' are required to achieve a stipulated minimum threshold per designated sectors and products

Industry/sector/sub-sector	Minimum threshold for local content
Electrical and telecom cables	90%
Motors	70%

Tenderers are required to achieve at least 35% Contract Participation Goals (CPG) including a minimum 10% Black Women participation and another 10% for Local participation of the value of goods, services and Works paid to one or more targeted enterprises to comply with Umgeni Water's BBBEE policy initiative.

Evaluation method:

The tender will firstly be evaluated on eligibility. If found to be eligible, it will be further evaluated in two stages i.e.

- Functionality shall be assessed. A minimum functionality score of 70 (seventy) points is required for the tender to be considered further.
- Price & Preference using the 80/20 Preference Point Scoring System in terms of PPPFA

Tender documents are available from the Supply Chain Management Office. Documents will be issued by email, upon request and submission of proof of payment to [nosipho.mkhize@umgeni.co.za](mailto:nosipho.mkhize@umgeni.co.za).

Documents will only be issued in electronic format, during working hours from 09h00 to 15h00 from 25 July 2022 to 11 August 2022

**Tender documents shall only be sold during the said period and hours.**

A non-refundable tender fee of R 200-00 payable by Electronic Fund Transfer is required before collecting the Tender Document. Proof of EFT payment is to be provided on collection. The said transfers may be made to:

BANK NAME: NEDBANK LIMITED  
ACCOUNT NAME: UMGENI WATER BOARD – MAIN ACCOUNT  
ACCOUNT NUMBER: 1196366594  
REFERENCE: TENDER NO. 2022/031 and Company Name.

**NOTE: 1 TENDER DOCUMENTS SHALL NOT BE ISSUED IF INCORRECTLY REFERENCED.**

**2 TENDERER TO FORWARD NOTIFICATION OF PAYMENT BY E-MAIL TO Nosipho Mkhize AT**  
[nosipho.mkhize@umgeni.co.za](mailto:nosipho.mkhize@umgeni.co.za)

**NOTE: NO CASH PAYMENT WILL BE ACCEPTED WHEN ISSUING TENDER DOCUMENTS.**

Queries relating to the issue of these documents shall be addressed to: Ms. Nosipho Mkhize, Tel No.: 033 341 1062, e-mail: nosipho.mkhize@umgeni.co.za.

A compulsory clarification meeting with representatives of Umgeni Water will take place at Groenkloof Pump Station on 12 August 2022 starting at 11: 00.

**Only Tenderers who have purchased the Tender documents may attend this compulsory meeting.**

No tender documents will be issued at the clarification meeting. Therefore if tenderers pay during the collection period, they must ensure collection before the meeting.

Tenderers must ensure that they bring their documents to the clarification meeting for signing purposes. No concessions will be made for tenderers who do not have their tender documents in their possession.

The closing time for receipt of Tenders is 12h00 on 30 August 2022.

Tenders are to be deposited in the Tender Box located outside the main entrance at Umgeni Water, 310 Burger Street, Pietermaritzburg.

Umgeni Water's Standard Conditions of Tender and Conditions of Contract are available on Umgeni Water's website [https://www.umgeni.co.za/pdf/cm009\\_standard\\_conditions\\_of\\_tender.pdf](https://www.umgeni.co.za/pdf/cm009_standard_conditions_of_tender.pdf)

Persons aggrieved by decisions or actions taken by Umgeni Water, may lodge an appeal within 7 days of the date of the intention to award advertisement appearing in the relevant print media.

The appeal (clearly stating reasons for appeal) and queries with regard to the decision of award are to be directed, in writing only to the Supply Chain Management Office,  
Attention: Supply Chain Management  
Email: [appeals@umgeni.co.za](mailto:appeals@umgeni.co.za)

Note that appeals not addressed to the abovementioned email will not be considered.

For any other Tender adverts, please visit this website.

**Umgeni Water Reserves the Right to Award the Contract In Whole or In Part.**

## T1.2 TENDER DATA (INCLUDING SPECIAL CONDITIONS OF TENDER)

The general conditions of tender are the Umgeni Water Standard Conditions of Tender (document number: SCM009, a copy of which may be obtained from Umgeni Water Supply Chain Management office or can be downloaded from the following web site:

[https://www.umgeni.co.za/pdf/cm009\\_standard\\_conditions\\_of\\_tender.pdf](https://www.umgeni.co.za/pdf/cm009_standard_conditions_of_tender.pdf)

For purposes of this Contract the following Special Conditions of Tender shall apply:

### F.3.8 Test for responsiveness

Sub-Clause F.3.8.1 Add the following new sub-clause:

“d) Meets the minimum Functionality requirement stated in the Tender Data.”

### F3.11.3 Method 2: Functionality, Price and Preference

#### Functionality

Each member of the Purchaser's tender evaluation committee is to independently score each tender in respect of functionality offered in accordance with the provisions of F.3.11.9. The committee is then to calculate the final score for each tender as the average of the score from each committee member, rejecting all tender offers that fail to score the minimum number of points stated in the tender data, if any.”

The Standard Conditions of Tender make 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 Standard Conditions of Tender.

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

Clause number	Tender Data
	<b>F.1.1 Actions</b>
F.1.1	The Purchaser is <b>Umgeni Water</b>
	<b>F.1.2 Tender Documents</b>
F.1.2	<p>The Tender Documents issued by the Purchaser comprise the following documents:</p> <p><b>VOLUME 1 – Tendering Procedures and Returnable Documents</b>  <b>Part T1: Tendering procedures</b>  <b>Part T2: Returnable documents</b></p> <p><b>VOLUME 2 – Offer, Contract, Price, Scope of Work and Site Information</b>  <b>Part C1: Agreements and Contract data</b>  <b>Part C2: Pricing data</b>  <b>Part C3: Scope of work</b>  <b>Part C4: Site information</b>  <b>Part C5: Annexures</b></p> <p>C5.1 Umgeni Water Insurance Summary and Claims Procedure  C5.2 Drawings  C5.3 Umgeni Water Particular Specification for OHSA 1993 Health and Safety  C5.4 Asset Numbering Standard  C5.5 O-M Manual Version 2  C5.6 Part Spec Construction Health – Safety  C5.7 Particular Spec for Instrumentation  C5.8 Quality Assurance Procedure  C5.9 Standard Spec for Mechanical Works  C5.10 Technical Spec for Electrical Installations</p>

	<b>F.1.4 Communication and Purchaser's agent</b>
F.1.4	<p>The Purchaser's agent is :</p> <p><b><u>Tender Queries</u></b>  Name: Nosipho Mkhize    Address: 310 Burger Street , Pietermaritzburg, 3200    Tel: 033 341 1062    E-mail: nosipho.mkhize@umgeni.co.za  </p> <p>  </p>
	<b>F.2.1 Eligibility</b>
F.2.1	<p>Umgeni Water will only consider submissions from tenderers who satisfy the following criteria:</p> <ul style="list-style-type: none"> <li>a) The tenderer has completed the Bidders Disclosure Form (T2.2.2)</li> <li>b) Tenderers are required to achieve the stipulated minimum threshold as per the relevant Treasury Instruction Note on local content and production. (Refer to Returnable Document T2.2.8)</li> <li>c) Tenderers are required to achieve at least 35% Contract Participation Goals (CPG) including a minimum 10% Black Women participation and another 10% for Local participation of the value of goods, services and Works paid to one or more targeted enterprises to comply with Umgeni Water's BBBEE policy initiative.  </li> <li>d) A CIDB grading of 4 EB/EP or higher is required</li> </ul>
	<b>F.2.7 Clarification meeting</b>
F.2.7	<p>There shall be a compulsory clarification meeting. The details for which are stated in the Tender Notice and Invitation to Tender.</p> <p>Tenderers must sign the attendance list in the name of the tendering entity. Addenda will be issued to and tenders will be received only from those tendering entities appearing on the attendance list.</p>
	<b>F.2.12 Alternative tender offers</b>
F.2.12	No alternative tender offers will be considered.
	<b>F.2.13 Submitting a tender offer</b>
F.2.13.3	Parts of each tender offer communicated on paper shall be submitted as an original.
F.2.13.5 and F.2.13.7	<p>The Purchaser's details and address for delivery of tender offers are stated in T1.1 <b>Tender Notice and Invitation to Tender.</b></p> <p><b>Identification details</b>  The identification details which must be stated in the tender offer outer package are:</p> <p><b>Tender Number</b>  <b>Title of Tender</b>  <b>Closing Date</b>  <b>Closing Time</b>  <b>Tenderer's Name</b></p>

	<p><b>Tenderer's Address</b></p> <p>Tenders issued in more than one volume must be returned in the same manner and bound separately as per the tender volumes issued.</p> <p>The tender box is available to the public 24 hours per day and 7 days per week. It is the Tenderers sole responsibility to ensure that tenders are placed in the tender box and only Tenders that have been placed in the tender box before the stipulated closing date and time will be considered.</p>
F.2.13.6	A two-envelope system is not applicable
	<b>F.2.15 Closing time</b>
F.2.15	The closing time for submission of tender offers is as stated in <b>T1.1 Tender Notice and Invitation to Tender.</b>
	<b>F.2.16 Tender offer validity</b>
F.2.16.1	The tender offer validity period is 120 days from the closing date.
	<b>F.2.19 Inspections, tests and analysis</b>
F.2.19	<p>Access shall be provided for the following inspections, tests and analysis:</p> <p>Factory Acceptance Testing (FAT) at the supplier's facility</p> <p>Site Acceptance Testing (SAT)</p> <p>Testing of PLC code at the supplier's facility</p>
	<b>F.2.20 Submit securities, bonds, policies, etc.</b>
F.2.20	The Tenderer is required to submit with his Tender a letter of intent from an approved Financial Services Provider registered with the Financial Services Board to provide the Insurances to the format included in Part T2.2 of this procurement document.
	<b>F.2.23 Certificates</b>
F.2.23	<p>The tenderer is required to submit with his tender:</p> <ol style="list-style-type: none"> <li>1) A Tax Compliance Status letter (with pin) issued by the South African Revenue Services.</li> <li>2) Central Supplier Database (CSD) Report</li> <li>3) Proof of good standing in terms of the COID Act</li> <li>4) Certificate of Independent Bid Determination</li> <li>5) A valid original or certified copy of B-BBEE Status Level Certificate or sufficient evidence to confirm status as a qualifying EME</li> </ol> <p>Company Registration Certificate</p>
	<b>F.3.4 Opening of tender submissions</b>
F.3.4	Tenders will be opened immediately after the closing time for tenders as stipulated in T1.1 Tender Notice and Invitation to Tender.
	<b>F.3.8 Test for responsiveness</b>
F.3.8	The minimum qualifying Functionality Evaluation Score shall be seventy (70) (seventy) points
	<b>F.3.11 Evaluation of tender offers</b>
F.3.11.3	The procedure for the evaluation of responsive tenders is Method 2 (Functionality, Price and Preference)
F.3.11.3 (4c)	The following preference point systems are applicable to all Tenders:



(5c)	1) 80/20 system for Tenders with a Rand value less than R50 000 000.00, inclusive of VAT, in which 80 points are allocated for price and 20 points for preference in respect of all responsive Tenders received.; and															
F.3.11.7	Scoring Price															
F.3.11.9	<p>The table below lists the returnable schedules that set out the scoring criteria and sub-criteria, and the percentage weighting for the score achieved against the relevant schedule:</p> <table><thead><tr><th colspan="2">Returnable Schedule</th><th>Weighting %</th></tr></thead><tbody><tr><td>T2.2.09</td><td>Tenderer's Experience</td><td>30</td></tr><tr><td>T2.2.10</td><td>Experience of Key Personnel</td><td>20</td></tr><tr><td>T2.2.10</td><td>Quality Assurance and Environmental Management</td><td>10</td></tr><tr><td>T2.2.11</td><td>Method Statement</td><td>40</td></tr></tbody></table> <p><b><u>Failure to score a single point in any of the criteria listed above will deem the bid non-responsive and the bidder will be disqualified.</u></b></p> <p>The score allocated by each Bid Evaluation Committee member for a tender shall be the sum, of the scores relevant to each of the above listed returnable schedules multiplied by the percentage weighting for each as shown above.</p>	Returnable Schedule		Weighting %	T2.2.09	Tenderer's Experience	30	T2.2.10	Experience of Key Personnel	20	T2.2.10	Quality Assurance and Environmental Management	10	T2.2.11	Method Statement	40
Returnable Schedule		Weighting %														
T2.2.09	Tenderer's Experience	30														
T2.2.10	Experience of Key Personnel	20														
T2.2.10	Quality Assurance and Environmental Management	10														
T2.2.11	Method Statement	40														
F.3.17 Provide copies of the contracts																
F.3.17	The number of paper copies of the signed contract to be provided by the Purchaser is one.															
F3.18 Provide written reasons for actions taken																
F3.18	Refer to Section 39 of the Supply Chain Management Policy															

## T2.1 LIST OF ALL RETURNABLE DOCUMENTS AND SCHEDULES

The Tenderer shall complete and submit the following returnable schedules and documents:

	Tenderer's Check List	Page No.
T2.2.1 Authority for Signatory		T2.12
T2.2.2 Bidder's Disclosure		T2.19
T2.2.3 Tax Compliance Status Letter Requirements		T2.22
T2.2.4 Proof of Attendance at the Compulsory Clarification/Site Meeting		T2.24
T2.2.5 Contract Participation Goals (CPG)		T2.25
T2.2.6 Tenderer's Experience		T2.29
T2.2.7 Quality Assurance & Environmental		T2.32
T2.2.8 Local Production and Content Declaration Certificate (SBD 6.2)		T2.34
T2.2.9 Method Statement		T2.41
T2.2.10 Preliminary Programme		T2.46
T2.2.11 Registration Certificate / Agreement / ID Document		T2.49
T2.2.12 Amendments, Qualifications and Alternatives		T2.50
T2.2.13 Record of Addenda to Tender Documents		T2.52
T2.2.14 VAT Registration Certificate		T2.53
T2.2.15 Schedule of Proposed Sub-Suppliers		T2.54
T2.2.16 Proof of Purchase of Tender Document		T2.55
T2.2.17 Goods and Services Sourced Internationally		T2.56
T2.2.18 Preference Points claim form in terms of the PPPFA Regulations 2017, substantiated by the B-BBEE Verified Status Level Verification Certificate		T2.58
T2.2.19 Letter of Good Standing in terms of COIDA Act		T2.65
T2.2.20 Tenderer's Financial Standing		T2.66
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T2.2.22 Pro forma OHS Notification		T2.68
T2.2.23 Letter of Intent for Public Liability		T2.70
T2.2.24 Central Supplier Database (CSD) Report		T2.71

### **T2.2.1 AUTHORITY FOR SIGNATORY**

*Fill in the relevant portion applicable to the type of organization*

#### **A. COMPANIES**

If a Tenderer is a company, a certified copy of the resolution by the board of directors, personally signed by the chairperson of the board, authorizing the person who signs this Tender to do so, as well as to sign any contract resulting from this Tender and any other documents and correspondence in connection with this Tender and/or contract on behalf of the company must be submitted with this Tender, that is before the closing time and date of the Tender.

#### **AUTHORITY BY BOARD OF DIRECTORS**

By resolution passed by the Board of Directors on ..... 20 .....

Mr/Mrs ..... (whose signature appears below) has been duly authorized to sign all documents in connection with this Tender on behalf of

(Name of Company) .....

**IN HIS/HER CAPACITY AS:** .....

**SIGNED ON BEHALF OF COMPANY:** .....  
(PRINT NAME)

**SIGNATURE OF SIGNATORY:** ..... **DATE:** .....

**WITNESSES:** .....

**B.     SOLE PROPRIETOR (ONE - PERSON BUSINESS)**

I, the undersigned .....

hereby confirm that I am the sole owner of the business trading as

.....

.....  
**SIGNATURE**

.....  
**DATE**

For information use only

C. PARTNERSHIP

The following particulars in respect of every partner must be furnished and signed by every partner:

Full name of Partner	Residential Address	Signature
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

We, the partners in the business trading as .....

hereby authorize .....  
to sign this Tender as well as any contract resulting from the Tender and any other documents and  
correspondence in connection with this Tender and /or contract on behalf of .....

.....	.....	.....
Signature	Signature	Signature
.....	.....	.....
Date	Date	Date

**D. CLOSE CORPORATION**

In the case of a close corporation submitting a Tender, a certified copy of the Founding Statement of such corporation shall be included with the Tender, together with the resolution by its members authorizing a member or other official of the corporation to sign the documents on their behalf.

By resolution of members at a meeting on ..... 20 .....

at .....

Mr/Ms ....., whose signature appears below, has been authorized to sign all documents in connection with this Tender on behalf of (Name of Close Corporation)

.....

.....

**SIGNED ON BEHALF OF CLOSE CORPORATION:**

(PRINT NAME) .....

IN HIS/HER CAPACITY AS ..... DATE: .....

**SIGNATURE OF SIGNATORY:** .....

**WITNESSES:** 1. ....

2. ....

**E. CO-OPERATIVE**

A certified copy of the Constitution of the co-operative must be included with the Tender, together with the resolution by its members authoring a member or other official of the co-operative to sign the Tender documents on their behalf.

By resolution of members at a meeting on ..... 20 .....

at .....

Mr/Ms ....., whose signature appears below, has been authorized to sign all documents in connection with this Tender on behalf of (Name of Co-Operative)

**SIGNATURE OF AUTHORIZED REPRESENTATIVE/SIGNATORY:**

(PRINT NAME) .....

**IN HIS/HER CAPACITY AS** .....

**DATE:** .....

**SIGNED ON BEHALF OF CO-OPERATIVE:** .....

**NAME IN BLOCK LETTERS:** .....

**WITNESSES:** 1. ....

2. ....

## F. JOINT VENTURE

If a tenderer is a joint venture, a certified copy of the resolution/agreement passed/reached signed by the duly authorised representatives of the enterprises, authorising the representatives who sign this tender to do so, as well as to sign any contract resulting from this tender and any other documents and correspondence in connection with the tender and/or contract on behalf of the joint venture must be submitted with this tender, before the closing time and date of the tender.

Authority to sign on behalf of the Joint Venture:

By resolution/agreement passed/reached by the joint venture partners on ..... 20 .....

Mr/Mrs ..... , Mr/Mrs .....

Mr/Mrs ..... and Mr/Mrs .....

(whose signatures appear below) have been duly authorised to sign all documents in connection with this tender on behalf of:

(Name of Joint Venture) .....

In his/her capacity as: .....

Signed on behalf of (COMPANY NAME): .....  
(PRINT NAME)

Signature ..... Date: .....

In his/her capacity as: .....

Signed on behalf of (COMPANY NAME): .....  
(PRINT NAME)

Signature ..... Date: .....

In his/her capacity as: .....

Signed on behalf of (COMPANY NAME): .....  
(PRINT NAME)

Signature ..... Date: .....

In his/her capacity as: .....

Signed on behalf of (COMPANY NAME): .....  
(PRINT NAME)

Signature ..... Date: .....



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**G. CONSORTIUM**

If a tenderer is a consortium, a certified copy of the resolution/agreement passed/reached signed by the duly authorised representatives of the enterprises, authorising the representatives who sign this tender to do so, as well as to sign any contract resulting from this tender and any other documents and correspondence in connection with the tender and/or contract on behalf of the consortium must be submitted with this tender, before the closing time and date of the tender.

Authority to sign on behalf of the consortium:

By resolution/agreement passed/reached by the consortium partners on .....20.....

Mr/Mrs ..... ,  
(whose signature appear below) have been duly authorised to sign all documents in connection with  
this tender on behalf of:

(Name of Consortium) .....

In his/her capacity as: .....

Signature ..... Date: .....

## **T2.2.2 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<sup>1</sup> 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**

- 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**

---

<sup>1</sup> 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.

2.3.1 If so, furnish particulars:

.....  
.....

**3 DECLARATION**

I, the undersigned, (name)..... 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<sup>2</sup> 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 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.

<sup>2</sup> 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.

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

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---

### **T2.2.3 TAX COMPLIANCE STATUS LETTER REQUIREMENTS**

It is a condition of a Tender that the taxes of the successful Tenderer **must** be in order, or that satisfactory arrangements have been made with South African Revenue Service (SARS) to meet the Tenderer's tax obligations.

- Bidders must ensure compliance with their tax obligations.
- 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.
- Application for Tax Compliance Status (TCS) pin may be made via e-filing through the SARS website [www.sars.gov.za](http://www.sars.gov.za).
- Bidders may also submit a printed TCS certificate together with the bid.
- In bids where consortia / joint ventures / sub-contractors are involved, each party must submit a separate TCS certificate / pin / CSD number.
- Where no TCS is available but the bidder is registered on the Central Supplier Database (CSD), a CSD number must be provided.
- 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 in the service of the state.

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**T2.2.3 TAX COMPLIANCE STATUS LETTER REQUIREMENTS (Continued.....)**

**[Tax Compliance Status (TCS) Letter *obtained from SARS to be inserted here*]**

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**T2.2.4 PROOF OF ATTENDANCE AT THE COMPULSORY CLARIFICATION SESSION / SITE MEETING**

**CERTIFICATE OF ATTENDANCE**

TENDER No. | 2022/031 |

This is to certify that

(Tenderer) .....

of (address) .....

.....

.....

was represented by the person(s) named below at the compulsory meeting held for all Tenderers at

(location) .....

..... on (date) .....

starting at (time) .....

I / We acknowledge that the purpose of the meeting was to acquaint myself / ourselves with the site of the works and / or matters incidental to doing the work specified in the Tender documents in order for me / us to take account of everything necessary when compiling our rates and prices included in the Tender.

**Particulars of person(s) attending the meeting:**

Name: ..... Signature: .....

Capacity: .....

Name: ..... Signature: .....

Capacity: .....

**Attendance of the above person(s) at the meeting is confirmed by the Purchaser's representative, namely:**

Name: ..... Signature: .....

Capacity: ..... Date and Time: .....

## T2.2.5 CONTRACT PARTICIPATION GOALS

### Objective

The objective of Umgeni Water's empowerment initiative is to bring about meaningful transformation in all procurement projects and in particular in the built environment / construction and consulting industry through achieving one or more of the following objectives:

- Meaningful Economic Participation;
- Local Economic Development;
- Transfer of Technical, Management and Entrepreneurial Skills; and
- Creation of sustainable Black Enterprises

### Contract Participation Goals

Contract Participation Goal (CPG) – the **final** value of services paid to the CPG Partner/s based on the **final** contract value.

At the time of awarding the contract the 35% minimum CPG amount will be based on the contract award value exclusive of the following:

- VAT, CPA and Contingencies.

During contract implementation, adjustments relating to Provisional Sums and Contingencies linked to the CPG allocation will be agreed upon between the parties to the contract, as and when the need arises.

**CPG Partner/s** – Service provider/s selected from Umgeni Water's Supply Chain Management (SCM) Enterprise Development Database.

Tenderers (the main contractor irrespective of BBBEE classification) who are on Umgeni Water's SCM Enterprise Development Database are not exempt from this requirement and are still required to have a CPG Partner.

Tenderers are required to achieve at least 35% Contract Participation Goals (CPG) including a minimum 10% Black Women participation and another 10% for Local participation of the value of goods, services and Works paid to one or more enterprises (CPG Partner/s)

- 35% includes any special materials
- 35% excludes VAT, CPA and Contingencies.
- The tenderer will be required to achieve the actual Rand value committed for CPG, adjusted according to the following:
  - Variation Orders – Each VO will be evaluated by the Employer's Agent and the Project Manager to determine whether it should be counted, in its entirety or partially, as part of CPG or not.
  - Re-measurable Items (including CPA, and provisional sums) – Each re-measurable item change will be evaluated by the Employer's Agent and the Project Manager to determine whether it should be counted as part of CPG or not.

Within 2 weeks of the award of contract, the tenderer will be required to submit a cash flow projection for the main contractor and the CPG Partner/s

### Applicability

The CPG target is applicable to all contracts to be adjudicated through the Umgeni Water procurement process and shall be achieved through the following mechanisms:-

- CPG Partner/s selection is concluded **after** adjudication of tenders and **before** contract award is made.
- The CPG Partner/s shall be selected according to the following criteria:
  - CPG Partner/s are to be obtained from Umgeni Water's database of suppliers specifically earmarked for CPG purposes.



- Umgeni Water reserves the right to provide or arrange a CPG Partner/s to work with the successful company.
- Sub-contracting of the CPG Partner/s at the same rate / price that the tenderer would have offered to Umgeni Water whilst making profit margins consistent to the profit margins that the main contractor would have made under normal trading processes.
- Value of the work to be sub contracted shall be at least **35% (minimum of 5% shall be due to Black Women participation and another 10% for Local participation)** of the total contract value excluding VAT, CPA and Contingencies.
- CPA is payable to the CPG Partner/s as per the indices stipulated in the contract document.
- The work allocated to the CPG Partner shall be performed by the CPG Partner directly and may not be allocated or sub-contracted out to other contractors/consultants/service providers.
- The main contractor **shall not** substitute any CPG Partner/s without the written approval of Umgeni Water.
- The working capital arrangements between the main contractor and the CPG Partner/s must be agreed upon between the two parties prior to commencement of works to ensure that the CPG Partner does not have cash flow challenges during contract implementation.

### Invoicing and Payment

The monthly measurement and payment will be according to the following guideline:

- Submission of payment certificate to the Employer's Agent by the Contractor– by 20<sup>th</sup> of each month, or the nearest previous working day. The submission from the contractor shall include the signature of the CPG Partner indicating agreement with the measurements and rates applicable to the work undertaken by the CPG Partner.
- Submission to Umgeni Water by the Employer's Agent – by 25<sup>th</sup> of each month, or the nearest previous working day;
- Payment to the Contractor – on the last day of the following month;
- The CPG Partner must be paid within reasonable time but no later than 3 working days after the Main Contractor has been paid by Umgeni Water; and
- The submission from the Contractor must include a schedule that clearly shows the following:
  - Total Contract Sum
  - Total amount payable to CPG Partner/s excluding current month
  - Amount payable to CPG Partner for current month
  - % split of Total amount payable to Main contractor and CPG Partner/s

### Monitoring and Reporting on CPG

- Umgeni Water will monitor CPG implementation on site. This may include direct contact with CPG Partner/s on site for verification purposes.
- The CPG Partner shall be in agreement with the measurement and payment for work completed, for the purposes of submitting payment certificates, as determined by the Contractor. Should disagreements arise, Umgeni Water reserves the right to intervene to resolve the disagreement.
- CPG Partner/s shall attend all contractual meetings relevant to their scope of work including contract award negotiations, monthly contract site meetings and technical meetings.

