



# The Kingdom of Eswatini

## ESWATINI INVESTMENT PROMOTION AUTHORITY

### Invitation To Tender (ITT) Document

for the

### Procurement of Works

<b>Procurement Method:</b>	<b>Open Tender</b>
<b>Subject of Procurement:</b>	<b>Refurbishment of Nhlanguano Wastewater Treatment Plant</b>
<b>Procurement Reference Number:</b>	<b>TENDER NO.1 2026/2027</b>
<b>Date of Issue:</b>	<b>01 April 2026</b>
<b>Participation</b>	<b>International</b>

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## IST OF ACRONYMS

TDS	Tender Data Sheet
TS	Tender Security
TSD	Tender Securing Declaration
ESHS	Environmental, Social, Health and Safety
GCC	General Conditions of the Contract
ITT	Instruction to Contractors.
JV	Joint Venture
PE	Procuring Entity
STD	Standard Tender Document
SCC	Special Conditions of the Contract
SOR	Statement of Requirements.
TCS	Technical Compliance Selection

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# Tender Document

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### Standard Invitation to Contractors

**01 April 2026**

#### **Refurbishment of Nhlangano Wastewater Treatment Works - Tender No. 1 of 2026/2027**

1. The Eswatini Investment Promotion Authority has allocated/received funds to be used for the Refurbishment of Nhlangano Wastewater Treatment Plant.
2. The Entity invites sealed Tenders from eligible Contractors for the provision of the above works.
3. Tendering shall be conducted in accordance with the procedures contained in the Public Procurement Act of 2011 and the Regulations of 2020.
4. Interested eligible Contractors may obtain further information about the tender document at the address given below at 8(a) from **0830hrs to 1630hrs**.
5. The Tender document which has been prepared in the English *language* may be obtained by interested Contractors at 8(b) upon payment of a non-refundable fee of **E1000**. The method of payment will be to the below EIPA Nedbank Account as of 17 April 2026

#### **Eswatini Investment Promotion Authority**

**Bank name:** Nedbank

**Account number:** 020000002543

**Branch code:** 360164

**Reference:** **Tender No.01 of 2026/2027**, Proof of payment shall be submitted with tender document with effect from 19 May 2026.

- 6.** Tenders must be delivered to the address indicated below at 8(c) at or before **1300hrs 19 May 2026**. All Tenders must be accompanied by a Tender security of **E 5000.00**. Tender securities must be valid until **20 September 2026**. Late Tenders shall be rejected. Tenders will be opened in the presence of the Contractors' representatives who choose to attend at the address below at 8(d) at **1315hrs, 19 May 2026**.
7. There shall be a pre-Tender meeting/site visit at **Nhlangano Zheng Yong at 1000hrs** on the dates indicated in the proposed schedule in this notice.
8. Address and Contact Details:

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## Part 1: Section 1 Instructions to Tenderers

(a)	Information about the tender may be accessed from:	<a href="mailto:procurement@sipa.org.sz">procurement@sipa.org.sz</a> and copy <a href="mailto:sihle@rszengineers.co.za">sihle@rszengineers.co.za</a>
(b)	Documents will be issued from:	The reception, 1st Floor, Building 1, Sibekelo Building, Mhlambanyatsi Road, Mbabane, Eswatini.
(c)	Tenders must be delivered to:	The reception, 1st Floor, Building 1, Sibekelo Building, Mhlambanyatsi Road, Mbabane, Eswatini.
(d)	Address of Tender opening:	The reception, 1st Floor, Building 1, Sibekelo Building, Mhlambanyatsi Road, Mbabane, Eswatini.

9. The Planned Procurement Schedule (subject to changes) is as follows:

Activity	Date
(a) Issue of invitation to tender letter	01 April 2026
(b) Pre-Tender meeting/ Site visits where applicable	17 April 2026
(c) Tender closing date	19 May 2026
(d) Tender opening date	19 May 2026
(e) Evaluation process	(Within 15 working days from Tender closing date)
(f) Notification and Publication of Notice of Intention to Award	(Within 10 working days from completion of evaluation process)
(g) Contract Award	(After expiry of at least 10 working days from issuance of the Notice of Intention to Award)

Signature:

Name: Ms Hanalora

CFO

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# PART 1 - Tender Procedures

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### A. General

#### 1. Scope of Tender

- 1.1 The Procuring Entity (PE), as defined in the Tender Data Sheet (TDS), invites Tenders for the construction of works, as described in the TDS. The name and procurement reference number of the Contract and number of lots in this Tender Document are provided in the TDS. The Instructions to Tenderers (ITT) should be read in conjunction with the TDS.
- 1.2 The successful Contractor will be expected to complete the works by the Intended Completion Date specified in the Special Conditions of Contract (SCC).
- 1.3 Throughout this Tender document:
- (a) the “Contractor” means the service provider.
  - (b) “day” means calendar day unless specified as working day.
  - (c) “day works” means varied work inputs subject to payment on a time basis for the Contractor’s employees and Equipment, in addition to payments for associated Materials and Plant.
  - (d) the “Employer” means the Procuring Entity.
  - (e) “ESHS” means environmental, social (including sexual exploitation and abuse (SEA) and gender -based violence (GBV)), health and safety.
  - (f) “in writing” means hand-written, type-written, printed or electronically made, and resulting in a permanent record.

#### 2. Source of Funds

- 2.1 The PE has an approved budget from Own Funds towards the cost of the procurement named in the TDS. The PE intends to use these funds to place a contract for which this Tender Document is issued.
- 2.2 Payments will be made directly by the PE and shall be subject to the terms and conditions of the resulting contract placed by the PE.

#### 3. Corrupt and Fraudulent Practices

- 3.1 It is the policy of the Government of The Kingdom of Eswatini through ESPPRA to require that PEs, as well as Contractors Sub- observe the highest standards of ethics during procurement and the execution of contracts.
- (a) In pursuit of this policy, the Government of Eswatini defines for the purposes of this provision, the terms set forth below as follows:
- (i) “corrupt practice” means the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value, to influence the action of a public official in the procurement process or in contract execution;
  - (ii) “fraudulent practice” means as any such practices under the code of ethics of the providers and not limited to misrepresentation of facts in order to influence a procurement or process or the execution of a contract to the

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## Part 1: Section 1 Instructions to Tenderers

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detriment of the procuring or disposing entity, and includes collusive practices among Contractors prior to or after Tender submission designed to establish Tender prices at artificial non-competitive levels and to deprive the PE of the benefits of free and competitive competition;

- (b) The PE shall reject a recommendation for award if the Contractor recommended for award has engaged in corrupt or fraudulent practices; and
- (c) The Agency shall suspend a contractor from engaging in any public procurement proceedings for a stated period of time in accordance with the Procurement Act and the Regulations made under the Act, if the provider has engaged in corrupt or fraudulent practices.

