



CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

Making progress possible. Together.

MEMORANDUM OF AGREEMENT

**FOR THE
DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR:
BELLVILLE DA PLANT REACTOR UPGRADE**

MADE AND ENTERED INTO BETWEEN

CITY OF CAPE TOWN METROPOLITAN MUNICIPALITY

And

INENZO WATER (PTY) LTD



CONTRACT NO: 3Q/2019/20



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DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR:
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CITY OF CAPE TOWN METROPOLITAN MUNICIPALITY

And

INENZO WATER (PTY) LTD

PREAMBLE

WHEREAS Tender **3Q/2019/20** was awarded to **INENZO WATER (PTY) LTD**, in line with the SCM- Bid Adjudication Committee resolution **SCMB 36/05/20** dated **18 May 2021** for the **DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR: BELLVILLE DA PLANT REACTOR UPGRADE**, for **1272 days from date of commencement of Contract not exceeding 30 June 2028**, in the amount of **R86 428 402.20 (excl. VAT)** and **R99 392 662.52 (Incl. VAT)** plus an allowance for Contract Price Adjustment and Rate of Exchange variations in the amount of R 13 500 000 and R18 000 000 respectively.

AND WHEREAS in line with resolution **SCMB 36/05/20** the conclusion of this Contract between the City of Cape Town and **INENZO WATER (PTY) LTD** is subject to the conclusion of the process prescribed by section 33 of the Local Government: Municipal Finance Management Act 56 of 2003.

AND WHEREAS it is recorded that this Contract will be governed by the provisions of **The Conditions of Contract for Plant and Design-Build for Electrical and Mechanical Works and for Building and Engineering Works Designed by the Contractor, First Edition 1999 (Yellow Book)** published by the International Federation of Consulting Engineers (**FIDIC**), read with the Contract Specific Data ("**CSD**") annexed hereto marked "**PART 2: CONTRACT SPECIFIC DATA**".

NOW THEREFORE THE PARTIES AGREE AS FOLLOWS:

- 1.2. **Inenzo Water (Pty) Ltd**, a private company registered in terms of the laws of the Republic of South Africa with registration no: [REDACTED] with its principal place of business situated at [REDACTED], [REDACTED] ("**the Contractor**"), herein represented by its duly authorised representative, [REDACTED] [REDACTED] in his capacity as **Director**;

Hereinafter, each a "party" and together the "parties".

2. INTERPRETATION

- 2.1. In the event of any conflict between the provisions of this Contract, the GCC and any Parts attached hereto, or any other document incorporated by reference to this Contract, save to the extent expressly stated to the contrary, such conflict will be resolved by giving precedence to such different parts of this Contract in the following order of precedence:
- 2.1.1 the Form of Offer and Acceptance,
 - 2.1.2 the Appendix to Tender within the Contract Data,
 - 2.1.3 the Particular Conditions within the Contract Data,
 - 2.1.4 the General Conditions contained herein,
 - 2.1.5 the Employer's Requirements,
 - 2.1.6 the Drawings, and
 - 2.1.7 Any Schedules attached hereto.

3. APPOINTMENT AND DURATION

- 3.1. The City hereby appoints the Contractor to perform the Scope of Work (Part 5) to the City from the Commencement Date.
- 3.2. Unless terminated earlier in accordance with the provisions as set out in the GCC or any other provision in terms of this Contract, this Contract shall commence on Commencement date and terminate on the Termination date.

4. MUTUAL GOOD FAITH / CO-OPERATION

- 4.1. The Parties represent and undertake to do all such things, perform all such acts and take all steps to procure the doing of all such things and the performance of all such acts, as may be necessary or incidental to give effect to the execution of this Contract.
- 4.2. The Parties shall at all times during the continuance of this Contract observe the principles of good faith towards one another in the performance of their obligations in terms of this Contract.

5. OBLIGATIONS OF THE CITY

- 5.1. The City undertakes to perform its obligations in accordance with the Contract, including but not limited to the Scope of Works (Part 5), subject to the satisfactory fulfilment of the obligations by the Contractor as set

- 6.2. The Contractor will perform the Works as expeditiously as possible and furthermore agrees and undertakes to perform the services in accordance with the operational requirements of the City.
- 6.3. The Contractor will ensure that the Works will be of a satisfactory quality and fit for purpose.
- 6.4. The Contractor shall, ensure that its employees, agents, representatives, sub-Contractors and Contractors comply with this Contract and all applicable Laws in the execution of the Works.
- 6.5. The Contractor will not conduct any activity of whatsoever nature which may be detrimental to the City's reputation and goodwill.

7. PRICING SCHEDULE

- 7.1. The Contract Price for the Works shall be as set out in Part4: Pricing Data.
- 7.2. The Contractor shall not be entitled to any other consideration for the rendering of the Works other than as provided for in this Contract.

DETAILS OF THE CONTRACTOR

CITY OF CAPE TOWN

WATER AND SANITATION: WASTEWATER

CONTRACT NO. 3Q/2019/20

DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT REACTOR UPGRADE

SCHEDULE 1: COMPULSORY ENTERPRISE QUESTIONNAIRE

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

Section 1: Name of enterprise:

Section 2: VAT registration number, if any:

Section 2a: National Treasury Central Supplier Database registration number:

Section 2b: SARS Tax Compliance Status PIN:

Section 3: cidb registration number, if any:

Section 4: Particulars of sole proprietors and partners in partnerships

** Complete only if sole proprietor or partnership and attach separate page if more than 3 partners*

Section 5: Particulars of companies and close corporations

Company registration number:

Close corporation number:

Tax reference number:

The undersigned, who warrants that he / she is duly authorised to do so on behalf of the enterprise:

- authorizes the Employer to obtain a tax clearance certificate from the South African Revenue Services that my / our tax matters are in order;
- confirms that neither the name of the enterprise or the name of any partner, manager, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004 or Database of Restricted Suppliers;
- confirms that no partner, member, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears, has within the last five years been convicted of fraud or corruption;
- confirms that I / we are not associated, linked or involved with any other tendering entities submitting tender offers and have no other relationship with any of the tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest; and
- confirms that the contents of this questionnaire are within my personal knowledge and are to the best of my belief both true and correct.

PART 1 : AGREEMENTS

CITY OF CAPE TOWN

WATER AND SANITATION: WASTEWATER

CONTRACT NO. 3Q/2019/20

DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT REACTOR UPGRADE

C1.1 Form of Offer and Acceptance

Offer

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

CONTRACT NO. 3Q/2019/20: DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT REACTOR UPGRADE

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

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

THE OFFERED TOTAL OF THE PRICES INCLUSIVE OF VALUE ADDED TAX IS:

Rand. Ninety-nine million, three hundred and ninety-two thousand
six hundred and sixty-two Rand and Fifty-two cents (in words);

R. 99 392 662,52 (in figures)

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

Signature(s)

Name(s)

Capacity

for the tenderer

(Name of organization/tenderer)

(Address of organization/tenderer)

**CONTRACT NO. 3Q/2019/20: DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR
THE BELLVILLE DA PLANT REACTOR UPGRADE**

ACCEPTANCE (TO BE FILLED IN BY THE CITY)

By signing this part of this form of offer and acceptance, the Employer identified below accepts the Contractor's offer in respect of the region(s) awarded to the Contractor. In consideration thereof, the Employer shall pay the contractor any amounts due in accordance with the conditions of contract identified in the contract data. Acceptance of the Contractor's offer shall form an agreement between the Employer and the Contractor 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:

Clause 1 to 7, and the sub-clauses therein, cited in pages 1 to 3 above;
Part 1: Agreements
Part 2: Contract Specific Data
Part 3: General Conditions of Contract
Part 4: Pricing Schedules
Part 5: Scope of Work
Part 6: Site Information
Part 7: Occupational Health and Safety Agreement
Part 8: Protection of the Environment Declaration
Part 9 : Contract of Temporary Employment as Community Liaison Officer
Part 10 : Details of Qualification and Staff Experience of Staff
Part 11 : Price Basis for Imported Resources
Part 12 : Technical data sheet

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

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

The Contractor shall within two weeks after receiving a completed copy of this agreement, including the

**CONTRACT NO. 3Q/2019/20: DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR
THE BELLVILLE DA PLANT REACTOR UPGRADE**

The Parties	Employer	Contractor
Business Name	CITY OF CAPE TOWN	INENZO WATER (PTY) LTD
Business Registration	N/A	[REDACTED]
Tax number (VAT)	[REDACTED]	[REDACTED]
Physical Address	Tower Block, Civic Centre, 12 Hertzog Boulevard Cape Town 8001	[REDACTED]
Accepted contract sum including tax	R 99 392 662.52 (including VAT)	R 99 392 662.52 (including VAT)
Accepted contract duration	1272 days from date of commencement of Contract	1272 days from date of commencement of Contract
Signed – who by signature hereto warrants authority	[REDACTED]	[REDACTED]
Name of signatory	Michael John Webster	[REDACTED]
Signed: Date	2022 -11- 15	10/11/22
Signed: Location		

FORM OF OFFER AND ACCEPTANCE (Continued)

CONTRACT NO. 3Q/2019/20: DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS
FOR THE BELLVILLE DA PLANT REACTOR UPGRADE

(TO BE FILLED IN BY THE CITY)

Schedule of Deviations

Notes:

1. The extent of deviations from the tender documents issued by the employer before the tender closing date is limited to those permitted in terms of the conditions of tender.
 2. A tenderer's covering letter shall not 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.
 3. Any other matter 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.
 4. Any change or addition to the tender documents arising from the above agreements and recorded here, shall also be incorporated into the Contract.
- 1 Subject **CLARIFICATION NOTICE 1- DATED 05 AUGUST 2019- CONTRACT NO. 3Q/2019/20: DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT REACTOR UPGRADE**

Details **AMENDMENTS, WHICH ARE TO BE MADE TO THE TENDER DOCUMENT FOR THE ABOVEMENTIONED IN TERMS OF THE FOLLOWING ADDENDUM, IS ISSUED IN TERMS OF CLAUSE F.3.2 OF THE STANDARD CONDITIONS OF TENDER AND IN ACCORDANCE WITH CLAUSE F .1.4 IN T1.2 TENDER DATA. TENDERERS WILL BE DEEMED TO HAVE MADE ANY ALLOWANCE NECESSARY TO PROVIDE FOR THESE AMENDMENTS IN THEIR TENDER OFFER.**

1. **COPY OF ATTENDANCE REGISTER ATTACHED (SITE CLARIFICATION MEETING 24/07/2019);**
2. **DO PROBE SUPPLIERS;**

11. UNDERDRAIN SYSTEM;

12. CIVIL WORKS ON ARCHIMEDES SCREW PUMPS.

- 1 Subject **CLARIFICATION NOTICE 2- DATED 16 AUGUST 2019- CONTRACT NO. 3Q/2019/20: DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT REACTOR UPGRADE**

Details AMENDMENTS, WHICH ARE TO BE MADE TO THE TENDER DOCUMENT FOR THE ABOVEMENTIONED IN TERMS OF THE FOLLOWING ADDENDUM, IS ISSUED IN TERMS OF CLAUSE F.3.2 OF THE STANDARD CONDITIONS OF TENDER AND IN ACCORDANCE WITH CLAUSE F .1.4 IN T1.2 TENDER DATA. TENDERERS WILL BE DEEMED TO HAVE MADE ANY ALLOWANCE NECESSARY TO PROVIDE FOR THESE AMENDMENTS IN THEIR TENDER OFFER.

1. Refer to Volume 3 (Page 166) SoQ item 2.1.6;
2. Refer to Volume 3 (Page 170) SoQ item 4.4.2;
3. Refer to Volume 3 (Page 195) SoQ item 10.1.7.3-10.1.7.8
4. Refer to Volume 3 (Page 220) ;
5. Refer to Volume 3A (Page 24) ;

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

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



CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

FINANCE
SUPPLY CHAIN MANAGEMENT

Samantha Lee Mars
Senior Professional Officer

T: 021 400 9240

E: samanthalee.mars@capetown.gov.za

05 August 2019

NOTICE TO TENDERERS NO: 1

Pages. 7

TENDER NUMBER: 3Q/2019/20

DESCRIPTION: DESIGN-BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT REACTOR UPGRADE

CLOSING DATE OF TENDER: 26 August 2019

BOX NUMBER: 137

Dear Sir/Madam

Tenderers should take note of the following:

Your attention is specifically drawn to the amendments which are to be made to the Tender Document for the above in terms of the following addendum is issued in terms of clause F.3.2 of the Standard Conditions of Tender and in accordance with Clause F.1.4 in T1.2 Tender Data. Tenderer's will be deemed to have made any allowances necessary to provide for these amendments in their tender offer.

NOTICE TO TENDERERS NO 1

RESPONSE TO REQUESTS FOR CLARIFICATION

- 1 Copy of attendance register attached (site clarification meeting 24/07/2019):
Refer to Attachment 01.

- 4 **Standard drawings:**
The tenderers should note that the standard City of Cape Town drawings is included in Attachment # 02.
- 5 **Removal of sludge and cleaning of reactor:**
Tenderers should note that it will be the civil contractor's responsibility to remove sludge and clean the respective north, central and south reactors. The civil contractor will remove all piping in the FBDA network and therefore does not need to be costed for by the M&E contractor.
- 6 **Removal of existing equipment from site:**
Tenderers should note that all existing vertical shaft mixers, screw pumps and aeration piping that forms part of these scope of works should be removed and stored in a designated area on site. The existing FBDA system and associated piping will be removed by the civil contractor.
- 7 **Removal of existing MCC panels:**
Tenderers should note that the removal of existing MCC panels from site has been allowed for on page 191 of Volume 3 SoQ item 9.24.1 – 9.24.11
Item 9.33 has been added to the SOQ on page 193 of Volume 3 (included in Attachment # 03) for the removal of the existing blower generator, existing area lighting and pump station small power & lighting.
- 8 **Performance guarantee:**
The tenderers should note that the performance guarantee will be valid for the total duration of the project.
- 9 **Partial taking-over:**
The tenderers should note that partial taking-over certificates will be issued after each reactor upgrade. The North, Central and South reactors will each be subjected to an estimated 9 months civil works followed consecutively by an estimated 4 months of Mechanical & Electrical works. The site establishment for the M & E contractor should occur 1 month prior to the civil works is due to complete on each reactor. Therefore, the site establishment will occur 3 times by the M & E contractor. The tenderer should take cognisant of these facts and plan their resource and storage of equipment accordingly.
- 10 **Knife Gate Valve specification:**
The tenderers should note the following on page 174 of Volume 3 SoQ item 6.1.5: the description of 316SS preceding PN6 DN200 should be deleted. In

12 Civil Work on Archimedes Screw Pumps

The civil work on the Archimedes screw pumps will be done by the civil contractor. This will include removing the concrete to make space for the new screws, preparation for the screws and screeding.

Yours Faithfully,

A large black rectangular redaction box covering the signature of Basil Chinasamy.

For: Basil Chinasamy
Director: Supply Chain Management

WRITTEN ACKNOWLEDGEMENT OF RECEIPT OF NOTICE: Notice no: 1 -3Q/2019/20

Signature.......... Date.....05/08/19.....

Legal and full name of tendering entity:

.....INENZO WATER (PTY) LTD.....

ATTENDANCE REGISTER

WV/BEL/MEETING REG/009 Date : 19/09/2016 Water and Sanitation Department
 Compiled by: Khuthala Faku Bellville Wastewater Works
 DATE: 24/07/19 MEETING AGENDA: 30/2019/10 Site Clarification

TIME START: TIME END: GROUP/COMPANY/PERSONS IN ATTENDANCE:

FACILITATOR: MEDIUM/METHOD and MATERIAL UTILISED:

No Name Surname Designation Department/Company Contact Number Email



ATTENDANCE REGISTER

WM/BEL/MEETING REG/009 Date: 19/09/2016 Water and Sanitation Department
 Compiled by: Khuthala Foku Bellville Wastewater Works
 DATE: 24/07/2019 MEETING AGENDA: 30/07/2020
 Version 1 Approved Operation

TIME START: 10:00 TIME END: GROUP/COMPANY/PERSONS IN ATTENDANCE: Nko Cumbusa line 15
 MEDIUM/METHOD AND MATERIAL UTILISED:

FACILITATOR: Roqeer Hossain

No	Name	Surname	Designation	Department/Company	Contact Number	Email
	Winye	Chosipos	Head of line	CC	082 810 762	Winye@wsp.co.za
	Shel		SFO	CC		Shel@wsp.co.za
	S. Goshwami	NO IPADIES		CC		S. Goshwami

**DESIGN - BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
BROUGHT FORWARD					
9.28	Disconnection, re-route and re-termination of the following TYPE S1 cables from the existing "MCC" to the "NEW MCC"				
9.29.1	0.5 mm2 x 1 Pair	No	1		Rate Only
9.29.2	0.5 mm2 x 2 Pair	No	1		Rate Only
9.29.3	0.5 mm2 x 4 Pair	No	1		Rate Only
9.29.4	0.5 mm2 x 8 Pair	No	1		Rate Only
9.29	Disconnection, re-route and re-termination of the following TYPE S2 cables from the existing "MCC" to the "NEW MCC"				
9.29.1	0.5 mm2 x 1 Pair	No	1		Rate Only
9.29.2	0.5 mm2 x 2 Pair	No	1		Rate Only
9.29.3	0.5 mm2 x 4 Pair	No	1		Rate Only
9.29.4	0.5 mm2 x 8 Pair	No	1		Rate Only
9.30	Disconnection and removal from cable ways and trenches of the following TYPE S1 cables				
9.30.1	0.5 mm2 x 1 Pair	m	1		Rate Only
9.30.2	0.5 mm2 x 2 Pair	m	1		Rate Only
9.30.3	0.5 mm2 x 4 Pair	m	1		Rate Only
9.30.4	0.5 mm2 x 8 Pair	m	1		Rate Only
9.31	Disconnection and removal from cable ways and trenches of the following TYPE S2 cables				
9.31.1	0.5 mm2 x 1 Pair	m	1		Rate Only
9.31.2	0.5 mm2 x 2 Pair	m	1		Rate Only
9.31.3	0.5 mm2 x 4 Pair	m	1		Rate Only
9.31.4	0.5 mm2 x 8 Pair	m	1		Rate Only
9.32	Additional Items Other items the tenderer may consider necessary to complete the installation				
9.32.1		Lot	1		R
9.32.2		Lot	1		R



**CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD**

**FINANCE
SUPPLY CHAIN MANAGEMENT**

Samantha Lee Mars
Senior Professional Officer
T: 021 400 9240

E: samanthalee.mars@capetown.gov.za

16 August 2019

NOTICE TO TENDERERS NO: 2

Pages 2

TENDER NUMBER: 3Q/2019/20

**DESCRIPTION: DESIGN-BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT
REACTOR UPGRADE**

CLOSING DATE OF TENDER: 26 August 2019

BOX NUMBER: 137

Dear Sir/Madam

Tenderers should take note of the following:

Your attention is specifically drawn to the amendments which are to be made to the Tender Document for the above in terms of the following addendum is issued in terms of clause F.3.2 of the Standard Conditions of Tender and in accordance with Clause F.1.4 in T1.2 Tender Data. Tenderers will be deemed to have made any allowances necessary to provide for these amendments in their tender offer.

NOTICE TO TENDERERS NO 2

- 1** Refer to Volume 3 (page 166) SoQ item 2.1.6:
Tenderers should include the word 'Sum' under the 'UNIT' column and the number '1' under the 'QTY' column.

Motor Casing: delete '316 Stainless Steel' and replace with 'Cast Iron coated to D44.3 of the Standard Specification for Mechanical Works'.

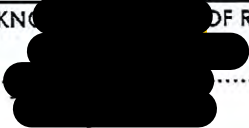
This applies to the SoQ item 3.2.5 on page 168 of Volume 3.

Yours Faithfully,



For: Basil Chinasamy
Director: Supply Chain Management

WRITTEN ACKNOWLEDGEMENT OF RECEIPT OF NOTICE: Notice no: 2 - 3Q/2019/20

Signature.......... Date.....16/08/19.....

Legal and full name of tendering entity:

.....INENZO WATER(PTY)LTD.....

PART 2: CONTRACT SPECIFIC DATA

PARTICULAR CONDITIONS

The Particular Conditions are:

1 General Provisions

Sub-Clause 1.1 Definitions

1.1.1 The Contract

1.1.1.1 is deleted and replaced by:

"Contract" means the Form of Offer and Acceptance, Contract Data, these General Conditions, the Employer's Requirements, the Drawings, the Schedules, and the further documents (if any) which are listed in the Form of Offer and Acceptance, and further includes drawings and documents or parts thereof which any of the aforesaid documents incorporate by reference.

1.1.1.2 is deleted and replaced by:

"Contract Agreement" means the document called "Form of Offer and Acceptance".

1.1.1.3 is deleted and replaced by:

"Letter of Acceptance" means that section of the Form of Offer and Acceptance called "Acceptance".

1.1.1.4 is deleted and replaced by:

"Letter of Tender" means that section of the Form of Offer and Acceptance called "Offer".

1.1.1.5 is deleted and replaced by:

"Employer's Requirements" means the document titled "Part C3: Scope of Work", as included in the Contract, and any additions and modifications to such document in accordance with the Contract. Such document specifies the purpose, scope, and/or design and/or other technical criteria, for the Works, and includes the Specifications.

1.1.1.6 is deleted and replaced by:

"Schedules" means the document(s) entitled schedules, completed by the Contractor and submitted with his tender offer, as included in the Contract. Such document(s) shall include the Returnable Schedules and the Schedules of Quantities, and may include data, lists and schedules of rates and/or prices.

1.1.1.7 is deleted and replaced by:

"Contractor's Proposal" means the information which the Contractor submitted with the Form of Offer and Acceptance, as included in the Contract. Such information shall include the information listed in Schedule 18 in Part T2.2 Returnable Schedules and may also include the Contractor's preliminary design.

1.1.2 Parties and Persons

1.1.2.3 is deleted and replaced by:

"Contractor" means the person(s) named as Contractor in that section of the Form of Offer called "Offer" accepted by the Employer and the legal successors in title to this person(s).

1.1.2.9 is deleted and replaced by:

"Mediator" means the person appointed under Sub-Clause 20.2 [*Mediation*] in the Contract Data.

1.1.3 Dates, Tests, Periods and Completion

1.1.3.1 is deleted and replaced by:

"Base Date" means the date 7 days prior to the closing date for the submission of the Tender.

1.1.3.2 is deleted and replaced by:

"Commencement Date" means the date the Contractor receives one fully completed original copy of the document

1.1.4 Money and Payments

1.1.4.1 is deleted and replaced by:

"Accepted Contract Amount" means the amount accepted in that section of the Form of Offer and Acceptance called "Acceptance" for the execution and completion of the Works and the remedying of any defects.

1.1.4.6 is deleted and replaced by:

"Foreign Currency" means a currency in which part (if any) of the Contract Price is payable, but not the Local Currency.

Add the following Sub-Clause after Sub-Clause 1.1.4.12:

1.14.13 **"Contract Price Adjustment"** means the adjustment to be included in the Contract Price for fluctuations in the Cost of Plant and Materials, Site Installation, General Items (comprising General Requirements and Conditions, Health and Safety, Environmental Management, Sundries, etc.), and Variations in Rates of Exchange, Customs Surcharge and Customs Duty, all as provided for in Sub-Clause 13.8 [*Adjustments for Changes in Cost*] in the Contract Data.

1.14.14 **"Reasonable Profit"** means an amount not exceeding 10% of the Cost of any item or activity

1.1.5 Works and Goods

1.1.5.6 is deleted and replaced by:

"Section" means a part of the Works specified in the Appendix to Tender as a Section (if any), or a part of the Works specified as a Section during the course of the Contract by the Employer (such Section may be an item of Plant).

- (a) the Form of Offer and Acceptance,
- (b) the Appendix to Tender within the Contract Data,
- (c) the Particular Conditions within the Contract Data,
- (d) these General Conditions,
- (e) the Employer's Requirements,
- (f) the Drawings, and
- (g) the Schedules.

If an ambiguity or discrepancy is found in the documents, the Engineer shall issue any necessary clarification or instruction.

Sub-Clause 1.6 Contract Agreement

Deleted and replaced by:

The Parties shall enter into a Contract Agreement after the Contractor is called upon to do so by the Employer. The Agreement shall be the fully completed Form of Offer and Acceptance contained in the Contract Document.

Sub-Clause 1.8 Care and Supply of Documents

Delete "six copies" in the second sentence of the first paragraph and replace with "three copies".

Sub-Clause 1.12 Confidential details

Insert the following after the first paragraph:

The Parties shall treat the details of the Works comprised in this Contract as private and confidential (save in so far as may be necessary for the purposes hereof) and shall not publish or disclose the same or any particulars thereof in any trade or technical paper elsewhere without the prior written consent of the other Party.

Sub-Clause 1.13 Compliance with Laws

Insert "deposits" after "taxes" in 1.13 b).

Add the following paragraph after 1.13 (b):

- (c) Where the Contract Sum exceeds one hundred and thirty million Rand (R130 000 000), the Employer shall, in compliance with Regulation 3 of the Construction Regulations, read together with the exemptions published in Government Notice dated 7 July 2015, apply to the Provincial Director of the Department of Labour for a construction work permit to perform the intended construction work. The employer will apply for the construction work permit as soon as possible after its Bid Adjudication Committee has awarded the contract, and the period that the Department of labour requires to issue the permit will run concurrently with the appeal period.

2 The Employer

Sub-Clause 2.1 Right of Access to the Site

Add the following after the first sentence of the first paragraph:

3 The Engineer

Add the following at the end of the third paragraph:

The requirements for the Engineer to obtain the approval of the Employer before exercising a specified authority are:

- (a) Clause 3.2: The delegation of duties to others
- (b) Clause 4.24: The issuing of instructions for dealing with fossils and the like.
- (c) Clause 6.5 (b): Giving consent for work to be carried out on days of rest or outside normal working hours.
- (d) Clause 8.6: The approval of a revised programme and supporting report in order to expedite progress.
- (e) Clause 8.8: Instruction to suspend the works
- (f) Clause 13.1: The issuing of any variation that causes the contract price to exceed the accepted contract amount
- (g) Clause 14.2: Agreeing to advance payment for deposits for items not listed in the Advance Payment Schedule.

Sub-Clause 3.4 Replacement of the Engineer

Deleted and replaced by:

The Employer shall have the right to replace the Engineer.

4 The Contractor

Sub-Clause 4.2 Performance Security

Delete the first sentence of the second paragraph and replace with:

The Contractor shall deliver the Performance Security to the Employer within 14 days from the Commencement Date.

Add the following at the end of the second paragraph:

The form of Performance Security shall contain the precise wording of the document included in Part C1.3 of the Contract Data: **Form of Performance Guarantee**, and it shall be issued by a financial institution approved by the Employer at the date when the guarantee is issued. The list of approved financial institutions current at the date of tender is attached to the **Form of Performance Guarantee**.

Sub-Clause 4.3 Contractor's Representative

Delete "prior to the Commencement Date" in the first sentence of the second paragraph and replace with "within 14 days from the Commencement Date".

Sub-Clause 4.4 Subcontractors

Delete "28 days' notice" in sub-paragraph (c) and replace with "14 days' notice".

Add the following clause:

Sub-Clause 4.16 Transport of Goods

Delete "and" after sub-paragraph (b) and add the following to sub-paragraph(c):

In this regard the Contractor's attention is also drawn to Sub-Clause 18.2(f)(i) in the Particular Conditions; and

Add the following sub-paragraph:

(d) the Contractor shall provide all lifting facilities unless specified otherwise in the Detailed Mechanical Specification in the Employer's Requirements.

Sub-Clause 4.17 Contractor's Equipment

Add the following:

The Contractor shall provide all necessary storage facilities on Site.

Sub-Clause 4.18 Protection of the Environment

Add the following:

The Contractor's attention is also drawn to the Environmental Management Specification in the Employer's Requirements.

Sub-Clause 4.21 Progress Reports

Delete " in six copies" in the first sentence and replace with "electronically and one hard copy".

Sub-Clause 4.22 Security of the Site

Add the following sub-paragraph:

(c) The Contractor shall in connection with the Works provide and maintain at his own cost all lights, guards, fencing, watching and other appropriate security measures when and where necessary or required by the Engineer or by any competent statutory or other authority for the protection and security of the Works and the Contractor's Equipment, or for the safety and convenience of the public and for the protection of life and property.

Sub-Clause 4.23 Contractor's Operations on Site

Add the following:

The Contractor shall protect and cover up all works as may be required and take all other precautions necessary to avoid causing damage or soiling of new and existing plant, equipment, buildings and structures. This shall inter alia apply when activities such as abrasive blasting, painting, grinding, sealing, lagging and so forth, must be performed on the Site. The Contractor shall, on completion, remove all covers and shall at his cost rectify all soiling and damage to finishes to the satisfaction of the Engineer.

6 Staff and Labour

Sub-Clause 6.10 Records of Contractor's Personnel and Equipment

Add the following:

The Contractor shall also submit the monthly returns as described in the Scope of Work, Part C3.5 Management, Clause 8.

8 Commencement, Delays and Suspension

Sub-Clause 8.1 Commencement of Work

Add the following at the end of the first paragraph:

Where the Contract Sum exceeds forty million Rand (R40 000 000), and a construction work permit from the Provincial Director of the Department of Labour is required, commencement of the Works shall not be deemed to take place until such construction work permit has been issued by the Provincial Director in terms of Clause 1.13 [Compliance with Laws].

Delete the first paragraph.

Delete the words "the design and execution of the Works as soon as is reasonably practicable after" in the second paragraph and replace with "executing the Works within 14 days from".

The Contractor will not be given access to, and possession of the Site, until the following documentation has been submitted and approved by the Engineer:

- (a) Health and Safety Plan (refer to Clause G1.4 in the Health and Safety Specification included in Volume 3A.
- (b) Method Statements (refer to Clause H5.1 in the Environmental Management Specification in Volume Specification included in Volume 3A.)
- (c) Proof of Registration / Letter of Good Standing with the appropriate Bargaining Council
- (d) Proof of insurances to be affected and maintained by the Contractor in terms of clause 18 of FIDIC 1999.
- (e) Health and Safety Agreement and Protection of Environment Declaration is completed and signed.
- (f) Performance Guarantee and Advance Payment Guarantee worded precisely as per the attached pro-forma in this Volume 3.

Sub-Clause 8.3 Programme

Delete the first sentence of the first paragraph and replace with:

The Contractor shall submit a detailed time programme to the Engineer within 14 days from the Commencement Date.

Add the following after the first paragraph:

The Contractor shall incorporate any programming restrictions that may be specified in Sub-Clause 2.1 in the Particular Conditions into the programme.

Sub-Clause 8.4 Extension of Time for Completion

June	4 days
July	4 days
August	4 days
September	4 days
October	2 days
November	2 days
December	2 days

Sub-Clause 8.7 Delay Damages

Wherever the phrase "Delay Damages" occur in the Contract it should be replaced with the phrase "Delay Penalties".

Insert the following at the end of the second sentence in the first paragraph:

....or, in the event of termination by the Employer under Sub-Clause 15.2 [*Termination by Employer*], the actual date of termination.

Sub-Clause 8.10 Payment for Plant and Materials in Event of Suspension

Replace sub-paragraph (b) with the following:

- (b) the Contractor has provided an advance payment guarantee in accordance with Sub-Clause 14.2 in the Particular Conditions.

9 Tests on Completion

Sub-Clause 9.1 Contractor's Obligations

Delete "21 days" in the first sentence of the second paragraph and replace with "14 days".

10 Employer's Taking Over

Sub-Clause 10.1 Taking Over of the Works and Sections

Delete 28 days in the 3rd and final paragraph and replace with 14 days

11 Defects Liability

Sub Clause 11.3 Extension of Defects Notification Period

Delete the first paragraph and replace with:

The Employer shall be entitled subject to Sub-Clause 2.5 [*Employer's Claims*] to an extension of the relevant Defects Notification Period for the Works or a Section if and to the extent that the Works or Section (as the case may be, and after taking-over) cannot be used for the purposes for which they are intended by reason of a defect or damage. However, a Defects Notification Period shall not be extended by more than five years.

13 Variations and Adjustments

Sub-Clause 13.8 Adjustments for Changes in Cost

Deleted and replaced by:

13.8.1 General

The Accepted Contract Amount shall be deemed to have included amounts to cover the contingency of all other rises and falls in costs not covered by the provisions of this or other Clauses.

If provision has been made in the Appendix to Tender for prices to be subject to adjustment, such adjustments claimed by the Contractor shall be made in accordance with the Sub-Clauses referred to therein.

The following general provisions shall apply in all cases:

- (a) The Base Date shall be as defined in Sub-Clause 1.1.3.1 in the Particular Conditions.
- (b) Adjustments for changes in cost shall be calculated as if the Works are executed within the time for completion and no additional costs due to any work being executed outside the time for completion shall be payable unless the Engineer allows an extension of time in accordance with Sub-Clause 8.4 [*Extension of Time for Completion*] and Sub-Clause 8.4 in the Particular Conditions.
- (c) Claims for adjustments for changes in cost shall be supported by such documentary evidence that may be required by the Engineer. Failure to render this information may result in the rejection of claims for price adjustment.
- (d) The value of imported Plant and Materials shall be as defined in the sub-clause below.
- (e) No claims for adjustments for changes in cost will be accepted which are submitted later than 28 days after the date of issue of the Taking-Over Certificate.