### Eligibility Criteria

For tenders where the CPG target is applicable, those that do not offer a **minimum** CPG participation of **35%** (including minimum 10% Black Women participation and another 10% for Local participation) according to the requirements mentioned above will be deemed **ineligible**.

### DECLARATION REGARDING CONTRACT PARTICIPATION GOALS

I, the undersigned, in submitting the accompanying bid:

---

(Bid Number and Description)

in response to the invitation for the bid made by:

**UMGENI WATER**

do hereby make the following declaration and certify the statements contained herein to be true and complete in every respect:

I certify, on behalf of: \_\_\_\_\_ that:  
(Name of Bidder)

1. I have read and I understand the contents of this Declaration and the fully completed bid document accompanying this declaration;
2. I understand and declare that the accompanying bid will, and must, be disqualified if this Declaration is found not to be true and complete in every respect;
3. I understand and declare that in the event that this bid is successful, I will be required to, and shall, fully implement the commitments that are submitted with this bid, in particular regarding the Bidder's contract participation goals and commitments towards the allocation of certain portion of the contract to small and emerging entities (CPG Partner/s). Failure to implement such commitments as outlined in the bid document (in particular, as detailed in the bill of quantities) and or failure to provide the relevant information within the prescribed period as determined in the Letter of Intention to Award the Bid, shall automatically disqualify this bid from further consideration and the Employer has the right to, and must, then award the bid to the next highest ranked bidder; and as a result I or the bidder or any of its directors shall have no recourse against Umgeni Water.
4. I am authorized by the bidder to sign this Declaration, and to submit the accompanying bid, on behalf of the bidder;
5. Each person whose signature appears on the accompanying bid has been authorized by the bidder to determine the terms of, and to sign the bid, on behalf of the bidder;

6. I am aware that, and do consent to, the disqualification of my or the bidder's future bids with Umgeni Water in the event that the commitments made herein are not fulfilled and that such non-fulfillment amounts to abuse of Umgeni Water's supply chain policies and procedures and/or empowerment objectives which must be penalized, over and above the contractual sanctions as agreed to in line with the contract signed with Umgeni Water, with a sanction of restricting me and or my company (the bidder) and or any of its directors from conducting business with Umgeni Water for a period not exceeding ten (10) years.
7. I consent that should my company (the Bidder) deviate from the commitments and the spirit of the CPG objectives as agreed to, shall amount to a repudiation of the contractual arrangement between the two parties (Umgeni Water and the Bidder); and Umgeni Water shall have the right to terminate the contract with immediate effect and without giving my company (the Bidder) prior notice to remedy the breach.

\_\_\_\_\_  
Full Names & Surname  
(Duly authorized)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Position

\_\_\_\_\_  
Name of Bidder

#### T2.2.6 TENDERER'S EXPERIENCE

The experience of the Tenderer or joint venture partners in the case of an unincorporated joint venture or consortium will be evaluated on the basis of experience in similar projects or similar areas and conditions in relation to the scope of work.

The evaluation will consider experience in relation to the management of programmes and projects and the provision of cost consulting services in relation to programmes of work as opposed to projects where bills of quantities have been used.

Tenderers should very briefly describe his or her experience in this regard relevant to the scope of work and attach this to this schedule.

The description should be put in tabular form with the following headings:

*(Note to compiler: amend table columns headings to be applicable to your tender and then delete this note)*

Project name	Period /Year	Value of work inclusive of VAT (Rand)	Size (of Infrastructure constructed)	Company (where the project was done)	Contact Details

Scoring of the Tenderer's experience will be as follows: | 30 |

DESCRIPTION	MAX POSSIBLE SCORE
<p>Company experience in the supply and installation of electrical systems which are MV Motors and MCCs/Switchgears.</p> <p><b>Full Points shall be given when a company has supplied and installed both components. A project for the supply and installation of MV motors and another project for the supply and installation of MV switchgear/MCC shall be equal to one project for scoring. Half-points shall be given for only the supply and installation of MV motors, and no points shall be given if the contractor has experience in MCCs or switchgear.</b></p> <p>(Submit completion certificates or reference letter as proof of previous experience).</p> <ul style="list-style-type: none"><li>• 1 projects – 50 points</li><li>• 2 projects – 60 points</li><li>• 3 projects – 70 points,</li><li>• 10 additional point for every project more than 3 projects to a maximum of 100 points</li></ul>	<b>100</b>

---

**T2.2.6 TENDERER'S EXPERIENCE (Continued)**

**INSERT HERE**

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**T2.2.7 QUALITY ASSURANCE AND ENVIRONMENTAL MANAGEMENT**

1. Does the Tenderer have a quality management system which is certified in terms of ISO 9001: 2015 .....

YES	NO
-----	----

2. If "yes", Tenderer to supply brief summary of structure of system:

.....

.....

.....

.....

.....

.....

.....

3. If "no", does the Tenderer intend to apply for certification? .....

YES	NO
-----	----

By when? .....

Date
------

OR

4. If "no", does the Tenderer have its own system? .....

YES	NO
-----	----

5. If "yes", please supply details of the system .....

.....

.....

.....

.....

.....

.....

6. Does the Tenderer have an environmental management system which is certified in terms of ISO 14 001 .....

YES	NO
-----	----

7. If "yes", Tenderer to supply brief summary of structure of system:

.....

.....

.....

.....

.....

.....

8. If "no", does the Tenderer intend to apply for certification? .....

YES	NO
-----	----

By when? .....

Date
------

OR

9. If "no", does the Tenderer have its own system? ..... 

YES	NO
-----	----

10. If "yes", please supply details of the system .....  
.....  
.....  
.....  
.....

*If the Tenderer does not intend to apply for certification, it shall submit details of the quality / environmental management system presently in place.*

The Tenderer shall insert here a copy of the company's quality assurance plan, control procedures and the relevant documentation supporting its commitment to environmental management. The successful Tenderer shall furnish the Employer a detailed Quality Control Plan (QCP) and Procedure for all materials, such as motors, MV switchgears, VSD's and drawings for approval prior to any fabrication, ordering, wiring and delivery. In the event of these documents being too extensive to be included in the procurement document, an abbreviated version of the master document will be included, referring to the master document.

Scoring of Quality Assurance and Environmental Management will be as follows: | 10 |

QUALITY ASSURANCE AND ENVIRONMENTAL MANAGEMENT	
<b>No submission (score 0)</b>	No Quality Assurance Plan & support documents submitted
<b>Poor (score 40)</b>	The organisation has its own developed Quality Assurance and Environmental Management system.
<b>Satisfactory (score 70)</b>	The organisation has applied for ISO 9001 or ISO 14001 certification, Or The organisation has a tailored detailed Quality Assurance and Environmental Management System that improves the project outcomes and the quality of the outputs.
<b>Good (score 90)</b>	The organisation is ISO 9001 or ISO 14001 certified.
<b>Very good (score 100)</b>	The organisation is both ISO 9001 and ISO 14001 certified.



## **T2.2.8 DECLARATION CERTIFICATE FOR LOCAL PRODUCTION AND CONTENT FOR DESIGNATED SECTORS**

This Standard Bidding Document (SBD) must form part of all bids invited. It contains general information and serves as a declaration form for local content (local production and local content are used interchangeably).

Before completing this declaration, bidders must study the General Conditions, Definitions, Directives applicable in respect of Local Content as prescribed in the Preferential Procurement Regulations, 2017, the South African Bureau of Standards (SABS) approved technical specification number SATS 1286:2011 (Edition 1) and the Guidance on the Calculation of Local Content together with the Local Content Declaration Templates [Annex C (Local Content Declaration: Summary Schedule), D (Imported Content Declaration: Supporting Schedule to Annex C) and E (Local Content Declaration: Supporting Schedule to Annex C)].

### **1. General Conditions**

- 1.1. Preferential Procurement Regulations, 2017 (Regulation 9) makes provision for the promotion of local production and content.
- 1.2. Regulation 9.(1) prescribes that in the case of designated sectors, where in the award of bids local production and content is of critical importance, such bids must be advertised with the specific bidding condition that only locally produced goods, services or works or locally manufactured goods, with a stipulated minimum threshold for local production and content will be considered.
- 1.3. Where necessary, for bids referred to in paragraph 1.2 above, a two stage bidding process may be followed, where the first stage involves a minimum threshold for local production and content and the second stage price and B-BBEE.
- 1.4. A person awarded a contract in relation to a designated sector, may not sub-contract in such a manner that the local production and content of the overall value of the contract is reduced to below the stipulated minimum threshold.
- 1.5. The local content (LC) expressed as a percentage of the bid price must be calculated in accordance with the SABS approved technical specification number SATS 1286: 2011 as follows:

$$LC = [1 - x / y] * 100$$

Where

- x is the imported content in Rand  
y is the bid price in Rand excluding value added tax (VAT)

Prices referred to in the determination of x must be converted to Rand (ZAR) by using the exchange rate published by South African Reserve Bank (SARB) at 12:00 on the date of advertisement of the bid as indicated in paragraph 4.1 below.

**The SABS approved technical specification number SATS 1286:2011 is accessible on [http://www.thedti.gov.za/industrial development/ip.jsp](http://www.thedti.gov.za/industrial%20development/ip.jsp) at no cost.**

1.6 A bid may be disqualified if –

- (a) this Declaration Certificate and the Annex C (Local Content Declaration: Summary Schedule) are not submitted as part of the bid documentation; and
- (b) the bidder fails to declare that the Local Content Declaration Templates (Annex C, D and E) have been audited and certified as correct.

## 2. Definitions

- 2.1. **“bid”** includes written price quotations, advertised competitive bids or proposals;
- 2.2. **“bid price”** price offered by the bidder, excluding value added tax (VAT);
- 2.3. **“contract”** means the agreement that results from the acceptance of a bid by an organ of state;
- 2.4. **“designated sector”** means a sector, sub-sector or industry that has been designated by the Department of Trade and Industry in line with national development and industrial policies for local production, where only locally produced services, works or goods or locally manufactured goods meet the stipulated minimum threshold for local production and content;
- 2.5. **“duly sign”** means a Declaration Certificate for Local Content that has been signed by the Chief Financial Officer or other legally responsible person nominated in writing by the Chief Executive, or senior member / person with management responsibility (close corporation, partnership or individual).
- 2.6. **“imported content”** means that portion of the bid price represented by the cost of components, parts or materials which have been or are still to be imported (whether by the supplier or its subcontractors) and which costs are inclusive of the costs abroad (this includes labour or intellectual property costs), plus freight and other direct importation costs, such as landing costs, dock duties, import duty, sales duty or other similar tax or duty at the South African port of entry;
- 2.7. **“local content”** means that portion of the bid price which is not included in the imported content, provided that local manufacture does take place;
- 2.8. **“stipulated minimum threshold”** means that portion of local production and content as determined by the Department of Trade and Industry; and
- 2.9. **“sub-contract”** means the primary contractor's assigning, leasing, making out work to, or employing another person to support such primary contractor in the execution of part of a project in terms of the contract.

## 3. The stipulated minimum threshold(s) for local production and content (refer to Annex A of SATS 1286:2011) for this bid is/are as follows:

Industry/sector/sub-sector	Minimum threshold for local content
Steel Power Pylons	100%
Rail Rolling Stock	65%
Set Top Boxes (STB)	30%
Office Furniture	85%
Solar Water Heater Components	70%

T2.35.

Electrical and telecom cables	90%
Valves & actuators	70%
Steel Pipes	80%
Working Vessels (Boats)	60%

4. Does any portion of the services, works or goods offered have any imported content?

(Tick applicable box)

YES		NO	
-----	--	----	--

- 4.1 If yes, the rate(s) of exchange to be used in this bid to calculate the local content as prescribed in paragraph 1.5 of the general conditions must be the rate(s) published by SARB for the specific currency at 12:00 on the date of advertisement of the bid.

The relevant rates of exchange information is accessible on [www.reservebank.co.za](http://www.reservebank.co.za).

Indicate the rate(s) of exchange against the appropriate currency in the table below (refer to Annex A of SATS 1286:2011):

Currency	Rates of exchange
US Dollar	
Pound Sterling	
Euro	
Yen	
Other	

NB: Bidders must submit proof of the SARB rate (s) of exchange used.

5. Were the Local Content Declaration Templates (Annex C, D and E) audited and certified as correct?

(Tick applicable box)

YES		NO	
-----	--	----	--

- 5.1. If yes, provide the following particulars:

- (a) Full name of auditor: .....
- (b) Practice number: .....
- (c) Telephone and cell number: .....
- (d) Email address: .....

(Documentary proof regarding the declaration will, when required, be submitted to the satisfaction of the Accounting Officer / Accounting Authority)

6. Where, after the award of a bid, challenges are experienced in meeting the stipulated minimum threshold for local content the dti must be informed accordingly in order for the dti to verify and in consultation with the AO/AA provide directives in this regard.

**LOCAL CONTENT DECLARATION**  
**(REFER TO ANNEX B OF SATS 1286:2011)**

**LOCAL CONTENT DECLARATION BY CHIEF FINANCIAL OFFICER OR OTHER LEGALLY RESPONSIBLE PERSON NOMINATED IN WRITING BY THE CHIEF EXECUTIVE OR SENIOR MEMBER/PERSON WITH MANAGEMENT RESPONSIBILITY (CLOSE CORPORATION, PARTNERSHIP OR INDIVIDUAL)**

**IN RESPECT OF BID NO. ....**

**ISSUED BY:** (Procurement Authority / Name of Institution):  
.....

NB

1 The obligation to complete, duly sign and submit this declaration cannot be transferred to an external authorized representative, auditor or any other third party acting on behalf of the bidder.

2 Guidance on the Calculation of Local Content together with Local Content Declaration Templates (Annex C, D and E) is accessible on <http://www.thedti.gov.za/industrialdevelopment/ip.jsp>. Bidders should first complete Declaration D. After completing Declaration D, bidders should complete Declaration E and then consolidate the information on Declaration C. **Declaration C should be submitted with the bid documentation at the closing date and time of the bid in order to substantiate the declaration made in paragraph (c) below.** Declarations D and E should be kept by the bidders for verification purposes for a period of at least 5 years. The successful bidder is required to continuously update Declarations C, D and E with the actual values for the duration of the contract.

I, the undersigned, ..... (full names),  
do hereby declare, in my capacity as .....  
of .....(name of bidder  
entity), the following:

(a) The facts contained herein are within my own personal knowledge.

(b) I have satisfied myself that:

- (i) the goods/services/works to be delivered in terms of the above-specified bid comply with the minimum local content requirements as specified in the bid, and as measured in terms of SATS 1286:2011; and
- (ii) the declaration templates have been audited and certified to be correct.

(c) The local content percentage (%) indicated below has been calculated using the formula given in clause 3 of SATS 1286:2011, the rates of exchange indicated in paragraph 4.1 above and the information contained in Declaration D and E which has been consolidated in Declaration C:

**Electrical and telecom cables 90%**

Bid price, excluding VAT (y)	R
Imported content (x), as calculated in terms of SATS 1286:2011	R
Stipulated minimum threshold for local content (paragraph 3 above)	
Local content %, as calculated in terms of SATS 1286:2011	

T2.37.

<b>Motors 70%</b>	
Bid price, excluding VAT (y)	R
Imported content (x), as calculated in terms of SATS 1286:2011	R
Stipulated minimum threshold for local content (paragraph 3 above)	
Local content %, as calculated in terms of SATS 1286:2011	

**If the bid is for more than one product, the local content percentages for each product contained in Declaration C shall be used instead of the table above.**  
**The local content percentages for each product has been calculated using the formula given in clause 3 of SATS 1286:2011, the rates of exchange indicated in paragraph 4.1 above and the information contained in Declaration D and E.**

(d) I accept that the Procurement Authority / Institution has the right to request that the local content be verified in terms of the requirements of SATS 1286:2011.

(e) I understand that the awarding of the bid is dependent on the accuracy of the information furnished in this application. I also understand that the submission of incorrect data, or data that are not verifiable as described in SATS 1286:2011, may result in the Procurement Authority / Institution imposing any or all of the remedies as provided for in Regulation 13 of the Preferential Procurement Regulations, 2017 promulgated under the Preferential Policy Framework Act (PPPFA), 2000 (Act No. 5 of 2000).

**SIGNATURE:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**WITNESS No. 1** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**WITNESS No. 2** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**T2.2.8 DECLARATION CERTIFICATE FOR LOCAL PRODUCTION AND CONTENT FOR DESIGNATED SECTORS (Continued.....)**

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**T2.2.8 DECLARATION CERTIFICATE FOR LOCAL PRODUCTION AND CONTENT FOR  
DESIGNATED SECTORS (Continued.....)**

**IN TERMS OF THE GUIDELINE DOCUMENT FOR CALCULATING LOCAL CONTENT, ANNEXURE  
C (ATTACHED) MUST BE SUBMITTED WITH THE TENDER.**

**PLEASE INSERT IT HERE.**

For information use only

## T2.2.9 METHOD STATEMENT

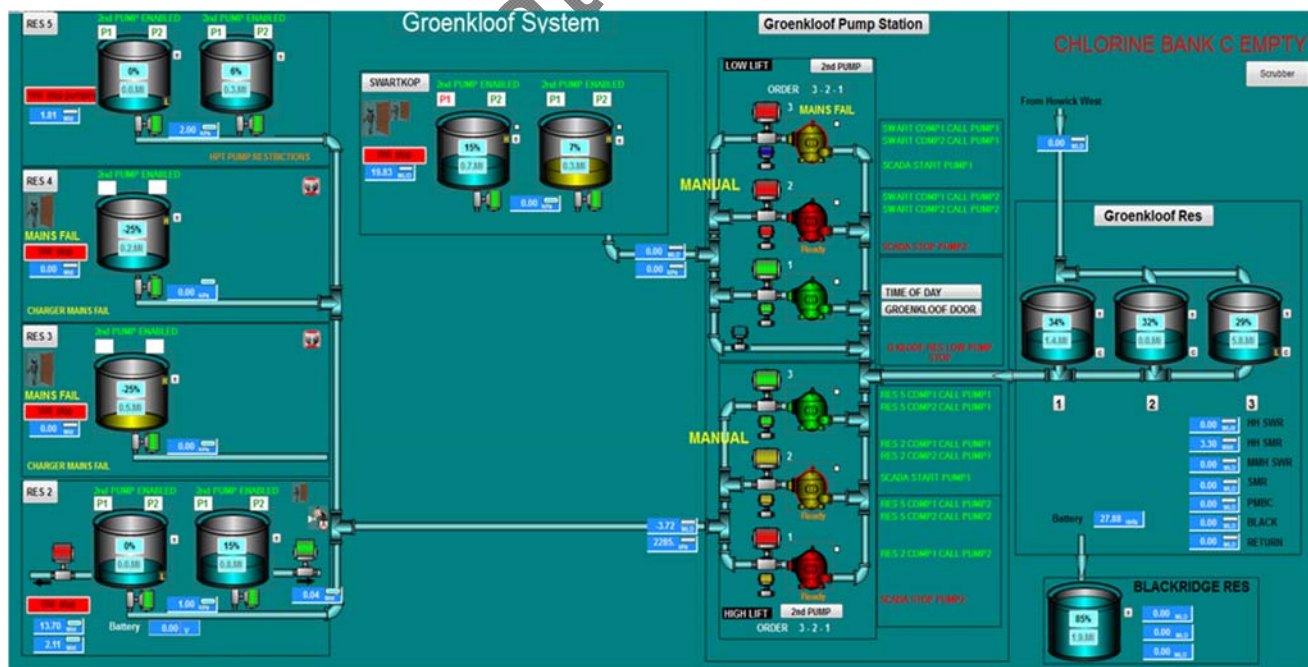
The method statement must respond to the Scope of Work and outline the proposed approach / methodology. The method statement should articulate what value the Tenderer will add by in achieving the stated objectives for the project.

The Tenderer must as such explain his / her understanding of the objectives of the assignment and the Purchaser's stated and implied requirements, highlight the issues of importance, and explain the technical approach they would adopt to address them. The approach paper should explain the methodologies which are to be adopted, demonstrate the compatibility of those methodologies with the proposed approach. The approach should also include a quality plan which outlines processes, procedures and associated resources, applied by whom and when, to meet the requirements and indicate how risks will be managed and what contribution can be made regarding value management.

The method statement shall cover but not limited to the following:

- How the approval process will be undertaken and integrated into the project programme;
- The approval process is critical, and shall indicate from the kick off meeting (approval of project programme till project completion), the approval of datasheets, etc. The approval process shall indicate all relevant stakeholders;
- How the installation is going to be done as the plant will be operating during the project;
- Safe installation without interfering with the process;
- Offsite work to be done prior to the installation of equipment;
- Programming of the SCADA system;
- Site Acceptance testing of the system;
- Factory Acceptance testing of the electrical panel and instrumentation system and
- How commissioning and testing of the system will be conducted.

## GROENKLOOF PUMP SYSTEM CONTROL PHILOSOPHY



## CONTROL OF PUMPS

### Pop up selection explanations.

#### Reservoir



- 1) Compartment in operation – (Reservoir 1, 2 and 5 only.)  
This allows the reservoir to be controlled by the set points.
- 2) Maintenance – (Reservoirs 1, 2 and 5 only.)  
This will close the inlet valve of that compartment, sends a stop signal to the pump station and ignores the set points. i.e.:- the compartment stays shut down  
N.B. – This is not a lock out.
- 3) Automatic start and stop set point values must be entered and the send buttons pressed.
- 4). Pressing the execute button will instruct the telemetry at the reservoir to use these new values. If a new value is not entered in one or more set points, the old value will be used.  
N.B. a). The start value must be lower than the stop value for both pumps.  
b). The second pump start and stop set points must be lower than the 1<sup>st</sup> pumps start and stop set points. e.g. :-  

	Correct	- Incorrect
1st Pump Stop	90%	80%
2nd Pump Stop	80%	90%
1st Pump Start	60%	50%
2nd Pump Start	50%	60%

If not, the value will not be used and an alarm (Set point error) will be displayed.
- 5). On receiving the set point, the reservoir telemetry will send it back to the SCADA and display it, to confirm that it has been received.

#### ■ Pump Station

- 1). Automatic. – The pumps will control the reservoir level as per set points selected.
- 2). Manual. - Allows the operator to start and stop pumps at will. - set points ignored.
- 3). Start and stop - after manual selection the pump can be started or stopped.  
A green border of 1, 2 and 3 indicates that the selection has been received by the pump station.
- 4). Time of day enable – the pump station has a maximum demand timer which will not allow a pump to start (off peak pumping only). It will also stop a pump if one is running.  
Pumps enable. - This will over-ride that feature and allow the pump to be started.  
Max demand – This enables the maximum demand feature if switched on at the pump station.  
This feature is only accessible by supervisor password.

#### Status of radio Signals on screen.

The reservoirs all send signals to Midmar and to the pump station. The pump station then re-sends certain of them to Midmar.

	<u>Sent by reservoir</u> (displayed on reservoir)	<u>Received by pump station</u> (displayed on pump station)
	Start	Swart call
	Stop	Swart stop
	Start	Res.2 Comp1 call
	Stop	
	Start	Res.2 Comp2 call
	Stop	
For both 1 <sup>st</sup> and 2nd Pumps	Start	Res.3 call
	Stop	
	Start	Res.4 call
	Stop	
	Start	Res.5 Comp1 call
	Stop	
	Start	Res.5 Comp2 call
	Stop	All res. Stop - (only when all Vulindlela reservoirs have sent a stop)

These values are used for control, and sent back from the stations to the SCADA for the operator to be able to see what the telemetry is doing, for fault diagnosis.



i.e.:- The operator can stop or start pumps from the SCADA

- 1). If the pumps are selected to manual they will continue in that state until started or stopped by the operator from SCADA, low flow, high delivery pressure or low Groenkloof reservoir.
- 2). Changing from manual to auto on SCADA will reset all manual settings.
- 3). If both pumps are running, selecting stop on 1<sup>st</sup> pump will stop both pumps.

**Local.** - Selected on MCC at pump station.

- 1). This is an override of all remote controls.
- 2). Pump start and stop buttons are enabled.
- 3). All motor sequences and protection are still followed.
- 4). Changing from tele-control to local will have no effect, until the stop or start buttons are pressed.
- 5). Changing from local to telemetry will resume auto controls.

**General**

- 1). The pump will start and stop against a closed delivery valve and an open bypass valve.
- 2). Communication fail (comms fail)
  - a) If there is a comms fail between the reservoir and pump station then the pumps will, continue as they were at the time of failure or until manual control is assumed, or if stopped by low flow, high delivery pressure or low Groenkloof reservoir level.
  - b). If there is a comms fail only between the reservoir and the water works then the reservoir information will not update but the pumps will continue as per normal with all manual controls available.
  - c). If there is only a comms. fail between the pump station and the water works then all auto controls will continue but all pump statuses will not be updated. (Note:- Manual controls will not work.
- 3). Mains failure will cause the pumps to stop and only when the mains has restored for 5min. will the pumps restart in sequence.
- 4). If the telemetry at the reservoir is reset by a technician, the set points will all be reset to zero and a "set point error" alarm will be displayed on the SCADA, the valves will close and a stop signal sent to the pump station - the operator must re-enter the values he requires and execute.
- 5). If the telemetry at the pump station is reset by a technician.
  - a). The pumps will default to manual/stop and an alarm " manual selected " will be displayed on SCADA. The operator must select the control that he requires.
  - b). The time of day over-ride will default to disable. (no pump at peak hours).
- 6). If a change is made on the scada and the function does not take place then purely repeat the change. e.g. it is not necessary to send a stop and then a start.
- 7). If any pump is running and there is no flow then the pump(s) will stop and an alarm-PRESSURE/FLOW stop – will be displayed on SCADA (stand by pump will not start).