3.2 In pursuit of the policy defined in ITT Sub-Clause 3.1, the PE may terminate a contract for works, if it at any time determines that corrupt or fraudulent practices were engaged in by representatives of the PE or of a Contractor or sub-Contractor during the procurement or the execution of a contract.

3.3 In further pursuit of the policy defined in ITT Sub-Clause 3.1, the Agency requires representatives of both the PE and of Contractors and sub-Contractors to adhere to the relevant codes of ethical conduct. The Code of Ethical Conduct for Contractors and Providers as provided in the Tender forms shall be signed by the Contractor and submitted together with the other Tender forms.

3.4 Any communications between a Contractor and the PE related to matters of alleged fraud or corruption must be made in writing and addressed to the Controlling Officer of the PE.

### 4. Eligible Contractors

4.1 A Contractor, and all parties constituting the Contractor, shall meet the following criteria to be eligible to participate in public procurement:

- (a) The Contractor has the legal capacity to enter into a contract with the PE;
- (b) The Contractor is not:
  - (i) Insolvent;
  - (ii) In receivership;
  - (iii) Bankrupt; or
  - (iv) Being wound up
- (c) The Contractor's business activities have not been suspended;
- (d) The Contractor is not the subject of legal proceedings for any of the circumstances in (b); and
- (e) The Contractor has fulfilled his or her obligations to pay taxes and social security contributions.
- (f) The Contractor is not a member of the Entity Tender Board or an employee of the Procuring Entity.

4.2 A Contractor may be a physical person or artificial person, such as an entity. A combination of persons can Tender if they have an agreement to form a Joint Venture (JV), Consortium or Association. Such a Tender shall include a Power of Attorney from each party authorizing a representative to conduct all business for and on behalf of the party during the Tender process, contract signature and contract

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## Part 1: Section 1 Instructions to Tenderers

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execution. Each party to the JV, Consortium or Association shall be a signatory to the contract with the PE and shall be jointly and severally liable.

- 4.3 A Contractor, and all parties constituting the Contractor including sub-contractors, shall have the nationality of an eligible country, in accordance with Section 5, Eligible Countries. A Contractor shall be deemed to have the nationality of a country if the Contractor is a citizen or is constituted, incorporated, or registered and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed subcontractors for any part of the Contract including related services.
- 4.4 A Contractor shall not have a conflict of interest. Any Contractor found to have a conflict of interest shall be disqualified. A Contractor may be considered to have a conflict of interest with one or more parties in this Tendering process, if the Contractor:
- (a) Has controlling shareholding with another Contractor; or
  - (b) Receives or has received any direct or indirect subsidy from another Contractor; or
  - (c) Has the same authorized representative for purposes of this tendering process as another Contractor; or
  - (d) Has a relationship with another Contractor, directly or through common third parties, that puts the Contractor in a position to have access to information about or influence the Tender of another Contractor, or influence the decisions of the PE regarding this tendering process; or
  - (e) Submits more than one Tender in this Tendering process, except for alternative Tenders permitted under ITT 19. However, this does not limit the participation of subcontractors in more than one Tender, or as Contractors and subcontractors simultaneously; or
  - (f) Is associated, or has been associated in the past, directly or indirectly, with the consultant or any other entity that has prepared the design, specifications, and other documents for the Project or is being proposed as Project Manager for the Contract. A Contractor that has been engaged by the PE to provide consulting services for the preparation or supervision of the works, and any of its affiliates, shall not be eligible to Tender.
- 4.5 A Contractor that is suspended by the Agency shall not be eligible to participate in the Tendering process.
- 4.6 Government-owned enterprises shall be eligible only if they can establish that they are legally and operate under commercial law.
- 4.7 Contractors shall provide such evidence of their continued eligibility satisfactory to the PE, as the PE shall reasonably request.
- 4.8 To establish eligibility in accordance with ITT 4, a Contractor shall complete the eligibility declarations in the Tender Submission Sheet, included in Section 4, Tender Forms and submit the documents required in Section 3, Evaluation Methodology and Criteria.
- 4.9 A Contractor whose circumstances in relation to eligibility change during a procurement process or during the implementation of a contract, shall immediately inform the PE.

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## Part 1: Section 1 Instructions to Tenderers

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- 4.10 All materials, equipment and services to be used in the performance of the contract shall have as their country of origin an eligible country in accordance with Section 5, Eligible Countries.

### 5. Qualification of the Contractor

- 5.1 To establish its qualifications to perform the Contract, the Contractor shall complete and submit:
- (a) The Qualification Form provided in Section 4, Tendering Forms; and
  - (b) The information and documents stated in Section 3, Evaluation Methodology and Criteria.
- 5.2 The qualifications of the best evaluated Contractor will be assessed as part of a post-qualification in accordance with ITT 40.

### 6. Joint Ventures, Consortia and Associations

- 6.1 Tenders submitted by a JV, Consortium or Association shall include a copy of the Joint Venture, Consortium or Association Agreement signed by all parties to the Joint Venture, Consortium or Association Agreement.
- 6.2 In addition to the requirements under ITT 15.1, Tenders submitted by a joint venture, consortium or association of two or more firms as partners shall comply with the following requirements, unless otherwise stated in the TDS:
- (a) The Tender shall include all the information listed in Section 3, Evaluation Methodology and Criteria for each partner;
  - (b) The Tender shall be signed to be legally binding on all partners;
  - (c) All partners shall be jointly and severally liable for the implementation of the Contract in accordance with the Contract terms;
  - (d) One of the partners will be nominated as being in charge and receive instructions for and on behalf of any and all partners; and
  - (e) The implementation of the entire Contract shall be by the Joint Venture, consortium or association.

### 7. One Tender per Contractor

Each Contractor shall submit only one Tender, either individually or as a partner in a joint venture, consortium or association. A Contractor who submits or participates in more than one Tender (other than as a subcontractor or in cases of alternatives that have been permitted or requested) shall cause all the Tenders with the Contractor's participation to be rejected.

### 8. Cost of Tendering

The Contractor shall bear all costs associated with the preparation and submission of his Tender, and the PE shall not be responsible or liable for those costs, regardless of the conduct or outcome of the Tendering process.