13.8.2 Plant and Materials Manufactured in South Africa

13.8.2.1 Permissible Adjustments

Adjustment to the Contract Price for the design, manufacture, painting, testing, supply, delivery, offloading and storage of Plant and Materials manufactured in the Republic of South Africa, shall be allowed **only** for variations in the cost of labour and material based on the indices published by the Steel and Engineering Industries Federation of South Africa (SEIFSA) using the method described in Sub-Clause 13.8.2.1.2.

The following SEIFSA tables shall be regarded as relevant to Mechanical and Electrical Works in this Contract:

Table C3 Index of actual labour cost

Table G Statistics SA - production price index. Mechanical and Electrical

- (a) The estimated proportions (represented by the coefficients "b", "c", "d" and "e" in the formulae in sub-paragraph (b) below) of the total values shall be adjusted on the basis of the increase or decrease between the indices in the relevant tables at the Base Date and these indices at a date 42 days prior to the valuation date, for each month in which the Plant and Materials are contractually delivered to Site, by multiplying the monthly values certified by the relevant Adjustment Factor in the formulae in sub-paragraph (b) below.

(b) the applicable formulae are:

Mechanical Plant and Materials

$$A = a + b \frac{L_n}{L_o} + c \frac{M_n}{M_o} + d \frac{S_n}{S_o} + e \frac{SS_n}{SS_o} - 1$$

where

A	=	Adjustment Factor rounded off to the sixth decimal place
a	=	0.10 Fixed coefficient (non-adjustable portion)
b	=	0.15)
c	=	0.35) Coefficients (sum of these coefficients shall be 0,90)
d	=	0.25)
e	=	0.15)
L _n	=	Current labour index in Table C3
L _o	=	Base labour index in Table C3
M _n	=	Current mechanical engineering materials index in Table G
M _o	=	Base mechanical engineering materials index in Table G
S _n	=	Current steel price index in Table E-EX
S _o	=	Base steel price index in Table E-EX
SS _n	=	Current stainless steel index type 316 in Table Q-(A)
SS _o	=	Base stainless steel index type 316 in Table Q-(A)

(COMPILER NOTE: specify stainless steel type if not 316)

"Current" indices are those applicable 42 days prior to date of claim, as stated in sub-paragraph (a) above

"Base" indices are those applicable at Base Date, as stated in sub-paragraph (a) above

Electrical Plant and Materials

$$A = a + b \frac{L_n}{L_o} + c \frac{E_n}{E_o} + d \frac{CR_n}{CR_o} + e \frac{C_n}{C_o} - 1$$

where

A	=	Adjustment Factor rounded off to the sixth decimal place
a	=	0.10 Fixed coefficient (non-adjustable portion)
b	=	0.10)
c	=	0.30) Coefficients (sum of these coefficients shall be 0,90)
d	=	0.20)
e	=	0.30)
L _n	=	Current labour index in Table C3
L _o	=	Base labour index in Table C3

shall be deemed to be manufactured in South Africa for the purposes of Contract Price Adjustment.

13.8.3 Plant and Materials Imported from Outside South Africa

1383.1 If price adjustment for variations in the cost of plant and materials imported from outside of South Africa is required, such adjustment shall be based on the information contained on the schedule titled "**Price Basis for Imported Resources**" and as below. For the purposes of this clause the Rand value of imported Plant and Materials inserted on the schedule titled "**Price Basis for Imported Resources**" (column (F)) shall be the value in foreign currency (column (A)) converted to South African Rand (column (C)) by using the closing spot selling rate quoted by **Employer's** main banker, ABSA, on the Base Date (seven calendar days before tender closing date) rounded to the second decimal place (column(B)), to which shall be added any Customs Surcharge and Customs Duty applicable at that date (columns (D) and (E)).

13.8.3.1.1 Adjustment for variations in rates of exchange:

- (a) The value in foreign currency inserted in column (A) shall be subject to clause (h) below when recalculating the Rand value.
- (b) The rate of exchange inserted in column (B) shall be the closing spot selling rate quoted by Council's main banker, ABSA, on the Base Date, rounded to the second decimal place, subject to sub-paragraph (c) below.
- (c) If the rate of exchange inserted by the Tenderer differs from the ABSA rate referred to above, then the ABSA rate shall apply and the Rand value in columns (C) and (F) shall be recalculated accordingly, without altering the price in the Schedules of Quantities for the relevant items.
- (d) If a tender from a supplier or sub-contractor provides for variations in rates of exchange, the Contractor may **only** claim for variations in rates of exchange if he binds the supplier or sub-contractor to the same provision to take out forward cover as described in sub-paragraph (e) below.
- (e) The Contractor (or supplier or sub-contractor) shall within five working days from the date of placing a firm order on an overseas supplier, cover or recover forward by way of a contract with a bank which is an authorised foreign exchange dealer, the foreign exchange component of the cost of any imported Plant and Materials inserted by the Tenderer on the schedule titled "**Price Basis for Imported Resources**".
- (f) When the Contractor (or supplier or sub-contractor) so obtains forward cover, the Contractor shall immediately notify the Employer of the rate obtained and furnish the Employer with a copy of the foreign exchange contract note.
- (g) Based on the evidence provided in sub-paragraph (f) above, the value in Rand inserted in column (C) of the schedule titled "**Price Basis for Imported Resources**" shall be recalculated using the forward cover rate obtained, and any increase or decrease in the Rand value defined in this clause shall be adjusted accordingly, subject to sub-paragraph (h) below. Failure to provide such evidence shall result in no such recalculation shall be considered by the Employer.
- (h) The adjustments shall be calculated upon the value in foreign currency in the Contractor's (or

installation for the sake of convenience, and which otherwise have no relationship with each other.

General Items shall comprise General Requirements and Conditions, Health and Safety, Environmental Management, Sundries, and any other items so described or implied in the Schedules of Quantities to be adjusted under this Sub-Clause.

Adjustment of the total values inserted in the Schedules of Quantities for Site Installation and General Items, shall be based on the following:

(a) No Contract Price Adjustment shall be applied to the total values in respect of providing the Performance Security (Demand Guarantee under URDG 758) and Insurances.

(b) The estimated proportion (represented by the 0.90 coefficient in the formula in sub-paragraph (c) below) of the total values shall be adjusted on the basis of the increase or decrease between SEI/FSA **Table C3(A)** Index of actual labour cost (field force) where subsistence allowance is paid, at the Base Date and this index at the valuation date, for each month in which the work is contractually executed, by multiplying the monthly values certified by the Adjustment Factor in the formula in sub-paragraph (c) below.

(c) the applicable formula is:

Site Installation and General Items

$$A = 0.10 + 0.90 L_n - 1$$

where A = Adjustment Factor rounded off to the sixth decimal place

0.10 = Fixed coefficient (non-adjustable portion)

0.90 = Coefficient

L_n = Current labour index in Table C3(A)

L_o = Base labour index in Table C3(A)

"Current" index is that applicable at the valuation date, as stated in sub-paragraph (b) above

"Base" index is that applicable at Base Date, as stated in sub-paragraph (b) above

14 Contract Price and Payment Sub-

Clause 14.1 The Contract Price Delete

sub-paragraph (d) and replace with:

(d) Price data in any Schedule, will be used for calculating the value of completed works for the purpose of interim payments or for determining the value of changes, omissions and additions for variation instructions when in the opinion of the Engineer such prices are applicable.

Add the following at the end of the Sub-clause:

(e) Except as otherwise stated in the Contract all parts of the Works are to be measured and the value agreed or determined, in accordance with Sub-Clause 3.5. Measurement shall be made of the net actual quantities of those parts, notwithstanding local practice.

Whenever the Engineer requires any part of the Works to be measured, reasonable notice shall be given to the Contractor's Representative, who shall:

- (i) promptly either attend or send another qualified representative to assist the Engineer in making the measurement, and
- (ii) supply any particulars requested by the Engineer.

If the Contractor fails to attend or send a representative, the measurement made by (or on behalf of) the Engineer shall be accepted as accurate.

- (f) Except as otherwise stated in the Contract, wherever any Permanent Works are to be measured by records, they shall be prepared by the Engineer. The Contractor shall, as and when requested, attend to examine and agree the records with the Engineer, and shall sign the same when agreed. If the Contractor does not attend to examine and agree, these records shall be accepted as accurate.

If the Contractor examines and disagrees the records, and/or does not sign them as agreed, then the Contractor shall notify the Engineer of the respects in which the records are asserted to be inaccurate. After receiving this notice, the Engineer shall review the records and either confirm or vary them. If the Contractor does not so notify the Engineer within 14 days after being requested to examine the records, they shall be accepted as accurate.

- (g) All measurements of quantity, length and mass for the purpose of payment shall be to the nearest standard unit for which rates are given in the Schedules of Quantities or have been agreed by the Engineer and shall be taken from the actual work on Site.
- (h) Surplus or waste material will not be taken over or paid for by the Employer except where at the time when it was reasonable for the material to be provided or manufacture to be put in hand it was not possible to determine the quantity of material required. The route lengths determined by the Contractor in accordance with the specification shall be used for the purposes of manufacture in place of the estimated route lengths and any surplus after completion arising therefrom will not be taken over or paid for by the Employer unless the Employer so decides.

Sub-Clause 14.2 Advance Payment

Deleted and replaced by:

Subject to sub-paragraphs (a) and (e) of Sub-Clause 14.3 in the Particular Conditions, and the Advance Payment Schedule, the Employer shall make an advance payment for Plant and Materials stored at places other than the Site, or in respect of which a deposit with order is required, only once the Contractor has submitted an advance payment guarantee in accordance with this Sub-Clause.

Unless and until the Employer receives this guarantee, the following paragraphs shall not apply.

The Engineer shall issue an Interim Payment Certificate for, or including, advance payment after receiving a Statement under Sub-Clause 14.3 [*Application for Interim Payment Certificates*] and after the Employer has received a guarantee in an amount equal to the advance payment requested. This guarantee shall be issued by a financial institution approved by the Employer, as listed in the Annexure in Part C1.3 of the Contract Data, and shall be in the form of and shall contain the precise wording of the document included in Part C1.4: **Form of Advance Payment Guarantee** and shall come into force, be administered and expire in terms thereof.

Sub-Clause 14.5 Plant and Materials intended for the Works

Add to (c)(ii):

or are ready to be delivered to site and the Engineer has instructed the Contractor to store the Plant and Materials until the site can accommodate their delivery, and are properly stored at the Contractor's or the sub-Contractor's Works, are protected against loss, damage or deterioration, and appear to be in accordance with the Contract and for which an advance payment guarantee has been provided in accordance with Sub-Clause 14.2 in the Particular Conditions. The advance payment guarantee shall be valid until the Plant and Materials are properly stored on Site and protected against loss, damage or deterioration.

Sub-Clause 14.6 Issue of Interim Payment Certificates

Delete "within 28 days" in the second sentence of the first paragraph and replace with "within 21 days".

Sub-Clause 14.7 Payment

Delete sub-paragraphs (a) to (c) and replace with:

- (a) the amount certified in each Interim Payment Certificate within 35 days after the Engineer receives the Statement and supporting documents; and
- (b) the amount certified in the Final Payment Certificate within 28 days after the Employer receives this Payment Certificate.

Add the following paragraph:

Notwithstanding the above, the Engineer shall be empowered to withhold the delivery of a payment certificate until the Contractor has complied with his obligations to submit the monthly returns in terms of Sub-Clause 6.10 in the Particular Conditions and as described in the Employer's Requirements.

The Contractor may submit a fully motivated application regarding more frequent payment to the Engineer to be submitted to the Employer for consideration. Requests for more frequent payments will be considered at the sole discretion of the Employer and is not a right in terms of this contract.

Sub-Clause 14.9 Payment of Retention Money

Delete the last paragraph and replace with:

The relevant contract value for each Section shall be determined by the Engineer, based on the Schedules of Quantities and any variations and adjustments thereto.

Sub-Clause 14.10 Statement at Completion

Delete "Within 84 days" in the first paragraph and replace with "Within 28 days,".

Delete "six copies of" in the first paragraph.

Final Payment Certificate], respectively. Failure by the Contractor to provide a tax invoice (VAT invoice) timeously may delay delivery of the payment certificate by the Engineer and no interest shall accrue.

Tax invoices may only be dated on or after the date of the relevant Payment Certificate as issued by the Engineer.

15 Termination by Employer

Add the following additional Sub-Clause after Sub-Clause (f)

- (f) who was a Sole Proprietor, or a sole member of a Close Corporation dies

16 Suspension and Termination by Contractor

Sub-Clause 16.1 Contractor's Entitlement to Suspend Work

Delete "Sub-Clause 2.4 [*Employer's Financial Arrangements*] or" in the first paragraph.

Sub-Clause 16.2 Termination by Contractor

Delete the content of sub-paragraph (a)

17 Risk and Responsibility

Sub-Clause 17.3 Employer's Risks

Add the following after sub-clause (h):

- (i) defects in the materials supplied by the Employer for incorporation in the Works,
- (j) the confiscation, commandeering, nationalisation, requisition or destruction of or damage to property by an order of government, or any public or local authority, and
- (k) the amounts by which the replacement value of free issue materials exceeds the values as specified in the tender document by the Employer.

18 Insurance

Sub-Clause 18.1 General Requirements for Insurances

Add the following at the end of the first paragraph:

Save as otherwise provided in the Contract, nothing herein contained shall oblige the Insuring Party to effect any insurance which is not generally obtainable from a registered insurer in South Africa.

Add the following at the end of the second last paragraph:

The Insuring Party shall be liable for the payment of all deductibles.

Add the following at the end of Sub-Clause (a) before the comma:

In addition to and in terms of the same conditions as the rest of this clause, the Insuring Party shall provide Motor Vehicle Liability Insurance comprising (as a minimum) "Balance of Third Party" Risks including Passenger Liability Indemnity.

Sub-Clause 18.4 Insurance of Contractor's Personnel

Add the following at the end of the first paragraph:

This insurance shall be in terms of the provisions of the Compensation for Occupational Injuries and Diseases Act, 130 of 1993.

20 Claims, Disputes

and Arbitration Sub-

Clause 20.5 Amicable

Settlement Add the

following after the first

paragraph:

Any amicable settlement conducted in terms of this clause will be done by mediation in accordance with rules determined by the mediator. Where the parties fail to agree on a mediator, the mediator shall be appointed by the entity or official named in the Appendix to Tender.

Mediation shall be conducted without legal representation with the costs being borne equally by the parties.

The parties shall record any agreement reached in writing and thereafter they shall be bound by such agreement.

The mediator shall be authorized to end the mediation process whenever, in his opinion, further efforts at mediation would not contribute to a resolution of the dispute between the parties.

If the mediation fails, then either party may require that the dispute be

settled by litigation. *Delete all references to "Arbitration" in the*

conditions and replace it with "Litigation" Delete Sub-Clause 20.6 and

replace with the following:

Sub-Clause 20.6 Litigation

Any unresolved dispute shall be finally determined by court proceedings in the Court as stated in the Appendix to Tender.

to review and terminate this contract as is contemplated in Section 116(1)(b)(iii) of the Local Government: Municipal Finance Management Act 56 of 2003, without adjustment to the agreed rates, sums or fees and without payment of any penalty or surcharge in this regard. The supplier shall however be entitled to pro-rata payment for all services carried out in terms of any adjustment to the Scope of Work or, in the case of termination, payment for good delivered.

Clause 23

As required by section 116(2)(b) of the *Local Government: Municipal Financial Management Act 56 of 2003*, the City shall monitor the performance of the contractor/supplier on at least a monthly basis, and the supplier agrees to provide the City with its full cooperation in this regard.

ADVANCE PAYMENT SCHEDULE

This Advance Payment Schedule is to be read in conjunction with Sub-Clauses 14.2 and 14.3 (sub-paragraphs (a) and (e)) in the Particular Conditions. The purpose of this schedule is to itemise specific Plant and Materials not yet brought on to the Site for building into the Permanent Works and for which the Employer is prepared to make advance payments to the Contractor, subject to the conditions below.

The items of Plant and Materials which have been identified by the Employer as being suitable for advance payment in terms of the Contract are listed in the table below. Should an item or items be added to the list at tender stage by a tenderer, such item(s) will not be binding on the Employer.

Plant and Materials which have been manufactured and are stored at places other than the Site:	Plant and Materials yet to be manufactured and for which a deposit with order is required from the Contractor by a manufacturer/supplier, and which may be stored at places other than the Site after manufacture:
	Diffuser grid assembly, including diffuser discs, diffuser bodies, lateral piping and pipe supports (materials only, not labour)
	Retrievable Diffuser Network and Clean in Place System (materials only, not labour)
	Screw pumps, submersible recycle pumps (materials only, not labour)
	Vertical shaft mixers (materials only, not labour)
	Electrical MCC panels
	Instruments
	Cabling

Conditions:

- 1) The Contractor can only rely on advance payment being permitted by the Employer in respect of the Plant and Materials listed in the table above, and in respect of condition 5) below. The Employer may, however, permit advance payment for other Plant and Materials in exceptional circumstances and at its sole discretion, during the course of the Contract, and upon reasonable request from the Contractor.
- 2) Advance payment for the purposes of deposits will only be provided up to a limit of 20% of the value of any one item being claimed.
- 3) The Contractor shall provide the Employer with documentary evidence of the terms and conditions for which a deposit with order is required by a manufacturer/supplier, together with the advance payment guarantee.
- 4) The Contractor will also be permitted to obtain advance payment for the balance of the value of the Plant and Materials in respect of which he has paid a deposit, for an item which after manufacture is stored at a place other than the Site. The Contractor shall, in respect of such payment, provide an advance payment guarantee, either for such balance or, if the advance payment guarantee in respect of the deposit is to be returned by the Employer upon request, for the whole value of the item.

ANNEXURE A: INSURANCE BROKER'S WARRANTY

Pro Forma

Logo

Letterhead of Contractor's Insurance Broker

Date _____

CITY OF CAPE TOWN
City Manager
Civic Centre
12 Hertzog Boulevard
Cape Town
8001

Dear Sir

CONTRACT NO.: 3Q/2019/20

CONTRACT TITLE: DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT
REACTOR UPGRADE

NAME OF CONTRACTOR: _____

I, the undersigned, do hereby confirm and warrant that all the insurances required in terms of the abovementioned term tender contract have been issued and, in the case of blanket/umbrella policies, will be endorsed to reflect the interests of the CITY OF CAPE TOWN with regard to each Works Project contract, and that all the insurances and endorsements, etc., are all in accordance with the requirements of the contract.

I furthermore confirm that all premiums in the above regard have been paid.

Yours faithfully

ANNEXURE B: FORM OF PERFORMANCE GUARANTEE

CITY OF CAPE TOWN

WATER AND SANITATION: WASTEWATER

CONTRACT NO. 3Q/2019/20

DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT REACTOR
UPGRADE

C1.3 Form of Performance Guarantee

PERFORMANCE GUARANTEE

For use with the General Conditions of Contract for Plant and Design-Build for Electrical and Mechanical Works and for Building and Engineering Works Designed by the Contractor, First Edition, 1999 (Yellow Book) published by the International Federation of Consulting Engineers (FIDIC).

GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means:

"Physical address:

"Employer" means: The City of Cape Town, Water and Sanitation.

"Contractor" means:

"Engineer" means:

"Works" means: Contract No. and Title

"Site" means: The site as defined in Sub-Clause 1.1.6.7 of the General Conditions of Contract.

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

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

Amount in words:

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

Amount in words:

3. The Guarantor hereby acknowledges that:
 - 3.1 any reference in this Performance Guarantee to the Contract is made for the purpose of convenience and shall not be construed as any intention whatsoever to create an accessory obligation or any intention whatsoever to create a suretyship;
 - 3.2 its obligation under this Performance Guarantee is restricted to the payment of money.
4. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor hereby undertakes to pay the Employer the sum certified upon receipt of the documents identified in 4.1 to 4.3:
 - 4.1 A copy of a first written demand issued by the Employer to the Contractor stating that payment of a sum certified by the Engineer in an Interim or Final Payment Certificate has not been made in terms of the Contract and failing such payment within seven (7) calendar days, the Employer intends to call upon the Guarantor to make payment in terms of 4.2;
 - 4.2 A first written demand issued by the Employer to the Guarantor at the Guarantor's physical address with a copy to the Contractor stating that a period of seven (7) calendar days has elapsed since the first written demand in terms of 4.1 and the sum certified has still not been paid;
 - 4.3 A copy of the aforesaid payment certificate which entitles the Employer to receive payment in terms of the Contract of the sum certified in 4.
5. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor undertakes to pay to the Employer the Guaranteed Sum or the full outstanding balance upon receipt of a first written demand from the Employer to the Guarantor at the Guarantor's physical address calling up this Performance Guarantee, such demand stating that:
 - 5.1 the Contract has been terminated due to the Contractor's default and that this Performance Guarantee is called up in terms of 5; or
 - 5.2 a provisional or final sequestration or liquidation court order has been granted against the Contractor and that the Performance Guarantee is called up in terms of 5; and
 - 5.3 the aforesaid written demand is accompanied by a copy of the notice of termination and/or the provisional/final sequestration and/or the provisional liquidation court order.
6. It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 4 and 5 shall not exceed the Guarantor's maximum liability in terms of 1.
7. Where the Guarantor has made payment in terms of 5, the Employer shall upon the date of issue of the Final Payment Certificate submit an expense account to the Guarantor showing how all monies received in terms of this Performance Guarantee have been expended and shall refund to the Guarantor any resulting surplus. All monies refunded to the Guarantor in terms of this Performance Guarantee shall bear interest at the prime overdraft rate of the Employer's bank compounded monthly and calculated from the date payment was made by the Guarantor to the Employer until the date of refund.
8. Payment by the Guarantor in terms of 4 or 5 shall be made within seven (7) calendar days upon receipt of the first written demand to the Guarantor.

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

Signed at

Date.....

Guarantor's signatory (1)

Capacity

Guarantor's signatory (2)

Capacity

Witness signatory (1)

Witness signatory (2)

ANNEXURE

LIST OF APPROVED FINANCIAL INSTITUTIONS

The following financial institutions are currently (as at 18 October 2016) approved for issue of contract guarantees to the City:

National Banks:

ABSA Bank Ltd.
FirstRand Bank Ltd.
Investec Bank Ltd.
Nedbank Ltd.
Standard Bank of SA Ltd.

International Banks (with branches in SA):

Barclays Bank plc.
Citibank n.a.
Credit Agricole Corporate and Investment Bank
HSBC Bank plc.
JP Morgan Chase Bank
Societe Generale
Standard Chartered Bank

Insurance companies:

ABSA Insurance
Coface s.a.
Compass Insurance Co.
Constantia Insurance Co. Credit
Guarantee Insurance Co.
Guardrisk Insurance Co.
Hollard Insurance Company Ltd.
Home Loan Guarantee Co.
Infiniti Insurance Limited
Lombard Insurance
Mutual & Federal Insurance Co.
New National Assurance Co.
Regent Insurance Co.
Renasa Insurance Company Ltd.
Santam Limited
Zurich Insurance Co.

ANNEXURE C: FORM OF ADVANCE PAYMENT GUARANTEE

CITY OF CAPE TOWN

WATER AND SANITATION: WASTEWATER

CONTRACT NO. 3Q/2019/20

DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT REACTOR
UPGRADE

C1.4 Form of Advance Payment Guarantee

ADVANCE PAYMENT GUARANTEE

For use with the General Conditions of Contract for Plant and Design-Build for Electrical and Mechanical Works and for Building and Engineering Works Designed by the Contractor, First Edition, 1999 (Yellow Book) published by the International Federation of Consulting Engineers (FIDIC).

GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means:

"Physical address:

"Employer" means: The City of Cape Town, Water and Sanitation.

"Contractor" means:

"Engineer" means:

"Works" means: Contract No. and Title

"Site" means: The site as defined in Sub-Clause 1.1.6.7 of the General Conditions of Contract.

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

"Plant and Materials" means: The Plant and Materials stored at places other than the Site, or in respect of which an advance payment prior to manufacture is required, which the Employer has agreed may be subject to advance payment, such Plant and Materials being listed in the Schedule of Plant and Materials.

1. The Guarantor's liability shall be limited to the amount of the Guaranteed Advance Payment Sum.
2. The Guarantor's period of liability shall be from and including the date of issue of this Advance Payment Guarantee and up to and including the Expiry Date or the date of payment in full of the Guaranteed Advanced Payment Sum, whichever occurs first.
3. The Guarantor hereby acknowledges that:
 - 3.1 any reference in this Advance Payment Guarantee to the Contract is made for the purpose of convenience and shall not be construed as any intention whatsoever to create an accessory obligation or any intention whatsoever to create a suretyship;
 - 3.2 its obligation under this Advance Payment Guarantee is restricted to the payment of money.
4. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor hereby undertakes to pay the Employer the sum certified upon receipt of the documents identified in 4.1 to 4.3:
 - 4.1 A copy of a first written demand issued by the Employer to the Contractor stating that payment of a sum certified by the Engineer in an Interim or Final Payment Certificate has not been made in terms of the Contract and failing such payment within seven (7) calendar days, the Employer intends to call upon the Guarantor to make payment in terms of 4.2;
 - 4.2 A first written demand issued by the Employer to the Guarantor at the Guarantor's physical address with a copy to the Contractor stating that a period of seven (7) calendar days has elapsed since the first written demand in terms of 4.1 and the sum certified has still not been paid;
 - 4.3 A copy of the aforesaid payment certificate which entitles the Employer to receive payment in terms of the Contract of the sum certified in 4.
5. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor undertakes to pay to the Employer the Guaranteed Advance Payment Sum or the full outstanding balance upon receipt of a first written demand from the Employer to the Guarantor at the Guarantor's physical address calling up this Advance Payment Guarantee, such demand stating that:
 - 5.1 the Contract has been terminated due to the Contractor's default and that this Advance Payment Guarantee is called up in terms of 5; or
 - 5.2 a provisional or final sequestration or liquidation court order has been granted against the Contractor and that the Advance Payment Guarantee is called up in terms of 5; and
 - 5.3 the aforesaid written demand is accompanied by a copy of the notice of termination and/or the provisional/final sequestration and/or the provisional liquidation court order.
6. It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 4 and 5 shall not exceed the Guarantor's maximum liability in terms of 1.
7. Payment by the Guarantor in terms of 4 or 5 shall be made within seven (7) calendar days upon receipt of the first written demand to the Guarantor.
8. The Employer shall have the absolute right to arrange his affairs with the Contractor in any manner which the

Signed at

Date

Guarantor's signatory (1)

Capacity

Guarantor's signatory (2)

Capacity

Witness signatory (1)

Witness signatory (2)

Schedule of Plant and Materials

tracts using the General Conditions of Contract for Plant and Design-Build for Electrical and Mechanical Works and for Contractor, First Edition, 1999 (Yellow Book) published by the International Federation of Consulting Engineers (FIDIC).

Water and Sanitation: WASTEWATER

.....
.....

owing items of Plant and Materials, which have been manufactured and are stored at places other than the Site, or in respect Contractor by a manufacturer/supplier:

Deposit with order required (Y/N)	Place of storage (or manufacture, if deposit with order is required)	Unit	Quantity	Unit price R c	Total Price R c
Total Value of Plant and Materials to be included in Guaranteed Advance Payment Sum				R	

..... on theday of.....20.....

.....
.....
As witness

..... Approved by Employer's Age

PART 3: GENERAL CONDITIONS OF CONTRACT

C1.2 Contract Data

GENERAL CONDITIONS OF CONTRACT

The following standardised General Conditions of Contract:

General Conditions which form part of the **Conditions of Contract for Plant and Design-Build for Electrical and Mechanical Works and for Building and Engineering Works Designed by the Contractor, First Edition 1999 (Yellow Book)** published by the International Federation of Consulting Engineers (FIDIC).

Copies of these Conditions of Contract (Yellow Book) may be obtained from the South African Institution of Civil Engineering (SAICE) (tel 011 805 5947) or Consulting Engineers South Africa (CESA) (tel 011 463 2022).

Copies of the Conditions of Contract (Yellow Book) are also available for inspection and scrutiny at the offices of the Employer.

The Annexes and Forms bound in the Conditions of Contract (Yellow Book) shall not apply to this Contract and shall be replaced with the documentation bound into this Contract Document.

The General Conditions make reference to the Appendix to Tender and Particular Conditions (contained in the Contract Data) which together with these conditions collectively describe the risks, liabilities and obligations of the contracting parties and the procedures for the administration of the Contract.

The General Conditions shall be read in conjunction with the variations, amendments and additions set out in the Appendix to Tender and Particular Conditions below. Each item of data given below is cross-referenced to the Clause or Sub-Clause in the General Conditions to which it mainly applies.

The documents forming the Contract are to be taken as mutually explanatory of one another. For the purposes of interpretation, the priority of the documents shall be in accordance with the sequence as stated in sub-clause 1.5 as amended in the Particular Conditions.

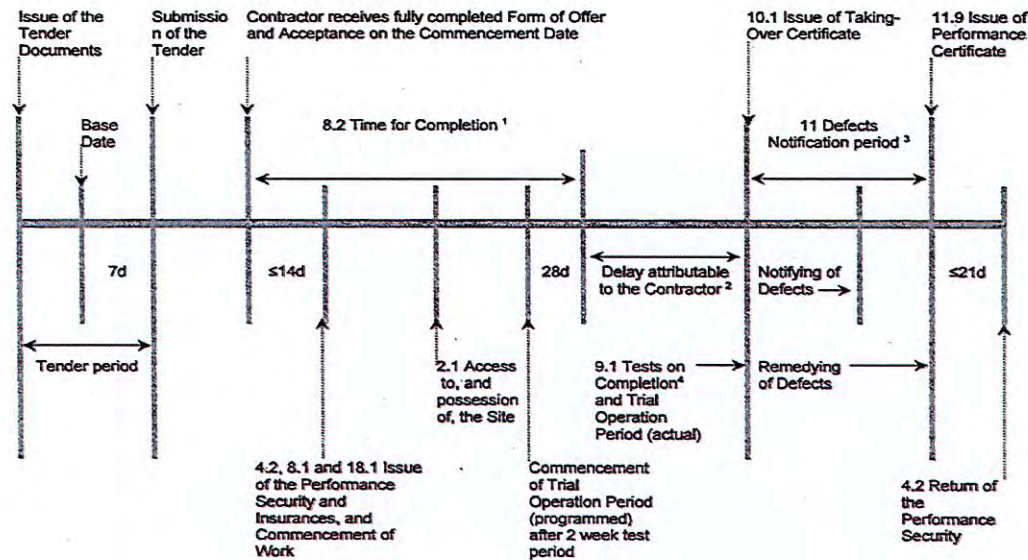
If an ambiguity or discrepancy is found in the documents, the Engineer shall issue any necessary clarification or instruction

The Foreword to the Conditions of Contract (Yellow Book) concludes with the following:

"In order to clarify the sequence of Contract activities, reference may be made to the charts on the next two pages and to the Sub-Clauses listed below (some Sub-Clause numbers are also stated in the charts). The charts are illustrative and must not be taken into consideration in the interpretation of the Conditions of Contract.

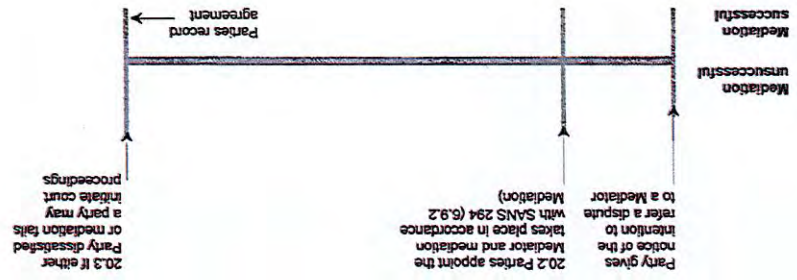
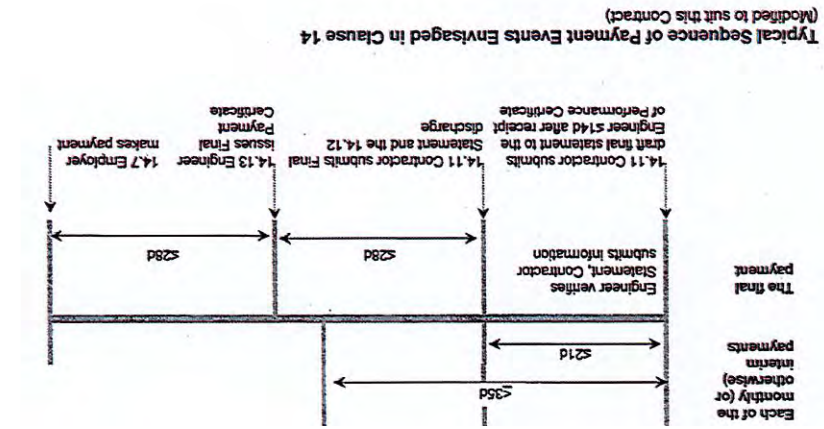
1.1.3.1	&	13.7	Base Date
1.1.3.2	&	8.1	Commencement Date
1.1.6.6	&	4.2	Performance Security
1.1.4.7	&	14.3	Interim Payment Certificate
1.1.3.3	&	8.2	Time for Completion (as extended under 8.4)

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**



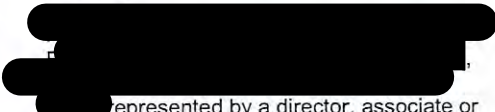
Typical sequence of Principal Events during Contracts for Plant and Design-Build
(Modified to suit this Contract)

1. The Time for Completion is stated (in the Appendix to Tender) as a number of days, to which is added any extensions of time under Sub-Clause 8.4.
2. In order to indicate the sequence of events, the above diagram is based upon the example of the Contractor failing to comply with Sub-Clause 8.2.
3. The Defects Notification Period is stated (in the Appendix to Tender) as a number of days, to which is added any extensions under Sub-Clause 11.3.
4. Depending on the type of Works, Tests after Completion may also be required, if provided for in the Contract.