**To restart in auto, select manual and then back to auto.**

**To restart in manual select start again.**

**This will only be allowed three times within the space of an hour then the pump will trip and the next sequence pump will start. This should only happen if a valve is closed or if there is a communication fail to the reservoir.**

- 8). If the reservoir level is faulty and it does not reach the stop set point, the high/high level alarm will be indicated on the SCADA but the pump will not stop. When the actual water lifts the ball valve and the Bermad valve closes, the pump station will detect low flow and stop the pump. The Bermad valve will again open when the level of the reservoir drops and the ball valve opens. The pump will have to be started in manual.
- 9). If the level measurement is faulty and the start level is not reached then the valve will not open and a start signal not sent. To start the pumps, send set points above the faulty level indicated.
- 10). The hydraulics of the reservoirs 2/3/4 and are such that if all valves are open, then reservoir 2 will fill first, followed by 3, 4 and then 5. If it is required, for example, to fill reservoir 4 first then place the previous reservoirs in Maintenance or change their set points so that their valves will close.

11). Flow in surge line of the low lift pumps for more than 5 minutes will stop the pumps, indicating on the panel and SCADA. The standby will not start. Reset able only at the pump station. This will mean that water is being re-circulated in the pump station an not being pumped to the reservoir.

12). High temperature will stop the pump – indicate the fault (locally and on Scada) and not allow it to restart. The next pump in sequence will start. This fault is only reset at the pump station.

The Tenderer must attach his / her approach paper to this page. The approach paper should not be longer than 8 pages.

The scoring of the approach paper will be as follows: | 40 |

Technical approach and methodology	
<b>No submission (score 0)</b>	No Method Statement submitted
<b>Poor (score 40)</b>	The technical approach and / or methodology is poor / is unlikely to satisfy project objectives or requirements. The Tenderer has misunderstood certain aspects of the scope of work and does not deal with the critical aspects of the project.
<b>Satisfactory (score 70)</b>	The approach is generic but tailored to address the general project objectives and methodology. The approach does not deal with the critical characteristics of the project. The quality plan, manner in which risk is to be managed is very generic.
<b>Good (score 90)</b>	The approach is specifically tailored to address the specific project objectives and methodology and is sufficiently flexible to accommodate changes that may occur during execution. The quality plan and approach to managing risk is specifically tailored to the critical characteristics of the project.
<b>Very good (score 100)</b>	Besides meeting the “good” rating, the important issues are approached in an innovative and efficient way, indicating that the Tenderer has outstanding knowledge of state-of-the- art approaches. The approach paper details ways to improve the project outcomes and the quality of the outputs.

**T2.2.10 PRELIMINARY PROGRAMME | 10**

The Tenderer shall detail below or attach a preliminary programme reflecting the proposed sequence and tempo of execution of the main work components. The programme shall be in accordance with the information supplied in the Contract, requirements of the Project Specifications and with all other aspects of his Tender.

The following is guiding information indicating what should be included in the preliminary programme:

- Introduce a program with dates e.g Gantt chart
- Careful consideration of the duration of the project and aligning this with the requirements of Umgeni Water's Procedures for health and safety while working on portable water works sites that are operational all the time.
- Carefully considered installation Plan ensuring no or minimum interruption to Umgeni Water's operations.
- Programme catering for the time to allow for observation of Umgeni Water's access protocols to sites and observation of COVID protocols in place at the time of implementation.
- Programme to allow for the convening of project Progress Meetings.

Programme to allow for the Testing, commissioning and handover plan implementation and rework should there be defects in equipment and or workmanship

The contract should note that the contract is required to be completed, commissioned and handed over to the Purchaser by the date specified in the contract data.

PROGRAMME												
Component / sub component	WEEKS / MONTHS											

**Note:** The programme must be based on the completion time as specified in the Contract Data. No other completion time that may be indicated on this programme will be regarded as an alternative offer, unless it is listed in supported by a detailed statement to that effect, all as specified in the Tender Data.

Scoring of the preliminary programme will be as follows:

	Suitability of programme
<b>No submission (score 0)</b>	No preliminary programme submitted
<b>Poor (score 40)</b>	Programme is inadequate and/or considered unrealistic and does not achieve required completion date
<b>Satisfactory (score 70)</b>	Programme is considered realistic and adequately shows the main components and compliance with completion date

T2.46.

<b>Good (score 90)</b>	Programme is considered realistic and includes the main components and sub components and compliance with completion date
<b>Very good (score 100)</b>	Programme is considered realistic and includes the main components and sub components and linkages and compliance with completion date

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**T2.2.10 PRELIMINARY PROGRAMME (Continued)**

**INSERT HERE**

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**T.2.2.11 REGISTRATION CERTIFICATE / AGREEMENT / ID DOCUMENT**

***Important note to Tenderer: The relevant supporting documents to the organization tendering i.e. Registration Certificates for Companies, Close Corporations and Partnerships, or Agreements and Powers of Attorney for Joint Ventures and Consortiums, or ID documents for Sole Proprietors, all as referred to in the foregoing forms and in T2.1, must be inserted here***

**INSERT HERE**

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## T2.2.12 AMENDMENTS, QUALIFICATIONS AND ALTERNATIVES

*(This is not an invitation for amendments, deviations or alternatives but should the Tenderer desire to make any departures from the provisions of this contract he shall set out his proposals clearly hereunder. Umgeni Water will not consider any amendment, alternative offers or discounts unless forms (a), (b) and (c) have been completed to the satisfaction of the Purchaser).*

I / We herewith propose the amendments, alternatives and discounts as set out in the tables below:

(a) **AMENDMENTS** - NOT APPLICABLE

PAGE, CLAUSE OR ITEM NO.	PROPOSED AMENDMENT

[Notes: (1) *Proposals for amendments to the General and Special Conditions of Contract are not acceptable, and will be ignored;*  
(2) *The Tenderer must give full details of all the financial implications of the amendments and qualifications in a covering letter attached to his Tender.*

(b) **ALTERNATIVES** - NOT APPLICABLE

PROPOSED ALTERNATIVE	DESCRIPTION OF ALTERNATIVE

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

(d) UNCONDITIONAL DISCOUNTS

ITEM ON WHICH DISCOUNT IS OFFERED	DESCRIPTION OF DISCOUNT OFFERED

**[Note: The Tenderer must give full details of the discounts offered in a covering letter attached to his Tender, failing which, the offer for a discount may have to be disregarded.]**

Signature..... Date.....

### T2.2.13 RECORD OF ADDENDA TO TENDER DOCUMENTS

I / We confirm that the following communications amending the Tender documents that I / we received from Umgeni Water or his representative before the closing date for submission of Tenders have been taken into account in this Tender.

A signed copy of each addendum shall be inserted after this page.

ADDENDUM No	DATE	TITLE OR DETAILS

.....  
Signature  
(of person authorized to sign on behalf of the Tenderer )

.....  
Date

**\_T2.2.14 VAT REGISTRATION CERTIFICATE**

*[VAT Registration Certificate obtained from SARS to be inserted here]*

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## T2.2.15 SCHEDULE OF PROPOSED SUB-SUPPLIERS

**Important note to Tenderer: The relevant supporting documents to the organization tendering i.e. Registration Certificates for Companies, Close Corporations and Partnerships, or Agreements and Powers of Attorney for Joint Ventures and Consortiums, or ID documents for Sole Proprietors, all as referred to in the foregoing forms and in T2.1, must be inserted here**

We notify you that it is our intention to employ the following Sub-Suppliers for work in this contract. If we are awarded a contract we agree that this notification does not change the requirement for us to submit the names of proposed Sub-Suppliers in accordance with requirements in the contract for such appointments. If there are no such requirements in the contract, then your written acceptance of this list shall be binding between us.

	Name and address of proposed Sub-Supplier	Nature and extent of work	Previous experience with Sub-Supplier
1.			
2.			
3.			
4.			
5.			

Signature..... Date .....

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

Tenderer.....

---

**T2.2.16 PROOF OF PURCHASE OF TENDER DOCUMENT**

**INSERT HERE**

For information use only

## **T.2.17 GOODS AND SERVICES SOURCED INTERNATIONALLY**

*Note only insert if applicable if not then omit and delete this note*

### **INTRODUCTION**

The National Industrial Participation (NIP) Programme, which is applicable to all government procurement contracts that have an imported content, became effective on the 1 September 1996. The NIP policy and guidelines were fully endorsed by Cabinet on 30 April 1997. In terms of the Cabinet decision, all state and State Owned Entity purchases / lease contracts (for goods, works and services) entered into after this date, are subject to the NIP requirements. NIP is obligatory and therefore must be complied with. The Industrial Participation Secretariat (IPS) of the Department of Trade and Industry (DTI) is charged with the responsibility of administering the programme.

### **1. PILLARS OF THE PROGRAMME**

1.1 The NIP obligation is benchmarked on the imported content of the contract. Any contract having an imported content equal to or exceeding US\$ 10 million or other currency equivalent to US\$ 10 million will have a NIP obligation. This threshold of US\$ 10 million can be reached as follows:

- (a) Any single contract with imported content exceeding US\$10 million.  
or
- (b) Multiple contracts for the same goods, works or services each with imported content exceeding US\$3 million awarded to one seller over a 2 year period which in total exceeds US\$10 million.  
or
- (c) A contract with a renewable option clause, where should the option be exercised the total value of the imported content will exceed US\$10 million.  
or
- (d) Multiple suppliers of the same goods, works or services under the same contract, where the value of the imported content of each allocation is equal to or exceeds US\$ 3 million worth of goods, works or services to the same government institution, which in total over a two (2) year period exceeds US\$10 million.

1.2 The NIP obligation applicable to suppliers in respect of sub-paragraphs 1.1 (a) to 1.1 (c) above will amount to 30 % of the imported content whilst suppliers in respect of paragraph 1.1 (d) shall incur 30% of the total NIP obligation on a pro-rata basis.

1.3 To satisfy the NIP obligation, the DTI would negotiate and conclude agreements such as investments, joint ventures, sub-contracting, licensee production, export promotion, sourcing arrangements and research and development (R&D) with partners or suppliers.

1.4 A period of seven years has been identified as the time frame within which to discharge the obligation.

### **2. REQUIREMENTS OF THE DEPARTMENT OF TRADE AND INDUSTRY**

2.1 In order to ensure effective implementation of the programme, successful tenderers (Suppliers) are required to, immediately after the award of a contract that is in excess of R10 million (ten million Rands), submit details of such a contract to the DTI for reporting purposes.

2.2 The purpose for reporting details of contracts in excess of the amount of R10 million (ten million Rands) is to cater for multiple contracts for the same goods, works or services; renewable contracts and multiple suppliers for the same goods, works or services under the same contract as provided for in paragraphs 1.1.(b) to 1.1. (d) above.

### **3. TENDER SUBMISSION AND CONTRACT REPORTING REQUIREMENTS OF TENDERERS AND SUCCESSFUL TENDERERS (SUPPLIERS)**

- 3.1 Tenderers are required to sign and submit this Section together with the tender on the closing date and time.
- 3.2 In order to accommodate multiple contracts for the same goods, works or services; renewable contracts and multiple suppliers for the same goods, works or services under the same contract as indicated in sub-paragraphs 1.1 (b) to 1.1(d) above and to enable the DTI in determining the NIP obligation, successful tenderers (Suppliers) are required, immediately after being officially notified about any successful tender with a value in excess of R10 million (ten million Rands), to contact and furnish the DTI with the following information:
- Tender / contract number.
  - Description of the goods, works or services.
  - Date on which the contract was accepted.
  - Name, address and contact details of the government institution.
  - Value of the contract.
  - Imported content of the contract, if possible.
- 3.3 The information required in paragraph 3.2 above must be sent to the Department of Trade and Industry, Private Bag X 84, Pretoria, 0001 for the attention of Mr Elias Malapane within five (5) working days after award of the contract. Mr Malapane may be contacted on telephone (012) 3941401, facsimile (012) 3942401 or e-mail at Elias@thedti.gov.za for further details about the programme.

#### 4. PROCESS TO SATISFY THE NIP OBLIGATION

- 4.1 Once the successful tenderer (Supplier) has made contact with and furnished the DTI with the information required, the following steps will be followed:
- (a) the Supplier and the DTI will determine the NIP obligation;
  - (b) the Supplier and the DTI will sign the NIP obligation agreement;
  - (c) the Supplier will submit a performance guarantee to the DTI;
  - (d) the Supplier will submit a business concept for consideration and approval by the DTI;
  - (e) upon approval of the business concept by the DTI, the Supplier will submit detailed business plans outlining the business concepts;
  - (f) the Supplier will implement the business plans; and
  - (g) the Supplier will submit bi-annual progress reports on approved plans to the DTI.
- 4.2 The NIP obligation agreement is between the DTI and the successful tenderer (Supplier) and, therefore, does not involve the purchasing institution.

Tender number .....	Closing date .....
Name of tenderer .....	
Postal address .....	
Signature .....	Name (in print) .....
Date .....	



## **T2.2.18 PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2017**

This preference form must form part of all tenders invited. It contains general information and serves as a claim form for preference points for Broad-Based Black Economic Empowerment (B-BBEE) Status Level of Contribution

**NB: BEFORE COMPLETING THIS FORM, TENDERERS MUST STUDY THE GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF B-BBEE, AS PRESCRIBED IN THE PREFERENTIAL PROCUREMENT REGULATIONS, 2017.**

### **1. GENERAL CONDITIONS**

1.1 The following preference point systems are applicable to all tenders:

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

1.2 The value of this tender is estimated not to exceed R50 000 000 (all applicable taxes included) and therefore the 80/20 system shall be applicable.

1.3 Preference points for this tender shall be awarded for:

- (a) Price; and
- (b) B-BBEE Status Level of Contribution.  
(Refer Clause 5.7)

1.3.1 The maximum points for this tender are allocated as follows:

	<b>POINTS</b>
<b>1.3.1.1 PRICE</b>	<b>80</b>
<b>1.3.1.2 B-BBEE STATUS LEVEL OF CONTRIBUTION</b>	<b>20</b>
<b>Total points for Price and B-BBEE must not exceed</b>	<b>100</b>

1.4 Failure on the part of a tenderer to fill in and/or to sign this form and submit a B-BBEE Affidavit, Verification Certificate from a B-BBEE Verification Agency accredited by the South African National Accreditation System (SANAS) or a Registered Auditor approved by the Independent Regulatory Board of Auditors (IRBA), issued prior to 01 January 2017 together with the tender, will be interpreted to mean that preference points for B-BBEE status level of contribution are not claimed.

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

### **2. DEFINITIONS**

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

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

- 2.3 “B-BBEE status level of contributor” means the B-BBEE status received by a measured entity based on its overall performance using the relevant scorecard contained in the Codes of Good Practice, or Sector Code on Black Economic Empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act;
- 2.4 “tender” means a written offer in a prescribed or stipulated form in response to an invitation by an organ of state for the provision of services, works or goods, through price quotations, advertised competitive tendering processes or proposals;
- 2.5 “Broad-Based Black Economic Empowerment Act” means the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);
- 2.6 “comparative price” means the price after the factors of a non-firm price and all unconditional discounts that can be utilized have been taken into consideration;
- 2.7 “consortium or joint venture” means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract;
- 2.8 “contract” means the agreement that results from the acceptance of a tender by an organ of state;
- 2.9 “EME” – (Exempted Micro Enterprise) means an Entity with annual turnover of R10 million or less means any enterprise with an annual total revenue of R5 million or less.
- 2.10 “Firm price” means the price that is only subject to adjustments in accordance with the actual increase or decrease resulting from the change, imposition, or abolition of customs or excise duty and any other duty, levy, or tax, which, in terms of the law or regulation, is binding on the Supplier and demonstrably has an influence on the price of any supplies, or the rendering costs of any service, for the execution of the contract;
- 2.11 “functionality” means the measurement according to predetermined norms, as set out in the tender documents, of a service or commodity that is designed to be practical and useful, working or operating, taking into account, among other factors, the quality, reliability, viability and durability of a service and the technical capacity and ability of a tenderer;
- 2.12 “non-firm prices” means all prices other than “firm” prices;
- 2.13 “person” includes a juristic person;
- 2.14 “QSE” – (Qualifying Small Enterprise) means an Entity that qualifies for measurement under the QSE scorecard with turnover of R10 million or more but less than R50 Million.
- 2.15 “rand value” means the total estimated value of a contract in South African currency, calculated at the time of tender invitations, and includes all applicable taxes and excise duties;
- 2.16 “sub-contract” means the primary Supplier’s assigning, leasing, making out work to, or employing, another person to support such primary Supplier in the execution of part of a project in terms of the contract;
- 2.17 “total revenue” – means the total income of an entity from its operations as determined under South African Generally Accepted Accounting Practice, as per the Codes of Good Practice on Black Economic Empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act and promulgated in the Government Gazette on 9 February 2007;
- 2.18 “trust” means the arrangement through which the property of one person is made over or bequeathed to a trustee to administer such property for the benefit of another person; and

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

### 3. ADJUDICATION USING A POINT SYSTEM

- 3.1 The tenderer obtaining the highest number of total points will be awarded the contract.
- 3.2 Preference points shall be calculated after prices have been brought to a comparative basis taking into account all factors of non-firm prices and all unconditional discounts;.
- 3.3 Points scored must be rounded off to the nearest 2 decimal places.
- 3.4 In the event that two or more tenders have scored equal total points, the successful tender must be the one scoring the highest number of preference points for B-BBEE.
- 3.5 However, when functionality is part of the evaluation process and two or more tenders have scored equal points including equal preference points for B-BBEE, the successful tender must be the one scoring the highest score for functionality.
- 3.6 Should two or more tenders be equal in all respects, the award shall be decided by the drawing of lots.

### 4. POINTS AWARDED FOR PRICE

#### 4.1 THE 80/20 OR 90/10 PREFERENCE POINT SYSTEMS

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

80/20

or

90/10

$$P_s = 80 \left( 1 - \frac{P_t - P_{\min}}{P_{\min}} \right) \quad \text{or} \quad P_s = 90 \left( 1 - \frac{P_t - P_{\min}}{P_{\min}} \right)$$

Where:

$P_s$  = Points scored for comparative price of tender under consideration  
 $P_t$  = Comparative price of tender under consideration  
 $P_{\min}$  = Comparative price of lowest acceptable tender

### 5. Points awarded for B-BBEE Status Level of Contribution

- 5.1 In terms of Regulation 6 (2) and 7 (2) of the Preferential Procurement Regulations, preference points must be awarded to a tenderer for attaining the B-BBEE status level of contribution in accordance with the table below:

B-BBEE Status Level of Contributor	Number of points (90/10 system)	Number of points (80/20 system)
1	10	20
2	9	18
3	6	14
4	5	12
5	4	8
6	3	6
7	2	4
8	1	2
Non-compliant contributor	0	0

- 5.2 Tenderers who qualify as EMEs in terms of the B-BBEE Act must submit a certificate issued by an Accounting Officer as contemplated in the CCA, prior to 01 May 2015 or a B-BBEE Affidavit with B-BBEE Status Level Certificates.
- 5.3 Tenderers other than EMEs must submit their original and valid B-BBEE status level Affidavit QSE (for entities whose turnover is between R10 million and R50 million, with 51% to 100% Black Ownership) verification certificate or a certified copy thereof, substantiating their B-BBEE rating issued by a Registered Auditor approved by IRBA (prior to 1 January 2017) or a Verification Agency accredited by SANAS.
- 5.4 A trust, consortium or joint venture, will qualify for points for their B-BBEE status level as a legal entity, provided that the entity submits their B-BBEE status level certificate for consortiums or joint ventures and affidavit for trusts.
- 5.5 A trust, consortium or joint venture will qualify for points for their B-BBEE status level as an unincorporated entity, provided that the entity submits their consolidated B-BBEE scorecard as if they were a group structure and that such a consolidated B-BBEE scorecard is prepared for every separate tender.
- 5.6 Tertiary institutions and public entities will be required to submit their B-BBEE status level certificates in terms of the specialised scorecard contained in the Amended B-BBEE Codes of Good Practice, Gazette No. 38766.
- 5.7 A person will not be awarded points for B-BBEE status level if it is indicated in the tender documents that such a tenderer intends sub-contracting more than 25% of the value of the contract to any other enterprise that does not qualify for at least the points that such a tenderer qualifies for, unless the intended sub-Supplier is an EME that has the capability and ability to execute the sub-contract.
- 5.8 A person awarded a contract may not sub-contract more than 25% of the value of the contract to any other enterprise that does not have an equal or higher B-BBEE status level than the person concerned, unless the contract is sub-contracted to an EME that has the capability and ability to execute the sub-contract.

## 6. TENDER DECLARATION

- 6.1 Tenderers who claim points in respect of B-BBEE Status Level of Contribution must complete the following:

**7. B-BBEE STATUS LEVEL OF CONTRIBUTION CLAIMED IN TERMS OF PARAGRAPHS 1.3.1.2 AND 5.1**

7.1 B-BBEE Status Level of Contribution: ..... = ..... (maximum of 10 or 20 points)

(Points claimed in respect of paragraph 7.1 must be in accordance with the table reflected in paragraph 5.1 and must be substantiated by means of a B-BBEE certificate issued by a Verification Agency accredited by SANAS or a Registered Auditor approved by IRBA (prior to 01 January 2017) or an Accounting Officer as contemplated in the CCA).

**8. SUB-CONTRACTING**

8.1 Will any portion of the contract be sub-contracted? **YES / NO** (delete which is not applicable)

8.1.1 If yes, indicate:

- i. what percentage of the contract will be subcontracted? ..... %
- ii. the name of the sub-Supplier? .....
- iii. the B-BBEE status level of the sub-Supplier? .....
- iv. whether the sub-Supplier is an EME? YES / NO (delete which is not applicable)

**9. DECLARATION WITH REGARD TO COMPANY/FIRM**

9.1 Name of organization: .....

9.2 VAT registration number: .....

9.3 Company Registration number: .....

9.4 TYPE OF COMPANY/ FIRM

- ☐ Partnership/Joint Venture / Consortium
- ☐ One person business/sole propriety
- ☐ Close corporation
- ☐ Company
- ☐ (Pty) Limited

[TICK APPLICABLE BOX]

9.5 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES

.....  
.....  
.....  
.....

9.6 COMPANY CLASSIFICATION

- ☐ Manufacturer
- ☐ Supplier
- ☐ Professional supplier
- ☐ Other suppliers, e.g. transporter, etc.

[TICK APPLICABLE BOX]

9.7 Total number of years the company/firm has been in business? .....

9.8 I/we, the undersigned, who is / are duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the B-BBE status level of contribution indicated in paragraph 7 of the foregoing certificate, qualifies the company/ firm for the preference(s) shown and I / we 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 paragraph 7, the Supplier may be required to furnish documentary proof to the satisfaction of the purchaser that the claims are correct;
- (iv) If the B-BBEE status level of contribution has been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the purchaser may, in addition to any other remedy it may have –
  - (a) disqualify the person from the tendering process;
  - (b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;
  - (c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;
  - (d) restrict the tenderer or Supplier, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, 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

.....  
**SIGNATURE(S) OF TENDERER(S):**

DATE:.....

ADDRESS:.....  
.....  
.....

**WITNESSES:**

1. ....

2. ....

---

**T2.2.18 .../continued B-BBEE STATUS LEVEL VERIFICATION CERTIFICATES**

Tenderers not submitting a **valid original or a certified copy** B-BBEE Status Level Verification Certificate or are non-compliant contributors to B-BBEE do not qualify for preference points for B-BBEE but will not be disqualified from the tendering process.

For information use only

**T2.2.19 LETTER OF GOOD STANDING IN TERMS OF COID ACT  
(Compensation for Occupational Injuries and Diseases Act)**

**INSERT HERE**

For information use only



## T2.2.20 TENDERER'S FINANCIAL STANDING

**In terms of the standard conditions of Tender, the Tenderer shall provide information about its commercial position, which includes information necessary for the Purchaser to evaluate the Tenderer's financial standing.**

To that end the Tenderer must provide with its Tender a bank rating, certified by its banker, to the effect that it will be able to successfully complete the contract at the Tendered amount within the specified time for completion.

**However, should the Tenderer be unable to provide a bank rating with its Tender, it shall state the reasons as to why it is unable to do so, and in addition provide the following details of its banker and bank account that it intends to use for project:**

Name of account holder: .....

Name of Bank:..... Branch: .....

Account number: ..... Type of account: .....

Telephone number: ..... Facsimile number: .....

Name of contact person (at bank: .....

***Failure to provide either the required bank details or a certified bank rating with its Tender, will lead to the conclusion that the Tenderer does not have the necessary financial resources at its disposal to complete the contract successfully within the specified time for completion.***

The Purchaser undertakes to treat the information thus obtained as confidential, strictly for the use of evaluation of the Tender submitted by the Tenderer.

SIGNATURE: ..... DATE: .....  
(of person authorized to sign on behalf of the Tenderer)

## **T2.2.21 SUPPLIERS HEALTH AND SAFETY DECLARATION**

In terms of Clause 5(1) 9(h) of the OHSA 1993 Construction Regulations 2014 (referred to as "the Regulations" hereafter), a Contractor may only be appointed to perform construction work if the Purchaser is satisfied that the Contractor has the necessary competencies and resources to carry out the work safely in accordance with the Occupational Health and Safety Act No 85 of 1993 and the OHSA 1993 Construction Regulations 2014.

To that effect a person duly authorized by the Tenderer must complete and sign the declaration hereafter in detail.