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## Part 1: Section 1 Instructions to Tenderers

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### 9. Site Visit and Pre-Tender Meeting

- 9.1 The Contractor, at the Contractor's own responsibility and risk, is encouraged to visit and examine the site of works and its surroundings and obtain all information that may be necessary for preparing the Tender and entering into a contract for construction of the works. The costs of visiting the site shall be at the Contractor's own expense.
- 9.2 The Contractor and any of its authorized personnel or agents shall be granted permission by the PE to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the Contractor, its personnel, and agents will release and indemnify the PE and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.
- 9.3 If so indicated in the TDS, the PE will hold a pre-tender meeting or site visit at the time, date and location specified in the TDS to clarify issues and to answer questions on any matter that may be raised at that stage.
- 9.4 Contractors may submit any questions in writing to the Entity prior to the date of the meeting and may also orally raise questions at the meeting.
- 9.5 Minutes of the pre-tender meeting, if any was held, including the text of the questions asked by Contractors, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Contractors who have acquired the Tendering Documents. Any modification to the Tendering Documents that may become necessary as a result of the pre-Tender meeting shall be made by the PE exclusively through the issue of an Addendum pursuant to ITT 12 and not through the minutes of the pre-Tender meeting. Unless otherwise indicated in the TDS, non-attendance at the site visit shall not cause disqualification of a Contractor.

### 10. Margin of Preference

- 10.1 Unless otherwise specified in the TDS, a margin of preference shall apply. Where the margin of preference applies, its application and detail shall be specified in Section 3, Evaluation Methodology and Criteria.

## B. Tendering Document

### 11. Content of Tendering Document

- 11.1 The Tendering Document consists of Parts 1, 2, and 3, which includes all the Sections indicated below, and should be read in conjunction with any addenda issued in accordance with ITT Clause 13.

#### PART 1 Tendering Procedures

- Section 1. Instructions to Contractors (ITT)
- Section 2. Tender Data Sheet (TDS)
- Section 3. Evaluation Methodology and Criteria
- Section 4. Tendering Forms

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## Part 1: Section 1 Instructions to Tenderers

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- Section 5. Eligible Countries

### **PART 2 Statement of Requirements**

- Section 6. Statement of Requirements

### **PART 3 Contract**

- Section 7. General Conditions of Contract (GCC)
- Section 8. Special Conditions of Contract (SCC)
- Section 9. Contract Forms

- 11.2 Unless obtained directly from the Employer, the Employer is not responsible for the completeness of the Tendering Documents, responses to requests for clarification, the minutes of the pre-Tender meeting (if any), or Addenda to the Tendering Documents.
- 11.3 The Contractor is expected to examine all instructions, forms, terms and specifications in the Tendering Document and to furnish with its Tender all information and documentation required by the Tendering Documents.

## **12. Clarification of Tendering Document**

A Contractor requiring any clarification of the Tendering Document shall contact the PE in writing at the PE's address indicated in the TDS. The PE will respond in writing to any request for clarification, provided that such a request is received no later than the date indicated in the TDS. The PE shall forward copies of its response to all Contractors who have acquired the Tendering Document, including a description of the inquiry but without identifying its source. Should the PE deem it necessary to amend the Tendering Document as a result of a clarification, it shall do so following the procedure under ITT 13 and ITT 24.2.

## **13. Amendment of Tendering Document**

- 13.1 Prior to the deadline for submission of Tenders, the PE may amend the Tendering Document by issuing an addendum.
- 13.2 Any addendum issued shall be part of the Tendering Document and shall be communicated in writing to all who have obtained the Tendering Document directly from the PE.
- 13.3 To give Contractors reasonable time in which to take an addendum into account in preparing their Tenders, the PE shall extend the deadline for submission of Tenders by a reasonable period in the event that less than one third of the Tendering period remains after the issue date of the addendum. The PE may, at its discretion, extend the deadline for the submission of Tenders, where more than one third of the Tendering period remains after the date of issue of the addendum.

## **C. Preparation of Tenders**

### **14. Language of the Tender and Communications**

- 14.1 The Tender shall be in writing.
- 14.2 The Tender, as well as all correspondence and documents relating to the Tender exchanged between the Contractor and the PE, shall be written in English or unless otherwise specified in the TDS.

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14.3 Supporting documents and printed literature that are part of the Tender may be in another language provided they are accompanied by an accurate translation by a competent institution of the relevant passages to the language stated in the ITT Sub-clause 14.2. In which case, for purposes of interpretation of the Tender, such translation shall govern.

### 15. Documents Comprising the Tender

15.1 The Tender submitted by the Contractor shall comprise the following:

- (a) The Tender Submission Sheet, in accordance with ITT 15.2;
- (b) A Tender Security or a Tender Securing Declaration in accordance with ITT 20;
- (c) Written confirmation authorising the signatory of the Tender to commit the Contractor, in accordance with ITT 22;
- (d) Documentary evidence in accordance with ITT 4.8 establishing the Contractor's eligibility to Tender;
- (e) A priced Activity Schedule or Bill of Quantities in accordance with ITT 16 and 17;
- (f) The Qualification Form and Documents in accordance with ITT 5;
- (g) Technical documentation (description of the proposed work method and schedule, including drawings and charts, as necessary) in accordance with ITT 16;
- (h) The duly signed Code of Ethical Conduct for Contractors and Providers in accordance with ITT 3.3; and
- (i) Any other document(s) required in the TDS.

15.2 The Contractor shall submit the Tender Submission Sheet using the form provided in Section 4, Tendering Forms. This form must be completed without any alterations to its format, and no substitutes shall be accepted. All blank spaces shall be filled with the information requested.

### 16. Technical Documentation

16 The Contractor shall furnish technical documentation including a statement of work, equipment, personnel, schedule and any other information as stipulated in Section 4, Tendering Forms, in sufficient detail to demonstrate the adequacy of the Contractor's proposal to meet the work's requirements and the completion time.

### 17. Tender Prices and Discounts

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- 17.1 The prices and discounts quoted by the Contractor in the Tender Submission Sheet and in the Priced Activity Schedules or Bills of Quantities submitted by the Contractor shall conform to the requirements specified below.
- 17.2 The Contractor shall fill in rates and prices for all items of the works described in the Bill of Quantities. If a Price Schedule shows items listed but not priced, their prices shall be assumed to be included in the prices of other items. Items not listed in the Price Schedule shall be assumed not to be included in the Tender, and provided that the Tender is substantially responsive, the corresponding adjustment shall be applied in accordance with ITT 32.3.
- 17.3 The price to be quoted in the Tender Submission Sheet shall be the total price of the Tender, excluding any discounts offered. In the event that taxes are not exempt, the price must include any applicable taxes.
- 17.4 The Contractor shall quote any unconditional and conditional discounts in the Tender Submission Sheet.
- 17.5 The total Tender price shall be for the whole works based on the priced Activity Schedule or Bill of Quantities submitted by the Contractor.
- 17.6 The contract price or tender price quoted by the Contractor shall be subject to adjustment during the performance of the Contract if provided for in the SCC and the provisions of Clause 47 of the GCC.