APPENDIX TO TENDER

Part 1 : Contract Data completed by the Employer

Item	Sub-Clause	Entry
Employer's name and address	1.1.2.2 & 1.3(b)	CITY OF CAPE TOWN, represented by the Director: Water and Sanitation: WASTEWATER, 8 Voortrekker Road, corner of Mike Pienaar Boulevard Private Bag X98, Bellville CAPE TOWN 7535 and/or such other person or persons duly authorised thereto by the Employer in writing; the Employer is referred to in this Contract Document by the terms "Employer", "City of Cape Town" or "Council" as the context provides.
Engineer's name and address	1.1.2.4 & 1.3(b)	 represented by a director, associate or an employee duly authorised thereto in writing.
Time for Completion of the Works	1.1.3.3 & 8.2	1272 Days calculated from the Commencement Date. This period includes the 14 day period referred to in Sub-Clause 8.1 and the 28 day trial operation period referred to in Sub-Clause 9.1 of the Particular Conditions. Within this period parts of the works will be taken over as referred to in Sub-Clause 10.2.
Defects Notification Period	1.1.3.7	365 days
Electronic transmission systems.....	1.3(a)	e-mail or facsimile
Governing Law.....	1.4	Republic of South Africa
Ruling language	1.4	English
Language for communications	1.4	English

DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE

APPENDIX TO TENDER (CONTD)

Item	Sub-Clause	Entry
Amount of Performance Security ...	4.2.....	7 % of the Accepted Contract Amount
Period for notifying unforeseeable errors, faults and defects in the Employer's Requirements	5.1.....	Within 21 days
Normal working hours.....	6.5.....	Between sunrise and sunset
Delay penalties for the Works.....	8.7* & 14.15(b)	R15000,00 per day
Maximum amount of Delay penalties	8.7.....	No limit
Adjustments for Changes in Cost ..	13.8.....	The Contract Price shall subject to Contract Price Adjustment, <u>Variations in Rates of Exchange, Customs Surcharge and Customs Duty</u> , which shall be for the Employer's account in accordance with Sub-Clause 13.8.2.2 in the Particular Conditions shall be payable.

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

APPENDIX TO TENDER (CONTD)

Item	Sub-Clause	Entry
Total advance payment.....	14.2.....	20 % deposit
Percentage of retention	14.3(c)*	5% reducing to 2.5% upon the issue of a Taking-Over Certificate.
Limit of Retention Money	14.3(c)*	No limit
Plant and Materials Intended for the Works	14.5(b)	No payment for plant and materials upon shipment
Plant and materials for payment when delivered to the Site	14.5(c)	All plant and materials delivered to site will be subject to payment in terms of this clause
Minimum amount of Interim Payment Certificates.....	14.6	No minimum
Currency/currencies of payment.....	14.15.....	South African Rand, as named in that section of the Form of Offer and Acceptance called "Offer"
Periods for submission of insurance:		
(a) evidence of insurance	18.1*	14 days
(b) relevant policies	18.1	14 days
Maximum amount of deductibles for insurance of the Employer's risks	18.2(d)	R10 000,00
Minimum amount of third party insurance	18.3	R20 000 000,00
The DAB shall be.....	20.2	One sole Member / adjudicator
Appointment (if not agreed) to be made by....	20.3	President of the South African Institution of Mechanical Engineers
Amicable Settlement will be conducted as....	20.5	Mediation
Appointment (if not agreed) to be made by....	20.5	President of the South African Institution of Mechanical Engineers
Litigation will be conducted in.....	20.6*	Applicable Court of Jurisdiction in Cape Town

* See Particular Conditions

DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE

APPENDIX TO TENDER (CONTD)

Part 2 : Contract Data completed by the Contractor

Item	Sub-Clause	Entry
Contractor's name and address.....	1.1.2.3 & 1.3(b)	Inenco Water (Pty) Ltd [REDACTED]
Contractor's Representative's name.....	4.3	[REDACTED]

The Tenderer shall complete the above Part 2 of the Appendix to Tender.

SIGNED ON BEHALF OF TENDERER.....
[REDACTED]



Part C2: Pricing Data

Pages	
C2.1 Pricing Assumptions.....	161 – 162
C2.2 Schedules of Quantities.....	163 – 222
C2.3 Schedule of Rates for Electrical Variations	223

Contract
Part C2: Pricing Data
Reference No. 3Q/2019/20

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

CITY OF CAPE TOWN

WATER AND SANITATION: WASTEWATER

CONTRACT NO. 3Q/2019/20

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT
REACTOR UPGRADE**

C2.1 Pricing Assumptions

Pricing Assumptions mean the criteria as set out below, read together with all Parts of this contract document, which it will be assumed in the contract, that the tenderer has taken into account when developing his prices.

1. The method of measurement published by the South African Bureau of Standards in clause 8 of the Standardised Specifications for Civil Engineering Construction is applicable, subject to the variations and amendments contained in the section "Applicable SANS 1200 standardised specifications".
2. Descriptions in the Schedules of Quantities are abbreviated and comply generally with those in the Standardised Specifications. The applicable clause of each Standardised Specification, read together with the relevant clauses of the Scope of Work, set out what ancillary or associated activities are included in the rates for the operations specified. Should any requirements of the measurement and payment clause of the applicable Standardised Specification, or the Scope of Work, conflict with the terms of the Schedule, the requirements of the Standardised Specification or Scope of Work, as applicable, shall prevail.
3. The measurement and payment clauses in a specification in which further information regarding the scheduled items is given, are referenced under "Item" (pay items) in the Schedules of Quantities. The referenced clauses are not necessarily the only sources of information in respect of scheduled items. Further information and specifications may be found elsewhere in the contract documents. Standardised Specifications are identified by the digits which follow SANS in the SANS 1200 series of specifications, e.g. G for SANS 1200 G.
4. Unless otherwise stated, items are measured net in accordance with the drawings, and no allowance is made for waste.
5. The quantities set out in the Schedules of Quantities are the estimated quantities of the Contract Works, but the Contractor will be required to undertake whatever quantities may be directed by the Employer's Agent from time to time. The Contract Price for the completed contract shall be computed from the actual quantities of work done, valued at the relevant unit rates and prices.
6. The prices and rates to be inserted in the Schedule of Quantities are to be the full inclusive prices for the work described under the several items. Such prices and rates shall cover all costs and expenses that may be required in and for the execution of the work described, and shall cover the cost of all general risks, liabilities, and obligations set forth or implied in the documents on which the tender is based, as well as overhead charges and profit. Reasonable prices shall be inserted as these will be used as a basis for assessment of payment for additional work that may have to be carried out.
7. A price or rate should be entered against each item in the Schedules of Quantities, whether the quantities are

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
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10. The units of measurement described in the Schedule of Quantities are metric units. Abbreviations which may be used in these Schedule of Quantities are as follows:

Item/sum	=	lump sum
No.	=	number
m	=	metre
m2	=	square metre
m3	=	cubic metre
Days	=	"Day" as defined in the Conditions of Contract
Month	=	a calendar month

11. Where fractions of a cent occur in calculations of prices and amounts, they shall be rounded up/down to the nearest whole cent.
12. The Tenderer is referred to F2.24 in Part T1.2 Tender Data regarding the pricing of Deviations and/or Qualifications.
11. Clause F.2.13.11 c) in Part T1.2 Tender Data shall be applicable to the submission of Schedules of Quantities which have been priced electronically, and which the Tenderer wishes to submit as a printed version with his/her tender in the place of handwritten priced Schedule of Quantities.

If there is found to be any variance between the printed version and the original issued document, the original shall stand. However, where Addenda have been issued which amend the Schedules of Quantities, then the printed Schedules of Quantities shall take these into account.

The pages of the issued Schedules of Quantities should not be removed from the tender document.

12. Tenderers are referred to Clause 8 Measurement and Payment in the Environmental Management (EM) Specification in Part C3.5 in the Scope of Work for the basic principles of measurement and pricing of the EM Specification.
13. All descriptions or clauses where trade names or proprietary products are specified, are deemed to include the phrase "or equal approved"
14. Tenderers are referred to Sub-Clause 13.8 in the Appendix to Tender in Part C1.2 Contract Data regarding contract price adjustment.
15. Design of the Works, Contractor's Documents (including "as built" drawings and Manual), and design for the manufacture of materials and equipment, must be priced and will be paid for as follows:
- An item is provided in the Schedules of Quantities (Schedule No. 1, General Requirements and Conditions) for Design of the Works and submission of Contractor's Documents – this item includes *inter alia* the Contractor's obligations under Clause 2 in Part C3.2 Engineering, up to Sub-Clause 2.3.
 - Items are provided in the Schedules of Quantities (Schedule No. 13, Sundries) for Providing "as built" drawings, and draft and final copies of the Installation, Operation and Maintenance Manuals – these items cover the Contractor's obligations under Clause 2 in Part C3.2 Engineering, Sub-Clauses 2.4 and 2.5.

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

CITY OF CAPE TOWN

WATER AND SANITATION: WASTEWATER

CONTRACT NO. 3Q/2019/20

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT
REACTOR UPGRADE**

C2.2 Schedules of Quantities

CONTENTS	PAGES
SCHEDULE NO. 1 GENERAL REQUIREMENTS AND CONDITIONS	164
SCHEDULE NO. 2 NEW FINE BUBBLE DIFFUSED AERATION (FBDA) EQUIPMENT, PIPING AND FITTINGS: MATERIALS & EQUIPMENT	165
SCHEDULE NO. 3 BIOREACTOR A, S and R RECYCLE PUMPS and FEED SCREW PUMP	168
SCHEDULE NO. 4 ANAEROBIC AND ANOXIC MIXERS	170
SCHEDULE NO. 5 MECHANICAL PIPING TO REACTOR AERATION BASINS	172
SCHEDULE NO. 6 SST UNDERFLOW and WAS DUMPING VALVES	174
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**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
1	<u>SCHEDULE NO. 1</u> <u>GENERAL REQUIREMENTS AND CONDITIONS</u> <i>Allow for all costs and expenses in connection with the following:-</i>				
1.1	Providing Performance Security (Demand Guarantee under URDG 758)	Item	1	1 552 500,00	1 552 500,00
1.2	Providing Insurances including Professional Indemnity Insurance	Item	1	1 161 500,00	1 161 500,00
1.3	Design of the Works and submission of Contractor's Documents	Item	1	2 87 500,00	2 87 500,00
1.4	Establishment /disestablishment on Site. Costs to allow for site establishment and disestablishment three times for the duration of the contract	Item	1	116 897,50	116 897,50
1.5	Chairing and minuting a HAZOP	Item	1	57 500,00	57 500,00
1.6	Site security as per sub-clause 4.22	Item	1	86 250,00	86 250,00
1.7	General expenses incurred in complying with the requirements of Part T1.2 Tender Data, not included above	Item	1	1 590 956,53	1 590 956,53
1.8	General expenses incurred in complying with the requirements of Part C1.2 Contract Data, not included above	Item	1	797 080,29	797 080,29
1.9	Cost for advanced payment guarantee	Item	1	-	no adv payment Req'd.
1.10	Signage board for the site displaying client, contractor and professional team information	Item	1	23 000,00	23 000,00
1.11	Saving for old scrap metal removed from site to scrap dealer (re-measureable)	kg		-	-
1.12	Allow for all costs and expenses to conduct a detailed dimensional survey of the existing and new civil infrastructure prior to finalizing the design of the new aeration networks, new recycle pumps, mixers, instrumentation and ancillary piping.	Item	1	69 000,00	69 000,00
1.13	Allow for costs associated with minor civil and structural design requirements as specified in Volume 3A.	Item	1	57 500,00	57 500,00
1.14	Other General expenses incurred in complying with the requirements of the Contract not included above. (Specify):	Item	1	-	-
1)		Item	1	-	-

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R. z c
	SCHEDULE NO. 2				
2	NEW FINE BUBBLE DIFFUSED AERATION (FBDA) EQUIPMENT, PIPING AND FITTINGS: MATERIALS AND EQUIPMENT				
2.1	Allow for all costs and expenses in connection with the design, manufacture, quality management, painting, testing, supply, delivery, offloading and storage of the following materials and equipment, including quality assurance, setting out of works and checking work carried out by others:-as set out hereunder and further detailed in Section A, Volume 3A:				
2.1.1	<u>NORTH REACTOR</u>				
2.1.1.1	Diffuser units, including membranes, baseplates, retainer rings, gaskets, O-rings and saddles	No	2474	477,14	1 180 444,36
2.1.1.2	Lateral piping assemblies	Sum	1	269 834,74	269 834,74
2.1.1.3	Header piping assemblies	Sum	1	54 025,83	54 025,83
2.1.1.4	Sub header assemblies	Sum	1	131 028,70	131 028,70
2.1.1.5	Drop legs	Sum	1	284 866,57	284 866,57
2.1.1.6	Fixings, including anchors to concrete floor and pipe supports	Sum	1	190 144,45	190 144,45
2.1.1.7	Condensate purging system	Sum	1	25 837,05	25 837,05
2.1.1.8	Spares: Diffuser units	No	15	477,14	7 157,10
2.1.1.9	Spares: Diffuser gaskets	No	25	67,85	1 696,25
2.1.2	<u>CENTER REACTOR</u>				
2.1.2.1	Diffuser units, including membranes, baseplates, retainer rings, gaskets, O-rings and saddles	No	2474	477,14	1 180 444,36
2.1.2.2	Lateral piping assemblies	Sum	1	269 834,74	269 834,74
2.1.2.3	Header piping assemblies	Sum	1	54 025,83	54 025,83
2.1.2.4	Sub header assemblies	Sum	1	131 028,70	131 028,70
2.1.2.5	Drop legs	Sum	1	284 866,57	284 866,57

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
	BROUGHT FORWARD				4 290 070,70
2.1.3	<u>SOUTH REACTOR</u>				
2.1.3.1	Diffuser units, including membranes, baseplates, retainer rings, gaskets, O-rings and saddles	No	2474	477,14	1 180 444,36
2.1.3.2	Lateral piping assemblies	Sum	1	269 534,74	269 534,74
2.1.3.3	Header piping assemblies	Sum	1	54 025,53	54 025,53
2.1.3.4	Sub header assemblies	Sum	1	131 025,70	131 025,70
2.1.3.5	Drop legs	Sum	1	234 566,87	234 566,87
2.1.3.6	Fixings, including anchors to concrete floor and pipe supports	Sum	1	190 144,45	190 144,45
2.1.3.7	Condensate purging system	Sum	1	25 537,05	25 537,05
2.1.3.8	Spares: Diffuser units	No	15	477,14	7 157,10
2.1.3.9	Spares: Diffuser gaskets	No	25	67,85	1 696,25
2.1.4	<u>Retrievable Diffuser Set</u>				
2.1.4.1	Diffuser units, including membranes, baseplates, retainer rings, gaskets, O-rings and saddles	No	9	530,15	4 771,35
2.1.4.2	Piping assembly, supports and isolation	Sum	1	57 500,00	57 500,00
2.1.4.3	Retrieval mechanism: Chain block, crawl beam and support, signage indicating maximum load on chain block and beam	Sum	1	117 300,00	117 300,00
2.1.5	<u>Clean in Place system</u>				
2.1.5.1	CIP dosing skid complete with dosing pump, flexible piping with dosing sprayball, chemical tank, compressor (if required), wheels, local control panel and control and power cabling.	Sum	1	77 865,35	77 865,35
2.1.5.2	CIP distribution piping for North reactor	Sum	1	11 500,00	11 500,00
2.1.5.3	CIP distribution piping for Center reactor	Sum	1	11 500,00	11 500,00
2.1.6	Cost for clean water testing as specified in Volume 3A, A 4.13.1. Cost to include testing at an approved independent test facility. Note: Testing need not be witnessed by the Engineer or Employer.	Add 2: Unit	1	224 613,40	224 613,40
CARRIED FORWARD					R 6 940 156,15

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WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
	BROUGHT FORWARD				6 940 156,15
2.2	All other plant and equipment items not included above but which are necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify):-				
2.2.1	a)	Sum	1	-	-
2.2.2	b)	Sum	1	-	-
2.2.3	c)	Sum	1	-	-
2.2.4	d)	Sum	1	-	-
2.3	Allow for all costs and expenses, including double handling (if stored) and final painting (if applicable), in connection with the Site installation, testing, relocation, commissioning and upholding during the Trial Operation Period and Defects Notification Period of the following:-				
2.3.1	North Reactor Fine Bubble Diffused Aeration Network, including diffuser units, lateral piping, header/sub header piping, drop legs, condensate removal piping, all fittings and fasteners	Sum	1	354 200,00	354 200,00
2.3.2	Center Reactor Fine Bubble Diffused Aeration Network, including diffuser units, lateral piping, header/sub header piping, drop legs, condensate removal piping, all fittings and fasteners	Sum	1	354 200,00	354 200,00
2.3.3	South Reactor Fine Bubble Diffused Aeration Network, including diffuser units, lateral piping, header/sub header piping, drop legs, condensate removal piping, all fittings and fasteners	Sum	1	354 200,00	354 200,00
2.3.4	Retrievable diffuser network including load testing of lifting equipment	Sum	1	5 750,00	5 750,00
2.3.5	Clean in Place pumping skid and tank	Sum	1	9 200,00	9 200,00
2.3.6	North Reactor CIP distribution piping	Sum	1	9 200,00	9 200,00
2.3.7	Center Reactor CIP distribution piping	Sum	1	9 200,00	9 200,00
2.3.8	South Reactor CIP distribution piping	Sum	1	9 200,00	9 200,00
2.4	All other site installation and general items				

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
3.	<u>SCHEDULE NO. 3</u> <u>BIOREACTOR A, S. AND R RECYCLE PUMPS</u> <u>AND FEED SCREW PUMP</u>				
3.1	Allow for all costs and expenses associated with the preparation of the site for installation of the pumps				
3.1.1	Allow for all costs for removal and disposal of existing A & S Recycle pumps offsite	Sum	1	192 182,25	192 182,25
3.2	<i>Allow for all costs and expenses in connection with the design, manufacture, quality management, painting, testing, supply, delivery, offloading and storage of the following materials and equipment, including quality assurance, setting out of works and checking work carried out by others:-as set out hereunder and further detailed in Section A, Volume 3A:</i>				
3.2.1	Axial lift R Recycle pumps (PU1, PU2, PU07, PU08, PU13, PU14). Including a suitable lifting mechanism per set of pumps (3 in total).	No	6	213 799,08	1 282 794,48
3.2.2	1300mm diameter inclined S Recycle screw pumps - (PU5, PU6, PU11, PU12, PU17, PU18) complete with pulleys, splash covers and lubrication system	No	6	784 282,32	4 705 693,92
3.2.3	2000mm diameter inclined A Recycle screw pumps (PU03, PU09, PU15) complete with pulleys, splash covers and lubrication system	No	3	785 697,10	2 357 093,10
3.2.4	Feed pump 5 - 1400mm diameter inclined A Recycle screw pumps (PU23) complete with pulleys, splash covers and lubrication system	No	1	879 501,14	879 501,14
3.2.5	Back-up submersible pump (A-recycle, PU24) including a suitable lifting mechanism per reactor (3 in total).	No	1	731 503,42	731 503,42
3.2.6	Mobile radial submersible pump – 165l/s @20m, complete with centrifugal screw impeller and motor.	No	1	159 210,60	159 210,60
3.3	All other plant and equipment items not included above but which are necessary to				

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WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
	BROUGHT FORWARD				10 307 978,91
3.4	<i>Allow for all costs and expenses, including double handling (if stored) and final painting (if applicable), in connection with the Site installation, testing, relocation, commissioning and upholding during the Trial Operation Period and Defects Notification Period of the following:-</i>				
3.4.1	All items associated with 3.2.1 - 3.2.5	Sum	1	780 643,00	780 643,00
3.5	<i>All other site installation and general items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify):-</i>				
3.5.1	a) Start Up oil	Sum	1	82 800,00	82 800,00
3.5.2	b)	Sum	1		
3.5.3	c)	Sum	1		
3.5.4	d)	Sum	1		

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WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
4	<u>SCHEDULE NO. 4</u>				
4.1	<u>ANAEROBIC AND ANOXIC MIXERS</u>				
	Allow for all costs and expenses associated with the preparation of the site for installation of the mixers				
4.1.1	Allow for all the costs associated with the removal and disposal offsite of existing mixers	Sum	1	95 552,75	95 552,75
4.2	Allow for all costs and expenses in connection with the design, manufacture, quality management, painting, testing, supply, delivery, offloading and storage of the following materials and equipment, including quality assurance, setting out of works and checking work carried out by others:-as set out hereunder and further detailed in Section A, Volume 3A:				
4.2.1	Vertical shaft anaerobic mixers (AG01, AG02, AG03, AG04, AG11, AG12, AG13, AG14, AG21, AG22, AG23, AG24)	No	12	101 052,70	1 212 992,40
4.2.2	Vertical shaft anoxic mixers (AG05, AG06, AG07, AG08, AG09, AG10, AG15, AG16, AG17, AG18, AG19, AG20, AG25, AG26, AG27, AG28, AG29, AG30)	No	18	167 525,54	2 680 406,44
4.3	<i>All other plant and equipment items not included above but which are necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify):-</i>				
	a)	Sum	1	-	-
	b)	Sum	1	-	-
	c)	Sum	1	-	-
	d)	Sum	1	-	-
4.4	Allow for all costs and expenses, including double handling (if stored) and final painting (if applicable), in connection with the Site installation, testing, relocation, commissioning and upholding during the Trial Operation Period and Defects Notification Period of the following:-				
4.4.1	Vertical shaft anaerobic mixers with high	No	12	10 540,90	126 490,80

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WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
BROUGHT FORWARD					4 305 210,29
4.5	All other site installation and general items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (<u>Specify</u>):-				
4.5.1	a)	Sum	1	-	-
4.5.2	b)	Sum	1	-	-
4.5.3	c)	Sum	1	-	-
4.5.4	d)	Sum	1	-	-

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WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
	<u>SCHEDULE NO. 5</u>				
5	<u>MECHANICAL PIPING TO REACTOR AREATION BASINS</u>				
5.1	Allow for all costs and expenses associated with the preparation of the site for installation of the air headers				
5.1.1	Stripping out of old aeration piping on reactor and disposal to an approved location	Sum	1	121 606,75	121 606,75
5.2	Allow for all costs and expenses in connection with the design, manufacture, quality management, painting, testing, supply, delivery, offloading and storage of the following materials and equipment, including quality assurance, setting out of works and checking work carried out by others:-as set out hereunder and further detailed in Section A, Volume 3A:				
5.2.1	Inclusion of two new main header piping systems to the north, south and center reactors extending from the two tie-in flange points off the main air header as per W1774-85001 and W1774-45003; this includes all associated fittings, isolation devices, supports, platforms, cat ladders, VJ couplings and cascade clamps.	sum	1	5 335 544,65	5 335 544,65
5.2.2	Mechanical materials and fittings to accommodate installation of various items of instrumentation as per the Instrument List W1774-61001 in Volume 4 of this tender.	sum	1	-	inci
5.2.3	DN450 PN6, V port knife gate valves with motorized actuators (FCV01, FCV04, FCV07)	No	3	152 515,81	457 727,43
5.2.4	DN350 PN6, V port knife gate valves with motorized actuators (FCV02, FCV05, FCV08)	No	3	123 568,51	370 705,53
5.2.5	DN300 PN6, V port knife gate valves with motorized actuators (FCV03, FCV06, FCV09)	No	3	110 041,68	330 125,04
5.2.6	DN450 PN6, V port knife gate isolation valves	No.	3	66 216,36	198 529,08
5.2.7	DN350 PN6, V port knife gate isolation valves	No.	3	38 588,54	116 650,62
5.2.8	DN300 PN6, V port knife gate isolation valves	No	3	21 015,28	78 045,84

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WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
BROUGHT FORWARD					7 440 771,04
5.2.13	GRP access grating including mounting brackets on North, Center and South Reactors	m ²	1420	2552,72	3 667 462,40
5.2.14	GRP Handrailing on North, Center and South Reactors	m	1560	408,66	637 509,60
5.3	All other plant and equipment items not included above but which are necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify):-				
5.3.1	a)	Sum		-	-
5.3.2	b)	Sum		-	-
5.3.3	c)	Sum		-	-
5.3.4	d)	Sum		-	-
5.4	Allow for all costs and expenses, including double handling (if stored) and final painting (if applicable), in connection with the Site installation, testing, relocation, commissioning and upholding during the Trial Operation Period and Defects Notification Period of the following:-				
5.4.1	All equipment associated with 5.2 and 5.3	sum	1	572 498,75	572 498,75
5.5	All other site installation and general items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify):-				
5.5.1	a)	Sum	1	-	-
5.5.2	b)	Sum	1	-	-

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ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
6	SCHEDULE NO. 6				
	<u>SST UNDERFLOW AND WAS DUMPING SYSTEM</u>				
6.1	Allow for all costs and expenses in connection with the design, manufacture, quality management, painting, testing, supply, delivery, offloading and storage of the following materials and equipment, including quality assurance, setting out of works and checking work carried out by others:-as set out hereunder and further detailed in Section A, Volume 3A:				
6.1.1	DN200, PN6 V port knife gate valve with motorized actuator for the control of WAS (FCV10, FCV11, FCV12)	No.	3	81 710,57	245 131,71
6.1.2	SS316 DN200 piping including all necessary supports, fittings and flanges required for installation of valves in items 6.1.1 and 6.1.6 and WAS flow meters (FE16, FE17, FE18) between puddle flanges.	m	15	5 466,48	81 997,20
6.1.3	Allow for costs associated with removal and disposal offsite of the existing underflow valves on SST1-6	Sum	1	17 250,00	17 250,00
6.1.4	DN400, Telescopic valve complete with handwheel and support pedestal for controlling the SST underflow on SST 1-6	No.	6	71 021,34	426 164,04
6.1.5	SS316 PN6 DN200 manually actuated knife gate valves for isolation upstream of the WAS dump valves and flow meters	No.	3	15 329,50	45 988,50
6.1.6	SS316 DN200 90° Elbows for 6.1.2 above	No.	9	6 164,49	55 480,41
6.1.7	SS316 DN200 T-piece for 6.1.2 above	No.	3	6 699,15	20 099,25
6.2	All other plant and equipment items not included above but which are necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify):-				
6.2.1	a)	Sum	1	-	-
6.2.2	b)	Sum	1	-	-

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ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
	BROUGHT FORWARD				892 111,11
6.3	Allow for all costs and expenses, including double handling (if stored) and final painting (if applicable), in connection with the Site installation, testing, relocation, commissioning and upholding during the Trial Operation Period and Defects Notification Period of the following:-				
6.3.1	Allow for costs associated with installation and testing associated with 6.1.1 - 6.1.7	Sum	1	89 700,00	89 700,00
6.4	All other site installation and general items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify):-				
6.4.1	a)	Sum	1	-	-
6.4.2	b)	Sum	1	-	-
6.4.3	c)	Sum	1	-	-
6.4.4	d)	Sum	1	-	-

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ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R c
	<u>SCHEDULE NO. 7</u>				
	<u>BELLVILLE ELECTRICAL WORKS</u>				
	<u>(FIXED CHARGES P&G's)</u>				
7	<u>Fixed Charges</u>				
7.1	Contractual Requirements	Sum	1	8 500,00	8 500,00
	Facilities required by Contractor:				
7.2	Offices and lockable storage	Sum	1	14 260,00	14 260,00
7.3	General responsibilities and other fixed charge obligations including but not limited to fencing, barricading, storage, guarding, warning notices and lighting for the protection of the works or for the safety and convenience of the public.	Sum	1	13 650,00	13 650,00
				16 200,00	16 200,00
7.4	Allow for compilation of QC data pack and all certification including 'as-built' drawings (3 paper sets and 3 electronic set)	Sum	1	13 650,00	13 650,00
				12 500,00	12 500,00
7.5	Removal of Site Establishment	Sum	1	16 200,00	16 200,00
				6 500,00	6 500,00
7.6	Statutory Certificate of Compliance by a Installation Electrician for the entire installation	Sum	1	12 500,00	12 500,00
				23 276,00	23 276,00
7.7	Cost of Professional Indemnity Insurance relevant to the entire electrical installation under this contract	Sum	1	6 500,00	6 500,00
				13 650,00	13 650,00
7.8	Travelling to site for the duration of the project	Sum	1	23 276,00	23 276,00
7.9	Disbursements for the duration of the project	Sum	1	12 450,00	12 450,00
7.10	Allow for 12 month guarantee period against defects in equipment and workmanship as set out in the specification but excluding abuse, wear and tear	Sum	1	43 200,00	43 200,00
TOTAL AMOUNT OF SCHEDULE NO. 6 CARRIED TO SUMMARY OF PAGE 219					R 164 216,00

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ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R c
	<u>SCHEDULE NO. 8</u>				
	<u>BELLVILLE ELECTRICAL WORKS</u>				
8	<u>LOW VOLTAGE MOTOR CONTROL CENTRES</u>				
8.1	<u>New Motor Control Centre & Distribution Centres</u>				
	Allow for all costs and expenses in connection with the design, manufacture, quality management, testing, supply, delivery, offloading and storage of the following materials and equipment, including quality assurance, setting out of the works and checking work carried out by others:-				
8.1.1	Manufacture of Main MCC & Distribution Panel, as per Ref Drawings, data sheets and to the specification.				
8.1.1.1	North Reactor MCC Panel Dwg Ref. W1774-94001 The MCC panel must include reverse phase protection.	Sum	1	580 463,00	R 580 463,00
8.1.1.2	Central Reactor MCC Panel Dwg Ref. W1774-94005 The MCC panel must include reverse phase protection.	Sum	1	580 463,00	R 580 463,00
8.1.1.3	South Reactor MCC Panel Dwg Ref. W1774-94004 The MCC panel must include reverse phase protection.	Sum	1	580 463,00	R 580 463,00
8.1.1.4	Pump Station No.2 Screw Pump MCC Panel Dwg Ref. W1774-94002 The MCC panel must include reverse phase protection.	Sum	1	596 080,00	R 596 080,00
8.1.1.5	Pump Station 2 Small Power Distribution Boards Dwg Ref. W1774-94007 The MCC panel must include reverse phase protection.	Sum	4	13 635,00	R 54 540,00

CARRIED FORWARD						R 3 500 259,00
8.1.3.1	North Reactor MCC Panel	Sum	1	14 650,00	R 14 650,00	
8.1.3.2	Central Reactor MCC Panel	Sum	1	14 650,00	R 14 650,00	
8.1.3.3	South Reactor MCC Panel	Sum	1	14 650,00	R 14 650,00	
8.1.3.4	Pump Station No.2 Screw Pump MCC Panel	Sum	1	12 730,00	R 12 730,00	
8.1.3.5	Pump Station 2 Small Power Distribution Boards	Sum	4	800,00	R 3 200,00	
8.1.3.6	Reactor PLC Panel	Sum	1	6 200,00	R 6 200,00	
8.1.4	Site Acceptance Tests inclusive of Programming and Network Configuration of the MCC's, Soft Starters, Power Quality & Power Meters, MCC PLC's, HMI's and UPS					
8.1.4.1	North Reactor MCC Panel	Sum	1	4 500,00	R 4 500,00	
8.1.4.2	Central Reactor MCC Panel	Sum	1	4 500,00	R 4 500,00	
8.1.4.3	South Reactor MCC Panel	Sum	1	4 500,00	R 4 500,00	
8.1.4.4	Pump Station No.2 Screw Pump MCC Panel	Sum	1	4 500,00	R 4 500,00	
8.1.4.5	Pump Station 2 Small Power Distribution Boards	Sum	4	650,00	R 2 600,00	
8.1.4.6	Reactor PLC Panel	Sum	1	3 500,00	R 3 500,00	
8.1.5	Supply and installation of following rack equipment c/w ventilation fans					
8.1.5.1	Supply and installation of 19" Rack Cabinet, 42U x 800mm deep floor standing complete with distribution circuit breakers and 10 way socket outlet power rail to house PLC, network & telemetry systems	Sum	1	17 320,00	R 17 320,00	
8.1.6	Supply and install the following equipment c/w the flexible connection to the appropriate bus bars within an existing Distribution Panel					
8.1.6.1	160A - 3phase Circuit Breaker or equivalent	No	1	3 600,00	Rate Only	
8.1.6.2	63A - 3phase Circuit Breaker or equivalent	No	1	1 800,00	Rate Only	
8.1.6.3	32A - 3phase Circuit Breaker or equivalent	No	1	1 650,00	Rate Only	
8.1.6.4	20A - 3phase Circuit Breaker or equivalent	No	1	1 650,00	Rate Only	
8.1.6.5	32A - 3phase Isolator or equivalent	No	1	1 750,00	Rate Only	
8.1.6.6	10A - 3phase Circuit Breaker or equivalent	No	1	1 650,00	Rate Only	
8.1.6.7	1.5kW DOL Starter to specification	No	1	13 250,00	Rate Only	
8.1.6.8	7.5kW DOL Starter to specification	No	1	14 800,00	Rate Only	
8.1.6.9	11kW Star/Delta Starter to specification	No	1	23 620,00	Rate Only	