### **Declaration by Tenderer**

1. I the undersigned hereby declare and confirm that I am fully conversant with the Occupational Health and Safety Act No 85 of 1993 (as amended by the Occupational Health and Safety Amendment Act No 181 of 1993), and the OHSA 1993 Construction Regulations 2014.
2. I hereby declare that my company / enterprise have the competence and the necessary resources to safely carry out the construction work under this contract in compliance with the Construction Regulations and the Purchaser's Health and Safety Specifications.
3. I hereby undertake, if my Tender is accepted, to provide a sufficiently documented Health and Safety Plan in accordance with CR7(1) of the Construction Regulations, approved by the Purchaser or its representative, before I will be allowed to commence with construction work under the contract. I hereby agree that my company/enterprise will not have a claim for compensation for delay or extension of time because of my failure to obtain the necessary approval for the said safety plan.
4. I confirm that copies of my company's approved Health and Safety Plan, the Purchaser's Safety Specifications as well as the OHSA 1993 Construction Regulations 2014 will be provided on site and will at all times be available for inspection by the Contractor's personnel, the Purchaser's personnel, the Employer's Agent, visitors, and officials and inspectors of the Department of Labour.
5. I hereby confirm that adequate provision has been made in my Tendered rates and prices in the bill of quantities to cover the cost of all resources, actions, training and all health and safety measures envisaged in the OHSA 1993 Construction Regulations 2014, including the cost for specific items that may be scheduled in the bill of quantities.
6. I hereby confirm that I will be liable for any penalties that may be applied by the Purchaser in terms of the said Regulations for failure on my part to comply with the provisions of the Act and the Regulations as set out in Regulation 30 of the Regulations.
7. I agree that my failure to complete and execute this declaration to the satisfaction of the Purchaser will mean that I am unable to comply with the requirements of the OHSA 1993 Construction Regulations 2014, and accept that my Tender will be prejudiced and may be rejected at the discretion of the Purchaser.
8. I am aware of the fact that, should I be awarded the contract, I must submit the notification required in terms of Regulation 4 of the OHSA 1993 Construction Regulations 2014 (*example attached hereafter*) before I will be allowed to proceed with any work under the contract.

SIGNATURE: ..... DATE: .....  
(of person authorized to sign on behalf of the Tenderer)

---

**T2.2.22 PRO FORMA OHS NOTIFICATION**

**PRO FORMA NOTIFICATION FORM IN TERMS OF THE OCCUPATIONAL HEALTH AND SAFETY  
ACT 1993, CONSTRUCTION REGULATIONS 2014**

***[In terms of Regulation 4 of the Construction Regulations 2014, the successful Tenderer must complete and forward this form prior to commencement of work to the office of the Department of Labour.]***

1. (a) Name and postal address of Contractor:

.....

- (b) Name of Contractor's contact person:

Telephone number:

2. Contractor's compensation registration number:

3. (a) Name and postal address of Purchaser:

- (b) Name of Purchaser's contact person  
agent:

Telephone, number

4. (a) Name and postal address of designer(s) for the project:

.....

- (b) Name of designer's contact person:

Telephone, number:

5. Name of Contractor's construction supervisor on site appointed in terms of Regulation 6(1):

Telephone number:

6. Name/s of Contractor's sub-ordinate supervisors on site appointed in terms of regulation 6(2).

.....

7. Exact physical address of the construction site or site  
office:

8. Nature of the construction work:

9. Expected commencement date:

10. Expected completion date:

11. Estimated maximum number of persons on the construction site:

12. Planned number of Sub-Contractors on the construction site accountable to Contractor:

13. Name(s) of Sub-Contractors already chosen:

SIGNED BY:

CONTRACTOR: ..... DATE: .....

PURCHASER: ..... DATE: .....

**T2.2.23 LETTER OF INTENT FOR PUBLIC LIABILITY**

**INSERT HERE**

For information use only

## **T2.2.24 CENTRAL SUPPLIER DATABASE (CSD) REPORT**

INSERT HERE

For information use only



**CONTRACT No:** 2022/031

**CONTRACT TITLE:**

Design, supply, install, commission of existing of water cooled motors at Groenkloof to be replaced by air cooled motors. Including a suitable HVAC system

**VOLUME 2 – Offer, Contract, Pricing, Scope of Work and Site Information**

**Issued by:**

Umgeni Water  
310 Burger Street  
Pietermaritzburg

**Tender Queries:**

Contact Name: Nosipho Mkhize  
Telephone: 033 841 1062

**Name of Tenderer:** .....

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[Note: Each section and subsection is preceded by its relevant table of contents.]

C.5.1 Umgeni Water Insurance Summary and Claims Procedure



---

## C.1 AGREEMENTS AND CONTRACT DATA

### **IMPORTANT NOTE ON C1.1:**

**ALL Tenderers MUST complete and sign Form A: OFFER (the first page hereafter).**

**Form B: ACCEPTANCE will be signed by the Employer and then only in the case of the successful Tenderer.**

**Form C: SCHEDULE OF DEVIATIONS must be signed by the Employer as well as the successful Tenderer after award of the contract.**

**Form D: CONFIRMATION OF RECEIPT must be signed by the successful Tenderer on receipt of a fully completed original copy of the Agreement including the Schedule of Deviations, if any.**

For information use only

## C1.1 FORM OF OFFER AND ACCEPTANCE

### A: OFFER

The Purchaser, identified in the Acceptance signature block, has solicited offers to enter into a contract in respect of the following works:

**TENDER NO. 2022/ 031 – DESIGN, SUPPLY, INSTALL, COMMISSION OF EXISTING OF WATER COOLED MOTORS AT GROENKLOOF TO BE REPLACED BY AIR COOLED MOTORS. INCLUDING A SUITABLE HVAC SYSTEM**

The Tenderer, identified in the Offer signature block below, 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 Tenderer, deemed to be duly authorized, signing this part of this Form of Offer and Acceptance, the Tenderer offers to perform all of the obligations and liabilities of the Supplier under the Contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the Conditions of Contract identified in the Contract Data.

**The offered total of the prices inclusive of Value Added Tax is:**

R ..... (In words.....),

This Offer may be accepted by the Purchaser by signing the Acceptance part of this Form of Offer and Acceptance and returning one copy of this document to the Tenderer before the end of the period of validity stated in the Tender Data, whereupon the Tenderer becomes the party named as the Supplier in the Conditions of Contract identified in the Contract Data.

**Signature:** (of person authorized to sign the tender)

.....

**Name:** (of signatory in capitals)

.....

**Capacity:** (of Signatory)

.....

**Name of Tenderer:** (organization)

.....

Address:.....

.....

Telephone number: ..... Fax number: .....

**CIDB Registration Number of Tenderer:**

.....

**WITNESS:**

**Signature:**.....

**Name:** (in capitals) .....

**Date:** .....

## **B: ACCEPTANCE**

By signing this part of the Form of Offer and Acceptance, the Purchaser identified below accepts the Tenderer's Offer. In consideration thereof, the Purchaser shall pay the Supplier the amount due in accordance with the Conditions of Contract as set out in the General and Special Conditions of Contract, and identified in the Contract Data. Acceptance of the Tenderer's Offer shall form an agreement between the Purchaser and the Tenderer upon the terms and conditions contained in this Agreement and in the Contract that is the subject of this Agreement.

The terms of the contract are contained in

- C.1 Agreement, and Contract Data, (which include this Agreement)
- C.2 Pricing Data, including the Bill of Quantities
- C.3 Scope of Work
- C.4 Site Information
- C.5 Annexures

and the schedules, forms, drawings and documents or parts thereof, which may be incorporated by reference into Parts 1 to 5 above.

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

The Tenderer shall within two weeks after receiving a completed copy of this Agreement, including the Schedule of Deviations (if any), contact the Purchaser's agent (whose details are given in the Contract Data) to arrange the delivery of any other 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 Tenderer receives one fully completed original copy of this document, including the Schedule of Deviations (if any). Unless the Tenderer (now Supplier) within five days of the date of such receipt notifies the Purchaser 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:** .....

**Name:** *(in capitals)* .....

**Capacity:** .....

**Name of Purchaser:** *(organization)* .....

**Address:** .....

**Telephone number:** ..... **Fax number:** .....

## **AS WITNESS**

**Signature:** ..... **Name:** *(in capitals)* .....

**Date:** .....

## C: SCHEDULE OF DEVIATIONS

The extent of deviations from the tender documents issued by Umgeni Water prior to the tender closing date is limited to those permitted in terms of the Tender Data and the Conditions of Tender.

A Tenderer's covering letter will not necessarily be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid become the subject of agreements reached during the process of offer and acceptance, the outcome of such agreement shall be recorded here.

Any other matters arising from the process of offer and acceptance either as a confirmation, clarification or change to the tender documents and which it is agreed by the Parties becomes an obligation of the contract shall also be recorded here.

Any change or addition to the tender documents arising from the above agreements and recorded here shall also be incorporated into the final draft of the Contract.

1. **Subject:** .....  
**Details:** .....  
.....
2. **Subject:** .....  
**Details:** .....  
.....
3. **Subject:** .....  
**Details:** .....  
.....
4. **Subject:** .....  
**Details:** .....  
.....
5. **Subject:** .....  
**Details:** .....  
.....
6. **Subject:** .....  
**Details:** .....  
.....
7. **Subject:** .....  
**Details:** .....  
.....

By the duly authorized representatives signing this Schedule of Deviations, Umgeni Water and the Tenderer agree to and accept the foregoing Schedule of Deviations as the only deviations from and amendments to the documents listed in the Tender Data and addenda thereto as listed in the Tender Schedules, as well as any confirmation, clarification or change to the terms of the offer agreed by the Tenderer and Umgeni Water during this process of offer and acceptance.

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

**FOR THE TENDERER:**

Signature: .....  
Name: .....  
Capacity: .....  
Tenderer: *(Name and address of organization)* .....  
.....

**Witness:**

Signature: .....  
Name: .....  
Date: .....

**FOR THE PURCHASER**

Signature: .....  
Name: .....  
Capacity: .....  
Purchaser: *(Name and address of organization)* .....  
.....

**Witness:**

Signature: .....  
Name: .....  
Date: .....

**D:      CONFIRMATION OF RECEIPT**

The Tenderer, (now Supplier), identified in the Offer part of this Agreement hereby confirms receipt from the Purchaser, identified in the Acceptance part of this Agreement, of one fully completed original copy of this Agreement, including the Schedule of Deviations on this

**FOR THE SUPPLIER:**

Signature: .....

Name: .....

Capacity: .....

**Signature and name of witness:**

Signature: .....

Name: .....

---

### C.1.2 CONTRACT DATA (INCLUDING SPECIAL CONDITIONS OF CONTRACT)

The Conditions of Contract are the Umgeni Water Standard Supply and Delivery of Goods Contract as per CIDB Contract for the Supply and Delivery of Goods (*August 2008*), (*Third Edition of CIDB document 1019*), a copy of which may be obtained from <https://www.google.co.za/> Contract for the Supply and Delivery of Goods.

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

#### Special Conditions of Contract

##### 1. National Treasury Central Supplier Database

The successful Tenderer is required to provide proof of registration with the National Treasury Central Supplier Database (CSD) prior to the award of contract.

##### 2. Application of Contract Price Adjustment Factor

Contract Price Adjustment will not be applicable

##### 3. Progress Measurement and Payments

Progress measurement shall take place on or before, but not later than, the 20<sup>th</sup> of the month, but should the 20<sup>th</sup> be a 'non-working' day, it shall take place on the last working day prior to the 20<sup>th</sup>.

Statements, invoices and back-up documentation together with a Payment Certificate shall be submitted to the Employer on or before the 25<sup>th</sup> of the month for payment not later than the last day of the month following the month in which same were submitted.

**PART 1: DATA PROVIDED BY THE PURCHASER**

CLAUSE	DATA
1	<p>The Purchaser is Umgeni Water</p> <p>The authorised and designated representative of the Purchaser is: Name: Mfanasibili Nkonyane</p> <p>The address for receipt of communications is: Telephone: 033 846 1873 Facsimile: E-mail: Mfanasibili.nkonyane@umgeni.co.za Address: 7 Portland Road, Mkondeni, 3201</p>
1	The Period of Performance is 54 weeks from the Commencement Date.
5.4.1	<p>The Service Provider is required to provide the following insurances:</p> <p>1. Public Liability Insurance [REDACTED] Cover is: R10 000 000.00 (Ten Million Rand) [REDACTED] Period of cover: For the period of performance</p>
5.5	Delivery is to take place in accordance with the approved programme.
7c	The goods will remain free from defects for a period of 12 months
12.1.2	Interim settlement of disputes is to be by adjudication.
12.2.2	In the event that the parties fail to agree on a adjudicator, the adjudicator is nominated by the Association of Arbitrators (Southern Africa)
12.2.4	Final settlement is by arbitration.

The additional conditions of contract are:



## PART 2: DATA PROVIDED BY THE SUPPLIER

The Supplier is advised to read the **CIDB Contract for the Supply and Delivery of Goods (August 2008), (Third Edition of CIDB document 1019)** in order to understand the implications of this Data which is required to be provided.

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

CLAUSE	DATA
1	<p>The Supplier is:</p> <p>Name: .....</p> <p>Address: .....</p> <p>.....</p> <p>Telephone:..... Facsimile: .....</p>
1	<p>The authorised and designated representative of the Supplier is:</p> <p>Name: .....</p> <p>Address: .....</p> <p>.....</p> <p>Telephone:..... Facsimile: .....</p>

## **PART C2: PRICING DATA**

### **C2.1 PRICING INSTRUCTIONS**

#### **1. GENERAL**

The Bill of Quantities forms part of the Tender Documents and must be read and priced in conjunction with all the other documents comprising the Tender Documents.

The Tenderer is advised to check the number of pages and should any be found missing or in duplicate or the figures or writing indistinct or these Bill of Quantities contain any obvious errors, the Tenderer must inform the Purchaser at once and have it rectified. No liability whatsoever will be admitted in respect of errors due to the foregoing.

Should there be any doubt or obscurity as to the meaning of any particular item, the Tenderer must obtain an explanation of it, in writing, from the Purchaser. No claims for extras arising from any such doubt or obscurity will be admitted after delivery of the tender.

#### **2. QUANTITIES REFLECTED IN THE BILL**

The quantities where shown in the Pricing Data (Bill of Quantities) are the estimated probable requirements to be supplied in the period of twelve months from the date of award of the Contract but the actual quantities ordered and supplied shall be at the sole discretion of the Purchaser.

*Refer Sub-Clause 10.3 a) of the Contract document.*

#### **3. PRICING OF THE BILL OF QUANTITIES**

All unit prices, extensions and totals must be filled in **black ink** and unit prices, extensions and totals submitted in electronic format will not be acceptable.

*Refer Sub-Clauses 10.3 b), c) and d) of the Contract document*

Each item shall be priced and extended to the "Amount per Item" column by the Tenderer. If the Supplier omits to price any items in the Bill of Quantities, then these items will be considered to have a nil rate or price.

All items for which terminology such as "inclusive" or "not applicable" have been added by the Tenderer will be regarded as having a nil rate which shall be valid irrespective of any change in quantities during the execution of the Contract and shall be reflected in the Bill of Quantities as having a nil rate or price..

All rates and amounts quoted in the Bill of Quantities shall be in Rands and cents and shall include all levies and taxes (other than VAT). VAT will be added in the summary of the Bill of Quantities.

#### **4. CORRECTION OF ENTRIES**

Incorrect entries shall not be erased or obliterated with correction fluid but must be crossed out neatly. The correct figures must be entered above or adjacent to the deleted entry in black ink, and the alteration must be initialled by the Tenderer.

#### **5. ARITHMETICAL ERRORS**

Arithmetical errors found in the Bill of Quantities because of faulty multiplication or addition will be corrected by the Purchaser at the tender evaluation stage, as set out in the Conditions of Tender F3.9.

n

#### **6. UNITS OF MEASUREMENT**

The units of measurement described in the Bill of Quantities are metric units for which the standard international abbreviations are used. Abbreviations used in the Bill of Quantities, including some non-standard abbreviations, are as follows:

mm	=	millimetre
m	=	metre
km	=	kilometre
m <sup>2</sup>	=	square metre
m <sup>2</sup> pass	=	square metre-pass
ha	=	hectare
m <sup>3</sup>	=	cubic metre
l	=	litre
kℓ	=	kilolitre
kW	=	kilowatt
kg	=	kilogram
t	=	ton (1000 kg)
No.	=	number
sum	=	lump sum

For information use only

## C2.2 PRICING SCHEDULE

### Bill of Quantities

ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
<b>Part 1: PRELIMINARY AND GENERAL</b>						
1.	<b>SANS 1200A</b>	<b>SECTION : GENERAL</b>				
1.1		<b>Construction Management</b>				
1.1.1		Compliance with all the contractual requirements of the contract, including project programming, outage management, weekly progress reporting, materials management, meetings and quality.	sum	1	R	R
1.1.2		Compliance with Environmental Management	sum	1	R	R
1.2		<b>Site Establishment</b>				
1.2.1		Facility for Contractor				
		a) Offices & storage sheds complete with furniture and facilities (electricity, cabling, water, etc).	sum	1	R	R
		b) Contractors Tools & equipment	sum	1	R	R
		c) Ablution facilities (complete with required plumbing and connection to UW system)	sum	1	R	R
		d) Certificate of Compliance for the Contractor facility	sum	1	R	R
1.2.2		Provision for the compilation of the Construction Programme, to be done in MS Project and update on a monthly basis and Quality Assurance Programme for the works.	sum	1	R	R
1.3		<b>Occupational Health &amp; Safety Requirements</b>				
1.3.1		Provision for Legal, Contractual & Safety Compliance. Compliance with OHSA of 1993 and Construction Regulations.	sum	1	R	R
1.3.2		Certificate of Compliance	sum	1	R	R
<b>SUBTOTAL - CARRIED FORWARD</b>						<b>R</b>

ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
		<b>SUBTOTAL - BROUGHT FORWARD</b>				<b>R</b>
1.3.3		Provision of personal protective equipment and clothing for all the contractor's staff, including sub-contractors. Even those related to COVID 19 requirements.	sum	1	R	R
a)		PPE for all employees (e.g. hardhat, overalls, safety shoes, gloves)				
		• Item 1	each		R	R
		• Item 2	each		R	R
		• Item 3	each		R	R
		• Item 4	each		R	R
		• Item 5	each		R	R
		• Item 6	each		R	R
		• Item 7	each		R	R
b)		COVID19 Requirements				
		• Item 1	each		R	R
		• Item 2	each		R	R
		• Item 3	each		R	R
		• Item 4	each		R	R
		• Item 5	each		R	R
1.3.4		Barricading of work area.	sum	1	R	R
		<b>SUBTOTAL - CARRIED FORWARD</b>				<b>R</b>

ITEM No	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	<b>SUBTOTAL - BROUGHT FORWARD</b>					<b>R</b>
<b>1.4</b>		<b>Materials</b>				
1.4.1		On completion of the project, all unused materials shall be reconciled and qualified. Once authorised by the Project Manager, the unused materials shall be transported to Midmar Workshop.	sum	1	R	R
1.4.2	6.1	The Contractor shall make allowance for the removal and disposal of old equipment. The Contractor shall provide disposal certificates.	sum	1	R	R
1.4.3		Provide for maintaining insurance in terms of the COID Act.	sum	1	R	R
<b>1.5</b>		<b>De-establishment</b>				
1.5.1		Removal of site establishment upon completion of construction and making good and restoring of the Site to the satisfaction of the Project Manager / Lead Engineer.	psum	1	R	R
1.5.2		Rehabilitation of site as to the condition it was before the start of the project or better.	sum	1	R	R
<b>1.6</b>		<b>Time Related Items</b>				
1.6.1		Contractual requirements	days	120	R	R
1.6.2		Contract supervision	days	120	R	R
<b>1.7</b>		<b>Training</b>				
1.7.1	6.2	The training will take place at Mkondeni Training Room or Midmar Water Works Boardroom, and at Groenkloof PS.				
		a) Accredited Trainings	sum	1	R	R
		b) Trainer Fee	sum	1	R	R
		c) Trainer Living Out Allowance	sum	1	R	R
		d) Accommodation	sum	1	R	R
		e) Travel	sum	1	R	R
	<b>SUBTOTAL - CARRIED FORWARD</b>					<b>R</b>

ITEM No	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	<b>SUBTOTAL - BROUGHT FORWARD</b>					<b>R</b>
<b>1.8</b>		<b>Industrial Tools</b>				
1.8.1		Industrial Programmable Tool	psum	1	R250 000.00	R250 000.00
1.8.2		Portable Power Quality Meter	psum	1	R400 000.00	R400 000.00
1.8.3		HV System tester	psum	1	R800 000.00	R800 000.00
1.8.4		Alignment Tools	psum	1	R200 000.00	R200 000.00
1.8.5		Contractor mark up	%			
<b>1.9</b>		<b>O &amp; M Manuals</b>				
1.9.1		Submit O&M manuals	sum	1	R	R
1.9.2		Develop Control Philosophy for the Groenkloof PS based on the current PLC programming and Operating Philosophy.	sum	1	R	R
1.9.3		Develop Functional Design Specification as per UW standard	sum	1	R	R
1.9.4		Develop P&IDs for the Groenkloof PS inclusive of new and existing equipment / field devices.	sum	1	R	R
1.9.5		Conduct HAZOP 3 study				
		a) Consultant Fee	day	10	R	R
		a) Contractors provision for the HAZOP Study	sum	1	R	R
1.9.6		Existing PLC interpretation and submission of report.	sum	1	R	R
<b>1.10</b>		<b>Testing and Commissioning</b>				
1.10.1		Factory Acceptance Testing for MV and LV Motors at Manufacturing or Supplier sites (flights, accommodation, transport to and from, and FAT tests).	sum	1	R	R
1.10.2		Factory Acceptance Testing for HVAC system at Manufacturing or Supplier site (accommodation, transport to and from, and FAT tests).	sum	1	R	R
1.10.3		Factory Acceptance Testing for PLC, Vibration Monitoring and SCADA systems at Supplier site (accommodation, transport to and from, and FAT tests).	sum	1	R	R
	<b>SUBTOTAL - CARRIED FORWARD</b>					<b>R</b>

ITEM No	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	<b>SUBTOTAL - BROUGHT FORWARD</b>					<b>R</b>
1.10.4		Factory Acceptance Testing for MCC system at Manufacturing or Supplier site (accommodation, transport to and from, and FAT tests).	sum	1	R	R
1.10.5		Integration of new systems to existing system.	sum	1	R	R
1.10.6		Commissioning of the system (mechanical installation, cold commissioning, hot commissioning, and wet commissioning).				
		a) Mechanical installation of the motors (MV and LV), HVAC system, and PLC&SCADA system. Submit the completion checklist to UW for approval. Complete and issue the mechanical completion certificate in the presence of The Lead Engineer / Project Manager.	sum	1	R	R
		b) Pre-commissioning of the new system. Prepare pre-commissioning checklist and submit to UW for approval. Complete and issue pre-commissioning completion certificate per each system completed in the presence of The Lead Engineer / Project Manager.	sum	1	R	R
		c) Cold commissioning of the new system. Prepare cold commissioning checklist and submit to UW for approval. Complete and issue cold commissioning completion certificate per each system completed in the presence of The Lead Engineer / Project Manager.	sum	1	R	R
		d) Pre-hot commissioning (switching ON of control voltage only) of the new system. Submit the checklist to UW for approval. Complete and issue pre-hot commissioning completion certificate per each system completed in the presence of The Lead Engineer / Project Manager.	sum	1	R	R
		e) Hot commissioning (switching ON of main power) of the new system. Submit the checklist to UW for approval. Complete and issue hot commissioning completion certificate per each system completed in the presence of The Lead Engineer / Project Manager.	sum	1	R	R
	<b>SUBTOTAL - CARRIED FORWARD</b>					<b>R</b>



ITEM No	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	<b>SUBTOTAL - BROUGHT FORWARD</b>					<b>R</b>
		f) Wet commissioning (pumping of water and controlling from SCADA) of the new system. Submit the checklist to UW for approval. Complete and issue wet commissioning completion certificate per each system completed in the presence of The Lead Engineer / Project Manager.	sum	1	R	R
<b>1.11</b>		<b>Crane / Crane Truck</b>				
1.11.1		Supply crane / crane truck for the removal of existing motors and installation of MV and LV motors, and HVAC system				
		a) Crane	day	30	R	R
		b) Labour (Crane Driver)	day	30	R	R
		c) Labour (Riggers)	day	30	R	R
		d) Rigging Tools	sum	1	R	R
<b>1.12</b>		<b>Handover</b>				
1.12.1		PLP Gate Review	sum	1	R	R
1.12.2		Project Handover	sum	1	R	R
1.12.3		Lesson Learnt	sum	1	R	R
1.12.4		Proving period (1 year).	sum	1	R	R
<b>SUBTOTAL PART 1 - CARRIED FORWARD TO SUMMARY PAGE</b>						<b>R</b>

ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
2		<b>HIGH LIFT SYSTEM</b>				
		<b>Decommissioning of existing water-cooled MV motors</b>				
2.1		Decommission 3 x 580KW water-cooled motors and related accessories.				
		a) Labour	sum	1	R	R
		b) Transportation	sum	1	R	R
2.2		Decommission High Lift motors' water cooling system and related accessories.				
		a) Labour	sum	1	R	R
		b) Transportation	sum	1	R	R
		<b>Air-Cooled MV Motors – New System</b>				
2.3	6.4 6.4.4	580kW Motor plinth modification				
		a) Concrete for the plinth (Material)	each	3	R	R
		b) Labour	sum	1	R	R
2.4	6.4 6.4.1	Supply, deliver, store, test and install 3300V, 3-phase, 580KW air-cooled motors with protection as UW specification and project technical specification.				
		a) Material (580 kW motor)	each	3	R	R
		b) Pump-motor set alignment	sum	1	R	R
		c) Labour	sum	1	R	R
2.5		Terminate existing High Lift Motor's power and controls cables				
		a) Terminating kit and accessories	sum	1	R	R
		b) Labour	sum	1	R	R
2.6	6.4 6.4.2	Supply and retrofit MV motor protection system.				
		a) Feeder protection relay	each	4	R	R
		<b>SUBTOTAL - CARRIED FORWARD</b>				<b>R</b>

ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
	SUBTOTAL - BROUGHT FORWARD					R
	6.4 6.4.2	b) Motor protection relay	each	4	R	R
		c) Programme all 8 relays as per requirement.	sum	1	R	R
		d) Supply termination kits with accessories and terminate all existing cables to the new protection relays.	sum	1	R	R
SUBTOTAL PART 2 - CARRIED FORWARD TO SUMMARY PAGE						R

ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
<b>3</b>		<b>LV ELECTRICAL SYSTEM</b>				
3.1		<b>Decommissioning of existing system</b>				
3.1.1		Decommission the existing LV System (MCC, motors, cabling and accessories).				
		a) Labour	sum	1	R	R
		b) Transport removed LV system to Midmar WW Workshop.	sum	1	R	R
3.2		<b>New LV System</b>				
3.2.1	6.5 6.5.2	Supply, deliver, store and install 200kW induction motor with the accessories as specified in the technical specifications.				
		a) 3-Phase, 400V, 50Hz, 200kW air-cooled induction motor as per UW specification.	each	3	R	R
		b) Pump motor set alignment	sum	1	R	R
		b) Labour	sum	1	R	R
3.2.2	6.5 6.5.7 6.5.7.1	200 kW Plinth – Modification of 150kW motor plinths to cater for the 200kW motors.				
		a) Material – Concrete for the plinth	sum	1	R	R
		b) Accessories for the concrete plinth	sum	1	R	R
		c) Labour	sum	1	R	R
3.2.3	6.5 6.5.1	Design, fabricate, supply, deliver, store and install 400V Motor Control Centre as specified and also as per the SLD. The MCC is to meet UW Electrical specifications.				