### 18. Currencies of Tender and Payment

- 18.1 Tender prices for works and related services originating in and outside Eswatini shall be quoted in Eswatini Lilangeni unless authorised by a competent authority.
- 18.2 If authorised by the competent authority the Contractor shall utilise the rate of exchange specified in the TDS to express its offer. The source, date and type of exchange rate shall be indicated in ITT 36.
- 18.3 If authorised by the competent authority, Contractors shall indicate details of their expected foreign currency requirements in the Tender. Foreign currency requirements shall be indicated as a percentage of the Tender price (excluding provisional sums) and shall be payable at the option of the Contractor in up to two foreign currencies, unless otherwise stated in the TDS.
- 18.4 If authorised by the competent authority, Contractors may be required by the PE to clarify their foreign currency requirements and to substantiate that the amounts included in the lump sum and in the SCC are reasonable and responsive to ITT 18.3.

### 19. Tender Validity

- 19.1 Tenders shall remain valid until the date specified in the TDS. A Tender valid for a shorter period shall be rejected by the PE as non-compliant while a Tender valid for a longer period than the date specified in the TDS shall not be rejected but shall only be valid until the date in the TDS.
- 19.2 The PE shall make its best effort to complete the procurement process within the duration of the validity period specified in the TDS. A PE must ensure the validity of Tenders, Tender securities and Tender securing declarations throughout the procurement process until contract signature.
- 19.3 In exceptional circumstances, prior to the expiration of the Tender validity period, the PE may request Contractors to extend the period of validity of their Tenders

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The request and the responses shall be made in writing. If a Tender Security or a Tender Securing Declaration is requested in accordance with ITT Clause 20, it shall also be extended for a period corresponding to the extension of the Tender validity. A Contractor may refuse to extend its Tender validity period without forfeiting its Tender Security or Tender Securing Declaration. A Contractor who extends the validity periods of its Tender and Tender security or Tender securing declaration shall not be required or permitted to modify its Tender.

### 20. Tender Security or Tender Securing Declaration

20.1 The Contractor shall furnish as part of its Tender either a Tender Security or a Tender Securing Declaration as specified in the TDS in original form and, in the case of a Tender Security, in the amount and currency specified in the TDS.

20.2 If a Tender security is specified pursuant to ITT 20,1, the Tender security shall be a demand guarantee in the amount specified in the TDS and denominated in Eswatini Lilangeni or a freely convertible currency, and shall:

- (a) Be issued by a reputable financial institution selected by the Contractor from an eligible country. If the institution issuing the security is located outside Eswatini, it shall be enforceable through a financial institution located in Eswatini.
- (b) Be in the form of the Tender security included in section 4, Tendering forms;
- (c) Be discharged by the financial institution immediately upon written demand by the PE in case the conditions stated in the Tender security are invoked;
- (d) Be included in the Tender and submitted in its original form - copies shall not be accepted.

20.3 The Tender Security or Tender Securing Declaration shall be submitted using the appropriate form included in Section 4, Tendering Forms and shall be valid until the date specified in the TDS.

20.4 Any Tender not accompanied by appropriate Tender Security or Tender Securing Declaration, shall be rejected by the PE as non-compliant.

20.5 The Tender Security of all Contractors shall be returned as promptly as possible once the successful Contractor has signed the contract and provided the required Performance Security and ESHS Performance Security where applicable.

20.6 The Tender Security or Tender Securing Declaration of a JV, Consortium or Association must be issued in the names of all their members or partners.

20.7 The Tender Security may be forfeited, or the conditions of the Tender Securing Declaration executed in the following circumstances:

- (a) If a Contractor withdraws its Tender during the period of Tender validity specified by the Contractor in the Tender Submission Sheet, or during any extension thereto;
- (b) If a Contractor fails to accept the correction of its Tender price pursuant to ITT Sub-Clause 32.5; or
- (c) If the successful Contractor fails to:

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- (ii) Furnish a Performance Security and if required in the TDS, the Environmental, Social, Health and Safety (ESHS) Performance Security in accordance with ITT 46.2.

### 21. Alternative Tenders

- 21.1 Contractors shall submit offers that comply with the requirements of the Tendering documents, including the basic technical design as indicated in the drawings and specifications. Alternative Tenders shall not be permitted.

### 22. Format and Signing of Tender

- 22.1 The Contractor shall prepare one original of the documents comprising the Tender as described in ITT Clause 14 and clearly mark it “ORIGINAL.” In addition, the Contractor shall submit copies of the Tender, in the number specified in the TDS, and clearly mark each of them “COPY.” In the event of any discrepancy between the original and the copies, the original shall prevail.
- 22.2 The Contractor shall separate his Technical submission to the Financial submission. The Contractor should submit 1 Original Technical submission and 1 Original Financial submission. The Contractor shall submit 2 Copies of the Technical submission and 2 Copies of the Financial submission.
- 22.3 The original and all copies of the Tender shall be signed by the Contractor in the event that he or she is a physical person personally submitting the Tender and in any other event by a person duly authorised to sign on behalf of the Contractor. This authorisation shall consist of a Power of Attorney which if signed in Eswatini shall be registered with the competent authority and if signed outside Eswatini, shall be notarized. The Power of Attorney shall be submitted in the Tender. The name and position held by each person signing the authorisation must be typed or printed below the signature. All pages of the Tender, except for un-amended printed literature, shall be signed or initialled by the person authorized to sign the Tender.

## D. Submission and Opening of Tenders

### 23. Sealing and Marking of Tenders

- 23.1 The Contractor shall enclose the original and each copy of the Tender, in separate sealed envelopes or packages, duly marking the envelopes as “ORIGINAL” and “COPY.” These envelopes or packages containing the original and the copies shall then be enclosed in one single plain envelope or package securely sealed in such a manner that opening and resealing cannot be achieved undetected and shall be submitted as specified in the TDS.
- 23.2 The inner and outer envelopes shall:
  - (a) Bear the name and address of the Contractor;
  - (b) Be addressed to the PE in accordance with ITT 23.1;
  - (c) Bear the Procurement Reference number of this Tendering process; and
  - (d) Bear a warning not to open before the time and date for Tender opening, in accordance with ITT 23.1.

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23.3 If all envelopes are not sealed and marked as required, the PE will assume no responsibility for the misplacement or premature opening of the Tender.