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ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R c
	BROUGHT FORWARD				3 500 259,00
8.1.6.10	15kW Star/Delta Starter to specification	No	1	26 980,00	Rate Only
8.1.6.11	45kW Soft Starter to specification	No	1	49 070,00	Rate Only
8.1.6.12	75kW Soft Starter to specification	No	1	65 668,00	Rate Only
8.1.6.13	63A - Single Phase Earth Leakage Isolators or equivalent	No	1	850,00	Rate Only
8.1.6.14	16A - Single Phase Earth Leakage Circuit Breaker or equivalent	No	1	1 620,00	Rate Only
8.1.6.15	20A - Single Phase Circuit Breaker or equivalent	No	1	220,00	Rate Only
8.1.6.16	30A - Single Phase Circuit Breaker or equivalent	No	1	280,00	Rate Only
8.1.6.17	16A - Single Phase Earth Leakage Circuit Breaker or equivalent	No	1	1 620,00	Rate Only
8.1.6.18	20A - Single Phase Circuit Breaker or equivalent	No	1	220,00	Rate Only
8.1.6.19	30A - Single Phase Circuit Breaker or equivalent	No	1	280,00	Rate Only
8.1.6.20	30A - Single Phase Circuit Breaker Double Pole or equivalent	No	1	650,00	Rate Only
8.1.6.21	40A - Single Phase Circuit Breaker Double Pole or equivalent	No	1	1 630,00	Rate Only
8.1.6.22	5A - Single Phase Circuit Breaker or equivalent	No	1	220,00	Rate Only
8.1.6.23	10A - Single Phase Circuit Breaker or equivalent	No	1	220,00	Rate Only
8.1.6.24	25A - Single Phase Circuit Breaker or equivalent	No	1	1 630,00	Rate Only
8.1.6.25	DIN rail mounted Phoenix SAK 2.5mm Terminals	No	1	12,00	Rate Only
8.1.6.26	DIN rail mounted Phoenix SAK 4mm Terminals	No	1	14,00	Rate Only
8.1.6.27	DIN rail mounted Phoenix SAK 6mm Terminals	No	1	28,00	Rate Only
8.1.6.28	DIN rail mounted Phoenix SAK 10mm Terminals	No	1	32,00	Rate Only
8.1.6.29	DIN rail mounted Phoenix SAK 16mm Terminals	No	1	45,00	Rate Only
8.1.7	Supply and installation A0 Snapper frame for mounting of SLD's and schematics	No	5	880,00	R 4 400,00
8.1.8	Supply and installation of panel cubicle initial labelling	Sum	9	650,00	R 5 850,00

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R c
	BROUGHT FORWARD				3 525 694,00
8.3	<u>PLC Systems</u>				
8.3.1	Supply and Installation of complete Schneider Modicon M580 Series (BMEP583040) Or equal and approved PLC system hardware for the North Reactor MCC panel mentioned above, complete with all connections, interposing relays, marshalling terminals and wiring looms, as per Dwg Ref. W1774-94001 & W1774-99001, data sheets and specification for the control of the entire facility. All PLC components to be corrosive resistant. Note that the Contractor must determine the I/O capacity for the entire installation and advise on the provision within the tender submission. Note that the Contractor must exclude the costs of the specific componentry to be priced in Item 8.4 below. Provisions of PLC I/O included in overall price above: Digital Input Digital Output Analog Input Analog Output Communication Interfaces	Sum	1	51 594,00	R 51 594,00
		Qty	4	14 919,00	Quantity offered
		Qty	1	17 412,00	Quantity offered
		Qty	5	14 017,00	Quantity offered
		Qty	2	15 122,00	Quantity offered
		Qty	1	23 035,00	Quantity offered
8.3.2	Supply and Installation of complete Schneider Modicon M580 Series (BMEP583040) Or equal and approved PLC system hardware for the Center Reactor MCC panel mentioned above, complete with all connections, interposing relays, marshalling terminals and wiring looms, as per Dwg Ref. W1774-94005 & W1774-99001, data sheets and specification for the control of the entire facility. All PLC components to be corrosive resistant. Note that the Contractor must determine the I/O capacity for the entire installation and advise on	Sum	1	39 240,00	R 39 240,00

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R c
	BROUGHT FORWARD				3 922 438,00
8.3.3	Supply and Installation of complete Schneider Modicon M580 Series (BMEP583040) Or equal and approved PLC system hardware for the South Reactor MCC panel mentioned above, complete with all connections, interposing relays, marshalling terminals and wiring looms, as per Dwg Ref. W1774-94004 & W1774-99001 , data sheets and specification for the control of the entire facility. All PLC components to be corrosive resistant. Note that the Contractor must determine the I/O capacity for the entire installation and advise on the provision within the tender submission. Provisions of PLC I/O included in overall price above: Digital Input Digital Output Analog Input Analog Output Communication Interfaces	Sum	1	39 240,00	R 39 240,00
	Digital Input	Qty	4	14 919,00	Quantity offered
	Digital Output	Qty	1	11 412,00	Quantity offered
	Analog Input	Qty	5	14 017,00	Quantity offered
	Analog Output	Qty	2	15 122,00	Quantity offered
	Communication Interfaces	Qty	1	23 035,00	Quantity offered
8.3.4	Supply and Installation of complete Schneider Modicon M580 Series (BMEP583040) Or equal and approved PLC system hardware for the Pump Station 2 Screw Pump MCC panels mentioned above, complete with all connections, interposing relays, marshalling terminals and wiring looms, as per Dwg Ref. W1774-94002 & W1774-99001 , data sheets and specification for the control of the entire facility. All PLC components to be corrosive resistant. Note that the Contractor must determine the I/O capacity for the entire installation and advise on the provision within the tender submission. Note that the Contractor must exclude the costs of the specific componentry to be priced in Item 8.4 below.	Sum	1	30 602,00	30 602,00

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ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R c
	BROUGHT FORWARD				3 992 280,00
8.3.5	Supply and Installation of complete Schneider Modicon M580 Series (BMEP583040) Or equal and approved PLC system hardware for the Reactor PLC Control Panel mentioned above, complete with all connections, interposing relays, marshalling terminals and wiring looms, as per Dwg Ref. W1774-94006 & W1774-99001 , data sheets and specification for the control of the entire facility. All PLC components to be corrosive resistant. Note that the Contractor must determine the I/O capacity for the entire installation and advise on the provision within the tender submission. Note that the Contractor must exclude the costs of the specific componentry to be priced in Item 8.4 below. Provisions of PLC I/O included in overall price above:	Sum	1	48 272,00	R 48 272,00
	Digital Input	Qty	2	14 919,00	Quantity offered
	Digital Output	Qty	2	17 412,00	Quantity offered
	Analog Input	Qty	5	14 017,00	Quantity offered
	Analog Output	Qty	1	15 122,00	Quantity offered
	Communication Interfaces	Qty	1	23 035,00	Quantity offered
8.4	<u>PLC Components</u>				
8.4.1	Rack				
	12 slot rack	No	5	7 488,00	R 37 440,00
8.4.2	CPU				
	CPU with integrated ModBus and Ethernet	No	5	106 164,00	R 530 820,00
8.4.3	Power Supply				
	Power Supply, 120/240 VAC, 24VDC, 36 Watts or as otherwise required.	No	5	11 888,00	R 59 290,00
8.4.4	Communications Module				
	Ethernet/IP and Modbus/TCP	No	5	23 034,00	R 115 170,00
8.4.5	Modbus Module				

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ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R c
	BROUGHT FORWARD				6 259 258,00
8.4.9	Analog Output Module Isolated High-level outputs, 0-10V, 4-20mA (8 Points) including connector	No	4	15 122,00	R 60 488,00
8.5	<u>PLC Network Switch & Fibre Converters</u>				
8.5.1	8-port unmanaged Ethernet switch TCS ESU 083FN0	No	6	14 490,00	R 86 940,00
8.5.2	1-port fibre optic, 4-port unmanaged Ethernet switch TCS ESU 043F1N0	No	4	3 893,00	R 15 572,00
8.5.3	8-port + 4-SFP slot managed industrial Ethernet Gigabit switch MOXA EDS-G512E-4GSFP	No	5	23 384,00	R 116 920,00
8.5.4	Fiber multimode SFP transceiver	No	5	2 423,00	R 12 115,00
8.5.5	Modbus RS485 to Modbus TCP/IP converter MOXA MGate MB3270I-T	No	4	15 554,00	R 63 536,00
8.6	<u>PLC Programming Software</u> Modicon Unity Pro - Large Edition (UNY SPU LFU CD31) Programming Software or equal and approved to suit PLC	Sum	1	108 724,00	R 108 724,00
8.6.1	Communication Link Cable for Programming	No	1	165,00	R 165,00
8.6.2	Programming Software Manual	No	1	1 650,00	R 1 650,00
8.6.3	Complete documentation package	Sets	3	1 650,00	R 4 950,00
8.7	<u>HMI Display</u>				
8.7.1	15" Colour Touch screen XBT GT	No	5	71 967,00	R 359 835,00
8.7.2	4Gb Compact Flash Memory card	No	5	4 452,00	R 22 410,00
8.8	<u>HMI Programming Software</u> Vijeo Designer (VJD UDT GSV**M) HMI Programming Software or equal and approved to suite HMI	No	1	13 643,00	R 13 643,00
8.8.1	Communication Link Cable for Programming	No	1	385,00	R 385,00
8.8.2	Programming Software Manual	No	1	550,00	R 550,00
8.8.3	Complete documentation package	Sets	3	1 650,00	R 4 950,00
8.9	<u>Interposing Relays</u>				

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WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION		UNIT	QTY	RATE	AMOUNT R - c
BROUGHT FORWARD						6 587 441,00
8.10.3	FAT	Hrs	45	45	825,00	37 125,00
8.10.4	Site Acceptance Testing	Hrs	45	45	825,00	37 125,00
8.10.5	Hot Commissioning of PLC and HMI	Hrs	108	108	825,00	89 100,00
8.10.6	PLC I/O : As-Built Mark-ups	Hrs	18	18	825,00	14 850,00
8.10.7	Allowance for PLC integration of Reactor basin control into existing Blower control BARS system	Hrs	45	45	825,00	37 125,00
8.11	SCADA System Hardware					
8.11.1	Supply and installation of SCADA server and workstation PC for the facility SCADA system according to the CoCT minimum specification					
8.11.1.1	Server: DELL : 19" rackmount CPU: Xeon 4Ghz min. Memory: 16Gb min. Hard Drive : 4x Dual SATA Seagate 1TB min. in mirror format Network Interface Card - 10/1001000 Screen - 19" rack mounted 15" LCD colour Keyboard & Mouse : 19" rack mountable keyboard tray with mini keyboard and mouse Operating System : Windows Server 2016	No	1	1	64 709,00	64 709,00
8.11.1.2	Workstation: DELL : Desk Mounted PC CPU: Intel i7 min. Memory: 16GB min. Hard Drive : Seagate 1TB min. Network Interface Card - 10/1001000 Screen - View Sonic 32" LCD min. Mouse : Microsoft Optical -USB Keyboard : Microsoft -USB Operating System : Windows 10 Accessories : all Power & Comms leads, mouse pad, software discs and license [State actual provision in a covering letter]	No	1		36 552,00	36 552,00
8.12	SCADA System Software					
8.12.1	Stand-alone Adroit Version 10 Programming Software and Tool Kit with Smart User Interface. Including license for up to 2500 Tags or as	Sum	1		240 673,00	240 673,00

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ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R c
	BROUGHT FORWARD				7 340 910,00
8.12.3	Communication Testing, Loop testing, Fault simulation & Commissioning; inclusive of Hot Standby simulations	Sum	1	7 425,00	R 7 425,00
8.12.4	Training of Engineering and Operational CoCT Staff (Assume 3 shifts, each requiring 3 Hrs training per Reactor)	Hrs	27	825,00	22 275,00
8.12.5	Allowance for possible additional SCADA Configuration work based on tendered rates; as directed by the Engineer	Hrs	90	825,00	74 250,00
8.12.6	Programming Software Manual	No	3	7 425,00	R 22 275,00
8.12.7	Complete documentation package	Sets	9	1 650,00	R 14 850,00
8.13	SCADA System Engineering [Specify Qty and Hourly Rate specific to the Scope of Work]				
8.13.1	Compilation of Detailed Functional Specification & System Clarification	Hrs	54	825,00	R 44 550,00
8.13.2	Software Development & Documentation	Hrs	177	825,00	R 146 025,00
8.13.3	FAT	Hrs	27	825,00	R 22 275,00
8.13.4	Site Acceptance Testing	Hrs	27	825,00	R 22 275,00
8.13.5	Hot Commissioning	Hrs	45	825,00	R 37 125,00
8.14	Additional Items Other items the tenderer may consider necessary to complete the installation				
8.14.1		Lot	1	-	R -
8.14.2		Lot	1	-	R -
8.14.3		Lot	1	-	R -

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ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
	<u>SCHEDULE NO. 9</u>				
9	<u>CABLING & TERMINATIONS</u> Allow for all costs and expenses in connection with the design, manufacture, quality management, testing, supply, delivery, offloading and storage of the following materials and equipment, including quality assurance, setting out of the works and checking work carried out by others:-				
9.1	Deliver, offload and install within trenches, sleeves, cable rack or ducts the following: BLACK PVC/SWA/PVC/Cu 600/1000V Multicore and Single core cables. (TYPE P1)				
9.1.1	1.5mm ² x 3 core	m	550	30,00	R 16 500,00
9.1.2	1.5mm ² x 4 core	m	750	33,00	R 24 750,00
9.1.3	1.5mm ² x 7 core	m	1	54,00	Rate Only
9.1.4	1.5mm ² x 19 core	m	1	150,00	Rate Only
9.1.5	1.5mm ² x 37 core	m	1	262,00	Rate Only
9.1.6	1.5mm ² x 32 core	m	1	262,00	Rate Only
9.1.7	2.5mm ² x 3 core	m	760	35,00	R 26 600,00
9.1.8	2.5mm ² x 4 core	m	21520	39,00	R 839 280,00
9.1.9	2.5mm ² x 7 core	m	1	75,00	Rate Only
9.1.10	2.5mm ² x 19 core	m	2950	117,00	R 345 150,00
9.1.11	2.5mm ² x 37 core	m	1270	231,00	R 293 370,00
9.1.12	4mm ² x 3 core	m	1	52,00	Rate Only
9.1.13	4mm ² x 4 core	m	5800	49,00	R 284 200,00
9.1.14	4mm ² x 7 core	m	1	102,00	Rate Only
9.1.15	6mm ² x 3 core	m	1	63,00	Rate Only
9.1.16	6mm ² x 4 core	m	5690	63,00	R 358 470,00
9.1.17	10mm ² x 3 core	m	720	73,00	R 52 560,00
9.1.18	10mm ² x 4 core	m	1530	87,00	R 133 110,00
9.1.19	16mm ² x 3 core	m	1600	93,00	R 148 800,00
9.1.20	16mm ² x 4 core	m	2670	111,00	R 296 270,00

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WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
BROUGHT FORWARD					1 094 080,00
9.1.27	150mm ² x 4 core	m	1570	862,00	1 353 R 340,00
9.1.28	185mm ² x 4 core	m	410	1 036,00	4 247 R 60,00
9.1.29	240mm ² x 1 core (stranded)	m	1	563,00	Rate Only
9.1.30	240mm ² x 4 core	m	1	963,00	Rate Only
9.1.31	300mm ² x 1 core (stranded)	m	1	689,00	Rate Only
9.1.32	300mm ² x 4 core	m	1	2 418,00	Rate Only
9.2	Gland, terminate and label the following TYPE P 1 cables within a NON HAZARDOUS AREA (i.e. CW gland)				
9.2.1	1.5mm ² x 3 core	No	180	303,00	54 540,00
9.2.2	1.5mm ² x 4 core	No	200	303,00	60 600,00
9.2.3	1.5mm ² x 7 core	No	1	390,00	Rate Only
9.2.4	1.5mm ² x 19 core	No	1	481,00	Rate Only
9.2.5	1.5mm ² x 37 core	No	1	610,00	Rate Only
9.2.6	1.5mm ² x 32 core	No	1	610,00	Rate Only
9.2.7	2.5mm ² x 3 core	No	110	303,00	33 330,00
9.2.8	2.5mm ² x 4 core	No	228	303,00	69 084,00
9.2.9	2.5mm ² x 7 core	No	1	390,00	Rate Only
9.2.10	2.5mm ² x 19 core	No	30	481,00	14 430,00
9.2.11	2.5mm ² x 37 core	No	20	610,00	12 200,00
9.2.12	4mm ² x 3 core	No	1	349,00	Rate Only
9.2.13	4mm ² x 4 core	No	56	349,00	19 544,00
9.2.14	4mm ² x 7 core	No	1	443,00	Rate Only
9.2.15	6mm ² x 3 core	No	1	349,00	Rate Only
9.2.16	6mm ² x 4 core	No	52	349,00	18 148,00
9.2.17	10mm ² x 3 core	No	10	474,00	4 740,00
9.2.18	10mm ² x 4 core	No	210	474,00	99 540,00
9.2.19	16mm ² x 3 core	No	30	474,00	14 220,00
9.2.20	16mm ² x 4 core	No	54	474,00	25 596,00

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ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
BROUGHT FORWARD					9 751 756,00
9.2.29	240mm ² x 1 core (stranded)	No	1	4 53,00	Rate Only
9.2.30	240mm ² x 4 core	No	1	2 055,00	Rate Only
9.2.31	300mm ² x 1 core (stranded)	No	1	586,00	Rate Only
9.2.32	300mm ² x 4 core	No	1	2 055,00	Rate Only
9.3	Deliver, offload and install within trenches, sleeves, cable rack or ducts the following: BLACK PVC/ALU/PVC/Cu 300/500V Surfex Multicore cables. (TYPE P2)				
9.3.1	2.5mm ² x 7 core	m	20	75,00	1 500 ^R ,00
9.3.2	35mm ² x 4 core	m	20	230,00	4 600 ^R ,00
9.4	Gland, terminate and label the following TYPE P2 cables within a NON HAZARDOUS AREA inclusive of submersible application				
9.4.1	2.5mm ² x 7 core	No	10	390,00	3 900 ^R ,00
9.4.2	35 mm ² x 4 core	No	10	525,00	5 250 ^R ,00
9.5	Deliver, offload and install within sleeves, cable rack or ducts the following: BLACK PVC/ALU/PVC/Cu 300/500V Surfex Multicore cables. (TYPE P3)				
9.5.1	1.5 mm ² x 3 core	m	350	14,00	4 900 ^R ,00
9.5.2	1.5 mm ² x 4 core	m	1	16,00	Rate Only
9.5.3	2.5 mm ² x 4 core	m	325	28,00	9 100 ^R ,00
9.5.4	2.5 mm ² x 4 core	m	325	28,00	9 100 ^R ,00
9.5.5	4mm ² x 4 core	m	200	35,00	7 000 ^R ,00
9.6	Gland, terminate and label the following TYPE S1 cables within a NON HAZARDOUS AREA (i.e CW gland)				
9.6.1	1.5 mm ² x 3 core	No	65	214,00	13 910 ^R ,00
9.6.2	1.5 mm ² x 4 core	No	1	214,00	Rate Only
9.6.3	2.5 mm ² x 3 core	No	42	214,00	8 988 ^R ,00

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ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
BROUGHT FORWARD					10 144 126,00
9.8	Gland, terminate and label the following TYPE S1 cables within a NON HAZARDOUS AREA (compression gland)				
9.8.1	1.5 mm ² x 3 core	No	80	293,00	R 23 440,00
9.8.2	1.5 mm ² x 4 Pair	No	1	293,00	Rate Only
9.8.3	1.5 mm ² x 8 Pair	No	1	420,00	Rate Only
9.9	Deliver, offload and install within sleeves, cable rack or ducts the following: BLACK PVC/DEKABON/PVC/Cu OS/IS Instrument cables (TYPE S2)				
9.9.1	1.5 mm ² x 2 Pair	m	1890	47,00	R 88 839,00
9.9.2	1.5 mm ² x 4 Pair	m	4910	83,00	R 407 530,00
9.9.3	1.5 mm ² x 8 Pair	m	1	285,00	Rate Only
9.9.4	1.5 mm ² x 16 Pair	m	840	387,00	R 325 080,00
9.10	Gland, terminate and label the following TYPE S2 cables within a NON HAZARDOUS AREA (compression gland)				
9.10.1	1.5 mm ² x 2 Pair	No	30	293,00	R 8 790,00
9.10.2	1.5 mm ² x 4 Pair	No	50	293,00	R 14 650,00
9.10.3	1.5 mm ² x 8 Pair	No	1	420,00	Rate Only
9.10.4	1.5 mm ² x 16 Pair	No	10	475,00	R 4 750,00
9.11	Deliver, offload and install within sleeves, cable rack or ducts the following: BLACK UNITRONIC® Li2YCYv (TP) RS485 Instrumentation cable (TYPE S3)				
9.11.1	0.5 mm ² x 2 Pair (2 x 2 x 0.5)	m	2940	28,00	R 82 320,00
9.12	Gland, terminate and label the following TYPE S3 cables within a NON HAZARDOUS AREA (compression gland)				
9.12.1	0.5 mm ² x 2 Pair (2 x 2 x 0.5)	No	40	224,00	R 8 960,00
9.13	Deliver, offload and install within sleeves, cable				

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ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
	BROUGHT FORWARD				11 230 356,00
9.15	Supply and installation of the following:				
9.15.1	Fiber patch cable with SC-type connectors of various lengths to suit the application	No	60	240,00	14 400,00 ^R
9.16	Deliver, offload and install within sleeves, cable rack or ducts the following: CAT 5E Shielded Twisted Pair (STP), UV Resistant (TYPE N1)				
9.16.1	CAT5E STP Network cable	m	2550	18,00	R 45 900,00
9.17	Gland, terminate and label the following TYPE N1 cables within a NON HAZARDOUS AREA (compression gland) CAT 5E Termination with RJ45 connector to network cable ends. Including testing				
9.17.1		No	50	280,00	R 14 000,00
9.18	Deliver, offload and install within sleeves, cable rack or ducts the following: BLACK ETHERLINE® ROBUST Cat.7 FLEX Outdoor Industrial Ethernet Braided Screen Cable (TYPE N2)				
9.18.1	Cat7 STP Network cable	m	6120	26,00	R 159 120,00
9.19	Gland, terminate and label the following TYPE N2 cables within a NON HAZARDOUS AREA (compression gland) Cat7 STP Termination with RJ45 connector to network cable ends. Including testing				
9.19.1		No	70	280,00	R 19 600,00
9.20	Supply and jointing of cables with the appropriate size jointing kit in the event where cables are to short. Cable measured elsewhere				
9.20.1	Scotchcast Splicing Kit - Size 0	No	1	280,00	Rate Only
9.20.2	Scotchcast Splicing Kit - Size 1	No	2	280,00	R 560,00
9.20.3	Scotchcast Splicing Kit - Size 2	No	10	280,00	R 2 800,00
9.20.4	Scotchcast Splicing Kit - Size 3	No	2	280,00	R 560,00

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ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
	BROUGHT FORWARD				11 488 446,00
9.21	<u>Testing and Commissioning</u> Provision for presence during the loop checking and testing in conjunction with the system integrator, making use of the labour rates which must be completed as part of the tender submission				
9.21.1	Man-hour	Hrs	25	450,00	R 11 250,00
9.21.2	Disbursements	Day	3	3 800,00	R 11 400,00
9.22	Meggar, continuity and functional Testing, etc. as defined within the Specification	Sum	1	8 960,00	R 8 960,00
9.23	<u>Disassembly and removal of existing equipment</u> Provision for tracing and tagging of outgoing cabling from existing MCC panels for reconnection to New MCC Panel, making use of the labour rates which must be completed as part of the tender submission	Sum	1	21 800,00	R 21 800,00
9.23.1	Man-hour	Hrs	40	450,00	Quantity allowed
9.23.2	Disbursements	Day	3	3 800,00	Quantity allowed
9.24	Making safe, disconnection and removal to client storage the following existing equipment				
9.24.1	Existing 90kW Surface Aeration Panels on walls of basins	No	9	1 200,00	R 10 800,00
9.24.2	Existing standalone MCC tier in UV MCC room	No	1	1 200,00	R 1 200,00
9.24.3	Existing redundant cable support infrastructure	Sum	1	4 500,00	R 4 500,00
9.24.4	Existing MCC panel	No	1	6 800,00	R 6 800,00
9.24.5	Cream Coloured MCC panel	No	1	6 800,00	R 6 800,00
9.24.6	Telemetry panel	No	1	950,00	R 950,00
9.24.7	DB-B distribution panel	No	1	1 200,00	R 1 200,00
9.24.8	Existing PFC panels	No	2	1 500,00	R 3 000,00
9.24.9	Existing transformers	No	2	4 500,00	R 9 000,00
9.24.10	Existing busbar system	No	2	3 600,00	R 7 200,00

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ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
BROUGHT FORWARD					11 603 706,00
9.25.6	16mm ² x 4 core	No		2100,00	Rate Only
9.25.7	25mm ² x 4 core	No		2 800,00	Rate Only
9.25.8	35mm ² x 4 core	No		2 800,00	Rate Only
9.25.9	50mm ² x 4 core	No		3 100,00	Rate Only
9.25.10	70mm ² x 4 core	No		3 100,00	Rate Only
9.25.11	95mm ² x 4 core	No		3 100,00	Rate Only
9.25.12	120mm ² x 4 core	No		3 650,00	Rate Only
9.25.13	150mm ² x 4 core	No		3 650,00	Rate Only
9.25.14	185mm ² x 4 core	No		4 200,00	Rate Only
9.26	Making safe, disconnection, re-route and re-termination of the following TYPE P2 cables from the existing "MCC" to "NEW MCC"				
9.26.1	1.5mm ² x 3 core	No		1 300,00	Rate Only
9.26.2	1.5mm ² x 4 core	No		1 600,00	Rate Only
9.26.3	2.5mm ² x 3 core	No		1 500,00	Rate Only
9.26.4	2.5mm ² x 4 core	No		1 500,00	Rate Only
9.26.5	4mm ² x 3 core	No		1 900,00	Rate Only
9.26.6	4mm ² x 4 core	No		1 900,00	Rate Only
9.27	Making safe, disconnection and removal from cable ways and trenches of the following TYPE P1 cables				
9.27.1	1.5mm ² x 4 core	m	1	10,00	Rate Only
9.27.2	2.5mm ² x 4 core	m	780	10,00	R 7 800,00
9.27.3	4mm ² x 4 core	m	1	10,00	Rate Only
9.27.4	4mm ² x 7 core	m	1	10,00	Rate Only
9.27.5	6mm ² x 4 core	m	2125	10,00	R 21 250,00
9.27.6	10mm ² x 4 core	m	2360	10,00	R 23 600,00
9.27.7	16mm ² x 4 core	m	3350	10,00	R 33 500,00
9.27.8	25mm ² x 4 core	m	2170	10,00	R 21 700,00
9.27.9	35mm ² x 4 core	m	1	12,00	Rate Only

Add 1:

**DESIGN-BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
BROUGHT FORWARD					11 771 721,00
9.28	Disconnection, re-route and re-termination of the following TYPE S1 cables from the existing "MCC" to the "NEW MCC"				
9.29.1	0.5 mm2 x 1 Pair	No	1	1 100,00	Rate Only
9.29.2	0.5 mm2 x 2 Pair	No	1	1 100,00	Rate Only
9.29.3	0.5 mm2 x 4 Pair	No	1	1 100,00	Rate Only
9.29.4	0.5 mm2 x 8 Pair	No	1	1 100,00	Rate Only
9.29	Disconnection, re-route and re-termination of the following TYPE S2 cables from the existing "MCC" to the "NEW MCC"				
9.29.1	0.5 mm2 x 1 Pair	No	1	1 100,00	Rate Only
9.29.2	0.5 mm2 x 2 Pair	No	1	1 100,00	Rate Only
9.29.3	0.5 mm2 x 4 Pair	No	1	1 100,00	Rate Only
9.29.4	0.5 mm2 x 8 Pair	No	1	1 100,00	Rate Only
9.30	Disconnection and removal from cable ways and trenches of the following TYPE S1 cables				
9.30.1	0.5 mm2 x 1 Pair	m	1	10,00	Rate Only
9.30.2	0.5 mm2 x 2 Pair	m	1	10,00	Rate Only
9.30.3	0.5 mm2 x 4 Pair	m	1	10,00	Rate Only
9.30.4	0.5 mm2 x 8 Pair	m	1	10,00	Rate Only
9.31	Disconnection and removal from cable ways and trenches of the following TYPE S2 cables				
9.31.1	0.5 mm2 x 1 Pair	m	1	10,00	Rate Only
9.31.2	0.5 mm2 x 2 Pair	m	1	10,00	Rate Only
9.31.3	0.5 mm2 x 4 Pair	m	1	10,00	Rate Only
9.31.4	0.5 mm2 x 8 Pair	m	1	10,00	Rate Only
9.32	Additional Items Other items the tenderer may consider necessary to complete the installation				
9.32.1		Lot	1	-	R -
9.32.2		Lot	1	-	R -

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
BROUGHT FORWARD					
9.28	Disconnection, re-route and re-termination of the following TYPE S1 cables from the existing "MCC" to the "NEW MCC"				
9.29.1	0.5 mm ² x 1 Pair	No	1		Rate Only
9.29.2	0.5 mm ² x 2 Pair	No	1		Rate Only
9.29.3	0.5 mm ² x 4 Pair	No	1		Rate Only
9.29.4	0.5 mm ² x 8 Pair	No	1		Rate Only
9.29	Disconnection, re-route and re-termination of the following TYPE S2 cables from the existing "MCC" to the "NEW MCC"				
9.29.1	0.5 mm ² x 1 Pair	No	1		Rate Only
9.29.2	0.5 mm ² x 2 Pair	No	1		Rate Only
9.29.3	0.5 mm ² x 4 Pair	No	1		Rate Only
9.29.4	0.5 mm ² x 8 Pair	No	1		Rate Only
9.30	Disconnection and removal from cable ways and trenches of the following TYPE S1 cables				
9.30.1	0.5 mm ² x 1 Pair	m	1		Rate Only
9.30.2	0.5 mm ² x 2 Pair	m	1		Rate Only
9.30.3	0.5 mm ² x 4 Pair	m	1		Rate Only
9.30.4	0.5 mm ² x 8 Pair	m	1		Rate Only
9.31	Disconnection and removal from cable ways and trenches of the following TYPE S2 cables				
9.31.1	0.5 mm ² x 1 Pair	m	1		Rate Only
9.31.2	0.5 mm ² x 2 Pair	m	1		Rate Only
9.31.3	0.5 mm ² x 4 Pair	m	1		Rate Only
9.31.4	0.5 mm ² x 8 Pair	m	1		Rate Only
9.32	Additional Items Other items the tenderer may consider necessary to complete the installation				R
9.32.1		Lot	1		R

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
	<u>SCHEDULE NO. 10</u>				
10	<u>CABLE SUPPORTS</u> Allow for all costs and expenses in connection with the design, manufacture, quality management, testing, supply, delivery, offloading and storage of the following materials and equipment, including quality assurance, setting out of the works and checking work carried out by others:-				
10.1	<u>Cable Basket</u> Supply & Install of the following cable basket support systems Inclusive all splices, unistrut supports, support brackets and fixing material as required, all in 316 stainless steel Allow for all costs and expenses in connection with the design, manufacture, quality management, testing, supply, delivery, offloading and storage of the following materials and equipment, including quality assurance, setting out of the works and checking work carried out by others:-				
10.1.1	"Gridspan" GS75 heavy duty cable basket 316 stainless steel - 800x75mm				
10.1.1.1	Straight Lengths	m	110	1386,00	R 152 460,00
10.1.1.2	Straight Lengths Covers	m	110	950,00	R 104 500,00
10.1.1.3	Equal or Reducing 'T'	No	4	5202,00	R 20 808,00
10.1.1.4	Equal or Reducing 'T' Covers	No	4	2115,00	R 8 460,00
10.1.1.5	Flat Bend	No	4	2342,00	R 9 368,00
10.1.1.6	Flat Bend Covers	No	4	1655,00	R 6 620,00
10.1.1.7	Internal / External Bend	No	4	1997,00	R 7 988,00
10.1.1.8	Internal / External Bend Covers	No	4	1395,00	R 5 580,00
10.1.2	"Gridspan" GS75 heavy duty cable basket 316 stainless steel - 600x75mm				
10.1.2.1	Straight Lengths	m	68	1141,00	R 77 588,00
10.1.2.2	Straight Lengths Covers	m	68	820,00	R 55 760,00
10.1.2.3	Equal or Reducing 'T'	No	2	3555,00	R 7 110,00
10.1.2.4	Equal or Reducing 'T' Covers	No	2	1915,00	R 3 830,00
10.1.2.5	Flat Bend	No	2	1796,00	R 3 592,00
10.1.2.6	Flat Bend Covers	No	2	1265,00	R 2 530,00
10.1.2.7	Internal / External Bend	No	2	1621,00	R 3 242,00