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		a) Material	sum	1	R	R
		b) Terminate existing cables	sum	1	R	R
		c) Labour	sum	1	R	R
3.2.4	6.5.7 6.5.7.2	MCC Building modification: a) Replace wooden door with steel door (Design, fabricate and install), b) Trench modification				
		a) Material for steel door (double and single doors) with all related accessories.	sum	1	R	R
	<b>SUBTOTAL - CARRIED FORWARD</b>					R
ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
	<b>SUBTOTAL - BROUGHT FORWARD</b>					R
		b) Civil work to accommodate the removal and installation of steel door.	sum	1	R	R
		c) MCC trench modification to accommodate the new MCC.	sum	1	R	R
3.2.5	6.5 6.5.4	Supply, deliver, store, install and commission a 30kVA UPS and related accessories in the MCC room.				
		a) 3-phase input and 1-phase output 50Hz transformer based 60KVA UPS	each	1	R	R
		b) Accessories and related kits	sum	1	R	R
		c) UPS DB	each	1	R	R
		d) Labour	sum	1	R	R
3.3		<b>Cabling</b>				
3.3.1		Supply, deliver, store, install, test and terminate 3core, 240mm <sup>2</sup> , SWA PVC SWA copper cable from the MCC to all three motors.				
		a) Material (Cable)	m	300	R	R
		b) Termination kit with all related accessories	sum	1	R	R
		c) Labour	sum	1	R	R

3.3.2		Supply, deliver, store, install, test and terminate 12core, 1.5mm <sup>2</sup> , ILO dekabon SWA (armouring) copper cable. Terminate from the PLC marshalling cabinet terminals to all field devices.				
		a) Material (Cable)	m	300	R	R
		b) Termination kit with all related accessories	sum	1	R	R
		c) Labour	sum	1	R	R
	<b>SUBTOTAL - CARRIED FORWARD</b>					<b>R</b>
ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
		<b>SUBTOTAL - BROUGHT FORWARD</b>				<b>R</b>
3.3.3		Supply, deliver, store, install, test and terminate 3core, 6mm <sup>2</sup> , SWA PVC SWA copper cable from the MCC to all actuators.				
		a) Material (Cable)	m	600	R	R
		b) Termination kit with all related accessories	sum	1	R	R
		c) Labour	sum	1	R	R
3.3.4		Supply, deliver, store, install, test and terminate 3core, 16mm <sup>2</sup> , SWA PVC SWA copper cable from the MCC to the UPS.				
		a) Material (Cable)	m	50	R	R
		b) Termination kit with all related accessories	sum	1	R	R
		c) Labour	sum	1	R	R
3.3.5		Supply, deliver, store, install, test and terminate 1core, 16mm <sup>2</sup> , SWA PVC SWA copper cable from the UPS to the UPS DB.				
		a) Material (Cable)	m	50	R	R
		b) Termination kit with all related accessories	sum	1	R	R

		c) Terminate existing control (230V) cables into the UPS DB.	sum	1	R	R
		d) Labour	sum	1	R	R
3.3.6		Supply, deliver, store, install, test and terminate 3core, 25mm <sup>2</sup> , SWA PVC SWA copper cable from the MCC to the 6 cooling motors.				
		a) Material (Cable)	m	300	R	R
		b) Termination kit with all related accessories	sum	1	R	R
	<b>SUBTOTAL - CARRIED FORWARD</b>					R
ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
	<b>SUBTOTAL - BROUGHT FORWARD</b>					R
		c) Labour	sum	1	R	R
3.3.7		Supply, deliver, store, install, test and terminate 7core, 1.5mm <sup>2</sup> , SWA PVC SWA copper cable from the MCC to the 6 cooling motors.				
		a) Material (Cable)	m	300	R	R
		b) Termination kit with all related accessories	sum	1	R	R
		c) Labour	sum	1	R	R
3.3.8		Supply, deliver, store and install hot dipped galvanised cable ladder between the MCC and the motors				
		a) Material (Cable)	sum	1	R	R
		b) Labour	sum	1	R	R
3.3.9		Supply, deliver, store, install, test and terminate 3.3kV, 3 x 3core, 185mm <sup>2</sup> , SWA PVC SWA copper cable from the 3.3kV Switchgear to the 3 MV (580kW) motors.				
		a) Material (Cable)	m	300	R	R
		b) Material (Cable termination accessories)	sum	1	R	R

		c) Labour	sum	1	R	R
3.3.10	6.7	Supply, deliver, store, install, test and terminate 3.3kV/400V, 630kVA Dry Type Transformer with related cabling.				
		a) Material (3.3kV/400V Transformer including the MV and LV terminations and the related termination boxes)	each	1	R	R
		b) Material (6.6/12kV XLPE, PVC, SWA cable, 3 core, 185mm <sup>2</sup> ). The cable is from the 3.3kV switchgear to the Transformer)	m	300	R	R
	<b>SUBTOTAL - CARRIED FORWARD</b>					R
ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
		<b>SUBTOTAL - BROUGHT FORWARD</b>				R
3.3.10	6.7	c) Material (1000V, cable, 3 core, SWA PVC SWA 3 x 120mm <sup>2</sup> ). The cable is from the LV side of the transformer to the LV MCC.	m	150	R	R
		d) Material (7core, 1.5mm <sup>2</sup> , SWA PVC SWA copper cable from the transformer sensors to the MV switchgear).	m	150	R	R
		e) Material (Weather proof outdoor container for the 630 kVA Dry Type Transformer with related cooling fans as per heat dissipation by the transformer)	sum	1	R	R
		f) Material (Maintenance and reliability sensors, e.g. temperature, arc flash, partial discharge)	sum	1	R	R
		g) Material (185mm <sup>2</sup> cable termination kit and accessories)	sum	1	R	R
		h) Material (120mm <sup>2</sup> cable termination kit and accessories)	sum	1	R	R
		i) Material (1.5mm <sup>2</sup> cable termination kit and accessories)	sum	1	R	R
		j) Labour	sum	1	R	R
3.4		<b>Instrumentation and Control</b>				
3.4.1	6.5 6.5.6 Annexure A	Supply, deliver, store, program, test and install an integrated telemetry system that will communicate with the SCADA system at Midmar WW.				
		a) CPU	each	3	R	R
		b) Power Supply	each	3	R	R
		c) Communication module	each	3	R	R
		d) 32 Channel DI	each	8	R	R

		e) 16 Channel DO	each	5	R	R
		f) 16 Channel AI	each	4	R	R
		g) 16 Channel AO	each	4	R	R
		i) Network Switch	each	4	R	R
		j) Telemetry system panel	each	2	R	R
		k) PC Panel with SCADA software, PLC/RTU software, Vibration Monitoring System,	each	1	R	R
		l) Link the PC Panel with the Groenkloof PS industrial network.	sum	1	R	R
		m) Traditional radio with transmitter and related aerials	each	2	R	R
		<b>SUBTOTAL - CARRIED FORWARD</b>				<b>R</b>
ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
		<b>SUBTOTAL - BROUGHT FORWARD</b>				<b>R</b>
3.4.1	6.5 6.5.6 Annexure A	n) Traditional radio with receiver and related aerials at Midmar WW	each	2	R	R
		o) Repeater station as per the selected telemetry system. Complete operational system	sum	1	R	R
		p) Telemetry system related cabling and accessories	sum	1	R	R
		q) Design the telemetry communication between Groenkloof PS, Howick West Reservoir, and Midmar WW.	sum	1	R	R
		r) Integrate the telemetry system to the Midmar WW SCADA system.	sum	1	R	R
		s) Test the telemetry system with the SCADA system.	sum	1	R	R
		t) Labour	sum	1	R	R
3.4.2	6.5.6	Supply, deliver, store, install, terminate and test pressure protection and monitoring system.				
		a) Pressure elements	each	6	R	R
		b) Pressure transmitters with 20m compatible cable	each	6	R	R
		c) Junction box with fused 20 terminals	sum	1	R	R
		d) Labour	sum	1	R	R



3.4.3	6.5.6	Supply, deliver, store, install, terminate and test vibration protection and monitoring system.				
		a) Vibration elements	each	24	R	R
		b) Vibration transmitters with 20m compatible cable	each	24	R	R
		c) Vibration Analysis system controller	each	1	R	R
		d) Junction box with fused 20 terminals	each	1	R	R
		e) Labour	sum	1	R	R
SUBTOTAL - CARRIED FORWARD						R
ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
SUBTOTAL - BROUGHT FORWARD						R
3.4.4	6.5.6	Supply, deliver, store, install, terminate and test temperature protection and monitoring system.				
		a) Temperature elements	each	6	R	R
		b) Temperature transmitters with 20m compatible cable	each	6	R	R
		c) Junction box with fused 20 terminals	sum	1	R	R
		d) Labour	sum	1	R	R
3.4.5		Supply, install, program, test and commission pump control model with integrated machine learning algorithm (predictive or prescriptive) to control and monitor the Groenkloof Pump Station.				
		a) Development of software, analytical tools and machine learning control and monitoring algorithm.	sum	1	R	R
		b) Integrate analytical tools (control model) into the SCADA system.	sum	1	R	R
		c) Supply, deliver, install, test and commission required hardware and software systems.	sum	1	R	R
		c) Labour	sum	1	R	R
3.4.6		Supply, deliver, store, install, terminate and test flow protection and monitoring system.				

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		a) Ultrasonic strap on with continuous measuring capability or flow measuring elements	each	12	R	R
		b) flow transmitters with 20m compatible cable	each	12	R	R
		c) Junction box with fused 20 terminals	each	2	R	R
		d) Labour	sum	1	R	R
<b>SUBTOTAL PART 3: -CARRIED FORWARD TO SUMMARY PAGE</b>						<b>R</b>

ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
4		<b>PART 4: HVAC SYSTEM</b>				
4.1		Demolishing part of the walls for the 2mx4m louveres, air inlet plenum, 1.5m diameter fans, 5mx05m grilles (Groenkloof PS & Howick West PS)				
		a) Labour	sum	1	R	R
4.2	6.6	Supply, deliver, store and install louveres, 2 times 2mx4m and 2mx1.5m rectangular meshed louveres (Groenkloof PS & Howick West PS)				
		a) Material	sum	1	R	R
		b) Labour	sum	1	R	R
4.3	6.6	Design the HVAC system and submit 3D drawings for the duct system, showing ducts, fittings, fans, air intake plenum, and joints. Assembly drawings, part drawings and exploded view (Groenkloof PS & Howick West PS).				
		a) Labour	sum	1	R	R
4.4	6.6	Supply and deliver 2mx1.3m, 1.8mx1.1m, 1.6x0.9m rectangular cross section galvanised steel duct (fiberglass lined) and all round galvanised steel ducts (fiberglass lined). Including the hangers, mountings and vibration isolators (Groenkloof PS & Howick West PS).				
		a) Material	sum	1	R	R
		b) Labour	sum	1	R	R
4.5	6.6	Supply, deliver and install diffusers with flow volume control dampers, to the ducts (Groenkloof PS & Howick West PS).				

		a) Material	sum	20	R	R
		b) Labour	sum	1	R	R
4.6	6.6	Supply, deliver and install acoustic sound silencer to the suction and discharge side of the fans ducts to restrict sound to within Municipality by-laws (Groenkloof PS & Howick West PS).				
		a) Material	sum	1	R	R
		b) Labour	sum	1	R	R
<b>SUBTOTAL - CARRIED FORWARD</b>						R
ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
<b>SUBTOTAL - BROUGHT FORWARD</b>						R
4.7	6.6	Supply and deliver centrifugal Fans and axial fans. Including the hangers, mountings and vibration isolators (Groenkloof PS & Howick West PS).				
		a) Material (centrifugal fan)	each	6	R	R
		b) Material (axial fan)	each	6	R	R
		c) Material (hangers, mountings, vibration isolators and related accessories for mounting of fans)	sum	1	R	R
		d) Labour	sum	1	R	R
4.8	6.6	Supply, deliver, store and install panel filters (2mx1.3m) for Groenkloof PS & Howick West PS.				
		a) Material	each	8	R	R
		b) Labour	sum	1	R	R
4.9	6.6	Supply, deliver, store and install flexible connectors for fans discharge side (Groenkloof PS & Howick West PS).				
		a) Material	sum	1	R	R
		b) Labour	sum	1	R	R

4.10	6.6	Supply, deliver, store and install fire and smoke dampers (Groenkloof PS & Howick West PS).				
		a) Material	each	12	R	R
		b) Labour	sum	1	R	R
4.11	6.6	Supply and deliver all air seal at the joints and the mastic seal, including rivets for the joints and wall mounting (Groenkloof PS & Howick West PS)				
		a) Material	sum	1	R	R
		b) Labour	sum	1	R	R
<b>SUBTOTAL - CARRIED FORWARD</b>						<b>R</b>
<b>ITEM No</b>	<b>PAYMENT REF</b>	<b>DESCRIPTION</b>	<b>UNIT</b>	<b>QTY</b>	<b>RATE</b>	<b>AMOUNT R-C</b>
<b>SUBTOTAL - BROUGHT FORWARD</b>						<b>R</b>
4.12	6.6	Supply, deliver, store and install automated differential pressure gauge sensors (Groenkloof PS & Howick West PS).				
		a) Material	each	12	R	R
		b) Labour	sum	1	R	R
4.13	6.6	Supply, deliver, store and install temperature sensors (Groenkloof PS & Howick West PS).				
		a) Material	each	12	R	R
		b) Labour	sum	1	R	R
4.14	6.6	Supply, deliver, store and install extraction fans in the pump room. Extend wall outwards the room with PVC material (1.5diameter) – Groenkloof PS & Howick West PS				
		a) Material (1.75kW extraction fan)	each	6	R	R
		b) Material (1.5 diameter PVC duct extending outside)	sum	1	R	R
		c) Labour	sum	1	R	R

4.15	6.6	Supply, deliver, store and install pump room meshed grilles (5x0.5m) – Groenkloof PS & Howick West PS.				
		a) Material	sum	1	R	R
		b) Labour	sum	1	R	R
4.16	6.6	Assembly and install the ducts, duct joints, fans, air intake plenum, wall mounting and hangers, pressure and temperature sensors, sound silencers (Groenkloof PS & Howick West PS).				
		a) Tools	sum	1	R	R
		b) Labour	sum	1	R	R
<b>SUBTOTAL - CARRIED FORWARD</b>						<b>R</b>
<b>ITEM No</b>	<b>PAYMENT REF</b>	<b>DESCRIPTION</b>	<b>UNIT</b>	<b>QTY</b>	<b>RATE</b>	<b>AMOUNT R-C</b>
<b>SUBTOTAL - BROUGHT FORWARD</b>						<b>R</b>
4.17	6.6	Supply, deliver and install meshed grilles (3mx0.5m) at the switch room, main MV switch room, MV switch room, LV switch room and control room – Groenkloof PS & Howick West PS.				
		a) Material	sum	1	R	R
		b) Labour	sum	1	R	R
4.18		Supply, deliver and install cables (4mm <sup>2</sup> , 3core, SWA, 300m) with cable trays/pipe for the supply air fans and extraction fans – Groenkloof PS & Howick West PS.				
		a) Material (4mm <sup>2</sup> , 3core, SWA)	m	400	R	R
		b) Material (cable trays)	sum	1	R	R
		c) Labour	sum	1	R	R
4.19		Rehabilitate existing ventilations existing fans, clean the filters and the concrete duct				
		a) Material	sum	1	R	R

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		c) Labour	sum	1	R	R
<b>SUBTOTAL PART 4: - CARRIED FORWARD TO SUMMARY PAGE</b>						<b>R</b>

**SUMMARY OF BILL OF QUANTITIES**

<b>PART</b>	<b>DESCRIPTION</b>	<b>AMOUNT R-C</b>
PART 1	PRELIMINARY AND GENERAL	R
PART 2	HIGH LIFT SYSTEM	R
PART 3	LV ELECTRICAL SYSTEM	R
PART 4	HVAC SYSTEM	R
<b>A – Sub-Total for all Items excluding VAT</b>		R
<b>B – Contingency(10% of A)</b>		R
<b>C – Sub-Total (A plus B)</b>		R
<b>D - Escalation @ 10% of C</b>		R
<b>E - Sub-Total (C plus D)</b>		R
<b>F - VAT @ 15% of E</b>		R
<b>G – Total Contract Price per annum including VAT (D+E)</b>		
<b>Total including VAT for total period of Contract</b> <i>carried forward to C1.1 ( Form of Offer).</i>		R

## **PART C3: SCOPE OF WORK**

### **1. Purchaser's objectives**

Umgeni Water (UW) requires a Contractor to supply, deliver, store, install, test, commission and handover air-cooled MV motors, Low Voltage system and HVAC for Groenkloof Pump Station.

### **2. Description of the Supply**

#### **2.1. Decommissioning of MV motors and LV systems**

- 2.1.1. Water-cooled High Lifts MV motors (580 kW) and the water cooling system.
- 2.1.2. Low Lifts motors (160 kW) and supply cables.
- 2.1.3. MCC, Telemetry system, field devices and related accessories.
- 2.1.4. Transport decommissioned equipment and materials to Midmar Workshop

#### **2.2. High Lifts System**

- 2.2.1. Supply, deliver, store, install, test and commission three air-cooled 580kW, 3300V, 1500 RPM (4 pole) motors with built-in external fans as specified in the technical specifications to drive the existing WL00/7 pumps.
- 2.2.2. Carry out plinth modifications to ensure the new High Lift motors are aligned with the existing pumps.

#### **2.3. Low Lifts System**

- 2.3.1. Supply, deliver, store, install, test and commission three VSD driven air-cooled 200 kW motors to drive the existing WKLN 150/3 pumps. Ensure the cable termination box is on the same side and height as the existing motor.
- 2.3.2. Carry out plinth modifications to ensure the new Low Lift motors are aligned with the existing pumps.

#### **2.4. Low Voltage System**

- 2.4.1. Supply, deliver, store, install, test and commission a Motor Control Centre (MCC) as specified in the technical specification. The 200 kW VSDs can be wall-mounted or installed inside the MCC.
- 2.4.2. Supply, deliver, store, install, test, program, and commission a Panel PC with Adroit SCADA System for the control and monitoring of both the High Lifts and Low Lifts Pump Stations.
- 2.4.3. Supply, deliver, store, install, test, program and commission a Telemetry System for the control and monitoring of both the High Lifts and Low Lifts Pump Stations.
- 2.4.4. Supply, deliver, store, install, test and commission insertion meters or strap ultrasonic flow meters with related cabling. The flow meters are to be installed at the inlet and outlet of each pump. The flow meters are to be terminated at the Telemetry System.
- 2.4.5. Supply, deliver, store, install, test and commission pressure transmitters. The pressure transmitters are to be installed at the inlet and outlet of the pumps. The flow meters are to be terminated at the Telemetry System.
- 2.4.6. Supply, deliver, store, install, test, program and commission vibration control and monitoring system. The vibration sensors are to be installed at the drive end and non-drive end of both the pump and motor. The vibration control system is to be integrated into the Telemetry and SCADA system.
- 2.4.7. Replace both MCC doors with steel doors.

#### **2.5. Cabling**

- 2.5.1. Supply, deliver, store, install, test and commission 200kW motor supply cables.
- 2.5.2. Supply, deliver, store, install, test and commission control voltage cables.
- 2.5.3. Supply, deliver, store, install, test and commission HVAC system cables.
- 2.5.4. Supply, deliver, store, install, test and commission instrumentation cables.

#### **2.6. HVAC system**

- 2.6.1. Supply, deliver, store, install, test and commission Groenklood PS HVAC system.
- 2.6.2. Supply, deliver, store, install, test and commission Howick West PS HVAC system.

#### **2.7. Project Closeout**

- 2.7.1. O&M Manuals as per UW specification
- 2.7.2. Project Handover
- 2.7.3. Project Closeout

### 3. Extent of the Supply

The supply involves removal of water-cooled MV motors, LV motors, MCC and LV system; installation of new air-cooled MV motors, 200kW, MCC and LV systems.

The key deliverables are as follows:

- Fit for purpose air-cooled High Lifts MV motors.
- Fit for purpose air-cooled Low Lifts LV motors.
- Simple and easy available Telemetry system.
- Fit for purpose MCC and LV system.
- Fit for purpose HVAC systems that meets Municipality by-laws.

The battery limits and exclusions:

- MV Switchgear is not part of the scope
- The Contractor is to integrate the new installation with existing information.
- The Contractor is to develop a Control Philosophy based on the existing control.
- The Contractor is to develop a Functional Design Specifications as per UW standard.

### 4. Use of reasonable skill and care

- The Contractor is to provide competent personnel for the installation of MV and LV motors.
- The MV motor protection relays to be programmed by a competent Protection specialists.
- HVAC system to adhere to Municipality by-laws.
- LV system to be installed by the competent personnel.
- Programming of VSDs to be done by the OEM or approved OEM installer or agent.

### 5. Co-operation with other Supply providers

This is a multi-disciplinary project and some components will be done by the Contractor appointed sub-contractors and CPGs. The Main Contractor is to have agreements or contracts in place for all their Sub-contractors and CPGs.

## 6. PROJECT TECHNICAL SPECIFICATIONS

### 6.1. Disposal

The materials / assets to be removed are as follows:

- 580 kW water-cooled motors. The motors have reached its end of life. (One motor to be used at Mkondeni Workshop COC for training purposes, and the two motors can be discarded)
- Water cooling system (redundant and to be discarded)
- 160 kW air-cooled motors (One motor to be used at Mkondeni Workshop COC for training purposes, two motors to be stored at Midmar WW Workshop.
- Cabling (To be transported to Midmar WW Workshop.
- MCC with soft-starters (To be discarded – redundant spare parts)
- Display panels with push-buttons (To be discarded – redundant spare parts)
- Telemetry System (To be transported to Midmar WW)
- MCC wooden doors (To be discarded as per the Contractor Environmental Management system)
- Concrete materials (To be discarded as per the Contractor Environmental Management system)

### 6.2. Training



### 6.2.1. PLC, RTU and HMI

The PLC training shall be between intermediate and expert level. The training shall be tailor made for the PLC and related software and program for the Groenkloof Pump Station. The theory part shall be the standard OEM offering, and the practical side shall be tailor-made for the system. The training shall be divided into two sessions, each session shall consists of 6 Technicians/Artisans.

The training shall include but not limited to the following:

- PLC/RTU, HMI Hardware & Software Overview
- Hardware, Inputs, Outputs & External Devices
- Software Fundamentals, Programming Techniques
- Ladder Logic, Function Blocks, Statement List and Structured Text
- Ladder Logic Concepts and Best Practices
- Troubleshooting, Emulation, Hardware & Software Considerations
- Alarms, Notifications, Faults & Proper Handling
- Project (Groenkloof Pump Station system)
- On-job training

### 6.2.2. Variable Speed Drive

The VSD training shall be between intermediate and expert level. The training shall be tailor made for the VSD and related software and program for the Groenkloof Pump Station. The theory part shall be the standard OEM offering, and the practical side shall be tailor-made for the system. The training shall be divided into two sessions, each session shall consists of 6 Technicians/Artisans.

The training shall include but not limited to the following:

- Theory of rectifiers, capacitors, and inverters.
- Hardware & Software Overview
- Software Fundamentals and Programming Techniques
- Troubleshooting and faultfinding
- Alarms, Notifications, Faults & Proper Handling
- Critical spares
- Maintenance
- On-job training

### 6.2.3. System Training

The Contractor is to provide the whole system training for the Artisans/Technicians and Operating staff. The training shall be based on the following:

- Operating of the Groenkloof Pump Station based on the new PLC codes.
- Introduction of the new installed equipment (PLC, VSDs, HVAC system, Motors, etc.)

- Maintenance for the installed equipment
- Safety and process interlocks
- Process sequence for starting the system.

The training shall be divided into two parts:

- Operating staff (two sessions)
- Maintenance staff (two sessions)

Each session shall be 5 days (two days theory & three days on-job training/practical). There shall be 4 sessions in total.

### 6.3. Testing and Commissioning

See attached Commissioning Procedure.

### 6.4. High Lifts System

#### 6.4.1. High Lifts Motors

There are three 580 kW motors driving KSB - WL00/7 pumps. They are configured in a two duty / one standby.