### 24. Deadline for Submission of Tenders

24.1 Tenders must be received by the PE at the address and no later than the date and time indicated in the TDS. When so specified in the TDS, Contractors shall have the option of submitting their Tenders electronically. Contractors submitting Tenders electronically shall follow the electronic Tender submission procedures specified in the TDS.

24.2 The PE may, at its discretion, extend the deadline for the submission of Tenders by amending the Tendering Documents in accordance with ITT 13, in which case all rights and obligations of the PE and Contractors previously subject to the deadline shall thereafter be subject to the deadline as extended.

### 25. Late Tenders

The PE shall not consider any Tender that arrives after the deadline for submission of Tenders, in accordance with ITT 24. Any Tender received by the PE after the deadline for submission of Tenders shall be declared late, rejected, and returned unopened to the Contractor.

### 26. Withdrawal and Replacement of Tenders

26.1 A Contractor may withdraw or replace its Tender after it has been submitted at any time before the deadline for submission of Tenders by sending a written notice, duly signed by an authorised representative, which shall include a copy of the authorisation in accordance with ITT 24.2. Any corresponding replacement of the Tender must accompany the respective written notice. All notices must be:

- (a) Submitted in accordance with ITT 23 and 24 (except that withdrawals notices do not require copies), and in addition, the respective envelopes shall be clearly marked “Withdrawal,” or “REPLACEMENT,” and
- (b) Received by the Procuring Entity prior to the deadline prescribed for submission of Tenders, in accordance with ITT Clause 24.

26.2 Tenders requested to be withdrawn in accordance with ITT Sub-Clause 24.1 shall be returned unopened to the Contractor.

26.3 No Tender may be withdrawn or replaced in the interval between the deadline for submission of Tenders and the expiration of the period of Tender validity specified by the Contractor in the Tender Submission Sheet or any extension thereof.

26.4 Tenders may only be modified by withdrawal of the original Tender and submission of a replacement Tender in accordance with ITT Sub-Clause 26.1. Modifications submitted in any other way shall not be taken into account in the evaluation of Tenders.

26.5 Contractors may only offer discounts to, or otherwise modify the prices of their Tenders, by withdrawing and replacing their Tender in accordance with this clause, or by including the discount in the original Tender submission in accordance with ITT 17.

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### 27. Tender Opening

- 27.1 The PE shall conduct the Tender opening in the presence of Contractors' designated representatives who choose to attend, and at the address, date and time specified in the TDS. Any specific electronic Tender opening procedures required if electronic Tendering is permitted in accordance with ITT 24.1 shall be as specified in the TDS.
- 27.2 First, envelopes marked "WITHDRAWAL" shall be opened and read out and the envelope with the corresponding Tender shall not be opened but returned to the Contractor. No Tender withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorisation to request the withdrawal and is read out at the Tender opening.
- 27.3 All other envelopes including those marked "REPLACEMENT" shall be opened and the relevant details read out. Replacement Tenders shall be recorded as such on the record of the Tender opening. The corresponding tender that is being replaced shall be returned unopened to the contractor.
- 27.4 Only envelopes or packages that are opened and read out at the Tender opening shall be evaluated.
- 27.5 All other envelopes shall be opened one at a time, reading out: the name of the Contractor; the Tender price, per lot where applicable, including any discounts; the presence of a Tender Security or Tender Securing Declaration; and any other details as the Procuring Entity may consider appropriate. No Tender shall be rejected at the Tender opening except for late Tenders, in accordance with ITT 25
- 27.6 The PE shall prepare a record of the Tender opening that shall include, as a minimum: the name of the Contractor and whether there is a withdrawal and/or replacement; the total Tender price or the Tender price per lot if applicable, including any discounts; the presence or absence of a Tender Security or Tender Securing Declaration, and whether a Power of Attorney was submitted. The Contractors' representatives who are present shall be requested to sign the record. The omission of a Contractor's signature on the record shall not invalidate the contents and effect of the record. 27.7 The opened tenders shall immediately be taken to a secure location, where they shall be kept until the evaluation begins.

## E. Evaluation of Tenders

### 28. Confidentiality

- 28.1 Information relating to the examination, evaluation, comparison, and post-qualification of Tenders, and recommendation of contract award, shall not be disclosed to Contractors or any other persons not officially concerned with such process until information detailing the Best Evaluated Contractor is communicated to all Contractors.
- 28.2 Any attempt by a Contractor to influence the PE in the examination, evaluation, comparison, and post-qualification of the Tenders or contract award decisions may result in the rejection of its Tender.

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28.3 Notwithstanding ITT 28.2, from the time of Tender opening to the time of Contract award, if any Contractor wishes to contact the PE on any matter related to the Tendering process, it should do so in writing.

### 29. Evaluation of Tenders

29.1 The PE shall use the criteria and methodologies listed in Section 3, Evaluation Methodology and Criteria. No other evaluation criteria or methodology shall be permitted. By applying the set criteria and methodology, the PE shall determine the Best Evaluated Tender.

29.2 If this Tendering document allows Contractors to quote separate prices for different lots, the methodology to determine the Best Evaluated Tender for a lot shall be as specified in Section 3, Evaluation Methodology and Criteria.

### 30. Clarification and Changes to Tenders

30.1 To assist in the examination, evaluation, comparison and post-qualification of the Tenders, the Procuring Entity may, at its discretion, ask any Contractor for a clarification of its Tender, including breakdowns of unit rates or prices. Any clarification submitted by a Contractor that is not in response to a request by the PE shall not be considered. The PE's request for clarification and the Contractor's response shall be in writing. No change in the prices or substance of the Tender shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the PE in the evaluation of the Tenders, in accordance with ITT 32.

30.2 If a Contractor does not provide clarifications of its Tender by the date and time set in the PE's request for clarification, its Tender may be rejected.

### 31. Compliance and Responsiveness of Tenders

31.1 The PE's determination of a Tender's compliance and responsiveness is to be based only on the contents of the Tender itself with the exception of findings recorded in the Evaluation Report after a due diligence or post qualification.

31.2 A substantially compliant and responsive Tender is one that conforms to all the terms, conditions, and specifications of the Tendering Document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that:

- (a) Affects in any substantial way the scope, quality, or performance of the Works specified in the Contract; or
- (b) Limits in any substantial way, inconsistent with the Tendering Document, the PE's rights or the Contractor's obligations under the Contract; or
- (c) If rectified would unfairly affect the competitive position of other Contractors presenting substantially compliant and responsive Tenders.
- (d) Impacts the key factors of a procurement including cost, risk, time and quality and causes -
  - (i) Unacceptable time schedules, where it is stated in the Tendering document that time is of the essence;

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- (ii) Unacceptable alternative technical details, such as design, materials, workmanship, specifications, standards or methodologies; or unacceptable counter-Tenders with respect to key contract terms and conditions, such as payment terms, price adjustment, liquidated damages, sub-contracting or warranty.