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
BROUGHT FORWARD					920 699,00
10.1.4.2	Straight Lengths Covers	m	203	523,00	R 107 184,00
10.1.4.3	Equal 'T'	No	12	2 245,00	R 26 940,00
10.1.4.4	Equal 'T' Covers	No	12	1 525,00	13 800,00
10.1.4.5	Flat Bend	No	6	1 175,00	R 7 065,00
10.1.4.6	Flat Bend Covers	NO	6	515,00	5 250,00
10.1.4.7	Internal / External Bend	No	6	1 147,00	R 6 882,00
10.1.4.8	Internal / External Bend Covers	No	6	349,00	5 094,00
10.1.5	"Gridspan" GS75 heavy duty cable basket 316 stainless steel - 200x75mm				
10.1.5.1	Straight Lengths	m	200	656,00	R 131 200,00
10.1.5.2	Straight Lengths Covers	m	200	417,00	R 83 400,00
10.1.5.3	Equal 'T'	No	20	1 714,00	R 35 430,00
10.1.5.4	Equal 'T' Covers		20	1 265,00	25 300,00
10.1.5.5	Flat Bend	No	25	1 003,00	R 25 075,00
10.1.5.6	Flat Bend Covers		25	745,00	R 18 625,00
10.1.5.7	Internal / External Bend	No	25	914,00	R 23 525,00
10.1.5.8	Internal / External Bend Covers		25	510,00	R 20 250,00
10.1.6	"Gridspan" GS75 heavy duty cable basket 316 stainless steel - 100x75mm				
10.1.6.1	Straight Lengths	m	336	536,00	R 180 096,00
10.1.6.2	Straight Lengths Covers	m	336	365,00	R 122 640,00
10.1.6.3	Equal 'T'	No	42	1 433,00	R 60 186,00
10.1.6.4	Equal 'T' Covers		84	1 005,00	R 84 420,00
10.1.6.5	Flat Bend	No	84	819,00	R 13 836,00
10.1.6.6	Flat Bend Covers		84	680,00	R 57 120,00
10.1.6.7	Internal / External Bend	No	126	1 119,00	R 98 154,00
10.1.6.8	Internal / External Bend Covers		126	732,00	92 232,00
10.1.7	"Gridspan" GS50 medium duty cable basket 316 stainless steel - 50x75mm				
10.1.7.1	Straight Lengths	m	168	415,00	R 70 224,00
10.1.7.2	Straight Lengths Covers	m	168	326,00	Add: R 54 768,00
10.1.7.3	Equal 'T'	No	1	923,00	R Rate Only 923,00
10.1.7.4	Equal 'T' Covers	No	1	1 005,00	R Rate Only 1 005,00
10.1.7.5	Flat Bend	No	1	632,00	R Rate Only 632,00
10.1.7.6	Flat Bend Covers	No	1	680,00	680,00
10.1.7.7	Internal / External Bend	No	1	614,00	R Rate Only 614,00
10.1.7.8	Internal / External Bend Covers	No	1	732,00	732,00
10.2	Cable Ladder Supply & Install of the following cable ladder support systems Inclusive all splices, unistrut supports, support brackets and fixing material as required, all in 316 stainless steel				

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
BROUGHT FORWARD					3335 311,00
10.2.2.2	Straight Lengths Covers	m	380	1 832,00	R 696 160,00
10.2.2.3	Equal or Reducing 'T'	No	11	2 686,00	R 29 546,00
10.2.2.4	Equal or Reducing 'T' Covers	No	11	5 800,00	63 910,00
10.2.2.5	Flat Bend	No	8	1 848,00	R 14 784,00
10.2.2.6	Flat Bend Covers	No	8	5 495,00	43 960,00
10.2.2.7	Internal / External Bend	No	9	1 255,00	R 11 295,00
10.2.2.8	Internal / External Bend Covers	No	9	1 972,00	17 748,00
10.2.3	Heavy duty cable ladder 316 stainless steel - 600x75mm				
10.2.3.1	Straight Lengths	m	490	1 000,00	R 490 000,00
10.2.3.2	Straight Lengths Covers	m	490	1 434,00	R 702 660,00
10.2.3.3	Equal or Reducing 'T'	No	8	6 375,00	R 51 000,00
10.2.3.4	Equal or Reducing 'T' Covers	No	8	4 694,00	R 37 552,00
10.2.3.5	Flat Bend	No	14	1 469,00	R 20 566,00
10.2.3.6	Flat Bend Covers	No	14	4 266,00	R 59 724,00
10.2.3.7	Internal / External Bend	No	15	1 181,00	R 17 715,00
10.2.3.8	Internal / External Bend Covers	No	15	1 552,00	R 23 280,00
10.2.4	Heavy duty cable ladder 316 stainless steel - 200x75mm				
10.2.4.1	Straight Lengths	m	351	826,00	R 289 926,00
10.2.4.2	Straight Lengths Covers	m	351	637,00	R 223 587,00
10.2.4.3	Equal or Reducing 'T'	No	9	1 706,00	R 15 354,00
10.2.4.4	Equal or Reducing 'T' Covers	No	9	2 483,00	R 22 347,00
10.2.4.5	Flat Bend	No	6	954,00	R 5 724,00
10.2.4.6	Flat Bend Covers	No	6	2 534,00	R 15 204,00
10.2.4.7	Internal / External Bend	No	10	969,00	R 9 690,00
10.2.4.8	Internal / External Bend Covers	No	10	704,00	R 7 040,00
10.3	PVC Conduit				
	Supply and installation of PVC conduit inclusive of all stainless steel fixing materials as required.				
10.3.1	20mm	m	150	31,00	R 4 650,00
10.3.2	25mm	m	200	35,00	R 7 000,00
10.3.3	32mm	m	300	48,00	R 14 400,00
10.4	Cable & Equipment Supports				
10.4.1	Unistrut P1000 Stainless Steel support of all luminaries within the Pump Stations inclusive of threaded rod hangers, purling clamps and fixing hardware	m	50	50,00	R 2 500,00
10.4.2	Unistrut P1000 support 316 stainless steel including fixing hardware as required	m	400	50,00	R 20 000,00

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
	BROUGHT FORWARD				6 410 653,00
10.4.7	Supply and fit SABS approved pictograms for Emergency Stop station complete with back plate.	No	68	130,00	R 8 840,00
10.4.9	Manufacture, deliver and install Stainless Steel supports, suitable for mounting Size 2 JB Enclosures	No	220	195,00	R 42 900,00
10.4.10	Manufacture, deliver and install Stainless Steel supports, suitable for mounting Reactor Junction Boxes	No	20	950,00	R 19 000,00
10.4.11	Chase and install conduit into drained Secondary Settling Tank wall and base in order to provide new cable route for new starter and motor supply cables	m	180	85,00	R 15 300,00
10.4.12	Manufacture, deliver and install Stainless Steel enclosure, suitable for mounting instrument analyser controller Refer Drawing: W1744-57003	No	20	9760,00	R 195 200,00
10.4.13	Manufacture, deliver and install Hot Dipped Galvanised Steel, cable ladder, basket and equipment supports c/w base plate & fixing bolts of various heights up to 3.0m	No	200	350,00	R 70 000,00
10.5	<u>Sundry Steel</u>				
10.5.1	Supply and installation of 316 stainless steel, fabricated supports or brackets for cable racking or equipment inclusive of stainless steel fixing hardware.				
10.5.1.1	Not exceeding 5kg	No	550	45,00	R 24 750,00
	Supply and installation of hot dipped galvanised steel, fabricated supports or brackets for cable racking or equipment inclusive of stainless steel fixing hardware.				
	Not exceeding 5kg	No	100	30,00	R 3 000,00
	Exceeding 5kg and not exceeding 15kg	No	60	120,00	R 7 200,00
	Exceeding 15kg and not exceeding 30kg	No	50	180,00	R 9 000,00
10.6.	<u>Additional Items</u>				
10.6.1		Lot	1	-	R -

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
	<u>SCHEDULE NO. 11</u>				
11	<u>EARTHING AND BONDING</u>				
	Allow for all costs and expenses in connection with the design, manufacture, quality management, testing, supply, delivery, offloading and storage of the following materials and equipment, including quality assurance, setting out of the works and checking work carried out by others:-				
11.1	Supply, deliver, offload and install the following Copper earth conductors				
11.1.1	120 mm ² -Insulated	m	690	157,00	R 129 030,00
11.1.2	95 mm ² -Insulated	m	3110	145,00	450 950,00
11.1.3	70 mm ² -Insulated	m	850	109,00	R 92 650,00
11.1.4	25 mm ² -Insulated	m	800	46,00	36 800,00
11.1.5	16 mm ² -Insulated	m	110	31,00	R 3 410,00
11.1.6	10 mm ² -Insulated	m	30	24,00	7 20,00
11.1.7	6 mm ² -Insulated	m	40	17,00	R 680,00
11.1.8	4 mm ² -Insulated	m	3110	15,00	R 46 650,00
11.1.9	70 mm ² -Uninsulated	m	1000	95,00	R 95 000,00
11.2	Termination of earth conductors with a ring lug and stainless steel set screw, nut and washers.				
11.2.1	120 mm ² -Insulated	No	40	340,00	R 13 600,00
11.2.2	95 mm ² -Insulated	No	95	200,00	19 000,00
11.2.3	70 mm ² -Insulated	No	55	200,00	R 11 000,00
11.2.4	25 mm ² -Insulated	No	85	160,00	13 600,00
11.2.5	16 mm ² -Insulated	No	10	120,00	R 1 200,00
11.2.6	10 mm ² -Insulated	No	10	120,00	1 200,00
11.2.7	6 mm ² -Insulated	No	10	120,00	R 1 200,00
11.2.8	4 mm ² -Insulated	No	310	20,00	R 6 200,00

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
BROUGHT FORWARD					1 030 115,00
11.6	Supply and install "Cape Concrete" or equal, - Earth Spike inspection pits inclusive of a 6mm mild steel hot dipped galvanized cover plate	No	45	1 200,00	R 54 000,00
11.7	Supply and install Potential Equalizing Earth Bars, 300mm x 30mm x 6mm, c/w insulated mounting bolts and a series of 10mm dia holes with set screws, nuts and washers.	No	11	850,00	R 9 350,00
11.8	4mm ² x 150mm long, insulated earth straps c/w hexagonally crimped lugs and two off stainless steel fixing nuts and bolts for bonding of all cable supports.	No	350	75,00	R 26 250,00
11.9	Initial Soil Resistivity Tests and final earthing system and bonding integrity tests and certification.	Sum	1	3 980,00	R 3 980,00
11.10	Supply and install a high quality earth mat dedicated to the PLC equipment and field instruments wired back to the PLC and instrument marshalling section in the Main control panel of approximate outer dimensions of 6mx4m. Refer to specification for details	Sum	1	8 960,00	R 8 960,00
11.11	Supply and install earth enhancing material around earth mat. Earth enhancing material properties to be 1,9 Ω/m or better.	m ³	2	6 500,00	R 13 000,00
11.12	Additional Items Other items the tenderer may consider necessary to complete the installation				
11.12.1		Lot	1	-	R -
11.12.2		Lot	1	-	R -
11.12.3		Lot	1	-	R -

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
	<u>SCHEDULE NO. 12</u>				
12	<u>CIVILS WORK ASSOCIATED WITH ELECTRICAL TRENCHING, SLEEVES AND SUPPORTS</u>				
	Allow for all costs and expenses in connection with the design, manufacture, quality management, testing, supply, delivery, offloading and storage of the following materials and equipment, including quality assurance, setting out of the works and checking work carried out by others:-				
12.1	<u>Cable Trenching</u>				
	Excavate cable trench 1000 mm deep and 600 mm wide, back filling, supply and install danger tape, compaction to SABS 1200 and removal of surplus off site.				
12.1.1	Pick able soil	m	1500	96,00	R 142 500,00
12.1.2	Extra over for soft rock	m³	180	55,00	R 9 900,00
12.1.3	Extra over for hard rock	m³	45	250,00	R 11 250,00
12.1.4	Extra over above for imported backfill material	m³	180	450,00	R 81 000,00
12.1.5	Extra over for excavation through tarmac road surface and reinstating afterwards	m²	1500	85,00	R 127 500,00
12.2	Supply and install danger tape within all trenches	m	1500	6,50	R 9 750,00
12.3	Supply and install concrete, conical cable route markers c/w inscribed stainless steel route marker plate	No	50	380,00	R 19 000,00
12.4	Core drilling of 160mm diameter holes through 150mm thick concrete for installation of cable sleeves. [Note to be taken that concrete could contain steel reinforcing]	No	30	720,00	R 21 600,00
12.5	<u>Sleeves</u>				
	Supply, install and bed 160 mm PAC KABLE FLEX cable sleeve in trench (trenching measured above)				
12.5.1	Straight Lengths	m	4500	85,00	R 382 500,00
12.5.2	Long Radius Bends	No	150	95,00	R 14 250,00
12.5.3	Supply and install 2mm run down wires in all cable	m	4500	15,00	R 67 500,00

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
BROUGHT FORWARD					1 100 600,00
12.7	<u>General concrete</u>				
12.7.1	Excavation of 600 x 600 x 1200 deep hole for in-ground lamp poles (measured elsewhere) inclusive of casting of 600 x 600 x 600 concrete around lamp pole, back filling, compaction and removal of surplus material off site.	No	45	950,00	R 42 750,00
12.7.2	Excavation of 300 x 300 x 400 deep hole and casting of concrete plinth for equipment support (measured elsewhere) and removal of surplus material off site.	No	60	495,00	R 29 700,00
12.8	<u>Additional Items</u>				
	Other items the tenderer may consider necessary to complete the installation				
12.8.1		Lot	1	-	R -
12.8.2		Lot	1	-	R -
12.8.3		Lot	1	-	R -

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
	<u>SCHEDULE NO. 13</u>				
13	<u>ANCILLIARY EQUIPMENT</u>				
	Allow for all costs and expenses in connection with the design, manufacture, quality management, testing, supply, delivery, offloading and storage of the following materials and equipment, including quality assurance, setting out of the works and checking work carried out by others:-				
13.1	<u>Ancillary equipment</u>				
13.1.1	Supply and Install Air Conditioning - Split Unit Type : Carrier or equal and approved, Corrosion resistant condensers, efficient inverter-driven, 22000 BTU, 230V AC supply c/w weather proof Isolator and all associated surface mounted conduit and wiring.	No	2	25 360,00	R 50 720,00
13.1.2	Supply and Installation of building small power and lighting, comprising of, SABS approved luminaries, switched socket outlets, light switches and all associated conduit and wiring from distribution boards.				
13.1.2.1	Type A - 1x20W LED Vandal Proof Bulkhead	No	40	3 188,00	R 127 520,00
13.1.2.2	Type B - 1x65W Linear LED Light fitting	No	20	2 026,00	R 40 520,00
13.1.2.3	Type E - 1x135W Omnistar Midi Optic 5121 LED Luminaire	No	4	6 158,00	R 24 632,00
13.1.2.4	BEKA K1876100 MINERAL GREY 10.0m (above ground) GRP Pole complete with - incl Single/Double Spigot (as required) - incl Baseplate Assembly 300x300x1.6 HDG - incl Gland plate Assembly GP/2/0/E/TB/MC - incl MCB Circuit breaker MG 5A/5KA	No	45	10 884,00	R 489 780,00
13.1.2.5	Beka LED Lume Maxi or Equal , 279W, side entry luminaire with lamp	No	45	3 310,00	R 148 950,00
13.1.2.6	Photocell	No	8	120,00	R 960,00
13.1.2.7	Type A - 16A double switched socket outlet	No	12	295,00	R 3 540,00
13.1.2.8	Type A - 16A One lever one way rocker type flush mounted switch	No	4	220,00	R 880,00
13.1.2.9	One lever weather proof light switch	No	2	320,00	R 640,00

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
BROUGHT FORWARD					1 184 752,00
13.2	Field Equipment				
13.2.1	Emergency Stop/Start Station - IP65 enclosure equipped with Schneider equipment or equal and approved. Green 'START' push button with 1xN/O contact and a red 'STOP' Mushroom head push-pull button with 2xN/C contact. Allowance to be made for Engraved labelling, comprising the Equipment Tag Number and function of each push button. Cable entries must be at the bottom of the enclosure minimum 1x M20. To be supplied with associated stainless steel stand..	No	70	719,00	R 50 330,00
13.2.2	Emergency Stop - IP65 enclosure equipped with Schneider equipment or equal and approved. Red Mushroom head push-pull button with 2xN/C contact. Allowance to be made for Engraved labelling, comprising the Equipment Tag Number and function of each push button. Cable entries must be at the bottom of the enclosure minimum 1x M20. To be supplied with associated stainless steel stand.	No	18	650,00	R 11 700,00
13.2.3	FWD/Emergency Stop/REV Station - IP65 enclosure equipped with Schneider equipment or equal and approved. Green 'FWD' push button with 1xN/O contact, a red 'STOP' Mushroom head push-pull button with 2xN/C contact and a green 'REV' push button with 1xN/O contact. Allowance to be made for Engraved labelling, comprising the Equipment Tag Number and function of each push button. Cable entries must be at the bottom of the enclosure minimum 1x M20. To be supplied with associated stainless steel stand.	No	24	750,00	R 18 000,00
13.2.4	Strobe Beacon - IP53 enclosed, 80fpm, yellow, 230Vac. allowance to be made for Engraved labelling, comprising the Equipment Tag Number. Cable entries must be at the bottom of the enclosure minimum 1x M20, including bracket for mounting on outside of MCC room	No	4	1 250,00	R 5 000,00
13.2.5	Electronic Sounder - IP65, 42-tone, 120dB, 230Vac. Allowance to be made for Engraved labelling, comprising the Equipment Tag Number. Cable entries must be at the bottom of the enclosure minimum 1x M20, including bracket for	No	2	1 850,00	R 3 700,00

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
	BROUGHT FORWARD				1 426 397,00
13.2.7	3ph Switched Socket Outlet - Weatherproof, 32A, 3ph+E, pad lockable switched socket outlet, inclusive of matching plug. Allowance to be made for Engraved labelling, comprising the Equipment Tag Number. Cable entries must be at the bottom of the enclosure minimum 1x M25, including bracket for outside mounting	No	4	1 250,00	R 5 000,00
13.2.8	3ph Switched Socket Outlet - Weatherproof, 63A, 3ph+E, pad lockable switched socket outlet, inclusive of matching plug. Allowance to be made for Engraved labelling, comprising the Equipment Tag Number. Cable entries must be at the bottom of the enclosure minimum 1x M25, including bracket for outside mounting	No	2	2 270,00	4 540,00 R 5 540,00
13.2.9	Extractor fan Isolators - IP65 enclosure equipped with a 12A, 3Ø lockable isolator. Schneider or equal and approved. Allowance to be made for Engraved labelling, comprising the Equipment Tag Number and function of each push button. Cable entries must be at the bottom of the enclosure and must accommodate 2 x Size 0 glands	No	2	850,00	R 1 700,00
13.2.10	HVAC Fan Isolators - IP65 enclosure equipped with a 32A, 3Ø lockable isolator. Schneider or equal and approved. Allowance to be made for Engraved labelling, comprising the Equipment Tag Number and function of each push button. Cable entries must be at the bottom of the enclosure and must accommodate appropriate glands	No	2	900,00	R 1 800,00
13.2.11	3ph Switched Isolator - Weatherproof, 32A, 3ph+E, pad lockable. Allowance to be made for Engraved labelling, comprising the Equipment Tag Number. Cable entries must be at the bottom of the enclosure minimum 1x M25, including bracket for outside mounting				R
13.2.11.1	16A Unit	No	58	550,00	R 31 900,00
13.2.11.2	32A Unit	No	28	650,00	R 18 200,00
13.2.11.3	63A Unit	No	7	850,00	R 5 950,00
13.2.11.4	125A Unit	No	12	1 500,00	R 18 000,00

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R c
BROUGHT FORWARD					1 305 702,00
13.6	Junction Boxes				
13.6.1	NJCB01, NJCB02, NJCB03, NJCB04 for North Reactor control and instrument signals Equipped with DIN rail mounted Phoenix SAK 2.5mm terminals, earth terminals, M20 cable entries and M25 cable entries as required The box must be labelled with engraved W/B/W Trafolyte labels. Polyester Resin boxes are preferred.	No	6	6 950,00	R 41 700,00
13.6.2	CJCB01, CJCB02, CJCB03, CJCB04 for Central Reactor control and instrument signals Equipped with DIN rail mounted Phoenix SAK 2.5mm terminals, earth terminals, M20 cable entries and M25 cable entries as required The box must be labelled with engraved W/B/W Trafolyte labels. Polyester Resin boxes are preferred.	No	6	6 950,00	R 41 700,00
13.6.3	SJCB01, SJCB02, SJCB03, SJCB04 for South Reactor control and instrument signals Equipped with DIN rail mounted Phoenix SAK 2.5mm terminals, earth terminals, M20 cable entries and M25 cable entry in accordance with Ref Dwg: W1744-64001 The box must be labelled with engraved W/B/W Trafolyte labels. Polyester Resin boxes are preferred.	No	6	6 950,00	R 41 700,00
13.6.4	PS2JCB01 for Pump Station 2 control signals. Equipped with DIN rail mounted Phoenix SAK 2.5mm terminals, earth terminals, M20 cable entries and M25 cable entry in accordance with Ref Dwg: W1744-64002 The box must be labelled with engraved W/B/W Trafolyte labels. Polyester Resin boxes are preferred	No	4	6 950,00	R 27 800,00
13.7	Network Boxes Supply and installation of network communications				

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R c
	BROUGHT FORWARD				2 590 072,00
13.8	<u>Testing & Commissioning</u>				
13.8.1	Allowance to be made for testing and commissioning of the entire electrical installation as per the electrical and mechanical scope of work and specifications	Sum	1	22 500,00	R 22 500,00
13.8.2	Allowance to be made for testing and commissioning of the entire Electrical and Electronic installation	Sum	1	39 650,00	R 39 650,00
13.8.3	QA/QC Pack to Engineer's Specification	Sum	1	18 460,00	R 18 460,00
13.8.4	Provisional Sum for testing and commissioning as directed by the Engineer	Sum	1	-	R -
13.9	<u>Additional Items</u> Other items the tenderer may consider necessary to complete the installation				
13.9.1		Lot	1	-	R -
13.9.2		Lot	1	-	R -
13.9.3		Lot	1	-	R -

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R c
	<u>SCHEDULE NO.14</u>				
	<u>INSTRUMENTATION</u>				
	Allow for all costs and expenses in connection with the design, manufacture, quality management, testing, supply, delivery, offloading and storage of the following materials and equipment, including quality assurance, setting out of the works and checking work carried out by others:-				
14	<u>Electronic Instrumentation</u>				
14.1	Supply and install the following instruments inclusive of necessary stainless steel brackets, stands and fixing hardware as required, as detailed in the instrument list. All Instrumentation to be supplied with 3CR12 Enclosures to house each remote transmitter individually				
14.1.1	FE01 Flow meter Type - Thermal Mass Flowmeter, Refer datasheet Output - Modbus RS485 Range - 0-9000kg/h at 60°C and 55kPag Design Pressure - 100kPag Design Temperature - 100°C Pipeline Diameter - 450mm NB	No	1	59 145,65	R 59 145,65
14.1.2	FE02 Flow meter Type - Thermal Mass Flowmeter, Refer datasheet Output - Modbus RS485 Range - 0-5400kg/h at 60°C and 55kPag Design Pressure - 100kPag Design Temperature - 100°C Pipeline Diameter - 350mm NB	No	1	58 562,60	R 58 562,60
14.1.3	FE03 Flow meter Type - Thermal Mass Flowmeter, Refer datasheet for type Output - Modbus RS485 Range - 0-3600kg/h at 60°C and 55kPag Design Pressure - 100kPag Design Temperature - 100°C	No	1	58 562,60	R 58 562,60

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R c
BROUGHT FORWARD					235 416,00
14.1.5	FE05 Flow meter Type - Thermal Mass Flowmeter, Refer datasheet Output - Modbus RS485 Range - 0-5400kg/h at 60°C and 55kPag Design Pressure - 100kPag Design Temperature - 100°C Pipeline Diameter - 350mm NB	No	1	58 562,60	R 58 562,60
14.1.6	FE06 Flow meter Type - Thermal Mass Flowmeter, Refer datasheet for type Output - Modbus RS485 Range - 0-3600kg/h at 60°C and 55kPag Design Pressure - 100kPag Design Temperature - 100°C Pipeline Diameter - 300mm NB	No	1	58 562,60	R 58 562,60
14.1.7	FE07 Flow meter Type - Thermal Mass Flowmeter, Refer datasheet Output - Modbus RS485 Range - 0-9000kg/h at 60°C and 55kPag Design Pressure - 100kPag Design Temperature - 100°C Pipeline Diameter - 450mm NB	No	1	59 145,65	R 59 145,65
14.1.8	FE08 Flow meter Type - Thermal Mass Flowmeter, Refer datasheet Output - Modbus RS485 Range - 0-5400kg/h at 60°C and 55kPag Design Pressure - 100kPag Design Temperature - 100°C Pipeline Diameter - 350mm NB	No	1	58 562,60	R 58 562,60
14.1.9	FE09 Flow meter Type - Thermal Mass Flowmeter, Refer datasheet for type Output - Modbus RS485 Range - 0-3600kg/h at 60°C and 55kPag Design Pressure - 100kPag Design Temperature - 100°C	No	1	58 562,60	R 58 562,60

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R c
BROUGHT FORWARD					1 046 276,95
14.1.11	LT01, LT02, LT03, LT04, LT05, LT06, LT09, LT10, LT11, spare Ultrasonic or Radar Level Transmitter. Refer datasheet for type. Type - Ultrasonic Output - Analogue 4-20mA Range - 1m Medium - Mixed liquor at 20°C Design Pressure - Atm Design Temperature - Amb	No	10	28 551,84 24	R 218 518,40
14.1.12	LT12, spare Ultrasonic or Radar Level Transmitter. Refer datasheet for type. Type - Ultrasonic Output - Analogue 4-20mA Range - 4m Medium - Mixed liquor at 20°C Design Pressure - Atm Design Temperature - Amb	No	2	21 851,84	R 43 703,68
14.1.13	FE16, FE17, FE18 Flow meter Type - Electromagnetic Flowmeter, Refer datasheet for type Output - Modbus RS485 Range - 50000-150000kg/h at 20°C and 20kPag and 3474mg/l TSS Design Pressure - 20kPag Design Temperature - 250°C Pipeline Diameter - 150mm NB	No	3	38 630,80	R 115 892,40
14.1.14	XE10, XE11, XE12 Turbidity or suspended solid meter Type - Multiple IR system, Refer datasheet for Transmitter type, Sensor type, Stand Type, Sensor Holder Type Output - Modbus RS485 Range - 3-10g/l TSS Medium - activated sludge Design Pressure - Atm Design Temperature - Amb	No	3	76 606,10	R 229 818,30

detailed in the instrument list

14.2.1	PI02, PI03, spare Pressure Gauge with contacts (at end of header) Type - Bourdon Type Range - 0 - 100kPag Design Pressure - 100kPag Design Temperature - 90°C	No	3	6 394,00	19 182,00 6 394,00
14.2.2	TI03, spare Temperature Gauge complete with Thermowell and contacts Type - Bimetal type Range - 0 - 100°C Design Pressure - 100kPag Design Temperature - 90°C Pipeline Diameter - 350mm NB	No	2	6 394,00	12 788,00 R
14.2.3	TI04, spare Temperature Gauge complete with Thermowell and contacts Type - Bimetal type Range - 0 - 100°C Design Pressure - 100kPag Design Temperature - 90°C Pipeline Diameter - 300mm NB	No	2	6 394,00	R 12 788,00
14.3	Supply and installation of engraved stainless steel instrument identification tags with CoCT tag numbers	Sum	1	1 475,00	R 1 475,00
14.4	Loop Checking, testing and commissioning of each instrument and control elements in conjunction with the Engineer and System Integrator	Sum	1	10 350,00	R 10 350,00
14.5	Additional Items Other items the tenderer may consider necessary to complete the installation				
14.5.1		Lot	1	-	R -
14.5.2		Lot	1	-	R -
14.5.3		Lot	1	-	R -
TOTAL AMOUNT OF SCHEDULE NO.13 CARRIED TO SUMMARY OF PAGE 219					R 17116 192,00

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R 31 400 d.k.H.