The medium voltage three-phase air-cooled induction motors – squirrel cage rotor shall be designed and manufactured in accordance to the following standards and any other relevant standards not mentioned below:

- SANS 60034-1: Specification
- SANS 60034-2: Test
- SANS 60034-9: Noise
- SANS 60034-14: Vibration
- SANS 60034-1: Tolerance
- BS 4999-141: 2004 General requirements for rotating electrical machines Part 10: Standard dimensions.
- BS 50347: 2001 Rotating electrical machines of particular types or for particular applications Part 10: General purpose induction motors.
- SANS 3743 – 1, 2: 1994: Determination of sound power levels of noise sources Part 1 and Part 2.
- SANS 10108: 2005

The motors are to be designed as per UW Specifications and the above standards. The new motors are to be able to drive the existing pumps.

Motor Name Plate			
Poles	4	Duty cycle	S1
Volts (v)	3.3KV	Cooling IC	IC611
Hz	50	Insulation class	H
Amps (A)	120.9	Mounting IM	B3L
kW	580	Frame	400
Cos Ø	0.87	Bearings D.E/N.D.E	6224 C3/ 6222 C3
r/min	1486	Lubrication interval D.E/N.D.E)	4500 h / 4500 h
Vibration	2.3mm/s rms	Grease Qty D.E/N.D.E)	45g /40g

Noise Level	84 dB (A)	Lubricant( D.E/N.D.E)	POLYREX EM 103
Protection IP	55	Starting method	Frequency inverter
Temperature rise		Altitude	±1094 m

**Table 1: Main Air-cooled Motor**

MV THREE PHASE MOTOR – SQUIRREL CAGE ROTOR DATASHEET				
Technical				
Description	Designer		Tenderer	
Make	As per manufacture			
Model	As per manufacture			
Frame size				
Output Power	580 kW			
Frequency	50 Hz			
Poles	4			
Rated Speed	1500 RPM			
Slip	0.8%			
Rated Voltage	3.3 kV			
Connection	Star			
Rated Current	As per manufacturer			
Rotor Voltage	As per manufacturer			
Rotor Current	As per manufacturer			
Locked Rotor Current	As per manufacturer			
LRC (p.u)	As per manufacturer			
kVA/kW	As per manufacturer			
No Load Current	As per manufacturer			
Rated Torque	As per manufacturer			
Locked Rotor Torque	40%			
Breakdown Torque	140%			
Insulation Class	H			
Efficiency	IE3 (Premium Efficiency)			
Service Factor	1.00			
Locked Rotor Time	25 s			
Duty Cycle	S1			
Bearings D.E & N.D.E	As per manufacturer			
Lubrication interval (D.E & N.D.E)	As per manufacturer			
Grease Quantity (D.E & N.D.E)	As per manufacturer			
Lubricant (D.E & N.D.E)	As per manufacturer			
Ambient Temperature	45°C			
Altitude	Inland			
Protection Degree	IP55			
Cooling	IC611			
Mounting	B3L (Foot mounted)			
Vibration	A 2.3 mm/s rms			
Moment of Inertia	As per manufacturer			
Noise Level	As per manufacturer			
Direction of rotation	BOTH			
Starting method	Direct & VSD			
Coupling	DIRECT			
Performance Data				
Output	50%	75%	100%	
Efficiency (%)	95.9	96.1	96	
Cos Φ	0.87	0.87	0.87	
Load Data				
Load Type	Centrifugal Pump			
Resistant Torque	J(J=GD²/4)			
Notes/Accessories				

Stray Load Losses	0.5% of Input Power	
The Motor is suitable for 3 COLD starting or 2 HOT starting per hour	Both	
Heating Constant	79 MIN	
Cooling Constant	393 MIN	
Noise level measured at 1m from the extremes of the machine considering the shaft end and terminal box	As per manufacturer	
Torque and current vs Speed curve at CM-16412/2014	As per manufacturer	
Thermal Limit Curve at CM-17619/2014	As per manufacturer	
Performance vs Output Curve at CM-17620/2014	As per manufacturer	
Equivalent Circuit at CM-17621/2014	As per manufacturer	
Suitable to operate the machine continuously with power of 110% with Class B temperature rise at ambient of 40°C or temperature rise of 85°C at ambient of 45°C.		
Customer Name	Umgenei Water	
Project Name	Groenkloof Pump Station	

#### 6.4.2. Motor Protection Relay

The motor protection relay shall have a modular design and be optimized for MV motor applications. The main characteristic of the relay are as follows:

- Motor and feeder protection functions
- Optional interface for connecting arc flash point sensors
- Optional high speed arc flash communication system and configuration
- 128 x 128 LCD matrix detachable
- Power quality measurements
- Disturbance recorder with capabilities to capture transients
- Communication protocols (Modbus TCP/IP, IEC61850 & Profibus)
- Power supply
- Earth fault overcurrent input sensitivity
- Digital inputs
- Trip contacts
- Integrated arc point sensors
- High-speed outputs communication interface
- Simple arc flash system communications interface
- Fiber loop communication interface
- Front panel protection of IP54
- Cybersecurity properties

PROTECTION RELAY FOR MOTOR & FEEDER APPLICATIONS		
Technical		
Description	Designer	Tenderer
Make	As per manufacture	
Model	As per manufacture	
Application	Feeder and Motor protection relay	
Supply Voltage	110 – 240 V ac/dc 6 x DO 1 change over signal duty 5 tripping duty	
I/O Card 1	6DI 4DO	
I/O Card 2	10DI	
I/O Card 3	10DI	
I/O Card 4	10DI	
I/O Card 5	4 Arc flash sensor	
Analog measurement card	As per manufacturer	
Communication Interface	As per manufacturer	
Display type	128 x 128 matrix detachable	
DI nominal voltage	110 V dc with conformal coating	
Digital Inputs	As per manufacturer	
Trip contacts	As per manufacturer	
Alarm contacts	As per manufacturer	
Self-supervision contacts	As per manufacturer	
Phase currents (5A/1A)	As per manufacturer	
Voltage channels	As per manufacturer	
(5/1A + 1/0.2A)	As per manufacturer	
MEASUREMENT SPECIFICATION		
RMS Phase Current	Range: 0.025 - 50 x I <sub>n</sub> Inaccuracy: I ≤ 1.5 x I <sub>n</sub> : ±0.5% of value or ±15 mA I > 1.5 x I <sub>n</sub> : ±3% of value	
RMS earth fault overcurrent	Range: 0.003 - 10 x I <sub>n</sub> Inaccuracy: I ≤ 1.5 x I <sub>n</sub> : ±0.3% of value or ± 0.2% of IDN I > 1.5 x I <sub>n</sub> : ±3% of value	
RMS line-to-line voltage	Range: 0.005 – 1.7 x U <sub>n</sub> Inaccuracy: ±0.5% or ± 0.3V	
RMS phase-to-neutral voltage	Range: 0.005 – 1.7 x U <sub>n</sub> Inaccuracy: ±0.5% or ± 0.3V	
RMS active power (PF>0.5)	Range: ±0.1 – 1.5 x P <sub>n</sub> Inaccuracy: ±1% of range (0.3-1.5xP <sub>n</sub> ) ; ±3% for range (0.1-0.3xP <sub>n</sub> )	
RMS reactive power (PF>0.5)	Range: ±0.1 – 1.5 x Q <sub>n</sub> Inaccuracy: ±1% of range (0.3-1.5xQ <sub>n</sub> ) ; ±3% for range (0.1-0.3xQ <sub>n</sub> )	
RMS apparent power (PF>0.5)	Range: ±0.1 – 1.5 x S <sub>n</sub> Inaccuracy: ±1% of range (0.3-1.5xS <sub>n</sub> ) ; ±3% for range (0.1-0.3xS <sub>n</sub> )	
Frequency	16Hz – 75Hz	
Fundamental frequency current values	Range: 0.025 – 50 x I <sub>n</sub> Inaccuracy: As per manufacturer	
Fundamental frequency voltage values	Range: 0.005 – 1.7 x U <sub>n</sub> Inaccuracy: As per manufacturer	
Fundamental frequency active, reactive and apparent power values	Range: ±1 – 1.5 x P <sub>n</sub> Inaccuracy: As per manufacturer	
Power factor	Range: 0.03– 1 Inaccuracy: As per manufacturer	
Active energy	Inaccuracy: As per manufacturer	
Reactive energy	Inaccuracy: As per manufacturer	
Energy transmitted with pulse outputs	Inaccuracy: As per manufacturer	

Demand values: phase currents	Range: 0.025 – 50 x In Inaccuracy: As per manufacturer	
Active power and demand	Range: $\pm 0.1 - 1.5 \times P_n$ Inaccuracy: As per manufacturer	
Reactive power demand	Range: $\pm 0.1 - 1.5 \times Q_n$ Inaccuracy: As per manufacturer	
Apparent power demand	Range: $\pm 0.1 - 1.5 \times S_n$ Inaccuracy: As per manufacturer	
Power factor demand	Inaccuracy: As per manufacturer	
Min. and max. demand values: phase currents	Range: 0.025 – 50 x In Inaccuracy: As per manufacturer	
Min. and max. demand values: RMS phase currents	Range: 0.025 – 50 x In Inaccuracy: As per manufacturer	
Min. and max. demand values: active, reactive, apparent power and power factor	Inaccuracy: As per manufacturer	
Maximum demand values over the last 31 days and 12 months: active, reactive, apparent power	Inaccuracy: As per manufacturer	
Minimum demand values over the last 31 days and 12 months: active, reactive power	Inaccuracy: As per manufacturer	
Max. and min. values: currents	Range: 0.025 – 50 x In Inaccuracy: As per manufacturer	
Max. and min. values: voltages	Range: 0.005 – 1.7 x Un Inaccuracy: As per manufacturer	
Max. and min. values: frequency	Range: 16 Hz – 75 Hz Inaccuracy: As per manufacturer	
Max. and min. values: active, reactive, apparent power and power factor	Range: $\pm 0.1 - 1.5 \times P_n, Q_n, S_n$ Inaccuracy: As per manufacturer	
Harmonic values of phase current and THD	Range: 2nd- 15th Inaccuracy: As per manufacturer	
Harmonic values of voltage and THD	Range: 2nd- 15th Inaccuracy: As per manufacturer	
Voltage sags and swells	Range: 0.005 – 1.7 x Un Inaccuracy: As per manufacturer	
RMS phase current	Range: 0.05 – 45 x In Inaccuracy: As per manufacturer	
RMS earth fault overcurrent	Range: 0.003– 10 x In Inaccuracy: As per manufacturer	
RMS phase-to-neutral voltage	Range: 0.05 – 2.08 x Un Inaccuracy: As per manufacturer	
RMS active power (PF>0.5)	Range: 0.005 – 1.7 x Un Inaccuracy: As per manufacturer	
RMS reactive power (PF>0.5)	Range: $\pm 0.1 - 1.5 \times Q_n$ Inaccuracy: As per manufacturer	
Frequency	Range: 45 Hz – 65 Hz Inaccuracy: As per manufacturer	
Fundamental frequency current values	Range: 0.05 – 45 x In Inaccuracy: As per manufacturer	
Fundamental frequency voltage values	Range: 0.05 – 2.08 x In Inaccuracy: As per manufacturer	
Fundamental frequency active power values	Range: $\pm 0.1 - 1.5 \times P_n$ Inaccuracy: As per manufacturer	
Fundamental frequency reactive power values	Range: $\pm 0.1 - 1.5 \times Q_n$ Inaccuracy: As per manufacturer	
Fundamental frequency apparent power values	Range: $\pm 0.1 - 1.5 \times S_n$ Inaccuracy: As per manufacturer	
Power factor	Range: 0.02 – 1 Inaccuracy: As per manufacturer	
Active energy	Inaccuracy: As per manufacturer	
Reactive energy	Inaccuracy: As per manufacturer	
Energy transmitted with pulse outputs	Inaccuracy: As per manufacturer	
Demand values: phase currents	Range: 0.05 – 45 x In Inaccuracy: As per manufacturer	
Active power demand	Range: $\pm 0.1 - 1.5 \times P_n$ Inaccuracy: As per manufacturer	
Reactive power demand	Range: $\pm 0.1 - 1.5 \times Q_n$	

	Inaccuracy: As per manufacturer	
Apparent power demand	Range: $\pm 0.1 - 1.5 \times S_n$ Inaccuracy: As per manufacturer	
Power factor demand	Inaccuracy: As per manufacturer	
Min. and max. demand values: phase currents	Range: $0.05 - 45 \times I_n$ Inaccuracy: As per manufacturer	
Min. and max. demand values: RMS phase currents	Range: $0.05 - 45 \times I_n$ Inaccuracy: As per manufacturer	
Min. and max. demand values: active, reactive, apparent power and power factor	Inaccuracy: As per manufacturer	
Maximum demand values over the last 31 days and 12 months: active, reactive power	Inaccuracy: As per manufacturer	
Minimum demand values over the last 31 days and 12 months: active, reactive power	Inaccuracy: As per manufacturer	
Max. and min. values: voltages	Range: $0.05 - 45 \times U_n$ Inaccuracy: As per manufacturer	
Max. and min. values: currents	Range: $0.05 - 2.08 \times U_n$ Inaccuracy: As per manufacturer	
Max. and min. values: frequency	Range: 45 Hz – 65 Hz Inaccuracy: As per manufacturer	
Max. and min. values: active, reactive, apparent power and power factor	Range: $\pm 0.1 - 1.5 \times P_n, Q_n, S_n$ Inaccuracy: As per manufacturer	
Harmonic values of phase current and THD	Range: 2nd- 15th Inaccuracy: As per manufacturer	
Harmonic values of voltage and THD	Range: 2nd- 15th Inaccuracy: As per manufacturer	
Voltage sags and swells	Range: $0.05 - 2.08 \times U_n$ Inaccuracy: As per manufacturer	
Customer Name	Umgani Water	
Project Name	Groenkloof Pump Station	

#### 6.4.3. Cooling motor

- When main motor starts, cooling motor shall start
- When cooling motor is faulty, main motor shall stop or vice versa
- When cooling motor fails to start, main motor shall stop or vice versa

Internal cooling motor shall meet or exceed the following ratings:

Internal cooling ratings			
Poles	6	Duty cycle	S1
Volts (v)	400	Cooling method	IC411 - TEFC
Hz	50	Insulation class	F
Amps (A)	4	slip	7%
kW	1.5	Moment of inertia	$0.0156 \text{ kgm}^2$
Frame	100L	Bearings D.E/N.D.E	6206-ZZ/6205 ZZ
r/min	930	Ambient temperature	-15 °C to +40 °C
Noise Level	44 dB (A)	Lubricant type ( D.E/N.D.E)	As per manufacturer
Protection IP	55	Starting method	Direct online
Mounting	B5R (E)	Altitude	$\pm 1094 \text{ m}$

Table 2: Internal air circulation motor

#### 6.4.4. MV Motor Plinth modification

Contractor should make sure that Plinth modification includes concrete and steel stand. Strength of material should be such that air-cooled 580KW load is adequate. Modification should be such that motor fits properly and prevents any vibrations.

## 6.5. Low Lifts System

### 6.5.1. Motor Control Centre

The contractor shall design, manufacture, supply, deliver to site, install and commission a new electrical panel. The new electrical panel shall be manufactured in accordance with the requirements of the following particular specifications: Umgeni Water Technical Specification for Electrical Installation. The electrical panel shall cater for all the Sections with their components and accessories.

#### 6.5.1.1. Electrical Panel Technical Specifications

Provide the following 400/230V Low VOLTAGE electrical panel:

Location: Groenkloof Pump Station – MCC Room

Layout: Floor standing with extended base plate to allow for bottom cable entry, front and rear access, top cable entry

Voltage : 400/230V

Colour : B26 electrical orange

Enclosure : IP66 Weatherproof

Metal work : 3Cr12 stain less steel

Upon Approval of the drawings, the contractor shall fabricate and prepare new base plates and doors as follows:

- These Cubicles shall be fitted with MCB using either Schneider, ABB, Siemens or Rockwell components.
- Enclosure equipped with plain double doors protected by one or two locking systems operated by a square tool. The single doors enclose Section doors.
- Door easily dismountable and opening of 120° - 180° (for enclosure with open canopy and base). Door seal made by polyurethane gasket and locking outside the sealed zone.
- Cubicles shall be fitted with VSD as specified in VSD specification
- Low lift motors shall operate both local and remotely. On manual, the cooling motors shall be operated by start and stop push buttons. On auto, the starting and stopping shall be controlled by telemetry signal.
- All cubicle shall be wired in accordance with UW standard for Low voltage wiring.

The single line diagram (SLD) for the Low Lift MCC shall consist of the following:

- Tier 1
  - Main Incomer Cubicle
  - Metering cubicle (Power Quality Meter)
- Tier 2
  - 300mm cable termination cubicle
- Tier 3
  - Low Lift Pump 1 (VSD)
  - Motor cooling fan 1
- Tier 4



- Low Lift Pump 2 (VSD)
- Motor cooling fan 2
- Tier 5
  - 300mm cable termination cubicle
- Tier 6
  - Low Lift Pump 3 (VSD)
  - Motor cooling fan 3
- Cubicle 5
  - Local DB
  - HVAC motor 1
  - HVAC motor 2

The contractor can make any configuration that will suit their proposed MCC and fit into the MCC room.

## 6.5.2. Low Lift Motor

### 6.5.2.1. Induction motor

Motors shall be designed and manufactured in accordance with SANS 60034-1 to 11 and also compliant to the following;

- BS 4999-141:2004 General requirements for rotating electrical machines
- Part 10: Standard dimensions.
- BS 50347:2001 Rotating electrical machines of particular types or for particular applications. Part 10: General-purpose induction motors.
- SANS 3743-1,2: 1994 Determination of sound power levels of noise sources Part 1 and Part 2
- SANS 10108 :2005
- Umgeni Water Specification

200 kW THREE PHASE MOTOR – SQUIRREL CAGE DATASHEET		
Technical for High Efficiency		
Description	Designer	Tenderer
Make	As per manufacture	
Model	As per manufacture	
Frame size	315S/M	
Output Power	200 kW	
Frequency	50 Hz	
Poles	4	
Rated Speed	1500 RPM	
Slip	0.8%	
Rated Voltage	400 V	
Connection	Star	
Rated Current	As per manufacturer	
Rotor Voltage	As per manufacturer	
Rotor Current	As per manufacturer	
Locked Rotor Current	As per manufacturer	
LRC (p.u)	As per manufacturer	
kVA/kW	As per manufacturer	
No Load Current	As per manufacturer	
Rated Torque	As per manufacturer	
Locked Rotor Torque	40%	
Breakdown Torque	140%	

Insulation Class	H	
Efficiency	IE3 (Premium Efficiency)	
Service Factor	1.00	
Locked Rotor Time	25 s	
Duty Cycle	S1	
Bearings D.E & N.D.E	As per manufacturer	
Lubrication interval (D.E & N.D.E)	As per manufacturer	
Grease Quantity (D.E & N.D.E)	As per manufacturer	
Lubricant (D.E & N.D.E)	As per manufacturer	
Ambient Temperature	45°C	
Altitude	Inland	
Protection Degree	IP55	
Cooling	IC611	
Mounting	B3 (Foot mounted)	
Vibration	A 2.3 mm/s rms	
Moment of Inertia	As per manufacturer	
Noise Level	As per manufacturer	
Direction of rotation	BOTH	
Starting method	VSD	
Coupling	DIRECT	
Performance Data		
Output	50% 75% 100%	
Efficiency (%)	95.9 96.1 96	
Cos Φ	0.87 0.87 0.87	
Load Data		
Load Type	Centrifugal Pump	
Resistant Torque	$J(J=GD^2/4)$	
Notes/Accessories		
Stray Load Losses	0.5% of Input Power	
The Motor is suitable for 3 COLD starting or 2 HOT starting per hour	Both	
Heating Constant		
Cooling Constant		
Noise level measured at 1m from the extremes of the machine considering the shaft end and terminal box	As per manufacturer	
Torque and current vs Speed curve at CM-16412/2014	As per manufacturer	
Thermal Limit Curve at CM-17619/2014	As per manufacturer	
Performance vs Output Curve at CM-17620/2014	As per manufacturer	
Equivalent Circuit at CM-17621/2014	As per manufacturer	
Suitable to operate the machine continuously with power of 110% with Class B temperature rise at ambient of 40°C or temperature rise of 85°C at ambient of 45°C.		
Customer Name	Umgenti Water	
Project Name	Groenkloof Pump Station – Low Lifts	

### 6.5.3. Low Lift Motor VSD

All three VSD's shall be mounted on the wall behind the LV panels in the LV room. The bottom part of the VSD shall be higher than a meter above ground allowing for a good bending radius and on the cable.

VSD's shall be mounted at least 500mm apart.

VSD's shall be supplied with a solid glanding plate which shall support glanding 4x 95mm<sup>2</sup> ECC cables.

The Contractor shall supply new fuse holders fitted with 710A- fast blowing fuses or CB for VSD's

Fuse holders / CB shall be fitted with door handles with mechanical interlocking mechanism which can be over-riden by the use of tool or pin. The Contractor shall ensure that the handle shaft is well aligned making ease to close and open the door.

The Contractor shall supply and fit a blanking plate on panel doors, to make neat clean finish on the installation.

Umgeni Water Specification shall be used for the manufacturer, supply and installation.

CONT ROL	METHOD	Voltage source Type of control: - V/f (Scalar); - VVW: Voltage Vector Control; - Vector control with encoder; - Sensor less vector control (without encoder). PWM SVM (Space Vector Modulation); Full digital (software) current, flux, and speed regulators. Execution rate: - current regulators: 0.2 ms (5 kHz) - flux regulator: 0.4 ms (2.5 kHz) - speed regulator / speed measurement: 1.2 ms
	OUTPUT FREQUE NCY	0 to 3.4 x rated motor frequency (P0403). The rated frequency is programmable from 0 Hz to 300 Hz in the scalar mode and from 30 Hz to 120 Hz in the vector mode.
PERFO RMAN CE	SPEED CONTR OL	<u>V/f (Scalar):</u> Regulation (with slip compensation): 1 % of the rated speed. Speed variation range: 1:20. <u>VVW:</u> Regulation: 1 % of the rated speed. Speed variation range: 1:30. <u>Sensor less:</u> Regulation: 0.5 % of the rated speed. Speed variation range: 1:100. <u>Vector with Encoder:</u> ±0.01 % of the rated speed with a 14-bits analogue input (IOA); ±0.01 % of the rated speed with a digital reference (Keypad, Serial, Fieldbus, Electronic Potentiometer, Multispeed); ±0.05 % of the rated speed with a 12-bits analogue input (CC11).
	TORQUE CONTROL	Range: 10 to 180 %, regulation: ±5 % of the rated torque (with encoder); Range: 20 to 180 %, regulation: ±10 % of the rated torque (Sensor less above 3 Hz).
INPUT S (CC11 board)	ANALOG	2 isolated differential inputs; resolution of AI1: 12 bits, resolution of AI2: 11bits + signal (0 to 10) V, (0 to 20) mA or (4 to 20) mA, Impedance: 400 kΩ for (0 to 10) V, 500 Ω for (0 to 20) mA or (4 to 20) mA, programmable functions.
	DIGITAL	6 isolated digital inputs, 24 Vdc, programmable functions.
OUTP UTS (CC11 board)	ANALOG	2 isolated analogue outputs, (0 to 10) V, $R_L \geq 10 \text{ k}\Omega$ (maximum load), 0 to 20 mA / 4 to 20 mA ( $R_L \leq 500 \Omega$ ) resolution: 11 bits, programmable functions.
	RELAY	3 relay outputs with NO/NC contacts, 240 Vac, 1 A, programmable functions.
SAFET Y	PROTECTION	Output overcurrent/short-circuit; Under / Overvoltage; Phase loss; Over temperature; Braking resistor overload; IGBTs overload; Motor overload;

		External fault / alarm; CPU or memory fault; Output phase-ground short-circuit.
INTEGRAL KEYPAD (HMI)  ENCLOSURE	STANDARD KEY PAD	9 operator keys: Start/Stop, Up Arrow, Down Arrow, Direction of Rotation, Jog, Local/Remote, Right Soft Key and Left Soft Key; Graphical LCD display; View/edition of parameters; Graphical LCD display; View/edition of parameters; Indication accuracy: - current: 5 % of the rated current;
	IP20	Indication accuracy: - current: 5 % of the rated current; - speed resolution: 1 rpm; Possibility of remote mounting. Models of frames A, B, and C without the top cover and conduit kit.
	NEMA1/IP20	Models of frame D without the IP21 kit.
	IP21	Models of frames A, B, and C with the top cover.
ENCLOSURE	NEMA1/IP21	Models of frames A, B, and C with the top cover and conduit kit; Models of frame D with the IP21 kit.
PC CONNECTION FOR INVERTER PROGRAMMING	USB CONNECTOR	USB standard Rev. 2.0 (basic speed); Type B (device) USB plug; Interconnection cable: standard host/device shielded USB cable.
SAFETY STANDARDS		UL 508C - Power conversion equipment. UL 840 - Insulation coordination including clearances and creepage distances for electrical equipment. EN61800-5-1 - Safety requirements electrical, thermal and energy. EN 50178 - Electronic equipment for use in power installations. EN 60204-1 - Safety of machinery. Electrical equipment of machines. Part 1: General requirements. <b>Note:</b> The final assembler of the machine is responsible for installing a safety stop device and a supply-disconnecting device. EN 60146 (IEC 146) - Semiconductor converters. EN 61800-2 - Adjustable speed electrical power drive systems - Part 2: General Requirements - Rating specifications for low voltage adjustable frequency AC power drive systems.