31.3 If a Tender is not substantially compliant and responsive to the Tendering Document, it shall be rejected by the PE and may not subsequently be made compliant and responsive by the Contractor by correction of the material deviation, reservation, or omission.

### 32. Nonconformities, Errors, and Omissions

32.1 Provided that a Tender is substantially compliant and responsive, the PE may waive any non-conformity or omission in the Tender that does not constitute a material deviation.

32.2 Provided that a Tender is substantially compliant and responsive, the PE may request that the Contractor submit the necessary information or documentation, within a reasonable period of time, to rectify non-material nonconformities or omissions in the Tender related to documentation requirements. Such an omission shall not be related to any aspect of the price of the Tender. Failure of the tender to comply with the request may result in the rejection of its Tender.

32.3 Provided that a Tender is substantially compliant and responsive, the PE shall rectify nonmaterial nonconformities or omissions. To this effect, the Tender price shall be adjusted, for comparison purposes only, to reflect the price of the missing or non-conforming item or component. The cost of any missing items will be added to the Tender price using the highest price from other Tenders submitted.

32.4 Provided that the Tender is substantially compliant and responsive, the PE shall correct arithmetic errors on the following basis:

- (a) If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the PE there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected;
- (b) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail, and the total shall be corrected; and
- (c) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.

32.5 If a Contractor does not accept the correction of errors, the Tender shall be rejected, and the Tender Security may be forfeited or conditions in the Tender Securing Declaration executed.

### 33. Stages of Evaluation: Using Technical Compliance Selection Evaluation Method

The evaluation of a Tender for the procurement of works using the technical compliance evaluation method shall be conducted under the following stages.

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### 34. Preliminary Examination of Tenders – Eligibility and Administrative Compliance

- 34.1 The PE shall examine the legal documentation to establish the eligibility of the Contractors and to verify the validity and authenticity of the documents submitted by the Contractor.
- 34.2 If after the examination of eligibility, the PE determines that the Tender is not compliant, it shall reject the Tender with the exception of rectification of omissions in accordance with ITT 32.2.
- 34.3 The PE shall confirm that the following administrative compliance documents and information have been provided in the Tender. If any of these documents or information is missing or contrary to the requirements in the Tendering document, the Tender shall be rejected.
- (a) The Tender Submission Sheet duly signed by the authorized representative of the Contractor, including:
    - (i) A brief description of the works and related services offered;
    - (ii) The total price of the Tender; and
    - (iii) The appropriate duration of the Tender validity;
  - (b) The Price Schedule;
  - (c) A Power of Attorney in accordance with ITT 22.2; and
  - (d) An authentic Tender Security or Tender Securing Declaration, whichever is applicable, in the appropriate form and amount.
- 34.4 Eligibility and administrative compliance shall be determined on a pass or fail basis and a Tender which is not eligible or administratively compliant shall be rejected at the preliminary stage of evaluation.

### 35. Technical Evaluation

- 35.1 The PE shall examine the technical aspects of the Tender submitted in accordance with ITT 16, in particular, to confirm that all requirements of Section 6, Statement of Requirements (SoRs) have been met without any material deviation, reservation or omission.
- 35.2 The determination shall be based upon an examination of the documentary evidence of the Contractor's qualifications submitted by the Contractor, pursuant to ITT Clause 5, to clarifications in accordance with ITT Clause 30 and the qualification criteria indicated in Section 3, Evaluation Methodology and Criteria.
- 35.3 If, after the examination of the terms, conditions and requirements, the PE determines that the Tender is not substantially responsive in accordance with ITT 31, it shall reject the Tender.

### 36. Currency and Exchange Rate

- 36.1 The currency that shall be used for evaluation purposes for all Tenders shall be Eswatini Lilangeni unless otherwise authorized by a competent authority.
- 36.2 The exchange rate shall be the prevailing Central Bank of Eswatini exchange rate and shall not precede the tender submission deadline by less than 21 days. Should

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## Part 1: Section 1 Instructions to Tenderers

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this date be a non-working day, the selling exchange rate on the date prior to this non-working day shall be used for currency conversion or as otherwise specified in the TDS.

### 37. Financial Comparison of Tenders

37.1 The PE will evaluate and compare only the Tenders determined to be substantially responsive following Technical Evaluation in accordance with ITT 37.3.

37.2 To financially evaluate a Tender, the PE shall only use the criteria and methodologies defined in this clause and in Section 3, Evaluation Methodology and Criteria. No other criteria or methodology shall be permitted.

37.3 To financially compare Tenders, the PE shall:

- (a) Correct any arithmetic errors in accordance with ITT 30.1;
- (b) Apply any discounts offered in accordance with ITT 17;
- (c) Make adjustments for any deviation that is not a material deviation in accordance with ITT 32;
- (d) Convert all Tenders to a single currency in accordance with ITT 18;
- (e) Apply any margin of preference, in accordance with ITT 38;
- (f) Determine the total evaluated price of each Tender.

37.4 The PE shall consider prices that appear to:

- (a) Be unbalanced;
- (b) Show a misunderstanding of the requirements; or
- (c) Be intended to front load earnings.

37.5 The PE reserves the right to accept or reject any variation, deviation, or alternative offer. Variations, deviations, and alternative offers and other factors which are in excess of the requirements of the Tendering documents or otherwise result in unsolicited benefits for the PE will not be taken into account in Tender evaluation, unless otherwise specified in Section 3, Evaluation Methodology and Criteria.

### 38. Margin of Preference

38.1 Unless otherwise specified in the TDS, a margin of preference shall apply. Where a Margin of Preference applies, its application and detail shall be specified in Section 3, Evaluation Methodology and Criteria.

38.2 For the purpose of granting a margin of domestic preference, Tenders will be classified in two groups, as follows:

- (a) Group A: Swati Company participating alone in the tender [*In accordance with Regulation 12(2) of the Procurement Regulations, 2020*]
- (b) Group B: Foreign Company sub-contracting or partnering with a Swati company [*In accordance with Regulation 12(5) of the Procurement Regulations, 2020*]

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### 39. Determination of Best Evaluated Tender

The best evaluated Tender shall be the lowest priced Tender which is eligible, administratively and technically compliant to the requirements specified in the Tendering document.