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R c
15	<u>SCHEDULE NO.15</u> <u>BUSBAR</u> <u>Allow for all costs and expenses in connection with the design, manufacture, quality management, testing, supply, delivery, offloading and storage of the following materials and equipment, including quality assurance, setting out of the works and checking work carried out by others:-</u>				
15.1	<u>North Reactor MCC Panel</u> Deliver, offload and install with appropriate supporting brackets the following: Resin Encapsulated Copper Bus bar 65kA IP55 400V (Triple Pole + 100% Neutral Pole + 25% Earth, all to be encapsulated) system between Main MCC Panel and North Reactor MCC Panel. Bus bar to be rated at 125% of the transformer output and to 1.6A/mm ² .				
15.1.1	Bus bar	m	24	S 292,00	127 008,00 R 5 292,00
15.1.2	Bends	No	6	2 220,00	R 13 320,00
15.1.3	Main MCC end Terminations complete with Flexible Connections	No	1	2 340,00	R 2 340,00
15.1.4	Reactor MCC end Terminations complete with Flexible Connections	No	1	2 340,00	R 2 340,00
15.2	<u>Central Reactor MCC Panel</u> Deliver, offload and install with appropriate supporting brackets the following: Resin Encapsulated Copper Bus bar 65kA IP55 400V (Triple Pole + 100% Neutral Pole + 25% Earth, all to be encapsulated) system between Main MCC Panel and Central Reactor MCC Panel. Bus bar to be rated at 125% of the transformer output and to 1.6A/mm ² .				
15.2.1	Bus bar	m	24	S 292,00	R 127 008,00
15.2.2	Bends	No	6	2 220,00	R 13 320,00
15.2.3	Main MCC end Terminations complete with Flexible Connections	No	1	2 340,00	R 2 340,00

TOTAL AMOUNT OF SCHEDULE NO.15 CARRIED TO SUMMARY OF PAGE 219					RTSS 812.00
15.4.1	Bus bar	m	24	S 2972,00	R 127 008,00
15.4.2	Bends	No	6	Z 2220,00	R 13 320,00
15.4.3	Transformer End Terminations complete with Flexible Connections	No	1	Z 340,00	R 2 340,00
15.4.4	MCC Terminations complete with Flexible Connections	No	1	Z 340,00	R 2 340,00
15.5	Meggar, continuity and functional Testing, Certificates of compliance, etc. as defined within the Specification	Sum	1	1 500,00	R 1 500,00
15.6	Additional Items Other items the tenderer may consider necessary to complete the installation				
15.6.1	Busbar Joint Packs	Lot	1	S 9758,00	R 59 758,00
15.6.2	Tripout Brackets	Lot	1	Z 400,00	R 32 400,00
15.6.3	Provisional and general engineering and design accommodation Transport and rigging	Lot	1	102 960,00	R 102 960,00

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16.2	Compliance with the requirements of the Occupational Health and Safety Act, 85 of 1993 and Construction Regulations, 2014 (for Health and Safety Plan see separate item).	Sum	1	13 579,00	13 570,00
16.3	Liaison, co-ordination and chairing of meetings in respect of Health and Safety requirements.	Sum	1	11 500,00	11 500,00
16.4	Contractor's initial obligation in respect to the Occupational Health and Safety Act and Construction Regulations, including the preparation of a Health & Safety Plan.	Sum	1	6 625,00	6 625,00
16.5	Provision for preparing a Hazard Identification and Risk Assessment (HIRA)	Sum	1	9 420,00	9 420,00
16.6	Provision for the development of a documented Plan of OH&S Method Statements and/or Safe Work Procedures	Sum	1	7 260,00	7 260,00
16.7	Provision for occupational health (Medicals – pre and post employment; Physical and Psychological for work at elevated heights; Medical surveillance for hazardous work; Baseline & audiometric screening tests; HIV and AIDS Programme; etc.)	Sum	1	23 575,00	23 575,00
16.8	Provision for medical certificates of fitness, issued by a registered Occupational Health Practitioner, for all contractor's employees on site	Sum	1	10 350,00	10 350,00
16.9	Provision for protective equipment, protective clothing and equipment	Sum	1	-	ind.
16.10	Provision for ensuring public health and safety	Sum	1	12 190,00	12 190,00
16.11	Provision for occupational health and safety signage, pictograms and notices	Sum	1	7 260,00	7 260,00
16.12	Provision of full time Construction Manager	Sum	1	-	ind.
16.13	Provision of a competent, part time Safety Officer who will carry out at least fortnightly safety audits of site	Sum	1	34 500,00	34 500,00
16.14	Provisions for the Implementation, Management and adherence of the OH&S Plan	Sum	1	4 140,00	4 140,00

CARRIED FORWARD

R 253 525,00

Contract
Part C2: Pricing Data
Reference No. 3Q/2019/20

213

C2.2
Schedules of Quantities
Summary



**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
BROUGHT FORWARD					268 525,00
16.15	Provision for ensuring Contractor(s) compliance to statutory requirements, including monitoring and auditing of Contractor(s)	Sum	1	-	-
16.16	Provision for OH&S training, promotion and awareness	Sum	1	4 140,00	4 140,00
16.17	Provision for emergency preparedness & response plan (This item should include: First Aid, Fire and Explosions, Acts of Nature, Hazardous Chemical Substances and Flammable Substances Spillage, Political Unrest and Violence and/or Terrorism).	Sum	1	5 175,00	5 175,00
16.18	Other Health and Safety fixed charge expenses incurred in complying with the requirements of the Contract not included above . (Specify):				
16.18.1	a)	Sum	1	-	-
16.18.2	b)	Sum	1	-	-
16.18.3	c)	Sum	1	-	-

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
	<u>SCHEDULE NO. 17</u>				
17	<u>ENVIRONMENTAL MANAGEMENT</u>				
	<i>Allow for all costs and expenses in connection with the following:-</i>				
17.1	Compliance with the Environmental Management Specification in Volume 3A. Other Environmental Management expenses incurred in complying with the requirements of the Contract not included above. (Specify):	Sum	1	24 725,00	24 725,00
17.2	a)	Sum	1	-	-
17.3	b)	Sum	1	-	-
17.4	c)	Sum	1	-	-

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
	<u>SCHEDULE NO. 18</u>				
	<u>MANAGEMENT AND INSPECTION</u>				
	<i>Allow for all costs and expenses in connection with the following:-</i>				
18.1	Management of Project programme	Sum	1	24 150,00	24 150,00
18.2	Management of Project Budget	Sum	1	-	incl-
18.3	Site Management: Overseeing Installation & Commissioning	Sum	1	-	incl -
18.4	Inspection of Local fabrication by sub-contractors	Sum	1	-	incl-
18.5	Management of monthly Progress Reports as per sub-clause 4.21	Sum	1	24 150,00	24 150,00

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
	<u>SCHEDULE NO. 19</u>				
19	<u>SUNDRIES</u>				
	<i>Allow for all costs and expenses in connection with the following:-</i>				
19.1	Providing "as built" drawings (GA's, P&ID's) in the latest AutoCAD version as well as 3 additional hard copies.	Item	1	17 020,00	17 020,00
19.2	Providing 2 draft copies of the Installation, Operation and Maintenance Manual prior to commissioning of the Works.	Item	1	56 925,00	56 925,00
19.3	Providing 6 final copies of the Installation, Operation and Maintenance Manual prior to the issue of the Taking -Over Certificate.	Item	1	70 725,00	70 725,00
19.4	Operating Instructions and Signage, as specified.	Item	1	9 476,00	9 476,00
19.5	Inspection, Tests, etc. of all equipment outside the Cape Metropolitan area.	Item	1	34 500,00	34 500,00
19.6	Provision of all Test Certificates and Certificate of Compliance in terms of the Code of Practice for Wiring of Premises.	Item	1	14 329,00	14 329,00
19.7	Checking, starting up, testing and commissioning of the complete Works.	Item	1	636 649,00	636 649,00
19.8	Operational Acceptance Testing of the complete works as well as recording the test result and presenting it to the Engineer for approval.	Item	1	153 140,00	153 140,00
19.9	Operational and Maintenance Training (allow for 3 full days, covering multiple shifts).	Item	1	50 140,00	50 140,00
19.10	Trial Operation Period obligations (Allow the costs for running the operations 24/7 for 28 days)	Item	1	113 275,00	113 275,00
19.11	Maintaining the Works during the Defects Notification Period.	Item	1	163 515,00	163 515,00
19.12	Maintenance inspection every 3, 6, 9 and 12	Item	1	112 700,00	112 700,00

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE	AMOUNT R c
BROUGHT FORWARD					1 501 375,00
19.16	Provision for repeating and addressing the asset register values.	Sum	1	5 175,00	5 175,00
19.17	Spares and Tools <u>NOTE:</u> The following items shall be adjusted in terms of Clause 13.9.2.1 in the Particular Conditions in C1.2 Contract Data, if applicable, specify			-	-
19.17.1	1).....			-	-
19.17.2	2).....			-	-
19.17.3	3).....			-	-
19.17.4	4).....			-	-

**DESIGN - BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	AMOUNT	
		R	C
	<u>SUMMARY</u>		
	Total of Schedule 1 from page 164 General Requirements and Conditions	5 799 684,47	
	Total of Schedule 2 from page 165 FBDA Equipment, Piping and Fittings: Materials And Equipment	8 102 806,15	
		6 740 156,15	
	Total of Schedule 3 from page 168 Bioreactor A, S, And R Recycle Pumps and Feed Screw Pump	11 171 421,91	
	Total of Schedule 4 from page 170 Anaerobic And Anoxic Mixers	4 305 210,29	
	Total of Schedule 5 from page 172 Mechanical Piping to Reactor Aeration Basins	12 318 241,79	
	Total of Schedule 6 from page 174 SST Underflow and WAS Dumping Systems	981 811,11	
	Total of Schedule 7 from page 176 Electrical Works - Preliminary and General	164 216,00	
	Total of Schedule 8 from page 177 Electrical Works - LV MCC	7 754 235,00	
	Total of Schedule 9 from page 186 Electrical Works - Cabling and Terminations	11 825 121,00	
	Total of Schedule 10 from page 194 Electrical Works - Cable Supports	6 805 843,00	
	Total of Schedule 11 from page 198 Electrical Works - Earth and Bonding	1 146 255,00	
	Total of Schedule 12 from page 200 Electrical Works - Civil Works	1 173 050,00	
	Total of Schedule 13 from page 202 Electrical Works - Ancilliary Equipment	2 670 682,00	
	Total of Schedule 14 from page 207 Electrical Works - Instrumentation	1 716 792,73	
	Total of Schedule 15 from page 211		

CARRIED FORWARD		T8 S47,49



**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR UPGRADES AT VARIOUS
WASTEWATER TREATMENT PLANTS: BELLVILLE DA PLANT REACTOR UPGRADE**

ITEM	DESCRIPTION	UNIT	QTY	PRICE		AMOUNT	
				R	c	R	c
BROUGHT FORWARD						78 548 547,45	
	<u>SCHEDULE 20</u>						
	<u>CONTINGENCIES</u>						
	<u>BELLVILLE DA PLANT REACTOR UPGRADE:</u>						
	<u>CONTINGENCIES</u>						
	The following items will be deducted in part or whole if not required :-						
20.1	Allow the sum of 10% (fifteen percent) of the above total for contingencies to be spent as the Engineer may direct.	Sum	1			7 854 854,75	
20.2	Allow for any additional Cost and profit required per day in the event of access to, and possession of, the Site not being available as per Sub-Clause 2.1(b) of the Conditions of Contract.	Days	35			No cost for 35 days	
20.3	Allow for any additional Cost and profit required per day in the event of a delay in the testing and commissioning at Site and the resultant delay in the commencement of the Defects Notification Period from causes not attributable to the Contractor, as per Sub-Clause 10.3 (b) of the Conditions of Contract.	Days	35			No Cost for 35 days	
20.4	Allow for all costs and expenses in leaving Site and returning at a later date due to causes not attributable to the Contractor.	Sum	1	25 000,00		25 000,00	

DECLARATION (In respect of completeness of Tender)

City of Cape Town
Tower Block, Civic Centre
12 Hertzog Boulevard
CAPE TOWN

I/ we, the undersigned, do hereby declare that these are the properly priced Schedules of Quantities forming Part C2.2 of this Contract Document which contains 248 pages numbered i to iii and 1 to 248 in consecutive order in Volume 3 and the number of pages in consecutive order in Volume 3A as stated on page i thereof, upon which my/our tender for **TENDER NO. 3Q/2019/20: DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT REACTOR UPGRADE** has been based. If I/we have submitted a printed version of the Schedules of Quantities, I/we warrant that no amendments have been made to it from the original, other than amendments issued in any Addenda in terms of Clause F.3.2 in Part T1.2 Tender Data.



SIGNED ON BEHALF OF TENDERER:

DATE: 23 / 05 / 2019

CITY OF CAPE TOWN

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**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT
REACTOR UPGRADE**

C2.3 Schedule of Rates for Electrical Variations

Not applicable to this tender.

PART 5: SCOPE OF WORK

Part C3: Scope of Work

	Pages
C3.1 Description of the Works	225 - 226
C3.2 Engineering.....	227 – 230
C3.3 Procurement	232 – 233
C3.4 Construction	234– 235
C3.5 Management.....	236 – 240
C3.6 Annexes (see Volume 3A)	241 – 247

Status

Should any requirement or provision in the parts of the Scope of Work conflict with any requirement of any Standardised Specification, particular specification or any drawings, the order of precedence, unless otherwise specified, is:

Drawings
Scope of Work (Parts C3.1, C3.4, C3.5 and C3.6)

Particular Specifications
SANS Standardised Specifications

CITY OF CAPE TOWN

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DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT REACTOR UPGRADE

C3.1 Description of the Works

CONTENTS

- 3.1.1 EMPLOYER'S OBJECTIVES
- 3.1.2 OVERVIEW OF THE WORKS
- 3.1.3 EXTENT OF THE WORKS
- 3.1.4 LOCATION OF THE WORKS
- 3.1.5 TEMPORARY WORKS

3.1.1 EMPLOYER'S OBJECTIVES

The Water and Sanitation Branch of the City of Cape Town proposes to change the reactor configuration at the Bellville WWTP from an MLE process to a UCT process to improve effluent quality and increase capacity. Additional instrumentation is to be installed to better monitor and control critical process parameters.

3.1.2 OVERVIEW OF THE WORKS

Sewage is biologically treated at the Bellville Wastewater Treatment Works (WWTW) using the activated sludge process. The WWTW is divided into two sections, the DA (Diffused Aeration) Plant and the MBR (Membrane Bioreactor) Plant. The DA plant consists of 3 bioreactors (North, Center and South) and 9 Secondary Settling Tanks (SST's). The current capacity of the DA plant is 52 MI/d (ADWF) and the MBR plant is 20 MI/d (ADWF). To increase capacity and improve effluent quality upgrades are to be made to the plant in 2 phases.

Phase 1 includes the addition of Primary Settling Tanks (PST's) and upgrading of the existing blowers and aeration piping. Phase 2 includes changing the configuration of the reactors from the existing Modified Ludzack – Ettinger (MLE) process to the UCT process, upgrading the diffused aeration equipment, refurbishment of the Secondary Settling Tanks (SST's) and addition of crucial instrumentation to monitor the process more efficiently.

3.1.3 EXTENT OF THE WORKS

The scope of this Contract includes the design - build, ie. design, supply, delivery, installation, testing, commissioning and upholding during the Trial Operation Period and the Defects Notification Period of the following:-

- i) Addition of a new inclined Archimedes screw feed pump at pump station 2 – 1 screw pump in total;
- ii) Replacement of all of the existing S-Recycle inclined Archimedes screw pumps at the respective pump stations, 2 per reactor – 6 pumps in total;
- iii) Replacement of all of the existing A-Recycle inclined Archimedes screw pumps at the respective pump stations, 1 per reactor – 3 pumps in total;

- (CIP) system and distribution piping to be supplied for cleaning of the diffuser network. A small, retrievable diffuser network to be supplied for installation in zone 1 of one of the reactors;
- xii) Prior to finalising the detailed design, conduct detailed dimensional survey of the civil infrastructure of each reactor, so much as it affects the design of each of the mechanical equipment as mentioned above;
 - xiii) Provision of portable submersible underflow drainage pumps, powered by a mobile generator, to prevent floating and damage of reactor floors for the duration of the entire period of the reactor upgrades;
 - xiv) Electrical infrastructure for all the new mechanical equipment as mentioned above.
 - xv) Provision to move all the electrical infrastructure to the new MCC room of the existing mechanical equipment in the vicinity of the 3 reactors.

All work (including construction and defects notification period) must be programmed to be completed within these 1272 days period. As this project will exceed the current budget cycle, it is subject to Section 33 of the Municipal Finance Management Act, 56 of 2003, and consequently the Employer must follow the required processes in terms of Section 33. These will run concurrently with the procurement process for this tender/ contract.

3.1.4 LOCATION OF THE WORKS

Bellville Wastewater Treatment Works

The Bellville Wastewater Treatment Works can be reached from Cape Town travelling out of the city along the N2. Take the left off ramp onto Robert Sobukwe Road and follow this road until you turn right into Sacks Circle. Follow the circle and the Bellville Wastewater Treatment Works is on the right hand side.



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REACTOR UPGRADE**

C3.2 Engineering

CONTENTS

- 3.2.1 DESIGN SERVICES AND ACTIVITY MATRIX
- 3.2.2 EMPLOYER'S DESIGN
- 3.2.3 DESIGN BRIEF
- 3.2.4 DRAWINGS
- 3.2.5 DESIGN PROCEDURES

3.2.1 DESIGN SERVICES AND ACTIVITY MATRIX

Design Stage	Responsibility
Concept, feasibility and overall process	Employer/Employer's Agent
Preliminary design and basic engineering for tendering purposes	Employer/Employer's Agent
Detail design for construction	Contractor
Approval of detail design for construction	Employer/Employer's Agent
Provision of as-build drawings, operation manuals, control philosophies, Functional Design Specifications	Contractor

3.2.2 EMPLOYER'S DESIGN

See section A, B and C in Volume 3A

3.2.3 DESIGN BRIEF

See section A, B and C in Volume 3A

3.2.4 DRAWINGS

The following drawings are applicable to the contract and are issued with this tender document and will form part of the Contract Documents as **Volume 3**.

DRAWING NUMBER	DESCRIPTION
W1774-85001 SHT 1&2	Bellville Air Supply Header
W1774-85003	Bellville DA Plant General Arrangement

W1774-61001	Bellville WWTP Instrumentation List
W1774-61002	Bellville WWTP Control Valve List
W1774-61003	Bellville WWTP On/Off Valve List
W1774-76003 SHT 1-10	Center Biological Reactor Layout
W1774-76004 SHT 1-10	North Biological Reactor Layout
W1774-76005 SHT 1-10	South Biological Reactor Layout
W1774-76006 SHT 1-4	Pump Station 2
W1774-76007 SHT 1-7	Pump Station 3
W1774-76008 SHT 1-7	Pump Station 4
W1774-76009 SHT 1-7	Pump Station 5
W1774-57001-0	Typical Field E-Stop or Start Stop Station Stand
W1774-57002-0	Support 2
W1774-94001-1	North Reactor MCC Panel
W1774-94002-1	Inlet Pump Station 2
W1774-94004-1	South Reactor MCC Panel
W1774-94005-1	Center Reactor MCC
W1774-94006-1	PLC Control Panel
W1774-94007-1	Typical Pump Station 2 Small Power Distribution Board
W1774-94008-0	Typical Reactor Pump Station 2 Small Power Distribution Board
W1774-98001-0	Proposed Site Lighting & Cable Route Layout
W1774-99001-1	PLC Block Diagram

3.2.5 DESIGN PROCEDURES

3.2.5.1 General Requirements

- g) Item lists shall be provided on the drawing or on a separate parts list.
- h) Item descriptions shall include the material of construction, quantity and full identification information, including, as applicable, brand name, manufacturer's reference number, model number, size, rating, source, duty, quantity, etc.

3.2.5.2 Required Submissions within 42 days

The Contractor shall submit the following for acceptance within 42 days from the Commencement Date:

- a) Finalised calculations verifying the selection of the diffusers (type and quantity) for each aerated zone, illustrating (but not limited to) the Standard Oxygen Transfer Rate (SOTR), Standard Oxygen Transfer Efficiency (SOTE), pressure drops over piping and diffusers, mixing intensity and air distribution per zone, diffuser density, maximum flow rates per diffuser
- b) Process flow diagram, indicating the distribution and quantities of each stream to the following systems:
Bio reactor mixed liquor system
Bio reactor aeration system

All relevant calculations to support figures used in each stream flow should be provided.

- c) Piping and instrumentation diagrams indicating all equipment capacity for the following systems:
Bio reactor mixed liquor system
Bio reactor aeration system
- d) Process description and control philosophy for the following systems:
Bio reactor mixed liquor system
Bio reactor aeration system
- e) Technical Datasheets summarising all process and fabrication design information for all new equipment within the following systems:
Bio reactor mixed liquor system
Bio reactor aeration system
- f) Dimensioned layout drawings (preferably A0 size but no smaller than A1) of the installation showing the proposed layout and design of the new equipment within the following systems:
Bio reactor mixed liquor system
Bio reactor aeration system

Sufficient sections and elevations must be shown so that the relative arrangement of all equipment is clear. The battery limits of supply should be indicated on the drawings.

- g) Drawings of pipe support details of the new diffuser network.
- h) Parts list to accompany layout drawings.
- i) Document register.
- j) Method Statement for fabrication and installation

- a) Final process schedules, including instrument list and equipment list including, as a minimum, the make, model, capacity and any set points of units to be installed.
- b) Cable schedule for power, data, control and instrumentation cables. This shall include the cable type and construction, conductor material, insulation, protection, voltage rating, start and finish points, route length, duty, load, voltage drop, core area, no. of cores, no. of cores used and gland size. For cable voltages above 400 Volts, the schedule shall also include the purchase details, specification and date of manufacture.
- c) Contractor's updated drawing and document register.
- d) Final piping and instrumentation diagrams.
- e) Final process flow diagrams.
- f) Final equipment, piping and ducting general arrangement and layout drawings.
- g) Final equipment datasheets.
- h) Electrical Single Line Diagrams.
- i) Electrical equipment datasheets: motor control centre, switchgear, PLC.
- j) Electrical panel layouts.
- k) Power and control cable routings.
- l) Earthing drawings.
- m) Loop diagrams.
- n) Instrument datasheets.
- o) Small power and lighting layout.

The date by which possession of the Site can be handed over to the Contractor and consequently the completion date of the Works, is dependent on the date of submission and acceptance of the documents referred to above. Cost resulting from delays in submission of the Contractor's Documents or in correcting errors or making changes on documents not approved by the Engineer shall be for the Contractor's account.

The item allowed for in the Schedules of Quantities to cover expenses incurred by the Contractor in the event of delays in handing over the Site shall not apply where such delay is attributable to the late submission and acceptance of the drawings referred to above.

3.2.5.4 Required Submissions before Commissioning the Works

Prior to commencement of the Tests on Completion and the start of the 28 day Trial Operation Period, the Contractor shall submit two copies of the Manual as specified in the Standard Specification for

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C3.3 Procurement

CONTENTS

- 3.3.1 PREFERENTIAL PROCUREMENT
- 3.3.2 SUB-CONTRACTING PROCEDURES

3.3.1. PREFERENTIAL PROCUREMENT

The Works shall be executed in accordance with the conditions associated with the granting of preferences detailed in the **Preference Schedule** where preferences are granted in respect of B-BBEE contribution.

Financial penalties, as described in the **Preference Schedule**, shall be applied in the event that the Contractor is found to have breached and of the conditions contained in the **Preference Schedule** (unless proven to be beyond the control of the Contractor).

Notwithstanding the application of penalties, the Contractor's attention is drawn to other sanctions that may be applied by the Employer (listed in the **Preference Schedule**) with due consideration to the circumstances.

3.3.2. SUB-CONTRACTING PROCEDURES

3.3.2.1 Monitoring the use of sub-contractors

Notwithstanding the restriction on sub-contracting as described on the **Preference Schedule**, it is recognised that sub-contracting is an integral part of construction, which the conditions of contract make provision for.

In order, however, to comply with the requirements of the **Preference Schedule**, the Contractor shall submit to the Employer's Agent, on a monthly basis, a **B-BBEE Sub-Contract Expenditure Report**. The format of this report is provided in Annex 2 attached.

The Contractor shall submit to the Employer's Agent documentary evidence in accordance with the applicable codes of good practise, of the B-BBEE status level of every sub-contractor employed by the Contractor. Until such time as documentary evidence as described above has been submitted to the Employer's Agent, a sub-contractor shall be deemed to be a non-compliant contributor.

The Contractor shall furthermore, on the written request of the Employer's Agent, provide documentary evidence showing the value of work sub-contracted to any or all of the sub-contractors employed by the

3.3.2.2 Procedure for the selection of sub-contractors/suppliers

Where monetary allowances for provisional sums or prime costs items have been provided in the Bills of Quantities, and where the work or items to which the allowances relate are to be executed/supplied by sub-contractors/suppliers, then the following selection process shall be followed in respect of the required sub-contractors/suppliers:

Where the monetary allowance is less than or equal to R200 000, the Contractor shall invite three quotations from suitably qualified sub-contractors/suppliers for the required work or items. The selection of the three sub-contractors/suppliers shall be in consultation with, and to the approval of the Employer's Agent. The evaluation of the quotations received must include a preference points system as described in F.3.11 of the Tender Data.

Where the monetary allowance is in excess of R200 000, an open competitive tender process shall be followed in respect of the selection of a sub-contractor/supplier for the required work or items. In such circumstances, tender documentation will be prepared by the Employer's Agent in consultation with and to the approval of the Contractor, invitations to tender will be advertised in the media by the Employer's Agent on behalf of the Contractor, and a sub-contractor/supplier will be selected from the responses received, by the Contractor and Employer's Agent in consultation. The evaluation of the offers received must include a preference points system as described in F.3.11 of the Tender Data. The Contractor must satisfy itself that the selected sub-contractor/supplier can meet the requirements of the sub-contract /supply agreement and may, on reasonable grounds, elect not to employ a particular sub-contractor/supplier.

In both instances above (less than or equal to R200 000 or in excess of R200 000), the contractual relationship between the Contractor and sub-contractor/supplier shall be as described in the conditions of contract.

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C3.4 Construction

CONTENTS

- 3.4.1 APPLICABLE STANDARDISED SPECIFICATIONS
- 3.4.2 PARTICULAR / PROJECT SPECIFIC SPECIFICATIONS
- 3.4.3 WAYLEAVES, PERMISSIONS AND PERMITS
- 3.4.4 LOCAL PRODUCTION AND CONTENT
- 3.4.5 EMPLOYMENT OF SECURITY PERSONNEL
- 3.4.6 UNIVERSAL ACCESS

3.4.1. APPLICABLE STANDARDISED SPECIFICATIONS

Standard specification for mechanical works included in Volume 3A.

Standard specification for electrical works included in Volume 3A.

3.4.2 PARTICULAR / PROJECT SPECIFIC SPECIFICATIONS

Detailed mechanical specification included in Volume 3A.

Detailed electrical specification included in Volume 3A.

Particular Specification G: Health and Safety Specification is included in Volume 3A.

Particular Specification H: Environmental Management Specification and its Annexures included in Volume 3A

3.4.3. WAYLEAVES, PERMISSIONS AND PERMITS

The Contractor shall be responsible for obtaining all of the necessary wayleaves, permissions or permits applicable to working near any existing services or other infrastructure on Site, and shall ensure that any wayleaves, permissions or permits obtained by the Employer's Agent prior to the award of the contract are transferred into the Contractor's name.

The Contractor shall abide by any conditions imposed by such wayleaves, permissions or permits.

The Contractor shall ensure that all wayleaves, permissions and permits are kept on site and are

In pursuit of becoming a fully accessible city, the City of Cape Town expects all Consultants and Service Providers to design and construct to SANS Standards for accessible Design, and any relevant City of Cape Town documents as may be relevant, and to exhibit a commitment to employing Universal Design Principles in their design, construction, service and product delivery of construction projects. This applies to all projects whether new, temporary, upgrades or rehabilitation works.

The contractor will engage with project representatives and the CCT's Universal Accessibility Department on how Universal Design Principles will enhance accessibility, within this project, that meets a variety of needs and creates a city that is accessible to everyone.

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C3.5 Management

CONTENTS

- 3.5.1. FORMS FOR CONTRACT ADMINISTRATION
- 3.5.2. PARTICIPATION OF TARGETED LABOUR
- 3.5.3. COMMUNITY LIAISON OFFICER
- 3.5.4. PARTICIPATION OF TARGETED ENTERPRISES
- 3.5.5. ENVIRONMENTAL MANAGEMENT PROGRAMME
- 3.5.6. HEALTH AND SAFETY

3.5.1. FORMS FOR CONTRACT ADMINISTRATION

The Contractor shall complete, sign and submit with each monthly statement for payment, the following updated returns (the format of which are attached in C3.6 Annexes as amended from time to time):

- a) Monthly Project Labour Report (Annex 1)
- b) B-BBEE Sub-Contract Expenditure Report (Annex 2)
- c) Joint Venture Expenditure Report (Annex 3)
- d) Targeted Labour Contract Participation Expenditure Report (Annex 4)
- e) Targeted Enterprises Contract Participation Expenditure Report (Annex 5)

The Monthly Project Labour Report must include details of all labour (including that of sub-contractors) that are South African citizens earning less than R350.00 per day, as adjusted from time to time (excluding any benefits), who are employed on a temporary or contract basis on this contract in the month in question.

In addition to the Monthly Project Labour Report the Contractor shall simultaneously furnish the Employer's Agent with copies of the signed employment contracts entered into with such labour, together with certified copies of identification documents as well as evidence of payments to such labour in the form of copies of payslips or payroll runs. If the worker is paid in cash or by cheque, this information must be recorded on the envelope and the worker must acknowledge receipt of payment by signing for it and proof of such acknowledgement shall be furnished to the Employer's Agent.

The Monthly Project Labour Reports shall be completed and submitted in accordance with the instructions therein and copies of all submitted documents must be kept on site be made available to the employer's agent upon request.

The B-BBEE Sub-Contract Expenditure Report is required for monitoring the prime contractor's compliance with the sub-contracting conditions of the Performance Schedule.

The Targeted Labour Contract Participation Expenditure Report (if applicable) is required for monitoring the contractor's compliance for achieving the specified minimum targeted labour contract participation goal (CPG_L) and, if applicable, for calculating any penalty in terms thereof.

The Targeted Enterprises Contract Participation Expenditure Report (if applicable) is required for monitoring the contractor's compliance for achieving the specified minimum targeted enterprises contract participation goal (CPG_E) and, if applicable, for calculating any penalty in terms thereof.

The Expenditure Reports shall be verified by the Employer's Agent/Employer's Agent's Representative.

In respect of Annexes 2 and 3, the Employer shall, in addition to any other sanctions available to it, apply the financial penalties applicable to breach of preferencing conditions in the **Preference Schedule** Preference Schedule in Part T2.2 Returnable Schedules. In the case of joint ventures (Annex 3), the contractor shall prove his compliance with item 6) in Section 2 of the Preference Schedule by providing a consolidated scorecard at his own cost on instruction from the Employer's Agent.

3.5.2 PARTICIPATION OF TARGETED LABOUR

3.5.2.1 Minimum targeted labour contract participation goal

In support of the National Department of Public Works' Expanded Public Works Programme which is aimed at alleviating poverty through the creation of temporary employment opportunities using labour intensive methodologies and practices where possible, the Employer is seeking to increase the intensity of labour, as appropriate, in all of its infrastructure sector projects.

It is a requirement of this contract, therefore, that the work be executed in such a manner so as to maximise the use of labour intensive construction methods in order to provide low and semi-skilled temporary employment opportunities.

To this end, a minimum targeted labour contract participation goal is specified below, which shall be achieved by the Contractor in the performance of the contract, failing which, penalties as described will be applied. The Contractor is required to provide all skills training where necessary, so as to ensure that a minimum level of competence is achieved and maintained, such that the various activities are carried out safely and to the required standard. The cost of training shall be included in the rates for the various work activities.

The specified minimum targeted labour contract participation goal (CPG_L) is

5 %

The minimum CPG_L is such that the Contractor will have to carry out some of the work that would normally have been undertaken using mechanised construction methods, by using labour intensive construction methods instead. It is left to the discretion of the Contractor to identify suitable work activities for the intensification of labour. The Contractor shall, within 5 working days of being requested in writing by the Employer's Agent to do so, submit details of his/her plan to achieve the minimum CPG_L.

3.5.2.2 Definitions

For the purposes of the requirements in respect of the participation of targeted labour, the following definitions shall apply:

3.5.2.3 The selection and recruitment of targeted labour

Where targeted labour is to be drawn from specific local communities (defined in terms of the target area), such labour shall be identified using the relevant Sub-Council Job-Seekers Database. The Contractor shall request, via a Community Liaison Officer (if required in terms of the contract), a list of suitable candidates from the database, from which the Contractor shall make his/her final selection. The contractor shall enter into written contracts of temporary employment with all targeted labour.

Any difficulty experienced by the Contractor in identifying candidates through the Job-Seekers Database, or as regards any matter relating to the employment of targeted labour, shall be immediately referred to the Employer's Agent.

3.5.2.4 Contract participation goal credits

Credits towards the achieving the minimum CPG_L shall be granted by converting the total monetary value of wages paid to targeted labour (including that of sub-contractors) to a percentage of the value of the contract. No credits shall be accorded should the contractor/sub-contractor fail to enter into written contracts with the targeted labour. Furthermore, no credits shall be accorded in respect of targeted labour employed on work in respect of provisional sums or prime cost items. Such labour shall nevertheless be recorded on the Project Labour Report which is required to be furnished by the Contractor.

3.5.2.5 Training of targeted labour

The Contractor is required to provide all informal (on-the-job) skills training so as to ensure that a minimum level of competence is achieved and maintained, such that the various activities are carried out safely and to the required standard. The cost of informal training shall be included in the rates for the various work activities.

3.5.2.6 Penalties

The financial penalty to be applied for failing to meet the specified minimum targeted labour contract participation goal in the performance of the contract (unless proven to be beyond the control of the Contractor), is as follows:

$$\text{Penalty} = (\text{CPG}_L^S - \text{CPG}_L^A) \times P^*$$

Where CPG_L^S = the specified minimum targeted labour contract participation goal (expressed as a percentage).

CPG_L^A = the targeted labour contract participation goal achieved (expressed as a percentage).

P^* = the value of the contract.

3.5.3. COMMUNITY LIAISON OFFICER

It is a requirement of this Contract that a Community Liaison Officer (CLO) shall be appointed by the Contractor. The primary functions of the CLO shall be to assist the Contractor with the selection and recruitment of targeted labour, to represent the local community in matters concerning the use of targeted labour (and/or enterprises) on the works, and to assist with and facilitate communication

paid). As said contract will be between the Contractor and the CLO, all costs involved shall be borne by the Contractor and the tender shall be deemed to include for this.

3.5.4. PARTICIPATION OF TARGETED ENTERPRISES

3.5.4.1 Minimum targeted enterprises contract participation goal

It is a requirement of this contract that enterprises located within the target area, as defined, be engaged by the Contractor for the provision of supplies, services or works necessary for the performance of this contract.

To this end, a minimum targeted enterprises contract participation goal is specified below, which shall be achieved by the Contractor in the performance of the contract, failing which, penalties as described will be applied.

The specified minimum targeted enterprises contract participation goal (CPG_E) is

5 %

The Contractor shall engage targeted enterprises directly or indirectly in the performance of the contract to the extent that the total monetary value of such engagements (exclusive of VAT), expressed as a percentage of the value of the contract, is sufficient to achieve the specified minimum CPG_E.

3.5.4.2 Definitions

For the purposes of the requirements in respect of the participation of targeted enterprises, the following definitions shall apply:

“**Target area**” means the geographical area shown on plan in Part C4: Site Information

“**Targeted enterprises contract participation goal (CPG_E)**” means the value of supplies, services or works (exclusive of VAT), for which the Contractor contracts targeted enterprises, either directly or indirectly, in the performance of the contract, expressed as a percentage of the value of the contract.

“**Targeted enterprises**” means any sole trader, partnership or legal entity that acts as a supplier, manufacturer, service provider or sub-contractor, and which has its base of operations in the target area.

“**Value of the contract**” means the contract sum (accepted contract amount) less provisional sums, contingencies and VAT.

3.5.4.3 Achieving the contract participation goal

The contractor may achieve the specified minimum CPG_E as follows:

- a) by engaging one or more targeted enterprises to perform commercially useful functions in the performance of the contract;
- b) by engaging non-targeted enterprises, who in turn engage one or more targeted enterprises to perform commercially useful functions in the performance of the contract;
- c) by a combination of the above.

Credits claimed towards the contract participation goal shall be denied where such written contractual agreements contain any of the following:

- c) conditions which are more onerous than those that exist in the prime contract (this contract);
- d) payment procedures based on a pay when paid system;
- e) authoritarian rights given to the employing contractor, with no recourse to independent adjudication in the event of a dispute arising.