ELECTROMAGNETIC COMPATIBILITY (EMC)	<p>EN 61800-3 - Adjustable speed electrical power drive systems - Part 3: EMC product standard including specific test methods.</p> <p>EN 55011 - Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment.</p> <p>CISPR 11 - Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement.</p> <p>EN 61000-4-2 - Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 2: Electrostatic discharge immunity test.</p> <p>EN 61000-4-3 - Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 3: Radiated, radio frequency, electromagnetic field immunity test.</p> <p>EN 61000-4-4 - Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 4: Electrical fast transient/burst immunity test.</p> <p>EN 61000-4-5 - Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 5: Surge immunity test.</p> <p>EN 61000-4-6 - Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 6: Immunity to conducted disturbances, induced by radio-frequency fields.</p>
MECHANICAL STANDARDS	<p>EN 60529 - Degrees of protection provided by enclosures (IP code).</p> <p>UL 50 - Enclosures for electrical equipment.</p>

#### 6.5.4. UPS SYSTEM

##### 6.5.4.1. 30 kVA UPS

30kVA 3ph/3ph transformer isolated inverter (galvanic isolation) double conversion online UPS:

- Fitted with a 6 pulse thyristor-based rectifier,
- Progressive rectifier start up, with an option to reduce the battery charging current during start ups.
- fitted with SNMP card for network connection
- fitted with paralleling kit including cables card etc.
- over load capabilities; 110% for 60 minutes, 125% for 10 minutes and 150% for 1 minute
- Noise level 62 dBA at 1 meter
- Shall comply to either of the following standards;
  - SABS
  - European directives: L V 2014/35/EU low voltage Directive EMC 2014/30/EU electromagnetic compatibility Directive Standards: Safety IEC EN 62040-1; EMC IEC EN 62040-2; RoHS compliant
  - Classification in accordance with IEC 62040-3 (Voltage frequency Independent) VFI - SS – 111

##### 6.5.4.2. 30 kVA UPS BATTERIES

12V, 200AH Lithium based batteries are to be supplied inside a cabinet with a 6 hours backup time. The battery management system shall be deployed in each battery and in the system level master controller integrated with the UPS management system.

The battery management system shall managed the following:

- Charge current
- Voltage

- Cell voltage balance

The battery management system shall be able to control and eliminate over temperature. If the temperature rise above the safe level, the battery management system shall independently disconnect the battery or string via multiple different disconnection means.

The battery management system shall have sms functionality for notifying programmed numbers and also be able to integrate seamlessly with UW SCADA system (Adroit Technologies).

#### 6.5.4.3. 30 kVA UPS DB

The UPS DB shall consist of the following:

- 100 A circuit breaker with overload, short-circuit and overcurrent protection.
- 5 x 20 A circuit breakers
- 3 x 10 A circuit breakers
- Busbar rating = 150 A, 50Hz, 10kA, 400V
- 3 phase system with a neutral and earth busbars.
- For the paralleling of the new UPS and existing UPS, a synchronising relay must be provided.
- Power Quality Meter.

#### 6.5.5. Power Quality Meter

The power quality meter shall consist of a comprehensive energy management and power monitoring program that is equipped with algorithms for continuous waveform recording. The specification for the power quality meter is as follows:

Data Sheet		
Description	Engineers Requirements	Contractors
Voltage Sampling Rate, Maximum Samples/Cycle	1,024	
Voltage Harmonics (Individual, Even, Odd, Total) Up to –	511th	
Type of Analog to Digital Converter	16/201 bit	
Internal Memory	16 GB	
Transient Detection, Microseconds (50Hz/60Hz)	19.5/16.3µs	
Ethernet Ports	2	
Power Over Ethernet (PoE- Out)	1	
Voltage Ride Through on Power Loss (up to)	25 sec.	
Applicable Measurement Standards	EN50160, IEEE1159, IEEE519, IEC61000-4-15, IEC61000-4-7, IEC61000-4-30 Class A, IEC62053-22/23 Class 0.2	

Applicable EMC Standards	EN55011 Group 1 Class A, EN61000-6-2, IEC60255EN60439-1 (clauses 7.9.1, 7.9.3, 7.9.4, 7.10.3, 7.10.4),FCC Part 15 Subpart B Class A, IEC61000-3-3	
<b>Voltage Channels</b>		
Channels	3 Phase + Neutral	
Nominal Full Scale	1,000V	
Maximum Peak Measurement	8kV	
Input Impedance	3M $\Omega$	
Uncertainty	0.1% of Nominal	
<b>Current Channels</b>		
Channels	3 Phase + Neutral	
Nominal Full Scale	5A	
Maximum Peak Measurement	50A	
Burden	0.0001VA@5A	
Phase	$\pm 0.42^\circ$ @3A $\pm 0.17^\circ$ @5A	
Uncertainty	0.1% of Nominal	
<b>Frequency Measurement</b>		
Fundamental Frequency	42.5 Hz to 69 Hz	
Frequency Resolution	10 mHz	
Frequency Accuracy	$\pm 10$ mHz	
<b>Physical</b>		
Dimensions	175mm x 232mm x138mm	
Weight	1.7Kg	
<b>Power Supply</b>		
Operating Range	100-260 VAC: 50/60 Hz 100-300 VDC	
Auxiliary DC Supply	48 VDC	
Auxiliary Supply – PoE In	PoE In According to 802.3af	

<b>Time Synchronization</b>		
Real Time Clock	20ppm	
GPS	100-200µs	
IRIG B	100-200µs	
SNTP Server	50-100µs	
DCF-77	±15ms	
<b>Environmental Conditions</b>		
Operation Temperature	-20°C to 70°C (-4°F to 158°F)	
Storage Temperature	-40°C to 85°C (-40°F to 185°F)	

## 6.5.6. Instrumentation and Controls

### 6.5.6.1. Telemetry & PLC

PLC and Telemetry digital inputs and outputs should consist of the following:

- 6 starts digital outputs from telemetry panel to new electrical panel cubicles
- 6 stops digital output from telemetry panel to new electrical panel cubicles
- 6 digital inputs (run) from electrical panel to telemetry panel
- 6 digital inputs (stop) from electrical panel to telemetry panel
- 6 digital inputs (run) from electrical panel to telemetry panel
- Ethernet/IP cable from overload relays connected in daisy chain to telemetry
- CPU
- Power Supply
- Analog Inputs cards
- Analog output cards
- Digital inputs cards
- Analog outputs cards

#### 6.5.6.1.1. Remote Telemetry Unit

- Supply and install the smart RTU. The RTU shall communicate with the Online Condition Monitoring System installed at the pump station
- Configure the RTU to transmit real time data to the existing SCADA
- Configure the existing SCADA to receive data from the RTU

#### 6.5.6.1.2. Specification for RTU & PLC

- DNP3 Level 4
- IP based connectivity
- IEC 61131-3 programming languages
- Availability of local technical support
- Availability of recognized and accredited training



- RTU scalability
- Peer to Peer communication capability
- RTU digital repeating (Di-peating) capability or store and forward
- The controller must be able to receive information from other sites and retransmit the data to another site, using the same communications port. This should be integrated into the controllers routing configuration.
- RTU remote configuration and firmware updates capabilities.
- RTU certification/registration with DNP3.org device interoperability profiles detailing compliance and level of functionality must be supplied.

#### **6.5.6.1.3. Architecture**

- Processor: 32-bit dual core Cortex A9 microcontroller, 500MHz.
- Memory: 128MB NAND FLASH, 128MB DDR3 RAM
- Non-volatile RAM CMOS SRAM with lithium battery retains contents for 2years with no power.

#### **6.5.6.1.4. Database capacity**

- Up to 20 000 objects (this number decreases if the event pool is above 7000 events).

#### **6.5.6.1.5. Database Concentrator:**

- Up to 15000 objects depending on the type used (analog or digital)
- Up to 100 devices in DNP3 and up to 100 devices in Modbus

#### **6.5.6.1.6. File system storage**

Internal: as per manufacturer. For effective control and future deployment of algorithms  
External: 128 GB

#### **6.5.6.1.7. COMMUNICATIONS**

##### **Serial Ports: Serial1, Serial2**

- RS-232 port, 8pin modular RJ45, full or half duplex with RTS/8-8 pin modular RJ45 jack, full or half duplex with RTS/CTS control and operator interface power control, supports baud rates up to 15200 bps
- Rated to  $\pm 15\text{kV}$  (IEC 61000-4-2, air discharge) static protection

##### **Serial Ports: Serial3 and Serial4 configurable as:**

- Either RS-232 port, 8 pin modular RJ45 jack, full or half duplex, rated to  $\pm 15\text{kV}$  (IEC 61000-4-2, air discharge) static protection
- Or RS-485 port, 2wire, half duplex, supports rates up to 115200 bps

##### **Embedded Wireless**

- Socket modem support for future use

##### **Serial Protocols**

- DNP3 level 4 slave/master and peer to peer, IEC 60870-5-101 slave, Modbus slave/master

##### **Ethernet Ports: Eth1, Eth2 and Eth3**

- 8-pin modular RJ45 jack, 10/100 Mbps UTP (10/100Base-T) transformer isolated

##### **IP Protocols**

- DNP3 level 4 in TCP slave/master, UDP Master/slave and peer-to-peer, IEC 60870-5-104 slave, Modbus/TCP server, Modbus/TCP Client, Modbus RTU in TCP client.
- NTP Client/Server, telnet server, FTP Server, BOOTP Server, Master-slave capability
- As data concentrator it can manage up to 100 local or remote DNP3 slaves, and up to 100 local slaves communicating with Modbus RTU/TCP
- In peer-to-peer it can connect to up to 90 remote sites
- Provides HART 5/6/7 (pass-thru and FBs)

##### **USB Device Port**

- USB 2.0 compliant "B"- type receptacle, local configuration, supports devices up to 32GB (specific memory supported)

#### 6.5.6.1.8. GENERAL

##### Logic Control

- Remote connect software (IEC 61131-3 languages)

##### I/O Terminations

- 5, 6, 7, 9, 11-pole connectors, 0.0810...3.31mm<sup>2</sup> solid or stranded

##### Environment

- -40 to 70°C operating temperature
- 5% RH to 95% RH, non-condensing

#### 6.5.6.1.9. POWER SUPPLY

- 12...30VDC, 5W typical. Limit voltage: 11.5...32VDC; turn on voltage: 10...11.5VDC and turn off voltage: 9...10VDC

##### Maximum Power:

- 8.7W: +4 x expansion IO modules + USB memory stick
- Power requirements (controller with integrated IO) 4.8W
- Expansion IO – 1.1W
- USB (5V at 100mA) 0.6W
- Serial port (5v at 250mA) 1.5W

##### Digital and Analog Inputs/Outputs

- Digital Inputs – 0 to 24VDC  
Analog Inputs – 4 to 20mA (voltage output or signal maybe accomplished with external precision resistor)
- Resolution of 12-bit over 4 – 20mA

#### 6.5.6.2. Process and Pump-Motor Protection system

- Pump running dry by means of a non-intrusive type flow switch in the outlet from each pump. Timers must be provided to over-ride this switch during start-up, stopping and short time disturbances. This timer must be coordinated with the ramping up and down times, to prevent nuisance tripping. Backup protection must be provided via the VFC undercurrent protection, subject to the same time coordination as for the flow switches.
- Low suction pressure by means of an adjustable pressure switch in each pump suction line.
- High delivery pressure by means of an adjustable pressure switch in each pump delivery line.
- Low delivery pressure as sensed by a pressure sensor in the common delivery line.
- Delivery high flow. The delivery line flow meter must be monitored and alarm and trip settings must be provided, for each pump, the alarm value to be set at 90 % of the maximum safe flow of the pump and the trip value set at 110 % of the maximum safe flow. The relevant flow must be present for 10 s, before the alarm/trip condition is accepted.
- Bearing over temperature by means of PT 100 temperature sensors, both for the drive end and non-drive end. Each bearing must be provided with an adjustable (via HMI) alarm and trip setting.
- Bearing vibration (vibration sensor with analogue output and programmable alarm and trip limits).

#### 6.5.6.2.1. Pressure

The pumps common suction and delivery lines pressure must be continuously monitored for by means of pressure sensors with transmitters. The following alarms shall be generated on HMI and SCADA if pre-set pressure values are exceeded:

- Low suction.

- High delivery.
- Low delivery.
- Measure pump performance
- High/Low differential pressure
- Meter faulty

#### **6.5.6.2.2. Flow**

The pumps common suction and delivery flows shall be continuously monitored for by means of insertion flow meters or strap on ultrasonic flow meters. The values, alarms and faults are to be generated on the Panel PC with SCADA. The following alarms shall be generated on the HMI and SCADA if pre-set pressure values are exceeded:

- No flow
- High/Low differential flow
- Meter faulty

#### **6.5.6.2.3. Vibration**

The drive end and non-drive end bearings of both the motor and pump shall be continuously monitored for by means of vibration sensors with transmitters and control system. Alarms shall be generated on HMI and SCADA if pre-set values are exceeded.

#### **6.5.6.2.4. Surge Protection**

The incoming section must be provided with surge protection in accordance with SANS 10142-1. Both Class 1 and Class 2 coordinated protection must be provided, directly adjacent to each other, with curve C backup protection circuit breakers, rated in accordance with the manufacturer's recommendation.

The surge arrestors must be of the clip in type, having both end of life and safety reserve visual indication, as well as provision for operational status remote monitoring. Electronic equipment must in addition be provided with suitable equipment specific coordinated surge protection.

### **6.5.7. Civil**

#### **6.5.7.1. 200kW Plinth Modification**

Contractor should make sure that Plinth modification includes concrete and steel stand. Strength of material should be such that air-cooled 200 kW load is adequate. Modification should be such that motor fits properly and prevents any vibrations.

#### **6.5.7.2. MCC Doors**

Contractor should replace the wooden double-doors with a double-steel emergency door. The door shall be sealed.

### **6.6. HVAC System**

#### **6.6.1. Existing Air Circulation System**

The current system that circulate air into the pump station uses two fans of 2.7 kW, the atmospheric air is extracted from outside the room and uses a brick built chamber to feed the fans via air filters.

## 6.6.2. Air Circulation System

The scope of work for the HVAC system entails the following:

- a. Draw 3D drawings for the HVAC system.
- b. Demolish part of existing air inlet wall to fit the size of the plenum air intake to be installed.
- c. Supply, deliver and install meshed louvres (2x4m, 2x1.5 rectangular)
- d. Demolish wall for installing grilles and extractor fans.
- e. Supply, deliver and install required 4.8kW centrifugal and axial fans.
- f. Supply, deliver and install cables and cables trays from fans to power source (30m distance).
- g. Supply, deliver and install galvanised steel duct (2mx1.3m, 1.8mx1.1m, 1.6mx0.9m) rectangular sections) with smooth fiberglass lining as specified.
- h. Supply, deliver and install all fittings required.
- i. Supply, deliver and install all air terminals, diffusers with dampers.
- j. Supply, deliver and install all hangers, mountings and vibration isolators
- k. Supply, deliver and install all seals.
- l. Supply, deliver and install air filters of duct size.
- m. Supply, deliver and install all volume flow control dampers required.
- n. Supply, deliver and install all fire and smoke dampers.
- o. Supply, deliver and install all pressure and temperature sensors
- p. Service the existing ventilation system, rehabilitate fans and clean the concrete duct including replacement of air filters.
- q. Conduct factory acceptance test for the fans and ducts fabrication.

The warm air in the room is situated higher than the cold air. Therefore the exhaust grilles and extractor fans shall be located above the overhead crane in the pump room and in the other rooms it will be located 0.5m below the ceiling.

The relevant standards are as follows;

- ASHRAE 62-1989 standards
- ASHRAE 1-1996 standards
- ISO 16890
- ANSI/SMACNA HVAC Duct Construction Standards
- AMCA Standard 210
- SANS

	Exhaust Equipment	Modifications	Location	Tenderer
Pumps Room	2x Extraction fans: Power: 1.75 kW Voltage: 230V single phase Volume flow rate: 2 to 4 m <sup>3</sup> /s Must have coarse mesh	Demolish wall for fitting 1.5m diameter fan.	2x fan equidistant 5m away from switch room on the far wall when entering the pump room. 2x fan equidistant 5m away from entrance door of pump room	
	Grilles with fine mesh: 5mx0.5m on the three side of the fans	Demolish wall to fit the 5mx0.5m grilles.	0.5m above overhead crane.	
Switch room	1x Extraction fan: Power: 1.75 kW Voltage: 230V single phase Volume flow rate: 2 to 4 m <sup>3</sup> /s	Demolish wall for fitting 1.5m diameter fan.	0.5m below ceiling	
Main MV Switch room	Grilles with fine mesh: 3mx0.5m	Demolish wall to fit the	0.5m below ceiling	

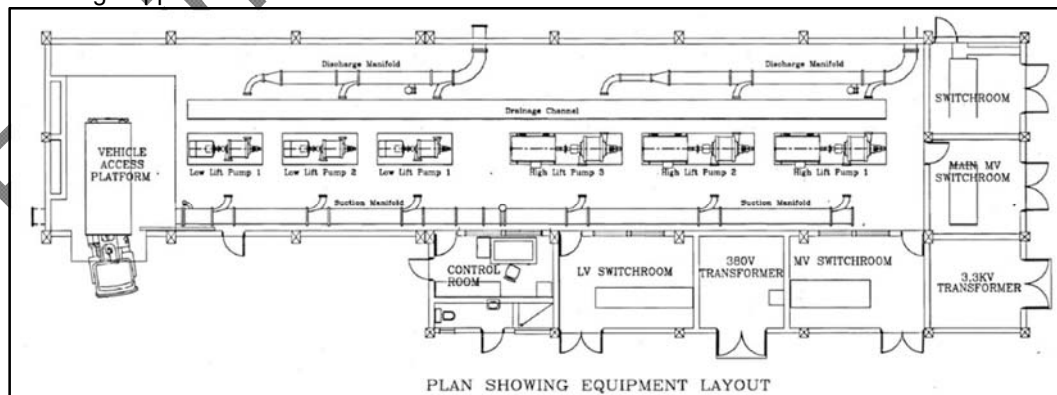
		3mx0.5m grilles.		
3.3kV Transformer	Grilles with fine mesh: 3mx0.5m	Demolish wall to fit the 3mx0.5m grilles.	0.5m below ceiling	
MV Switch room	Grilles with fine mesh: 3mx0.5m	Demolish wall to fit the 3mx0.5m grilles.	0.5m below ceiling	
380V Transformer	Grilles with fine mesh: 3mx0.5m	Demolish wall to fit the 3mx0.5m grilles.	0.5m below ceiling	
LV Switch room	Grilles with fine mesh: 3mx0.5m	Demolish wall to fit the 3mx0.5m grilles.	0.5m below ceiling	
Control Room	Grilles with fine mesh: 2mx0.5m	Demolish wall to fit the 2mx0.5m grilles.	0.5m below ceiling	

#### 6.6.3.1. Rooms dimensions and layout

The table below shows the dimensions of the rooms in the pump station and the required volume flow rate per room for sufficiently cooling of motors, electrical components and human comfort.

	Dimensions (m)	Volume (m <sup>3</sup> )	Volume flow rate (m <sup>3</sup> /s)
Pumps Room	35x7x6.5	1593	1.5
Switch room	3.6x3.7x3	40	0.25
Main MV Switch room	3.6x3.7x3	40	0.25
3.3kV Transformer	3.6x3.5x3	38	0.25
MV Switch room	5.4x3.5x3	57	0.25
380V Transformer	3.3x3.5x3	35	0.25
LV Switch room	5.4x3.5x3	57	0.9
Control Room	4.8x3.5x3	50	0.25

The diagram illustrated below shows the layout of the building, drawing with dimensions can be found in the drawings Appendix.



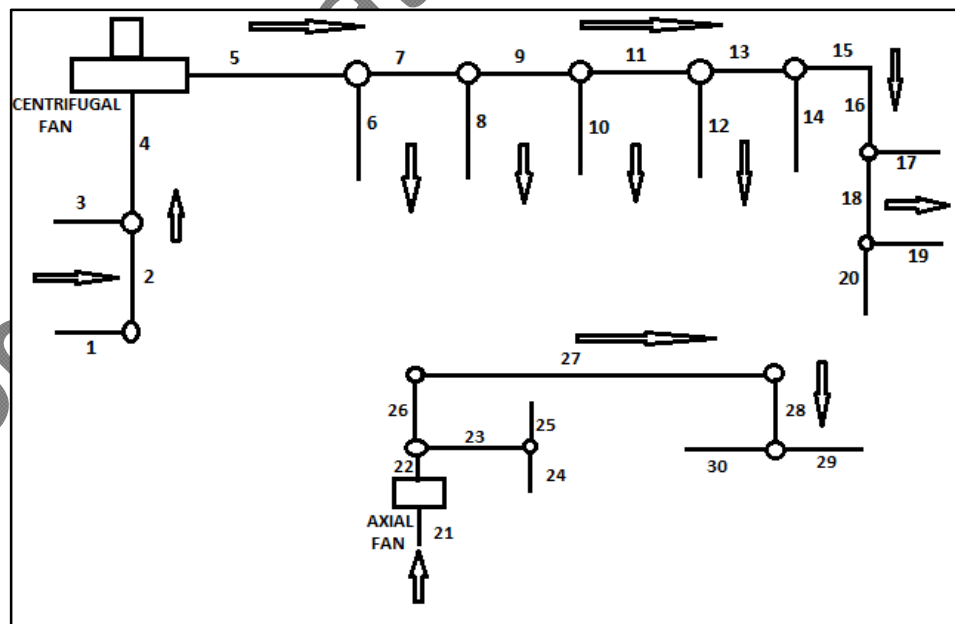
#### 6.6.3.2. Lists of Equipment

List of equipment and parameters to consider in the pump station:

Description	Quantity	Heat dissipation
<b>Pumps Room</b>		
MV Motor	3	8kW
LV Motor	3	4kW
4 stage Pump	3	Water cools the pumps
6 stage pumps	3	Water cools the pumps
Piping		Water cools the pipes
Crane motor	1	79W
Personnel		
Door opening		
<b>MV, LV, Switch rooms</b>		
MV motor VSD	3	7.6kW
LV motor VSD	3	3.4kW
LV Switchgear	1	1.2kW
MV switch gear	1	1.5kW
MCC	6	40kW
Lights	18	15W

#### 6.6.3.3. Ducts, fans, fittings, inlet, exhaust, sealing, diffusers & clamps

The layout of the duct of the duct system is shown below with the schematic diagram showing point of intake, diffusers points, fans and bends



The table below shows the dimensions of the ducts, fittings, reducers, plenum and fans.

	Diameter (m)	WxH (mxm)	Length (m)	shape	Fitting
--	--------------	-----------	------------	-------	---------

1		2x3	0.4	Rectangular	louvre
2		2x1.3	4.5	Rectangular	Plenum
3		2x3	0.4	Rectangular	louvre
4	0.6		0.5	Round	Round duct
	0.6	0.8x0.5	1	Round	Centrifugal fan
5		2x1.3	4	Rectangular	duct
		2x1.3- 1.8x 1.1		Rectangular	reducer
6		0.8x0.5	1.5	Rectangular	diffuser
7		1.8x 1.1	6	Rectangular	duct
8		0.8x0.5	1.5	Rectangular	diffuser
9		1.8x 1.1	6	Rectangular	duct
10		0.8x0.5	1.5	Rectangular	diffuser
11		1.8x 1.1	7	Rectangular	duct
		1.8x 1.1 – 1.6x0.9		Rectangular	reducer
12		0.8x0.5	1.5	Rectangular	diffuser
13		1.6x0.9	7	Rectangular	duct
	Diameter (m)	WxH (mxm)	Length (m)	Shape	Fitting
14		0.8x0.5	1.5	Rectangular	diffuser
15		1.6x0.9	4	Rectangular	duct
16		1.6x0.9	1.5		
17		1.6x0.9	1	Rectangular	duct
17A		0.8x0.5		Rectangular	diffuser
18		1.6x0.9	7	Rectangular	duct
19		1.6x0.9	1	Rectangular	duct
19A		0.8x0.5		Rectangular	diffuser
20		1.6x0.9	5	Rectangular	duct
20A				Rectangular	diffuser
21		2x1.3		Rectangular	louvre
	0.8			Round	Axial fan
22		1.8x1.1	1	Rectangular	duct
23		1.8x1.1	4.5	Rectangular	duct
24		1.6x0.9	1.5	Rectangular	duct
24A		0.8x0.5		Rectangular	diffuser
25		1.6x0.9	1.5	Rectangular	duct
25A		0.8x0.5		Rectangular	diffuser
26		1.8x1.1	1	Rectangular	duct
27		1.8x1.1	14	Rectangular	duct
28		1.8x1.1	1.7	Rectangular	duct
29		1.6x0.9	2	Rectangular	duct
29A		0.8x0.5		Rectangular	diffuser
30		1.6x0.9	2	Rectangular	duct
30A		0.8x0.5		Rectangular	diffuser

#### 6.6.3.3.1. Intake louvres and filters

##### Louvres

There are two intakes with louvres that take the atmospheric air from outside. The louvres in the pump room will be modified to the dimensions specified below, the position of current existing louvres will not

change. There will be required work for demolishing of wall to maximise the intake louvres to specified dimensions.

The louvres in the LV switchroom will be constructed on the existing louver door.

The louvres must be:

- Galvanised outdoor weather proof
- Air vent must be fitted with screen mesh

Description	Specification
Pump Room louvres	
Dimensions	2m x 3m
Air flow required	Atmospheric Pressure
	<b>Flow Rate:</b> Min: 2.8m³/s at wind speed of 0.7m/s Average: 5m³/s at wind speed of 1.3m/s
	Temperature: Max 45°C at summer season Min 3°C at winter season
LV MCC louvres	
Dimensions	2m x 1.3m
Air low required	Flow Rate: Min: 1.2m³/s at wind speed of 0.7m/s Average: 2.2m³/s at wind speed of 1.3m/s

#### Filters

Air supplied to the pump station must be filtered to remove dust and other contaminants that may adversely affect the health of personnel and damage equipment. The specified filter below is to be used for all air intakes.