## F. Award of Contract

### 40. Award Procedure and Notice of Intention to Award

- 40.1 An award decision by the relevant approvals authority is not a contract. The Contractor with the best evaluated Tender shall be awarded the contract following an adjudication by the relevant approvals authority.
- 40.2 The PE shall issue a Notice of Intention to Award within five (5) working days after the decision of the relevant approvals authority to all Contractors who participated in the Tendering process and the Agency for publication on its website
- 40.3 No contract shall be awarded within the period of ten (10) working days after the date of issuance of the Notice of Intention to Award.
- 40.4 Negotiations will only be held in exceptional circumstances as provided for under the Procurement Act.

### 41. PE's Right to Accept any Tender and to Reject any or all Tenders

The PE reserves the right to accept or reject any Tender and to cancel the Tendering process at any time prior to contract award, without thereby incurring any liability, subject to adherence to Regulation 26 and 27. of the Public Procurement Regulations of 2020.

### 42. Confirmation of Award

An award shall be confirmed by acceptance of a Letter of Award by the contractor.

### 43. Signing and Effectiveness of Contract

- 43.1 On expiry of the ten (10) working day period after issuance of the letter of appointment to the best evaluated Contractor, the PE shall promptly sign a contract with the successful Contractor.
- 43.2 Failure by the successful Contractor to promptly sign the contract shall constitute sufficient ground for annulment of the contract award decision and forfeiture of the Tender Security or execution of the Tender Securing Declaration. In that event, the PE may award the Contract to the next best ranked Contractor whose Tender was evaluated at the financial comparison stage.
- 43.3 Effectiveness of the contract shall be subject to submission of a satisfactory performance security where applicable and any other conditions specified in the Contract.
- 43.4 A contract shall not be entered into by the Controlling Officer with a Contractor during the period of administrative review.

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## Part 1: Section 1 Instructions to Tenderers

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### 44. Debriefing of Contractors

44.1 The Contractor shall be provided with information on the reasons for the failure of its Tender after the notice of Intention to Award has been issued. The Procuring Entity shall give the Contractor a written debrief.

### 45. Performance Security

45.1 Within twenty-one (21) calendar days after signing of the contract, the successful Contractor shall where applicable, furnish to the PE a Performance Security and the Environmental, Social, Health and Safety (ESHS) Performance Security if required in the TDS, in the amount stipulated in the SCC and in the form of an on demand Bank Guarantee as stipulated in Section 9, denominated in the type and proportions of the currencies of the Contract. The Performance Security shall be issued by a Bank located in Eswatini or a foreign Bank through correspondence with a Bank located in Eswatini. Notwithstanding the foregoing and unless the acceptance of a performance security by the procuring entity would be in violation of the laws of Eswatini, a procuring entity shall not reject a performance security on the grounds that the performance security was not issued by the issuer in Eswatini, if the performance security and the issuer otherwise conform to the requirements prescribed in the invitation document.

45.2 Failure of the successful Contractor to submit the above-mentioned Performance Security and the Environmental, Social, Health and Safety (ESHS) Performance Security, if required in the TDS, shall constitute sufficient ground for annulment of the contract award decision. In this case, or where the successful Contractor fails to sign the contract as stated in ITT Clause 43.2, the successful Contractor's Tender Security shall be forfeited, or the conditions of the Tender Securing Declaration shall be executed. In that event, the PE may award the contract to the next best ranked Contractor whose Tender was evaluated at the financial comparison stage.

### 46. Procurement Related Complaints and Administrative Review

46.1 The procedures for making a Procurement-related Complaint are as specified in the TDS

### 47. Abnormally Low and Abnormally High Prices

#### 47.1 Abnormally Low Prices

47.1.1 An Abnormally Low Price is one where the financial price, in combination with other constituent elements of the Tender, appears unreasonably low to the extent that the price raises material concerns with the Procuring Entity as to the capability of the Contractor to perform the Contract for the offered price.

47.1.2 In the event of identification of a potentially Abnormally Low Price by the evaluation committee, the Procuring Entity shall seek written clarification from the firm, including a detailed price analysis of its price in relation to the subject matter of the contract, scope, delivery schedule, allocation of risks and responsibilities and any other requirements of the Tendering document.

47.1.3 After evaluation of the price analyses, if the Procuring Entity determines that the firm has failed to demonstrate its capability to perform the contract for the

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## Part 1: Section 1 Instructions to Tenderers

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offered price, the Procuring Entity shall reject the firm's Tender.

### 47.2 Abnormally High Prices

47.2.1 An abnormally high price is one where the proposal price, in combination with other constituent elements of the Tender, appears unreasonably too high to the extent that the Procuring Entity is concerned that it (the Procuring Entity) may not be getting value for money or it may be paying too high a price for the contract compared with market prices or that genuine competition between the Contractors is compromised.

47.2.2 In case of an abnormally high tender price, the Procuring Entity shall make a survey of the market prices, check if the estimated cost of the contract is correct and review the Tendering Document to check if the specifications, scope of work and conditions of contract are contributory to the abnormally high proposals. The Procuring Entity may also seek written clarification from the Contractor on the reason or the high Tender price. The Procuring Entity shall proceed as follows:

- i) If the Tender price is abnormally high based on wrong estimated cost of the contract, the Procuring Entity may accept or not accept the proposal depending on the Procuring Entity's budget considerations.
- ii) If specifications, scope of work and/or conditions of contract are contributory to the abnormally high proposal prices, the Procuring Entity shall reject all Tenders and may re-invite for Tenders for the contract based on revised estimates, specifications, scope of work and conditions of contract.

47.2.3 If the Procuring Entity determines that the Tender Price is abnormally too high because genuine competition between Contractors is compromised (often due to collusion, corruption or other manipulations), the Procuring Entity shall reject all Tenders and shall institute or cause competent Government Agencies to institute an investigation on the cause of the compromise and copy ESPPRA, before re-inviting tenders.