No credits may be claimed in respect of targeted enterprises that do not adhere to statutory labour practices.

No credits shall be accorded in respect of targeted enterprises engaged on work in respect of provisional sums or prime cost items.

In the event that a targeted enterprise sub-contracts to another targeted enterprise, only the value of the higher level sub-contract shall be granted as credit towards achieving the specified minimum CPG_E.

In addition to the form required for contract administration (the Targeted Enterprises Contract Participation Expenditure Report), the Contractor shall furnish the Employer's Agent, upon written request, with documentary evidence that the targeted enterprises have their base of operations in the target area, copies of the contractual agreements with the various targeted enterprises, as well as documentary proof of payments made to the various targeted enterprises.

3.5.4.5 Penalties

The financial penalty to be applied for failing to meet the specified minimum targeted enterprises contract participation goal in the performance of the contract (unless proven to be beyond the control of the Contractor), is as follows:

$$\text{Penalty} = (\text{CPG}_E^S - \text{CPG}_E^A) \times P^*$$

Where CPG_E^S = the specified minimum targeted enterprises contract participation goal (expressed as a percentage).

CPG_E^A = the targeted enterprises contract participation goal achieved (expressed as a percentage).

P^* = the value of the contract.

3.5.5. ENVIRONMENTAL MANAGEMENT PROGRAMME

The Environmental Management Specification and its Annexures are included in Volume 3A.

3.5.6. HEALTH AND SAFETY

The Health and Safety Specification is included in Volume 3A.

CITY OF CAPE TOWN

WATER AND SANITATION: WASTEWATER

CONTRACT NO. 3Q/2019/20

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT
REACTOR UPGRADE**

C3.6 Annexes

CONTENTS

Annex 1: Monthly Project Labour Report

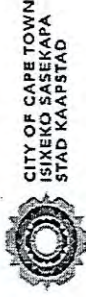
Annex 2: B-BBEE Sub-Contract Expenditure Report

Annex 3: Joint Venture Expenditure Report

Annex 4: Targeted Labour Contract Participation Expenditure Report

Annex 5: Targeted Enterprises Contract Participation Expenditure Report

CITY OF CAPE TOWN MONTHLY PROJECT LABOUR REPORT



CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

- Jobseeker Database Reference Number**
- Unique number generated by Jobseekers system to confirm workers were sourced from the Jobseekers database operated by Subcouncils
- New workers: Training: Reporting Threshold**
- A new worker is one in respect of which a new employment contract is signed in the current month.
- Refers to work days only. Formal accredited Training / Non-accredited training that does not form part of on-the-job training must be excluded from this entry
- All formal accredited / non-accredited training that does not form part of on-the-job training
- Workers earning more than the maximum daily rate (Reporting Threshold)
- (currently R350 excluding any benefits) shall not be reflected on this form at all.
- Submission of Forms**
- Signed hardcopy forms must be scanned and submitted to the City's project manager in electronic (.pdf) format, together with the completed form in Microsoft Excel format.
- Scanned copies of all applicable supporting documentation must be submitted along with each monthly project labour report. Copies of employment contracts and **Certified ID documents** are only required in respect of new workers.
- If a computer is not available hardcopy forms and supporting documentation will be accepted.
- Failure to adhere to reporting requirements may result in the withholding of payment; penalties being applied or both

PROJECT DETAILS

Information above for completing and submitting forms

CONTRACT OR WORKS		PROJECT NUMBER: (6)			
DEPARTMENT:					
CONTRACTOR OR VENDOR					
E-MAIL ADDRESS:					
CONTRACTOR OR VENDOR					
TEL. NUMBER:					
JUL		AUG		SEP	
OCT		NOV		DEC	
				YEAR (Insert last 2 digits)	
				2 0	

ANTICIPATED / ACTUAL END DATE (yyyy/mm/dd)		(7)	
2 0			
TOTAL DATE (INCLUDING ALL COSTS, BUT EXCLUDING VAT)			

CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

Year	Month		
			of

Year	Month	
		of

[illegible]

Name		
Date		Signature

Name			Signature
Date			

CITY OF CAPE TOWN

T EXPENDITURE REPORT BASED ON PAYMENT CERTIFICATE NO.

R		B-BBEE Status Level of Prime Contractor		
B-BBEE Status Level of Sub-contractor ¹	Total value of Sub-contract (excl. VAT) ¹	Value of Sub-contract work to date (excl. VAT) ¹	Value of Sub-contract work to Sub-contractors with a lower B-BBEE Status Level than Prime Contractor	
	R	R	R	
	R	R	R	
	R	R	R	
Total:			R	
Expressed as a percentage of P*				%

Date: _____

Date: _____

CITY OF CAPE TOWN

PENDITURE REPORT BASED ON PAYMENT CERTIFICATE NO.

R		B-BBEE Status Level of Joint Venture		
Status of each JV as at award	Percentage contribution of JV partner per JV Agreement ¹ A	Total value of JV partner's contribution (excl. VAT) ¹ $B = A\% \times P^*$	Value of JV partner's contribution to date (excl. VAT) ¹ C	Value of JV partner's contribution as a percentage of the work executed to date $D = C/P \times 100$
	%	R	R	%
	%	R	R	%
	%	R	R	%

Date: _____

Date: _____

1

Schedule)	R	
		Specified Targeted Labour Contract Participation Goal
		%

THE UNIVERSITY OF CHICAGO

100

Date _____



TENDER NO. 3Q/2019/20



CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

SCM – 511 | Approved by Branch Manager: 10/04/2017

Version: 3

Page 1 of 160

CONTRACT DOCUMENT

FOR THE

**DESIGN – BUILD OF MECHANICAL AND ELECTRICAL
WORKS FOR : BELLVILLE DA PLANT REACTOR
UPGRADE**

VOLUME 3A

(NON-RETURNABLE DOCUMENT)

SCOPE OF WORK, PART C3.6 ANNEXES: SPECIFICATIONS

ISSUED BY:

**DIRECTOR: WATER AND
SANITATION: WASTEWATER**
CITY OF CAPE TOWN
8 Voortrekker Road, corner of
Mike Pienaar Boulevard
Private Bag X98, Bellville
CAPE TOWN
75351

COMPILED BY:

in conjunction with

FOR OFFICIAL USE.

Tender Serial No.:

Signatures of City Officials at Tender
Opening

1.

2.

3.

PART 6: SITE INFORMATION

CITY OF CAPE TOWN

WATER AND SANITATION: WASTEWATER

CONTRACT NO. 3Q/2019/20

DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT
REACTOR UPGRADE

C4 Site Information

CONTENTS

1. PROCESS INTERRUPTIONS

The wastewater works is in full operation and cannot be closed down, it is critical that any work carried out causes the least possible interruption to the plant and its processes.

The Contractor shall liaise regularly with the Employer and his agent during the works execution, to adjust his programme as might be necessary, in order to minimise any adverse effect on the plant's final effluent quality.

PART 7: OCCUPATIONAL HEALTH AND SAFETY AGREEMENT

Occupational Health and Safety Agreement

AGREEMENT MADE AND ENTERED INTO BETWEEN THE CITY OF CAPE TOWN (HEREINAFTER CALLED THE "EMPLOYER") AND

INGENZO WATER (PTY) LTD
(Contractor/Mandatory/Company/CC Name)

IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT, 85 OF 1993 AS AMENDED.

I, [REDACTED], representing

INGENZO WATER (PTY) LTD, as an employer
in its own right, do hereby undertake to ensure, as far as is reasonably practicable, that all work will be performed, and all equipment, machinery or plant used in such a manner as to comply with the provisions of the Occupational Health and Safety Act (OHSA) and the Regulations promulgated thereunder.

I furthermore confirm that I am/we are registered with the Compensation Commissioner and that all registration and assessment monies due to the Compensation Commissioner have been fully paid or that I/We are insured with an approved licensed compensation insurer.

COID ACT Registration Number: [REDACTED]

OR Compensation Insurer: [REDACTED] Policy No.: [REDACTED]

I undertake to appoint, where required, suitable competent persons, in writing, in terms of the requirements of OHSA and the Regulations and to charge him/them with the duty of ensuring that the provisions of OHSA and Regulations as well as the Council's Special Conditions of Contract, Way Leave, Lock-Out and Work Permit Procedures are adhered to as far as reasonably practicable.

I further undertake to ensure that any subcontractors employed by me will enter into an occupational health and safety agreement separately, and that such subcontractors comply with the conditions set.

I hereby declare that I have read and understand the Occupational Health and Safety Specifications contained in this tender and undertake to comply therewith at all times.

I hereby also undertake to comply with the Occupational Health and Safety Specification and Plan submitted and approved in terms thereof.

Signed at BELLVILLE on the 10th NOVEMBER 2022

Witness [REDACTED]

Mandatory

PART 8: PROTECTION OF THE ENVIRONMENT DECLARATION

PROTECTION OF THE ENVIRONMENT DECLARATION

The Contractor will not be given right of access to the Site until this form has been signed

CONTRACT NO.: 3Q/2019/20

CONTRACT TITLE: DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT REACTOR UPGRADE

I/ we, INENZO WATER (PTY) LTD {Contractor} record as follows:

1. I/ we, the undersigned, do hereby declare that I/ we am/ are aware of the increasing requirement by society that construction activities shall be carried out with due regard to their impact on the environment.
2. In view of this requirement of society and a corresponding requirement by the Employer with regard to this Contract, I/ we will, in addition to complying with the letter of the terms of the Contract dealing with protection of the environment, also take into consideration the spirit of such requirements and will, in selecting appropriate employees, plant, materials and methods of construction, in-so-far as I/ we have the choice, include in the analysis not only the technical and economic (both financial and with regard to time) aspects but also the impact on the environment of the options. In this regard, I/ we recognise and accept the need to abide by the "precautionary principle" which aims to ensure the protection of the environment by the adoption of the most environmentally sensitive construction approach in the face of uncertainty with regard to the environmental implications of construction.
3. I/ we declare that I/ we have read and understood the contents of the Environmental Management Programme (which is comprised of the Environmental Management Specification and its Annexures) for this Contract, and that I/ we understand my/our responsibilities in terms of enforcing and implementing the Environmental Management Programme. I/ we also declare that I/ we have made appropriate provision in my/ our pricing of the Schedules of Rates items for the Environmental Management Programme.
4. I/ we acknowledge and accept the right of the Employer to deduct, should he so wish, from any amounts due to me/ us, such amounts (hereinafter referred to as fines) as the Employer's Agent shall certify as being warranted in view of my/ our failure to comply with the terms of the Contract dealing with protection of the environment, subject to the following:
 - 4.1 The Employer's Agent, in determining the amount of such fine, shall take into account, *inter alia*, the nature of the offence, the seriousness of its impact on the environment, the degree of prior compliance/non-compliance, the extent of the Contractor's overall compliance with environmental protection requirements and, in particular, the extent to which he considers it necessary to impose a sanction in order to eliminate/reduce future occurrences
 - 4.2 The Employer's Agent shall, with respect to any fine imposed, provide me/ us with a written statement giving details of the offence, the facts on which the Employer's Agent has based his assessment and the terms of the Contract (by reference to the specific clause) which has been contravened.

PART 9: CONTRACT OF TEMPORARY EMPLOYMENT AS COMMUNITY LIAISON OFFICER

C1.8 Contract of Temporary Employment as Community Liaison Officer

Construction Contract No.:

PROJECT.....

- AGREEMENT made between the CONTRACTOR.....
and the Community Liaison Officer....., hereafter referred to as
the CLO, for the appointment and employment of a CLO for the duration of the work in respect of the above named construction
contract.

1. THE PARTIES HAVE AGREED THAT

The CLO will be employed by the CONTRACTOR on a temporary basis for the duration of the work from the date of signing this agreement to the date of practical completion as defined in the Contract, subject to all the conditions set out below.

2. THE DUTIES OF THE COMMUNITY LIAISON OFFICER SHALL BE:

1. to keep the community informed on the progress of the project;
2. to keep the Contractor informed on relevant Community affairs and possible grievances;
3. to manage the recruitment of workers from the Sub-Council Job-Seekers Database;
4. to assist the Contractor's supervisory staff in the management of the workers.

3. THE FOLLOWING CONDITIONS OF EMPLOYMENT SHALL APPLY:

The Conditions of Temporary Employment as applicable on this Contract for the workers recruited from the Community shall apply equally to the CLO, except that the rate of remuneration shall be **R365.00** per working day. These conditions that apply are listed below as they appear in the Contract of Temporary Employment:

- 3.1 If required to work on a statutory public holiday or Sunday the payment will be double the amount stated in the previous paragraph.
- 3.2 Maximum hours of work:
 - (i) 9¼ hours per day

- (iii) abuse of intoxicating substances;
- (iv) criminal actions by the employee;
- (v) strike action or political stayaways.

3.6 Workers, including the CLO, may be dismissed after two official written warnings for the following behaviour:

- (i) undisciplined or unruly behaviour;
- (ii) insubordination to Team Leader, Supervisors or Management;
- (iii) abuse of intoxicating substances;
- (iv) wilful or negligent damage to or loss of machines or equipment.

The Contractor shall ensure that he has statements from at least two witnesses concerning any of the above situations.

The Contractor shall inform the CLO within 24 hours of any warning issued to workers employed from the Job-Seekers Database.

3.7 The CLO will be paid on a Friday afternoon every two weeks, one week in arrears.

3.8 The CLO shall be given a statement with each payment on which is recorded:

- (i) the name of the Contractor;
- (ii) the CLO's name;
- (iii) the number of days worked by the CLO;
- (iv) the rate per day;
- (v) the details of any deductions made;
- (vi) the actual amount paid to the CLO.

3.9 No deduction shall be made from the remuneration except where the CLO consents in writing or unless the Contractor is permitted or required to do so by law or the order of any competent court.

3.10 The CLO shall be supplied free of charge with all health and safety equipment required by the Occupation Health and Safety Act. The equipment shall remain the property of the Contractor.

3.11 The Contractor must give the CLO at least one week's notice of the termination of the Contract of Temporary Employment. If this is not done, the CLO must be paid earnings for five days. This condition does not apply if the CLO is dismissed.

3.12 At the end of the period of temporary employment, the Contractor shall provide a Certificate of Service recording the Contractor's name, the CLO's name and address, the period of service, the type of work on which the CLO was engaged and the rate of remuneration on termination.

4. TERMINATION OF AGREEMENT

4.1 If the CLO can no longer perform and execute his/her duties as detailed in this agreement, this agreement will be terminated without prejudice to any rights under this agreement.

5. THE CONDITIONS OF THIS AGREEMENT

5.1 The parties expressly declare that this agreement contains all the conditions negotiated between them, and

PART 10- DETAILS OF QUALIFICATIONS AND STAFF EXPERIENCE OF STAFF

CITY OF CAPE TOWN

WATER AND SANITATION: WASTEWATER

CONTRACT NO. 3Q/2019/20

DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT REACTOR UPGRADE

SCHEDULE 12: DETAILS OF QUALIFICATIONS AND STAFF EXPERIENCE OF STAFF

Tenderers shall set out in the Schedule hereunder details of the listed staff's experience in work of a similar nature to that for which their Tender is submitted.

PROPOSED CONTRACTOR'S REPRESENTATIVE (PROJECT LEADER)	NAME [REDACTED] [REDACTED] [REDACTED]	NQF LEVEL 7.....		
CONTRACT & CLIENT	NATURE OF WORK	POSITION HELD	VALUE OF WORK	YEAR COMPLETED
* Refer to tender file - divider 13.				

Mechanical Engineer

Name:

Degree/Diploma:

ECSA registration
no.

Electrical Engineer

Name:

Not used

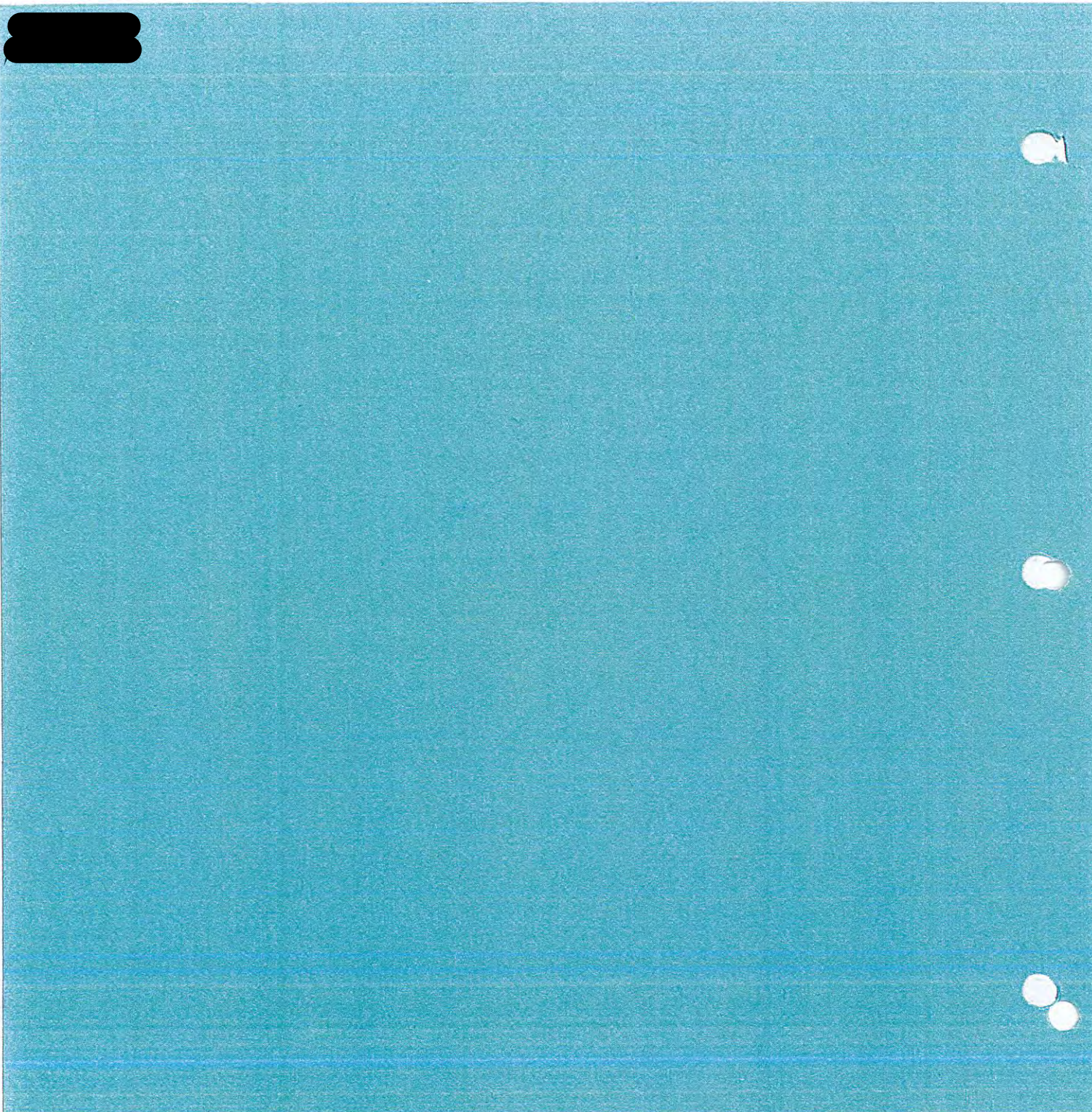
Degree/Diploma:

Not used

ECSA registration
no.

Not used

Number of sheets appended by the tenderer to this Schedule (If nil, enter NIL).



NAME:

OBTAINED,

Language	Speaking	Reading	Writing
	Good	Good	Good
	Good	Good	Good

Cell:

Cell:

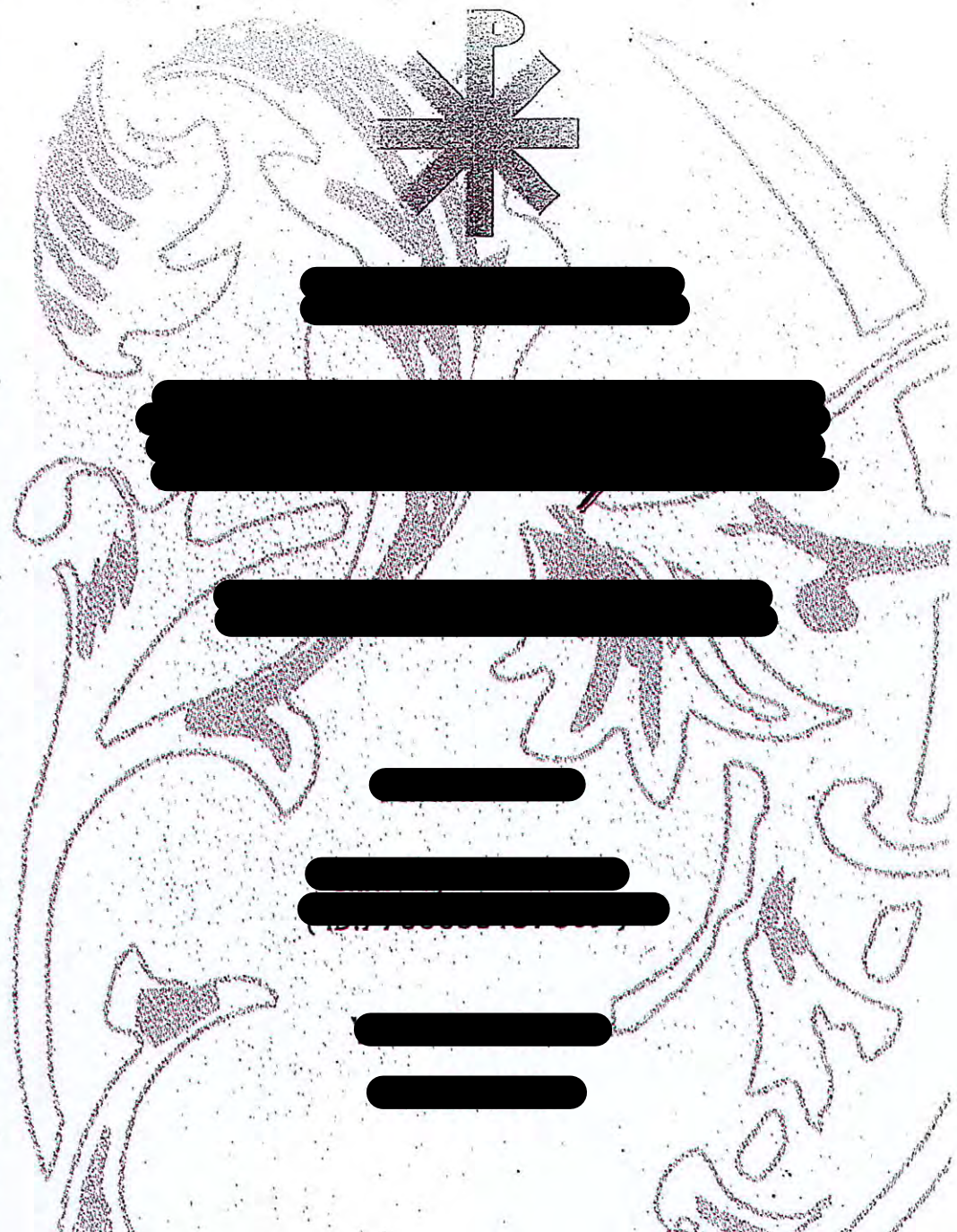
Tel:

Tel:

Fax:

Fax:

20.08.2019



[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Engineering Council of South Africa



[Redacted]

[Redacted]

is registered as

[Redacted]

[Redacted]

Date

[Redacted]

Registration
Number

[Redacted]

[Redacted]

[Redacted]



TENDER NO. 3Q/2019/20
BELLVILLE DA PLANT

[REDACTED]

[REDACTED]

[REDACTED]

NATIONALITY:

YEARS OF RELEVANT EXPERIENCE::

Language	Speaking	Reading	Writing
	Good	Good	Good
	Good	Good	Good

KEY QUALIFICATIONS

[illegible]

[illegible]

2014	R167 861 898	Joint Venture: IAE Joint Venture Inenzo Water – Adenco – Exeo Tender: 1Q/2013/14 Design-Build of Mechanical and Electrical Works for Upgrades at Various Wastewater Treatment Plants: Aeration Blower Replacements	City of Cape Town Leonard Schnapps Tel: 021 444 0103 Fax: 086 588 8012	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
2016	R 41 234 789	Tender: 240Q/2015/16 Design-Build of Mechanical and Electrical Works for upgrades at Borcherds Quarry Wastewater Treatment Works: Mechanization of Stercus Building at Borcherds Quarry Wastewater Treatment Works	City of Cape Town Wayne Olieslager Tel: 021 487 2596 Fax: 021 423 9540	[REDACTED]
2018	R 52 449 912	Design-Build of Mechanical and Electrical Works for the Refurbishment of a Biological Reactor and Associated Equipment at the Borcherds Quarry Waste Water Treatment Works	City of Cape Town Wayne Olieslager Tel: 021 487 2596 Fax: 021 423 9540	[REDACTED]
2018	R 22 470 361	Contract: 63Q/2017/18 Design – Build of Mechanical and Electrical works for fine bubble diffuser aeration system (FBDA) at Mitchells Plain WWTW	City of Cape Town Wayne Olieslager Tel: 021 487 2596 Fax: 021 423 9540	[REDACTED]
2018	R 44 493 635	Contract: 64Q/2017/18 Design – Build of Mechanical and Electrical works for fine bubble diffuser aeration (FBDA) system replacements at Cape Flats WWTW	City of Cape Town Wayne Olieslager Tel: 021 487 2596 Fax: 021 423 9540	[REDACTED]
2019	R 110 645 668	Contract no.: 47Q/2018/19 Design- Build of Mechanical & Electrical Works for the Replacement of Blowers for the DA plant at Bellville Wastewater Treatment Works	City of Cape Town Wayne Olieslager Tel: 021 487 2596 Fax: 021 423 9540	[REDACTED]

Die Universiteit van Stellenbosch

Hiermee word verklaar dat nademaal


ten opsigte van die vierjarige Baccalaureus-graadkursus
in die Ingenieurswese met


as hoofstudierigting, voldoen het aan al die vereistes soos
neergelê in Wet Nr. 107 van 1992 en die Statuut en
Regulasies van die Universiteit, die graad

Baccalaureus in die Ingenieurswese
(B.Eng.)

met al die regte en voorregte daaraan verbonde, by
geleentheid van 'n Kongregasie van die Universiteit op

11 DESEMBER 1996

aan HOM verleen is.



Engineering Council of South Africa



This is to
certify
that

[Redacted]

is registered as

[Redacted]

in terms of the Engineering Profession Act, 2000
(Act No. 46 of 2000)

Date

13 November 2003

Registration
Number

[Redacted]

[Redacted]

PART 11 – PRICE BASIS FOR IMPORTED RESOURCES

CITY OF CAPE TOWN

WATER AND SANITATION: WASTEWATER

CONTRACT NO. 3Q/2019/20

DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT REACTOR UPGRADE

SCHEDULE 23: PRICE BASIS FOR IMPORTED RESOURCES

IMPORTED RESOURCES TO BE ADJUSTED								
Description of Resources	Value in Foreign Currency (A)	Rate of Exchange as at BASE DATE (B)	Value in Rand (A) x (B) (C)	Customs Surcharge		Customs Duty		Total in Rand (C) x (D) + (E) Included in Schedule of Quantities of Item (F)
				% (D)	Rand (E)	%	Rand	
1. Equipment	301 789,45	EUR 11,31	5 228 113,38	-	-	-	-	5 228 113,38
2. Materials	403 300,00	EUR 11,31	6 989 718,00	-	-	-	-	6 989 718,00
3. Labour	41 215,63	EUR 11,31	714 533,93	-	-	-	-	714 533,93
4. Transport	96 519,03	EUR 11,31	1 511 783,00	-	-	-	-	1 511 783,00
5. Utilities	54 105,12	EUR 11,31	1 024 781,25	-	-	-	-	1 024 781,25
6. Other	74 884,01	EUR 11,31	1 296 243,20	-	-	-	-	1 296 243,20
Refer to tender file for electrical R.O.C. - electrical							24	

by Tariff Reference for each item

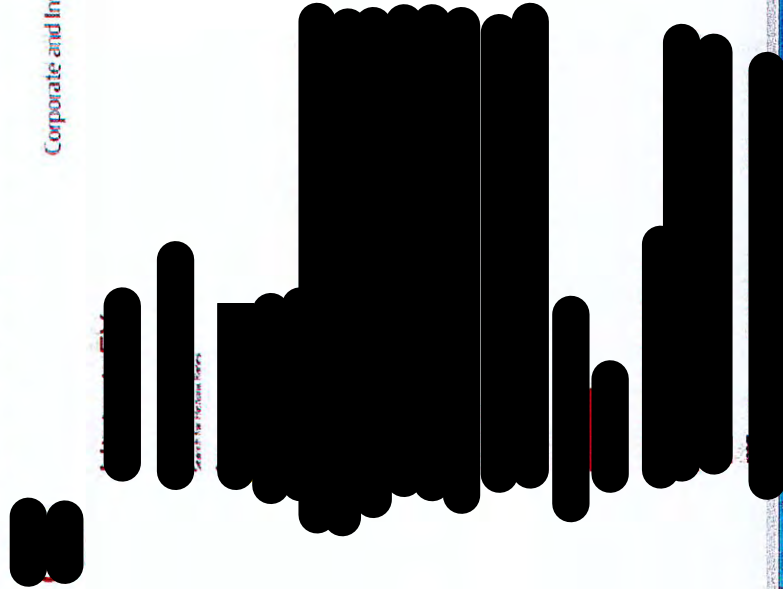
Resources not inserted in this schedule
 are to be manufactured / supplied in South Africa for the purposes of Contract Price Adjustment.
 DATE referred to in column (B) will be 7 calendar days before tender closing.