An automated differential pressure gauge with a timed alarm must be installed to signal when the filter elements are due for replacement or washing

Description	Designer	Tenderer
Filter type	Washable Panel filters	
Frame material	Galvanised steel	
Frame Dimensions	2mx1.3m	
Filter medium	Must be of washable medium	
Range of particle removal	1 – 50 microns	
Mesh	Aluminium mesh	

Automated Differential Pressure Gauge Data Sheet

Description	Designer	Tenderer
Measurement range	Max: 500Pa	
	Min: -20Pa	
Power supply	5V	
Accuracy	1.5% m.v.	
Repeatability	0.5% m.v.	
Offset stability	0.1 pa/year	
Resolution	0.05 – 0.2 Pa	

#### 6.6.3.3.2. Plenum and Duct 4

##### Plenum

The air flows from the louvres to the plenum where air is kept at high volumes. The current existing intake require modification of the brick wall to install the plenum trunk. The specifications of the plenum are as shown in the table below:



Description	Designer	Tenderer
Material	Galvanised steel	
dimension	WxHxL: 2x1.3x4.5	
Liner	Fiberglass liner Thickness: 10mm	
Manhole	0.8mx0.8m	
	Door Open outside	
	Door to be sealed with rubber all round.	
	Galvanised steel step ladder with rails leading to manhole	

Temperature sensor will be installed on the duct system including at inlet at the plenum, specifications are shown in the table below.

Description	Designer	Tenderer
Temperature range	-10 to 110°C	
Probe	Fine mesh gauge for sensor protection	
Housing	IP65 with 20mm conduit entry	
Power source	24V	

#### Duct 4

These are two round duct leading to the inlet of the centrifugal fans.

Description	Designer	Tenderer
material	Galvanised steel	
dimensions	Diameter: 0.8m	
	Length: 0.5m	
Sound silencer	Must be fitted with internal sound absorbing material	

#### 6.6.3.3.3. Fans and Duct 5

##### Fans

The fans will supply air flow from the downstream diffusers to upstream diffusers. The fan must overcome the pressure losses due to fittings and friction losses. Must meet the demand air flow to every room in the pump station, the specifications of the fan are shown below.

Description	Designer	Tenderer
<b>Pump room</b>		
Fan type	Centrifugal fan	
Impeller type	Airfoil	
casing	Epoxy coated steel housing	
Power (motor)	4.8kW	
Voltage (motor)	230V	
Motor weather proof	IP 65	
Frequency (motor)	50Hz	
Volume flow rate	1.5 m3/s to 7 m3/s	
Max speed	1750 RPM	
Inlet	Diameter: 0.6m flange	
outlet	0.5mx0.35m (inner dimensions)	
Quantity	2 fans	
Orientation	The inlet will face the incoming flow from the plenum.	

	The fans will be place adjacent of the outlet casing. Motors must be at different sides, one on the right and the other on the left when facing the outlet	
<b>LV Swithroom</b>		
Fan type	Aerofoil Axial flow fan	
Impeller type	Vaneaxial	
Diameter	0.9m	
Material	Galvanised steel/ epoxy coated steel	
Power(motor)	4kW	
Voltage	230V	
frequency	50Hz	
Static pressure	1kPA	
Volume flow rate	0.08 to 40 m <sup>3</sup> /s	
Max speed	3050 RPM	

**Flexible connectors must be used to connect the discharge and suction side of the fans.**  
**Vibration isolators of rubber material or steel springs must be installed between the holding mounting and the wall.**

## Duct 5

This is the discharge side of the fan, the duct must be a bellmouth. The duct consist of a sound silencer of 1.3m length inside the duct. The specifications of the ducts are shown below:

Description	Designer	Tenderer
Material	Galvanised steel	
Dimensions	Bellmouth end: 2.4mx1.7m Bellmouth Length: 0.5m	
	Duct: 2mx1.3m Duct length: 3.5m	
Sound silencer	Length: 1.3m	
	Must be fitted with internal sound absorbing material	
	Tapered at the end of the silencer baffle for static pressure regain	
Liner	Parts where there is no silencer baffle, a liner of 10mm thickness must be applied.	

### 6.6.3.3.4. Ducts and Diffusers

The ducts goes around the pump station on the far wall when entering the pump station door. The ducts will be mounted on the wall due to restriction of overhead crane. Brackets will hold the ducts to the wall in the pump room. The LV switch room duct will mounted on the roof as there is no restriction. The duct must adhere to the following specifications.

- Sheet metal should be G-90 coated galvanized steel and must be of lock forming quality.
- All joints, seams and wall penetration must be sealed with UL 181 approved mastic sealant that is water based.
- The duct are designed for low pressure, less than 750Pa and low velocity system, less than 10m/s airflow in the duct.
- The duct system must have a maximum noise level of 60DB (decibel) in a 1 meter distance.
- All ducts that are rectangular shape must have aspect ratio (width/height) that is less than 4.
- Ducts must be lined internal with smooth fiberglass lining.
- The sheet metal must be 1.6mm thick, withstand maximum pressure of 1000Pa.
- The bracket, hanger and mountings must be equidistant by 1.2m apart.
- Duct 16 penetrates the wall to the switch room. The wall penetration must be sealed.
- Duct 18 is connected to duct 16 with rivets and air sealed.
- Duct 19 is connected to main MV Switch room via a duct that connect to the existing diffuser.

- Duct 20 enters the MV switch room and connect to the existing diffuser.
- All mountings and brackets must be of galvanized steel.
- Diffusers must have control flow dampers
- Diffusers must be able to control the volume of airflow,
- Minimum diffuser pressure drop of 13Pa and maximum 300Pa
- Maximum Velocity through the diffuser should be 5m/s
- Fire and smoke dampers must be installed on the wall penetration of switch room, Main MV Switch room, MV Switch room and LV Switch room.
- The throw should be: 2m/s at a distance of 2.5m.
- Acoustic silencers must be installed on the discharge side of the fans.
- Duct must be 0.5m below the overhead crane and 1 m above the door.

#### 6.6.3.3.5. Exhaust Offtakes

The warm air in the room is situated higher than the cold air. Therefore the exhaust grilles and extractor fans shall be located above the overhead crane in the pump room and in the other rooms it will be located 0.5m below the ceiling.

	Exhaust Equipment	Modifications	Location	Tenderer
Pumps Room	2x Extraction fans: Power: 1.75 kW Voltage: 230V single phase Volume flow rate: 2 to 4 m <sup>3</sup> /s Must have coarse mesh	Demolish wall for fitting 1.5m diameter fan.	2x fan equidistant 5m away from switch room on the far wall when entering the pump room. 2x fan equidistant 5m away from entrance door of pump room	
	Grilles with fine mesh: 5mx0.5m on the three side of the fans	Demolish wall to fit the 5mx0.5m grilles.	0.5m above overhead crane.	
Switch room	1x Extraction fan: Power: 1.75 kW Voltage: 230V single phase Volume flow rate: 2 to 4 m <sup>3</sup> /s	Demolish wall for fitting 1.5m diameter fan.	0.5m below ceiling	
Main MV Switch room	Grilles with fine mesh: 3mx0.5m	Demolish wall to fit the 3mx0.5m grilles.	0.5m below ceiling	
3.3kV Transformer	Grilles with fine mesh: 3mx0.5m	Demolish wall to fit the 3mx0.5m grilles.	0.5m below ceiling	
MV Switch room	Grilles with fine mesh: 3mx0.5m	Demolish wall to fit the 3mx0.5m grilles.	0.5m below ceiling	
380V Transformer	Grilles with fine mesh: 3mx0.5m	Demolish wall to fit the 3mx0.5m grilles.	0.5m below ceiling	
LV Switch room	Grilles with fine mesh: 3mx0.5m	Demolish wall to fit the 3mx0.5m grilles.	0.5m below ceiling	
Control Room	Grilles with fine mesh: 2mx0.5m	Demolish wall to fit the 2mx0.5m grilles.	0.5m below ceiling	

#### 6.6.4. Testing, Commissioning and Documentation

When the installation of the duct system has been completed including installing of fans, hangers, seals, duct, and all fittings the following tests must be conducted:

- Balance of the system
  - Inspect the complete system, locate all ducts, openings and dampers.
  - Open all dampers in the ducts and diffusers.
  - Check velocities at each diffuser outlet using **anemometer**
  - Measure the air flow volume at each outlet diffuser
  - Measure the total volume flow of air in each room.
  - Check velocities at each outlet grilles and fans
  - Determine the airflow in ducts at the three point where cross sectional area has change.
  - Measure the air flow volume at each exhaust outlets
  - Adjust diffuser dampers to balance air flow for each diffuser as per the required flow of each room.
  - Measure pressure losses in the duct using manometer and check if records the same as the differential pressure sensor installed.
- Check for leakages
- Run the system three times at three different fan velocities (max, min, average).
- Fix all snags observed during the test before commissioning.
- Provide commissioning completion certificate

The factory acceptance should be conducted for the fans and duct. The test must show that the fans deliver the required volume airflow rate. The galvanised sheet metal construction of ducts must be observed to determine if it is of lock form locking quality

The O&M manuals must be supplied upon handover, the following must be included in the manuals:

- HVAC system control philosophy
- Equipment specifications (power rating, design flow deliverable, efficiency, material)
- Equipment list of equipment and components, exploded view of fan and ducts.
- Frequency of cleaning the duct system, how to clean the ducts, frequency of changing the filters.
- As built drawings of all the ducts and integration of all ducts with fans, sensors, filters, plenum and ducts.
- SHEQ regulations and legislations applicable

#### 6.7. 3.3kV / 400V Cast Resin Dry Type Transformer

##### 6.7.1. Design and construction features

The overall dimensions of the transformer shall be kept as low as possible and in any case the transformer with all parts / fittings shall not occupy more space than the existing oil-type transformer.

##### 6.7.2. Temperature Rise

The temperature rise shall not exceed the following values above the ambient temperature indicated while the transformer is delivering the full rated MVA. The ambient temperature for air is 40 °C. The maximum output of the transformer can deliver may also be indicated by the tenderer.

- **Winding:** The temperature rise of the windings for ON transformers as measured by the resistance method, over an ambient air temperature of 40 °C shall not be more than 55 °C.

##### 6.7.3. Efficiency

The transformer shall be so designed that the maximum efficiency occurs at about 80% full load and the efficiency load characteristic shall be as flat as possible between 80% and 100% rated capacity. The efficiency figures shall be subjected to tolerance as per IEC standard and SANS standard.

#### 6.7.4. Losses

The transformers are to be designed with maximum permissible losses as indicated below:

Transformer Rating	No load loss at 75 °C at rated voltage.	Full load losses (Copper loss + stray loss) at 75 °C
630 kVA 3.3kV / 400V	As per IEC standard	As per IEC standard

The above losses are maximum, without any positive tolerance. The offered Transformer exceeding this limit shall not be accepted against the tender.

#### 6.7.4. Windings and Core

The primary and secondary windings are to be encapsulated with epoxy resin. The transformer is to be non-hygroscopic. The 630kVA cast resin dry type transformer is to have an insulation class H (90°C or more Temperature Rise). The important design parameters:

- Insulation Class H (180°C) with high temperature withstand property
- Varnish or polyester resin can be used as an insulation medium for the windings.
- Basic capabilities – mechanical strength; dielectric strength and resistance to thermal shock
- Copper for windings or coil
- Core material must possess low hysteresis losses and high permeability (silicon steel, CRGO, etc)
- Leakage reactance is to be kept with 2% during design

#### 6.7.5. Weather Proof Container

The weather proof container shall be design with the following minimum requirements:

- 3CR12 Stainless Steel
- Weather proof
- IP68 or better
- 3 forced-cooling fans mounted on the bottom of the container based on the heat dissipation of the 630kVA transformer

The rating and general data of the transformer

	Designer	Contractor
Type of transformer	Containerized Three phase, 3.3 kV/400V Step down Dry Type Power Transformer. Forced cooling with bottom mounted fans	
No. of Phase	THREE Phase	

Type of windings	MV: Interleaved type / Disc type with static endrings at both ends with uniformly insulated LV: Continuous disc type / layer type with uniformly insulated.	
Winding connection for 3 phase	MV winding – Delta, LV winding – Star.	
Vector Grouping	D-Y n 11	
Type of insulation	Uniformly insulated as per IEC60076	
Winding Material	Electrolytic grade copper	
Winding Insulation	Class-A	
System frequency	50Hz ± 3%	
Rated CAPACITY in kVA	630	
Rated Primary Voltage in kV	3.3	
Rated Secondary Voltage in kV at No Load	0.42	
Rated Primary Current at the principle tapping	As per manufacture	
Rated Secondary Current at the principle Tapping.	As per manufacture	
Maximum value of percentage Impedance at the (Normal working) principle tap position at 630 kVA	As per manufacture	
Non-cumulative over load capacity after the transformer has reached steady temperature on continuous operation at rated load ie. At rated power)	110% for continuous, 125% for 15 minute, 140% for 5 min	
Tapings (On load Tap Changer)	As per manufacture	
Maximum No load losses (KW) at 100% rated voltage.	As per manufacture	
Maximum copper losses at 75degree C at rated Voltage.	As per manufacture	
Total losses (KW)	As per manufacture	
Insulating medium	As per manufacture	

System neutral earthing	LV – Solidly earthed, HV- Non effectively earthed	
Insulation level for windings: a) Impulse 1.2/50 Micro second wave impulse withstand voltage b) Power frequency withstand voltage(KV rms)	MV – 350 KV (peak) MV – 90 KV (peak) MV – 140 KV (rms) MV – 30 KV (rms)	
Max Temp Rise of Oil	45 deg C over the ambient	
Max Temp Rise of Winding	55 deg C Over the ambient	
Terminal Arrangement	MV –Bare Bushing inside the termination box, LV- Cable Box	
Efficiency at 75 deg. C at unity power factor	Not less than 99%at all loads.	
Maintenance and Reliability Sensors	Temperature, partial discharge, arc flash and infrared	

#### 7. Reference data

Umgeni Water Specifications  
OEM Manuals  
National and International Standards

#### 8. Applicable national and international standards

SANS  
IEC  
ANSI  
BS  
Other Related standards

#### 9. Particular/Generic specifications

- Technical Spec for Electrical Installations
- O-M Manual Version 2
- Electrical Spec
- Instrumentation Specification Version 11 rev1
- Asset Numbering Standard
- Colour Coding Spec-2021
- Particular Spec Construction Healthy & Safety
- Quality Assurance Procedure

#### 10. Approvals

The Project Manager / Lead Engineer is responsible for all approvals:

- Approval of program
- Approval of specifications/datasheets before procuring of equipment.

The Contractor is to submit Request for Information as per GCC 2015.

#### 11. Procurement

*Umgeni Water SCM Procedure*

**12. Access to land / buildings / sites**

- The Contractor is to submit the Safety File for approval by UW.
- Access to the site by the Contractor will be arranged by the Project Manager / Lead Engineer. The SHERQ Department and Security will need to approve the access to site.
- The Contractor is to adhere to all adhere to UW access requirements.
- The access for the Contractor is restricted to only the place where work will be taking place, and their activities shall not impact day to day operations for UW.

**13. Planning and programming**

- Microsoft Office Project or similar
- The Contractor is to submit a detailed program for the complete installation of the UPS systems.

**14. Software application for programming**

SCADA  
PLC and Telemetry  
Vibration  
AUTOCAD  
Power Quality Meter Software  
UPS Software  
HVAC system software

**15. Quality management**

- ISO 9001
- ISO 14001
- UW Quality Management System (QCP)

**16. Format of communications**

- O-M Specification for submission of final documentations
- Communications is via all platforms

**17. Key personnel**

*Refer to Returnable Schedule T2.2.17 and C1.2 Part 2: Contract Data to be provided by the Service Provider.*

**18. Management meetings**

- Monthly meetings
- Weekly reporting of progress. Report to be submitted to the PM / Lead Engineer.
- Adhoc meetings as required by the PM/Lead Engineer

**19. Payment certificates**

GCC 2015

Monthly payments

- Preliminary and General as per BOQ and activities
- 50% payments after FAT
- 75% payment with materials on site
- 95% after project handover
- 5% retention after 1 year proving period. Proving period starts after practical completion certificate.

**20. Property provided for the Supplier's use**

- Ablution facilities
- Water and Electricity



## 21. Proof of compliance with the law

## 22. OCCUPATIONAL HEALTH AND SAFETY *(Read with SANS 1921 - 1: 2004 Clause 4.18 and the Particular Specification for Construction Health and Safety)*

### 22.1 General Statement

It is a requirement of this Contract that the Contractor shall provide a safe and healthy working environment and to direct all his activities in such a manner that his employees and any other persons, who may be directly affected by his activities, are not exposed to hazards to their health and safety. To this end, the Contractor shall assume full responsibility to conform to all the provisions of the Occupational Health and Safety Act, 1993 (Act 85 of 1993) (OHASA), and the Construction Regulations 2014 issued under Section 43 of the OHASA by the Minister of Labour.

For the purpose of this Contract, the Contractor is required to confirm his status as mandatory of the Employer for the execution of the Contract by entering into an agreement with the Employer in terms of the OHASA by executing the Agreement under C1.5 included in Section C1: Agreements and Contract Data.

### 22.2 Health and Safety Specifications and Plans to be submitted at Tender Stage

(a) Employer's Health and Safety Specification

The Employer's Health and Safety Specification will be included in the tender documents as part of the Project Specifications.

(b) Contractor's Health and Safety Plan

The Occupational Health and Safety Plan should be submitted at tender stage so as enable the Employer to determine whether the Contractor is capable of fulfilling the requirements of Construction Regulation 5(1)(h).

The successful Tenderer shall, on receipt of notification that he has been awarded the contract, submit without delay his own documented Health and Safety Plan for the execution of the work under the Contract. His Health and Safety Plan must at least cover the following:

- (i) a proper risk assessment of the works, risk items, work methods and procedures in terms of Construction Regulations 7 to 30 inclusive;
- (ii) pro-active identification of potential hazards and unsafe working conditions;
- (iii) provision of a safe working environment and equipment;
- (iv) statements of methods to ensure the health and safety of Sub-Contractors, employees and visitors to the site, including safety training in hazards and risk areas;
- (v) monitoring health and safety on the site of works on a regular basis, and keeping of records and registers as provided for in the Construction Regulations;
- (vi) details of the Construction Supervisor, the Construction Safety Officers and other competent persons he intends to appoint for the construction works;
- (vii) details of methods to ensure that his Health and Safety Plan is carried out effectively in accordance with the Construction Regulations 2014; and
- (viii) all other information and documentation that is required by the Employer, the Employer's Agent, or the agent who acts as a representative for the Employer, in order to enable the Employer to apply for a construction work permit in terms of Construction Regulation 3(1) (if required by law).

The Contractor's Health and Safety Plan will be subject to approval by the Employer, or his agent appointed as contemplated under the relevant provisions of the Construction Regulations 2014, and the Contractor's Health and Safety Plan may be required to be amended if necessary, before commencement of construction work. The Contractor will not be allowed to commence work, or his work will be suspended if he had already commenced work, before he has obtained the Employer's written approval of his Health and Safety Plan,

and before the requirements of Construction Regulation 3, or Construction Regulation 4, as applicable, have been complied with.

Time lost due to delayed commencement or suspension of the work as a result of the Contractor's failure to obtain approval for his safety plan, or any failure on the part of the Contractor to submit the required information or documentation in support of the application for a construction work permit (in terms of Construction Regulation 3), or failure to give notification of construction work (in terms of Construction Regulation 4), as applicable, shall not be used as a reason to claim for extension of time or standing time and related costs.

### **22.3 Cost of Compliance with the OHASA and Construction Regulations 2014**

The rates and prices tendered by the Contractor shall be deemed to include all costs for conforming to the requirements of the Occupational Health and Safety Act, 1993 (Act 85 of 1993) (OHASA), the Construction Regulations 2014, and the Employer's Health and Safety Specification as applicable to this Contract.

Should the Contractor fail to comply with any of the provisions of the OHASA, Construction Regulations 2014, or Employer's Health and Safety Specification, he shall be liable for penalties as provided for in any of the aforementioned documents.

Items that may qualify for remuneration will be specified in the Health and Safety Specifications, or in the Project Specifications.

### **22.4 Security**

The Contractor shall ensure that all tools and materials are kept under lock and key. Umgeni Water is not responsible for the loss of the Contractor's equipment as a result of any cause whatsoever. Umgeni Water reserves the right for security guards to search persons or vehicles entering or leaving the premises.

### **22.5 Permits**

The Contractor shall not perform work for which the issuing of a permit is required prior to the obtaining of a duly completed and approved permit. The following are included as hazardous tasks and may not be carried out by the Contractor unless a work permit has been duly authorized by Umgeni Water:

- Cutting or welding in any risk area.
- Working at a height of more than two meters.
- Working with hazardous substances (e.g. toxic chemicals and flammable liquids).
- Working inside confined spaces (e.g. vessels, chambers and pipelines).
- Working in electrical lockouts installations.
- Breaking in any live water main.

### **22.6 Housekeeping**

After the completion of each day work the Contractor must make good and clean up the site area where work was performed, and also at the completion of the contract. Sites must be kept reasonable tidy during work operations.

### **22.7 Alcohol or Intoxicating Substances**

The Contractor shall ensure that no alcohol or intoxicating substances are on their possession while on site. Anyone suspected to be intoxicated or under influence of alcohol shall not be allowed on site.

### **22.8 Safety**

Umgeni Water has a strict attitude when it comes to personal safety of all on site. The Contractor is expected to provide a Health and Safety File to meet the minimum

requirements of the Construction Regulations 2014.

**The Health & Safety file must be submitted to the SHEQ coordinator within 5 days after the issuing of the award letter. The Contractor and sub-contractors have to attend a Compulsory Induction before starting the project.** Unsafe activities, equipment and procedures shall not be tolerated. It should be noted that if this work requires people to work in elevated positions and confined areas, compliance to the OHS Act is mandatory. The Contractor will be required to submit together with the quotation a schedule of all his activities and as to how he intends to carry them, to the Umgeni Water Project Manager and Safety Officer for approval.

## 22.9 Safety File Index

- a) Organogram (Site Structure)
- b) Section 37 (signed by Umgeni Water representative as well as the contractor To be provided by Umgeni Water)
- c) Rules for Contractors on Site (signed by Contractor Supervisor to be provided by Umgeni Water)
- d) Appointments (As well as proof of training)
- e) Medical fitness test certificated with copies of IDs
- f) Letter of good standing with Labour Department
- g) COID
- h) Company safety Policy
- i) Method Statements
- j) Risk assessments
- k) Safe working Procedures / SHE Plan (to include confined space as well as a fall protection plan if work is to be done at heights exceeding 1.5m)
- l) Equipment certification (as per legislative requirements depending on the equipment to be used during the project as well as proof of training to operate equipment as may be required by legislation also depending on equipment / machinery used during the project)
- m) Registers (PPE, Equipment Checklist, First aid box etc.)
- n) Emergency Numbers
- o) Environmental Management Plan (covering bad weather conditions as well)

## 22.10 Safety Induction

The qualifying contractor to make sure that all staff who will be working on this project must be Safety Inducted before the commencement of any work. This will include all sub-contractors' staff.

## 22.11 Safety Clothing and Equipment

The Contractor shall supply all the Umgeni Water specified safety clothing and equipment for his workmen on site. The Contractor's workmen on site shall wear hard hats, safety glasses, safety shoes and overalls.

## 22.12 Accidents

In addition to any statutory obligations, the Contractor shall immediately report to the Project Manager every occurrence causing damage to property or injury to persons.

If required by Umgeni Water, the Contractor shall submit a further report in writing to Umgeni Water within 48 hours of such requirement setting out full details of the occurrence.

The Contractor shall report those injuries that are reportable in terms of Section 24 of the OHS Act (1993) to the Department of Labour. Umgeni Water shall have the right to make any queries either on the Site or elsewhere as to the cause and results of any such occurrence and the Contractor shall make available to Umgeni Water the necessary

facilities for carrying out such enquiries.

#### **22.13 Safety Precautions**

The Contractor shall observe all applicable regulations regarding safety on the Site. Unless otherwise agreed, the Contractor shall, from the commencement of work on Site until taking over provide:

- a) fencing, lighting, guarding and watching of the Works, and
- b) Temporary roadways, footways, guards and fences which may be necessary for the accommodation and protection of owners and occupiers of adjacent property, the public and others.

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## PART C4: SITE INFORMATION

- **Authority for Access**

No persons other than the employees of the Contractor and his Subcontractors shall be allowed on the site except with the consent of the Project Leader. Facilities to inspect the works shall at all times be afforded by the Contractor to the Project Leader and his representatives, Umgeni Water's representatives, authorities and officials.

- **Information for Import Permits and Licences**

The Contractor shall submit to Umgeni Water in good time such details of all plant and Contractor's equipment as will enable Umgeni Water to obtain all necessary import permits or licences.

- **Access to and Possession of the Site**

Umgeni Water shall in reasonable time grant the Contractor access to and possession of the Site, which may, however, not be exclusive to the Contractor. Umgeni Water shall to the extent stated in the specification provide means of access for the delivery of all plant and Contractor's equipment to the site.

- **Consents and Wayleaves**

Umgeni Water shall in due time obtain or grant all consents including permits to-work, wayleaves and approvals required for the Works.

- **Site Co-ordinates**

UW Plants		
Name	:	Groenkloof Pump Station
Site co-ordinates	:	Latitude : -29.570579 Longitude: 30.287299

**PART C5: ANNEXURES**

Umgeni Water Particular Specification for OHASA 1993 Health and Safety

Umgeni Water Particular Specification for 164mm to 2230mm Diameter Steel Pipes, Specials, Coatings and Linings

Umgeni Water Particular Specification for Air Release and Vacuum Break Valves

Umgeni Water Particular Specification for Fixing of dowels and Anchor Bolts

Umgeni Water Technical Specifications - Operation and Maintenance (O&M) Manuals

Umgeni Water Insurance Summary and Claims Procedure

Umgeni Water SHEQ Guideline 5-43-1 Rules for Contractors on Site.

Umgeni Water Particular Specification for Electrical Works.

Umgeni Water Particular Specification Drawings.

Umgeni Water Particular Specification for Instrumentation.

Umgeni Water Particular Specification for Cable Type.

Umgeni Water Particular Specification for Labelling.

Umgeni Water Quality Assurance Procedures.

**Disclaimer**

Personal Information (PI) requested in this form is mandatory for operational and administrative processes, and to comply with regulatory requirements. Umgeni Water will take reasonable steps to ensure that the Personal Information collected on this form is processed responsibly, kept safe and confidential, and does not unjustifiably infringe your privacy. This is in compliance to the Protection of Personal Information Act No. 4 of 2013.

For information use only