NAME OF TENDERER:

8.4.6	24 VDC Input (64 Points) including connector	602.76 €	R 17.31	R10 433.81	2.5%	R260.85	7.5%	R782.54	R11 477.19
8.4.7	24 VDC Output (64 Points) including connector	703.54 €	R 17.31	R12 178.28	2.5%	R304.46	7.5%	R913.37	R13 396.11
8.4.8	Isolated High-level inputs, 0-10V, 4-20mA (8 Points) including connector	566.32 €	R 17.31	R9 802.93	2.5%	R245.07	7.5%	R735.22	R10 783.23
8.4.9	Isolated High-level outputs, 0-10V, 4-20mA (8 Points) including connector	610.98 €	R 17.31	R10 576.09	2.5%	R264.40	7.5%	R793.21	R11 633.70
8.4.4	Ethernet/IP and Modbus/TCP	915.18 €	R 17.31	R15 841.70	2.5%	R396.04	7.5%	R1 188.13	R17 425.87
8.4.5.1	Modbus TCP comms module	520.09 €	R 17.31	R9 002.67	2.5%	R225.07	7.5%	R675.20	R9 902.94
8.4.5.2	Modbus RS485 comms module	930.68 €	R 17.31	R16 110.15	2.5%	R402.75	7.5%	R1 208.26	R17 721.16
8.5.1	8-port unmanaged Ethernet switch TCS ESU 083FNO	583.44 €	R 17.31	R10 099.33	2.5%	R252.48	7.5%	R757.45	R11 109.26
8.5.2	1-port fiber optic, 4-port unmanaged Ethernet switch TCS ESU 043F1NO	157.28 €	R 17.31	R2 722.57	2.5%	R68.06	7.5%	R204.19	R2 994.82
8.7.1	15" Colour Touch screen XBT GT	2 907.75 €	R 17.31	R50 333.20	2.5%	R1 258.33	7.5%	R3 774.99	R55 366.52
8.7.2	4Gb Compact Flash Memory card	181.06 €	R 17.31	R3 134.13	2.5%	R78.35	7.5%	R235.06	R3 447.54
8.8	Wjeco Designer (VJD UDT GSV**M) HMI Programming Software or equal and approved to suite HMI	551.20 €	R 17.31	R9 541.27	2.5%	R238.53	7.5%	R715.59	R10 495.39
13.7	8-port + 4-SFP slot managed Industrial Ethernet Gigabit	944.83 €	R 17.31	R16 355.04	2.5%	R408.88	7.5%	R1 226.63	R17 990.55
13.7	Fiber multimode SFP transceiver	97.90 €	R 17.31	R1 694.68	2.5%	R42.37	7.5%	R127.10	R1 864.15
13.7	Modbus RS485 to Modbus TCP/IP converter MOXA MGate MB32701-T	641.80 €	R 17.31	R11 109.59	2.5%	R277.74	7.5%	R833.22	R12 220.55
13.7	Inclusive of DIN-rail terminals, earth terminals, cable entries as required and engraved labelling	108.78 €	R 17.31	R1 882.98	2.5%	R47.07	7.5%	R141.22	R2 071.28
-	Supply and install UPS, 6kVA,	1 063.07 €	R 17.31	R18 401.68	2.5%	R460.04	7.5%	R1 380.13	R20 241.84
8.2.1	Supply and install UPS, 6kVA,	2 580.30 €	R 17.31	R59 667.00	2.5%	R1 491.68	7.5%	R4 475.03	R65 633.70
8.2.1	Supply and install UPS, 6kVA,	617.63 €	R 17.31	R10 691.09	2.5%	R267.28	7.5%	R801.83	R11 760.20
8.2.1	Supply and install UPS, 6kVA,	170.18 €	R 17.31	R2 945.90	2.5%	R73.65	7.5%	R220.94	R3 240.48
-	462.00 €	R 17.31	R7 997.22	2.5%	R199.93	7.5%	R599.79	R8 796.94	



Corporate and Investment Banking



SCHEDULE 27: INFORMATION TO BE PROVIDED WITH THE TENDER

- A) Process and technical description of offer; including confirmation that the tenderer's design will be adequately accommodated in the existing infrastructure relating to all equipment covered in the scope of this contract – **Refer to attached**
- B) Mythology for replacing the air headers to the bioreactors without detrimental interruptions to the air supply to the reactors that are operational – **Refer to attached**
- C) Calculation supporting the selection of the type and number of diffusers in each zone – **Refer to attached**
- D) Preliminary piping and diffuser arrangement drawings for each reactor and zone – **Refer to attached**
- E) Technical literature for all items of plant and equipment – **Refer to completed datasheets and brochures submitted – Divider 29**
- F) Preliminary piping arrangement drawings for the new air headers and equipment – **Refer to attached**
- G) Preliminary design drawings for mixers and pumps indicating layout and dimensions – **Refer to attached**
- H) The various technical details and data required by the Technical Data sheets and information required in the Returnable Schedules – **Refer to completed datasheets and brochures submitted – Divider 29**
- I) A health and safety plan – **Refer to Schedule 19 – Divider 20**
- J) A programme which takes into account the contract period and full scope of works – **Refer to Schedule 15 – Divider 16**

PART 11- TECHNICAL DATASHEET

CITY OF CAPE TOWN

WATER AND SANITATION: WASTEWATER

CONTRACT NO. 3Q/2019/20

DESIGN – BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE BELLVILLE DA PLANT REACTOR UPGRADE

SCHEDULE 27: INFORMATION TO BE PROVIDED WITH THE TENDER

No.	Document Description	Submitted (Yes / No)
a)	Process and technical description of offer, including confirmation that the tenderer's design will be adequately accommodated in the existing infrastructure relating to all equipment covered in the scope of this contract.	Yes
b)	Methodology for replacing the air headers to the bioreactors without detrimental interruptions to the air supply to the reactors that are operational.	Yes
c)	Calculations supporting the selection of the type and number of diffusers in each zone, with specific consideration for the required Standard Oxygen Requirement (SOR) and airflows in each zone. Parameters such as Standard Oxygen Transfer Efficiency (SOTE) within each zone, pressure drop through the pipework & diffusers, maximum flowrates per diffuser, diffuser density and minimum air flow for mixing should be given, along with other relevant outputs	Yes
d)	Preliminary piping and diffuser arrangement drawings for each reactor and zone, illustrating overall dimensions (including distances between diffusers and laterals, number of grids and diffusers, layout of sub headers (if required), headers, laterals and nominal line sizes. This must include the layout of the retrievable diffuser network.	Yes
e)	Technical literature for all items of plant and equipment; including all mixers, all recycle pumps, FBDA system, valves and instrumentation .	Yes
f)	Preliminary piping arrangement drawings for the new air headers and equipment.	Yes
g)	Preliminary design drawings for mixers and pumps indicating layout and dimensions	Yes
i)	The various technical details and data required by the Technical Data Sheets and information required in the Returnable Schedules	Yes
j)	A Health and Safety Plan	Yes

SCHEDULE 27: INFORMATION TO BE PROVIDED WITH THE TENDER

- A) Process and technical description of offer; including confirmation that the tenderer's design will be adequately accommodated in the existing infrastructure relating to all equipment covered in the scope of this contract – **Refer to attached**
- B) Mythology for replacing the air headers to the bioreactors without detrimental interruptions to the air supply to the reactors that are operational – **Refer to attached**
- C) Calculation supporting the selection of the type and number of diffusers in each zone – **Refer to attached**
- D) Preliminary piping and diffuser arrangement drawings for each reactor and zone – **Refer to attached**
- E) Technical literature for all items of plant and equipment – **Refer to completed datasheets and brochures submitted – Divider 29**
- F) Preliminary piping arrangement drawings for the new air headers and equipment – **Refer to attached**
- G) Preliminary design drawings for mixers and pumps indicating layout and dimensions – **Refer to attached**
- H) The various technical details and data required by the Technical Data sheets and information required in the Returnable Schedules – **Refer to completed datasheets and brochures submitted – Divider 29**
- I) A health and safety plan – **Refer to Schedule 19 – Divider 20**
- J) A programme which takes into account the contract period and full scope of works – **Refer to Schedule 15 – Divider 16**

a)



[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

3Q/2018/19

23 AUG 2019

Attention: [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

Yours faithfully

[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

**B) MYTHOLOGY FOR REPLACING THE AIR HEADERS TO THE BIOREACTORS
WITHOUT DETRIMENTAL INTERRUPTIONS TO THE AIR SUPPLY TO THE
REACTORS THAT ARE OPERATIONAL**

REFER TO ATTACHED



[REDACTED]

3Q/2018/19

23 AUG 2019

Attention: [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



[REDACTED]

Yours faithfully

[REDACTED]

[REDACTED]

[REDACTED]

**C) CALCULATION SUPPORTING THE SELECTION OF THE TYPE AND
NUMBER OF DIFFUSERS IN EACH ZONE**

REFER TO ATTACHED



[REDACTED]

3Q/2018/19

23 AUG 2019

Attention: [REDACTED]

[REDACTED]

[REDACTED]

Yours faithfully

[REDACTED]

[REDACTED]

[REDACTED]



TENDER NO. 3Q/2019/20
BELLVILLE DA PLANT

**D) PRELIMINARY PIPING AND DIFFUSER ARRANGEMENT DRAWINGS FOR
EACH REACTOR AND ZONE**

REFER TO ATTACHED



[REDACTED]

3Q/2018/19

23 AUG 2019

Attention: [REDACTED]

[REDACTED]

[REDACTED]

Yours faithfully

[REDACTED]

[REDACTED]

E) TECHNICAL LITERATURE FOR ALL ITEMS OF PLANT AND EQUIPMENT

**REFER TO COMPLETED DATASHEETS AND BROCHURES SUBMITTED –
DIVIDER 29**



3Q/2018/19

23 AUG 2019

Attention: [REDACTED]

[REDACTED]

[REDACTED]
[REDACTED]

[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]
[REDACTED]



TENDER NO. 3Q/2019/20
BELLVILLE DA PLANT

**F) PRELIMINARY PIPING ARRANGEMENT DRAWINGS FOR THE NEW AIR
HEADERS AND EQUIPMENT**

REFER TO ATTACHED

[REDACTED]

[REDACTED]

[REDACTED]

3Q/2018/19

23 AUG 2019

Attention: [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Yours faithfully

[REDACTED]

[REDACTED]

**G) PRELIMINARY DESIGN DRAWINGS FOR MIXERS AND PUMPS INDICATING
LAYOUT AND DIMENSIONS**

REFER TO ATTACHED

[REDACTED]

3Q/2018/19

23 AUG 2019

Attention: [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Yours faithfully

[REDACTED]

[REDACTED]

[REDACTED]

[illegible]

[illegible]

ITEM	EQUIPMENT DESCRIPTION	

[illegible]

[illegible]

[illegible]

ITEM	EQUIPMENT DESCRIPTION	FOR COMPLETION BY TENDERERS	
6.0	Recycle Pumps – Archimedes Screw Pumps	A-Recycle (PU03, PU09, PU15)	S-Recycle (PU05, PU06, PU11, PU12, PU17, PU18)
6.1	Equipment Details		
	Type		
	Quantity	3	
6.2	Product Specification		
	Fluid		
	Specific gravity		
	Viscosity (cP)		
	Temperature, T (°C)		
	Total Suspended Solids (mg/l)		
	Solid size (mm)		
6.3	Performance		
	Pumping Capacity @100% Duty		
	Pumping Capacity @120% Duty		
	Rotation Speed @100% Duty		
	Rotation Speed @120% Duty		
	Absorbed Power @100% Duty		
	Absorbed Power @120% Duty		
	Pumping efficiency		
	Pump curve number		
6.4	Screw Body		
	Make		
	Description		
	Supplier		
	Screw outside diameter (mm)		
	Tube Diameter (mm)		
	Angle of inclination (°)		
	Weight (kg)		
	Length of tube (mm)		
	Length of flights (mm)		
	Material of screw		
	Thickness of screw blades (mm)		
	Material of outer 50mm of flights		
	Surface protection		
6.5	Top Bearing		
	Make		
	Type		
	Shaft diameter (mm)		
	Weight (kg)		

ITEM	EQUIPMENT DESCRIPTION	FOR COMPLETION BY TENDERER	
6.0	Recycle Pumps – Archimedes Screw Pumps (continued)	A-Recycle (PU03, PU09, PU15)	S-Recycle (PU05, PU06, PU11, PU12, PU17, PU18)
6.8	Motor Specification		
	Make		
	Electrical supply (V)		
	Enclosure rating		
	Speed (rpm)		
	Power (kW)		
	Rated Current (A)		
6.9	Gearbox		
	Make		
	Type		
	Reduction Ratio		
	Input speed @ 100% Duty		
	Output speed @ 100% Duty		
	Nominal Power Rating (kW)		
	Nominal Output Torque (Nm)		
	Supplier		
6.10	Coupling		
	Make		
	Type		
	Bore Gearbox Side (mm)		
	Bore Pump Side (mm)		
	Weight (kg)		
	Max Rated Speed (rpm)		
	Operating Speed (rpm)		
	Rated Nominal Torque (Nm)		
	Supplier		
6.11	Belt Drive System		
	Motor Pulley Diameter (100% Duty) (mm)		
	Motor Pulley Diameter (120% Duty) (mm)		
	Motor Pulley Type		
	Gearbox Pulley Diameter (100% Duty) (mm)		
	Gearbox Pulley Diameter (120% Duty) (mm)		
	Gearbox Pulley Type		
	Supplier		
	Belt for Gearbox drive (100%) (mm)		
	Belt for Gearbox drive (120%) (mm)		

ITEM	EQUIPMENT DESCRIPTION	FOR COMPLETION BY TENDERER
7.0	Feed Pump – Archimedes Screw Pump	Pump station 2 Feed pump (PU23)
7.1	Equipment Details	
	Type	
	Quantity	
7.2	Product Specification	
	Fluid	
	Specific gravity	
	Viscosity (cP)	
	Temperature, T (°C)	
	Total Suspended Solids (mg/l)	
	Solid size (mm)	
7.3	Performance	
	Pumping Capacity @100% Duty	
	Pumping Capacity @120% Duty	
	Rotation Speed @100% Duty	
	Rotation Speed @120% Duty	
	Absorbed Power @100% Duty	
	Absorbed Power @120% Duty	
	Pumping efficiency	
	Pump curve number	
7.4	Screw Body	
	Make	
	Description	
	Supplier	
	Screw outside diameter (mm)	
	Tube Diameter (mm)	
	Angle of inclination (°)	
	Weight (kg)	
	Length of tube (mm)	
	Length of flights (mm)	
	Material of screw	
	Thickness of screw blades (mm)	
	Material of outer 50mm of flights	
	Surface protection	
7.5	Top Bearing	
	Make	
	Type	
	Shaft diameter (mm)	
	Weight (kg)	

ITEM	EQUIPMENT DESCRIPTION	FOR COMPLETION BY TENDERER
7.0	Feed Pump – Archimedes Screw Pump (continued)	Pump station 2 Feed pump (PU23)
7.8	Motor Specification	
	Make	
	Electrical supply (V)	
	Enclosure rating	
	Speed (rpm)	
	Power (kW)	
	Rated Current (A)	
7.9	Gearbox	
	Make	
	Type	
	Reduction Ratio	
	Input speed @ 100% Duty	
	Output speed @ 100% Duty	
	Nominal Power Rating (kW)	
	Nominal Output Torque (Nm)	
	Supplier	
7.10	Coupling	
	Make	
	Type	
	Bore Gearbox Side (mm)	
	Bore Pump Side (mm)	
	Weight (kg)	
	Max Rated Speed (rpm)	
	Operating Speed (rpm)	
	Rated Nominal Torque (Nm)	
	Supplier	
7.11	Belt Drive System	
	Motor Pulley Diameter (100% Duty) (mm)	
	Motor Pulley Diameter (120% Duty) (mm)	
	Motor Pulley Type	
	Gearbox Pulley Diameter (100% Duty) (mm)	
	Gearbox Pulley Diameter (120% Duty) (mm)	
	Gearbox Pulley Type	
	Supplier	
	Belt for Gearbox drive (100%) (mm)	
	Belt for Gearbox drive (120%) (mm)	

ITEM	EQUIPMENT DESCRIPTION	FOR COMPLETION BY TENDERERS
8.0	A recycle backup pump	PU24 (back-up submersible pump)
8.1	Equipment Details	
	Pump make and model	
	Pump Type	
	Country of manufacture	
8.2	Product Specification	
	Fluid	
	Solids (%)	
	Temperature (°C)	
	Viscosity (cP)	
	Fluid Specific Gravity	
8.3	Operating Conditions	
	Guaranteed capacity (m³/h)	
	Total Head (m)	
	Efficiency (%)	
	Pump curve number	
	Speed (rpm)	
8.4	Physical data	
	Pump diameter x height (mm)	
	Propeller diameter (mm)	
	Unit Mass (kg)	
8.5	Motor Specification	
	Electrical supply (V)	
	Phase/Hertz	
	Speed (rpm)	
	Rated Power (kW)	
	Absorbed Power (kW)	
	Motor enclosure rating	
8.6	Materials of construction	
	Motor Shaft	
	Propeller	
	Motor	
	Piping	
8.7	General Notes	

ITEM	EQUIPMENT DESCRIPTION	FOR COMPLETION BY TENDERERS	
		Anaerobic Zone	Anoxic Zone
9.	Vertical Shaft Mixers		
9.1	Equipment Details		
	Make		
	Model		
	Country of manufacture		
	Type		
	Quantity		
9.2	Product Specification		
	Fluid		
	Fluid Temperature (°C)		
	Specific Gravity		
	Viscosity (mPa.s)		
	Total Suspended Solids (mg/l)		
9.3	Operating Conditions		
	Noise level (dBA @ 1m)		
	Pumping rate (m³/h)		
	Shaft speed (rpm)		
	Impeller tip speed (m/s)		
9.4	Physical data		
	Overall mass including motor and gearbox (kg)		
	Shaft Length (mm)		
	Shaft Diameter (mm)		
	Impeller Diameter (mm)		
9.5	Motor		
	Frame size		
	Type		
	Operating Voltage (V)		
	Rated Power (kW)		
	Absorbed Power @ duty (kW)		
	Motor Speed (rpm)		
	Full Load Current (A)		
	Ingress Protection		
9.6	Gearbox		
	Model		
	Type		
	Rating		
	Output shaft speed (rpm)		
9.7	Materials of Construction		

ITEM	EQUIPMENT DESCRIPTION	FOR COMPLETION BY TENDERERS
10.0	Air header isolation valves	
10.1	Equipment details	
	Valve make and model	
	Valve Type	
	Country of manufacture	
10.2	Product Specifications	
	Fluid	air
	Temperature (°C)	
	Viscosity (cP)	
	Fluid Specific Gravity	
	Corrosive Agents	
	Flowrate (kg/h)	
	Line Pressure (kPa g)	
	Allowable pressure drop (kPa)	
10.3	Materials of Construction	
	Body	
	Seat	
	Trim	
	Packing	
	Stem	
	Disc/Plug	
10.4	Physical data	
	Design Pressure (kPa g)	
	Design Temperature (°C)	
	End Connection type	
	End Connection Rating	
	Valve Nominal Bore (mm)	
	Pipeline Nominal Bore (mm)	
10.5	General Notes	

ITEM	EQUIPMENT DESCRIPTION	FOR COMPLETION BY TENDERERS
11.0	WAS Dump Valves	FCV10, FCV11, FCV12
11.1	Equipment details	
	Valve make and model	
	Country of manufacture	
	Supplier	
11.2	Product Specifications	
	Fluid	
	Solids (%)	
	Temperature (°C)	
	Viscosity (cP)	
	Fluid Specific Gravity	
	Corrosive Agents	
	Flowrate (m³/h)	
	Line Pressure (kPa g)	
	Allowable pressure drop (kPa)	
11.3	Materials of Construction	
	Body	
	Seat	
	Trim	
	Packing	
	Stem	
	Disc/Plug	
11.4	Physical data	
	Design Pressure (kPa g)	
	Design Temperature (°C)	
	End Connection type	
	End Connection Rating	
	Valve Nominal Bore (mm)	
	Pipeline Nominal Bore (mm)	
11.5	Actuation	
	Actuation type	
	Electrical supply (V)	
	Phase/Hertz	
	Rated Power (kW)	
	Communications protocol	
11.6	Position Indication	
	Visual Position Indication	
	Protection class	

ITEM	EQUIPMENT DESCRIPTION	FOR COMPLETION BY TENDERERS
12.	V-Port Knife Gate Valves (sizes as per Schedule of Quantities)	FCV01, FCV02, FCV03, FCV04, FCV05, FCV06, FCV07, FCV08, FCV09
12.1	Equipment Details	
	Make and Model	
	Country of manufacture	
	Supplier	
12.2	Product Specification	
	Fluid	
12.3	Operating Conditions	
	Guaranteed design pressure (kPag)	
	Guaranteed design temperature (°C)	
12.4	Physical data	
	Fluid port profile type	
	Flange connection detail	
	Type of facing	
	Supports	
	Overall valve dimensions (mm)	
	Valve mass (kg)	
12.5	Materials of construction	
	Body	
	Corrosion protection	
	Blade	
	Seals	
	Scrapers	
	Gland packing	
	Rising spindle	
	A-plate top works	
	Bridge and hand wheel	
	Body and bridge plate fasteners	
12.6	Actuator	
	Actuation type	
	Electrical supply (V)	
	Phase/Hertz	

[illegible]

EQUIPMENT VENDOR / SERVICE AGENT DETAILS

TYPES OF EQUIPMENT OFFERED	NAMES OF EQUIPMENT VENDORS OR SERVICE AGENT	EQUIPMENT VENDOR/ SERVICE AGENT CONTACT DETAILS
Fine Bubble Diffusers		
Anoxic/Anaerobic Vertical Shaft Mixers		
Screw Pumps		
A recycle back up submersible pump		
Recycle Axial Lift Screw Pumps		
Knife Gate Control Valves		
Level Transmitters		
Oxygen transmitters		
Flow meters (Thermal Mass)		
Flow meters (Electromagnetic)		
UPS		
Pressure gauge/ Temp. gauge/ Transmitters		
Transformers		
Circuit Breakers		
Control / Instrument Cables (230/110Vac)		
1000/600V cables		
PLC/SCADA		

ELECTRICAL EQUIPMENT INFORMATION

No:	Item	Specified	Offered
1.1	Distribution:		
1.1.1	Manufacturer		
1.1.2	In accordance with specification		
2.1	LV Cables:		
2.1.1	Manufacturer		
2.1.2	Type		
2.1.3	Rating		
2.1.3	SANS Approved.		
2.1.4	In accordance with specification		
3.1	Control Cables:		
3.1.1	Manufacturer		
3.1.2	Type		
3.1.3	Rating		
3.1.4	SANS Approved		
3.1.5	In accordance with specification		
4.1	1000/600V Plus Cables:		
4.1.1	Manufacturer		
4.1.2	Type		
4.1.3	Rating		
4.1.4	SANS Approved		
4.1.5	In accordance with specification		

TECHNICAL DATA SHEET NO. E1.1

Page 1 of 2

SWITCHBOARDS AND MOTOR CONTROL CENTRES

No	Item	Offered by TENDERER
1.1.	Enclosure:	
1.1.1	Material.....	
1.1.2	Colour – Exterior & Interior	
1.1.3	Form Factor.....	
1.1.4	Compliance , Standards and Tests.....	
1.1.5	Phase to Phase – Short Circuit Rating (3 Sec).....	
1.1.6	IP Rating – Doors Open / Doors Closed	
1.2.	Busbars:	
1.2.1	Material.....	
1.2.2	Current density	
1.3.	Moulded case circuit breakers:	
1.3.1	Manufacturer	
1.3.2	Type	
1.3.3	In accordance with specification	
1.4.	Main Isolators:	
1.4.1	Manufacturer	
1.4.2	Type	
1.4.3	In accordance with specification	
1.5.	Surge Protection Devices:	
1.5.1	Manufacturer	
1.5.2	Type	
1.5.3	In accordance with specification	
1.6.	Power Meter:	
1.6.1	Manufacturer	
1.6.2	Type	
1.6.3	In accordance with specification	
1.7.	HRC fuse links:	
1.7.1	Manufacturer	
1.7.2	Type	
1.7.3	In accordance with specification	
1.8.	Contactors:	
1.8.1	Manufacturer	
1.8.2	Type	
1.8.3	In accordance with specification	
1.8.4	In accordance with specification	
1.9.	Electronic Overload relays:	
1.9.1	Manufacturer	
1.9.2	Type	
1.9.3	In accordance with specification	
1.10.	Earth Leakage relays:	
1.10.1	Manufacturer	
1.10.2	Type	
1.10.3	In accordance with specification	

TECHNICAL DATA SHEET NO. 1 (CONT'D)

Page 2 of 2

SWITCHBOARDS AND MOTOR CONTROL CENTRES

No	Item	Offered by TENDERER
1.12	Emergency Stop buttons:	
1.12.1	Manufacturer	
1.12.2	Type	
1.12.3	In accordance with specification	
1.13	Control circuit transformers:	
1.13.1	Manufacturer	
1.13.2	Type	
1.13.3	In accordance with specification	
1.14	Soft Starter Units:	
1.14.1	Manufacturer	
1.14.2	Type	
1.14.3	In accordance with specification	
1.14	Pushbuttons:	
1.14.1	Manufacturer	
1.14.2	Type	
1.14.3	In accordance with specification	
1.15	Ammeter:	
1.15.1	Manufacturer	
1.15.2	Type	
1.15.3	In accordance with specification	
1.16	Voltmeter:	
1.16.1	Manufacturer	
1.16.2	Type	
1.16.3	In accordance with specification	
1.17	Run Hour Meter:	
1.17.1	Manufacturer	
1.17.2	Type	
1.17.3	In accordance with specification	
1.18	Power Factor Correction Controller:	
1.18.1	Manufacturer	
1.18.2	Type	
1.18.3	In accordance with specification	
1.19	Power Factor Correction Capacitors	
1.19.1	Manufacturer	
1.19.2	Type	
1.19.3	In accordance with specification	
1.20	Generator Change-over Controller:	
1.20.1	Manufacturer	
1.20.2	Type	
1.20.3	In accordance with specification	
1.21	Selector switches:	
1.21.1	Manufacturer	
1.21.2	Type	
1.21.3	In accordance with specification	

TECHNICAL DATA SHEET NO. E1.2

Page 1 of 1

MV, LV AND SIGNAL CABLES

No	Item	Offered by TENDERER
2.1	MV Cables:	
2.1.1	Manufacturer	
2.1.2	Type	
2.1.3	Rating	
2.1.4	SABS Approved	
2.1.5	In accordance with specification	
2.2	LV Power Cables:	
2.2.1	Manufacturer	
2.2.2	Type	
2.2.3	Rating	
2.2.4	SABS Approved	
2.2.5	In accordance with specification	
2.3	Fibre Optic Cables:	
2.3.1	Manufacturer	
2.3.2	Type	
2.3.3	Rating	
2.3.4	SABS Approved	
2.3.5	In accordance with specification	
2.4	Control Cables:	
2.4.1	Manufacturer	
2.4.2	Type	
2.4.3	Rating	
2.4.4	SABS Approved	
2.4.5	In accordance with specification	
2.5	Signal Cables:	
2.5.1	Manufacturer	
2.5.2	Type	
2.5.3	Rating	
2.5.4	SABS Approved	
2.5.5	In accordance with specification	
2.6	MV Cable joints:	
2.6.1	Manufacturer	
2.6.2	Type	
2.6.3	In accordance with specification	
2.7	LV Cable joints:	
2.7.1	Manufacturer	
2.7.2	Type	
2.7.3	In accordance with specification	
2.8	MV Cable Terminations:	
2.8.1	Manufacturer	
2.8.2	Type	
2.8.3	In accordance with specification	

TECHNICAL DATA SHEET NO. E1.3

Page 1 of 1

UNINTERRUPTIBLE POWER SUPPLIES

No	Item		Offered by TENDERER
3.1.	MANUFACTURE		
3.1.1	Manufacturer		
3.1.2	Place of manufacture		
3.1.3	Type		
3.2.	RATINGS		
3.2.1	Power	(kVA)	
3.2.2	Output voltage	(V)	
3.2.3	Output voltage variation	(%)	
3.2.4	Input voltage	(V)	
3.2.5	Input voltage variation	(%)	
3.2.6	Stored energy time	(min)	
3.3.	BATTERIES		
3.3.1	Manufacturer		
3.3.2	Type		
3.3.3	Voltage	(V)	
3.3.4	Rating	(Ah)	
3.4.	COMMUNICATION LINK		
3.4.1	Type		
3.4.2	Protocol		
3.5.	MANUFACTURE		
3.5.1	Manufacturer		
3.5.2	Place of manufacture		
3.5.3	Type		
3.6.	RATINGS		
3.6.1	Power	(kVA)	
3.6.2	Output voltage	(V)	
3.6.3	Output voltage variation	(%)	
3.6.4	Input voltage	(V)	
3.6.5	Input voltage variation	(%)	
3.6.6	Stored energy time	(min)	
3.7.	BATTERIES		
3.7.1	Manufacturer		
3.7.2	Type		
3.7.3	Voltage	(V)	
3.7.4	Rating	(Ah)	
3.8.	COMMUNICATION LINK		
3.8.1	Type		
3.8.2	Protocol		

TECHNICAL DATA SHEET NO. E1.4

Page 1 of 1

PROGRAMMABLE LOGIC CONTROLLER

[illegible]

TECHNICAL DATA SHEET NO. E1.6

Page 1 of 1

HMI SYSTEM

Offered by TENDERER

[illegible]

TECHNICAL DATA SHEET NO. E2.1(a)

Page 1 of 1

FLOW TRANSMITTER FT

No	Item	Offered by TENDERER
Make:	Endress + Hauser or equal	
Model:	T-mass 65i or equal	
Area Classification:	Non-hazardous	
Output	Modbus RS485	
Display	Local Display	
Operation	Push buttons	
Material	Stainless Steel	
Electrical Connection	M20 Gland	
IP Rating	IP67	
Sensor Range:		
FE01	0-9000kg/h at 60°C and 55kPag	
FE02	0-5400kg/h at 60°C and 55kPag	
FE03	0-3600kg/h at 60°C and 55kPag	
FE04	0-9000kg/h at 60°C and 55kPag	
FE05	0-5400kg/h at 60°C and 55kPag	
FE06	0-3600kg/h at 60°C and 55kPag	
FE07	0-9000kg/h at 60°C and 55kPag	
FE08	0-5400kg/h at 60°C and 55kPag	
FE09	0-3600kg/h at 60°C and 55kPag	
Process Connection	Thread ISO 228	
Process Medium	Highly Corrosive Air including H ₂ S	
Design Pressure	100kPag	
Design Temperature	100°C	
Insertion tube	Stainless Steel	
Pipeline Diameters NB:		
FE01	450mm	
FE02	350mm	
FE03	300mm	
FE04	150mm	

TECHNICAL DATA SHEET NO. E2.1b		
FLOW TRANSMITTER FT		
No	Item	Offered by TENDERER
Make:	Endress + Hauser or equal	
Model:	Promag or equal	
Area Classification:	Non-hazardous	
Output	Modbus RS485	
Display	Local Display	
Operation	Push buttons	
Material	Stainless Steel	
Electrical Connection	M20 Gland	
IP Rating	IP67	
Sensor Range:		
FE16	50 000-150 000kg/h at 20°C and 20kPag	
FE17	50 000-150 000kg/h at 20°C and 20kPag	
FE18	50 000-150 000kg/h at 20°C and 20kPag	
Process Connection	ASME SS ASME B16.5	
Process Medium	3 474mg/l TSS	
Design Pressure	20kPag	
Design Temperature	25°C	
Pipeline Diameters NB:		
FE16	150mm	
FE17	150mm	

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TECHNICAL DATA SHEET NO. E2.3	
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DISSOLVED OXYGEN TRANSMITTER	
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TECHNICAL DATA SHEET NO. E2.5		
LEVEL TRANSMITTER SENSOR		
No	Item	Offered by TENDERER
Make:	Endress + Hauser or equal	
Model:	FMU90+FDU9x or equal	
Area Classification:	Non-hazardous	
Measuring Principle	Ultrasonic, Point Source or radar level sensing technology	
Supply / Communication	230V or 24VDC / 4-20mA	
Operation	Push button on display	
Material	Aluminium, Glass Window	
Electrical Connection	M20 Gland	
IP Rating	IP66	
Sensor Range		
LT01 – LT11	0 – 1m @ 20°C FDU90	
LT12	0 – 4m @ 20°C FDU91	
Accuracy	+/- 0.2 % of set measuring range	
Ambient temperature	Amb	
Process temperature	Mixed liquor at 20 °C	
Design pressure	Atm	
Output	Local Display and 0-20mA	
Main wetted parts	PVDF	
Process Connection	To suit installation design	
Certificates / Approvals	CSA	

TECHNICAL DATA SHEET NO. E2.6		
FLOW CONTROL VALVES		
No	Item	Offered by TENDERER
	REQUIRED	OFFERED
Description	Knife-gate Flow Control Actuated Valve	
Supplier	Rotork or equal	
Type	Knife-gate with V-port	
Material	316 ST/ST	
Differential Pressure	1kPa	
Medium	Air	
Supply	220V 1ph or 380V 3ph as required	
Output	Positional Control	
Communication	Modbus TCP/IP	
Protection	IP67	
Design Temperature	90°C	
Upstream Temperature	58°C	
FCV001, FCV004, FCV007		
Mass Flow Rate	0 – 13500 kg/h	
Upstream Pressure	58 kPag	
Nom. diameter DN	450mm	
FCV002, FCV005, FCV008		
Mass Flow Rate	0 – 8100 kg/h	
Upstream Pressure	55 kPag	
Nom. diameter DN	350mm	
FCV003, FCV006, FCV009		
Mass Flow Rate	0 – 5400 kg/h	
Upstream Pressure	55 kPag	

TECHNICAL DATA SHEET NO. E2.7		
LOCAL PRESSURE INDICATOR		
No	Item	Offered by TENDERER
Make:	ASHCROFT or equal	
Model:	Model T5500 or equal	
Display size	100mm diameter face	
Pressure Range		
PI02, PI03	0 – 100 kPag	
Construction : External Housing	304 SS	
: Wetted Parts	Corrosion Resistant / Product Compatible – 316 / 316L SS	
Enclosure Rating	IP 55 Min	
Dial - Display	Anti-parallax	
- Material	Aluminium / Stainless Steel	
- Graduation Markings	Black numbers and graduations	
Lens	Glass	
Accuracy	+/- 1.6% Full Scale	
	ASME B40.3 Grade A	
Temperature Limit - Ambient	40°C	
- Process	90°C	
Pressure Limit	Full Scale Value	
Process Connection – Position	Lower mount	
Liquid Filled	Glycerine	
Note 1 :		Gauge Isolators to be considered if there is a compatibility risk between the Process medium and the wetted parts

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TECHNICAL DATA SHEET NO. E2.9 (a)		
TSS TRANSMITTER		
No	Item	Offered by TENDERER
	Make:	Hach or equal
	Model:	SC200 or equal
	Area Classification:	Non-hazardous
	Output	Modbus RS485
	Display	Remote Display mounted in IP rated enclosure
	Operation	Push buttons
	Electrical Connection	M20 Gland
	IP Rating Transmitter	IP66
	Sensor Range:	
	XE10, XE11, XE12	3 -10 g/l
	Process Connection	N/A
	Process Medium	N/A
	Design Pressure	Atm
	Design Temperature	Abm
	Immersion tube	N/A
	Cleaning	N/A

TECHNICAL DATA SHEET NO. E2.9 (b)		
TSS PROBE		
No	Item	Offered by TENDERER
Make:	Hach or equal	
Model:	Solitax or equal	
Area Classification:	Non-hazardous	
Output	Proprietary OEM	
Display	N/A	
Sensing Technology	Multiple beam alternating light with IR diode and beam focussing ts-line sc 0.001mg/l to 50g/l	
Electrical Connection	M12 Plug	
IP Rating Transmitter	IP67	
Sensor Range:		
XE10, XE11, XE12	3 -10 g/l	
Process Connection	Immersion type with pole mount kit option added	
Process Medium	Activated Sludge	
Design Pressure	Atm	
Design Temperature	Abm	
Immersion tube	Stainless Steel	
Cleaning	Wiper arm	

TECHNICAL DATA SHEET NO. E2.9 (c)

TSS PROBE HOLDER

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