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## Section 2: Tender Data Sheet

Instructions to Contractors Reference	Data relevant to the ITT
ITT 1.1	The Procuring Entity is: <b>Eswatini Investment Promotion Authority</b>
ITT 1.1	The works consist of: <b>Refurbishment of Nhlngano Wastewater Treatment Plant</b>
ITT 1.1	The Procurement Reference Number of the Contract is: <b>Tender No.1 of 2026/2027</b>
ITT 1.1	The number and identification of lots comprising this Tendering Document is: 1  The minimum and maximum number of lots a Contractor may Tender for is: 1
ITT 9.3	The PE shall be holding a pre-Tender meeting or site visit.  Site visit is to be held; it shall take place at:  Location: Nhlngano Zheng Yong- Water treatment plant  Date: 17 April 2026  Time: 10:00am
ITT 9.5	Site visit shall be a mandatory requirement.
ITT 12	For clarification purposes only, the Procuring Entity's address is:  Attention: Lungile Simelane  Physical Address: EIPA Offices  Telephone: 2404 0470  Electronic mail address: <a href="mailto:procurement@sipa.org.sz">procurement@sipa.org.sz</a> and copy <a href="mailto:sihle@rszengineers.co.za">sihle@rszengineers.co.za</a>
ITT 12	The Procuring Entity will respond to any request for clarification provided that such request is received no later than <b>10 May 2026</b> .
ITT 14.2	The language of the Tender shall be <b>English</b>
ITT 15.1(i)	The Contractor shall submit with its Tender the following additional documents:  <b>ESHS Code of Conduct for Contractor's Personnel</b>  The Contractor shall submit its Code of Conduct that will apply to the Contractor's Personnel to ensure compliance with its Environmental, Social, Health and Safety (ESHS) obligations under the contract. <i>[Note:</i>

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## Part 1: Section 2 Tender Data Sheet

Instructions to Contractors Reference	Data relevant to the ITT
	<p><i>Complete and include the risks to be addressed by the Code in accordance with Section VI- Statement of Requirements, e.g. risks associated with: labour influx, spread of communicable diseases, sexual harassment, gender based violence, sexual exploitation and abuse, illicit behaviour and crime, and maintaining a safe environment etc.]</i></p> <p>In addition, the Contractor shall detail how this Code of Conduct will be implemented. This will include: how it will be introduced into conditions of employment/engagement, what training will be provided, how it will be monitored and how the Contractor proposes to deal with any breaches.</p> <p>The Contractor shall be required to implement the agreed Code of Conduct.</p> <p><b>Environment and Social Management Plan (ESMP)</b></p> <p>The Contractor shall be required to submit for approval, and subsequently implement, the Contractor's Environment and Social Management Plan that includes the Strategies and Implementation Plans described below:</p> <p><i>[Note: insert name of applicable plans and strategies and specific risk/s];</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> <i>[e.g. Traffic Management Plan to ensure safety of local communities from construction traffic];</i></li> <li><input type="checkbox"/> <i>[e.g. Water Resource Protection Plan to prevent contamination of drinking water];</i></li> <li><input type="checkbox"/> <i>[e.g. Boundary Marking and Protection Strategy for mobilization and construction to prevent offsite adverse impacts];</i></li> <li><input type="checkbox"/> <i>[e.g. Strategy for obtaining Consents/Permits prior to the start of relevant works such as opening a quarry or borrow pit];</i></li> <li><input type="checkbox"/> <i>[e.g. Gender based violence and sexual exploitation and abuse (GBV/SEA) prevention and response action plan].</i></li> <li><input type="checkbox"/> <i>[e.g strategy for marking and respecting work site boundaries etc.]</i></li> </ul> <p><i>[Note: The extent and scope of these requirements should reflect the significant ESHS risks or requirements set out in Section VI as advised by Environmental/Social specialists.</i></p> <p><i>The key risks to be addressed by the Contractor should be identified by Environmental/Social specialists, for example from the Environmental and Social Impact Assessment (ESIA). The risks may arise during mobilization or construction phases, and may include construction traffic impacts on the community, pollution of drinking water, depositing on private land and impacts on rare species etc.</i></p>
ITT 18.2	The Authority for specifying rates of exchange shall be the Central Bank of Eswatini.
ITT 18.3	Foreign currency requirements <i>shall not</i> be payable in different foreign currencies

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## Part 1: Section 2 Tender Data Sheet

Instructions to Contractors Reference	Data relevant to the ITT
ITT 19.1	Tenders must be valid until 20 September 2026
ITT 20.1	A Tender Security <i>shall</i> be required
ITT 20.2	Where a Tender Security is required, the amount and currency of Tender Security shall be <b>E5000.00</b> Eswatini Lilangeni.
ITT 20.3	The Tender Security or Tender Securing Declaration shall be valid until <b>20 September 2026.</b>
ITT 22.1	In addition to the original of the Tender, the number of copies required is: <b>Two</b>
ITT 23.1	For Tender submission purposes only, the Procuring Entity's address is: Attention: CEO Physical Address: 1 <sup>st</sup> Floor, Sibeketelo Building, Mhlambanyatsi Road, Mbabane
ITT 24.1	The deadline for Tender submission is: Date: 19 May 2026 Time (SAST): <b>1300hrs</b>
ITT 27.1	The Tender opening shall take place at: Physical Address: EIPA Offices Date: <b>19 May 2026</b> Time (SAST): 1315hrs
ITT 38.1	A margin of preference <i>shall not</i> apply.
ITT 38.2	(a) The margin of preference for contractors in Group A shall be: <i>N/A</i> (b) The margin of preference for contractor in Group B shall be: <i>N/A</i>
ITT 46.1	The procedures for making a Procurement-related Complaint are detailed in the ESPPRA website <a href="https://esppra.co.sz">https://esppra.co.sz</a> If a Contractor wishes to make a procurement-related complaint, the Contractor shall submit its complaint following these procedures, in writing (by the quickest means available, that is by email), to: <b>Title/position: Procurement Officer</b> <b>Procuring Entity: EIPA</b>

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## Part 1: Section 2 Tender Data Sheet

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Instructions to Contractors Reference	Data relevant to the ITT
	<p><b>Email address:</b> <i>info@sipa.org.sz</i></p> <p>In summary, a procurement-related complaint may challenge any of the following:</p> <ol style="list-style-type: none"><li>1. the terms of the Tendering Documents; and</li><li>2. the Procuring Entity's decision to award the contract.</li></ol>

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**Procurement Reference Number:** Tender No 1 of 2026/2027

**A. Evaluation Methodology**

**1. Methodology Used**

The evaluation methodology to be used for the evaluation of Tenders received shall be the Technical Compliance Selection (TCS) methodology.

**2. Summary of Methodology**

2.1 The evaluation shall be conducted in four sequential stages –

- (a) A Preliminary Examination to determine the eligibility of Contractors and the administrative compliance of Tenders received;
- (b) A Technical Evaluation to determine the technical responsiveness of the eligible and compliant Tenders;
- (c) A Financial Comparison to compare costs of the eligible, compliant, responsive Tenders received and determine the best evaluated Tender; and
- (d) Post qualification to confirm whether the best evaluated contractor has the capacity and resources to effectively execute the works.

2.2 Failure of a Tender at any stage of the evaluation shall prevent further consideration at the next stage of evaluation. Substantial responsiveness shall be considered a pass at the Technical Evaluation stage.

**B. Preliminary Examination Criteria**

**3. Eligibility Criteria**

3.1 The eligibility requirements shall be determined in accordance with ITT Clause 4; and

3.2 The documentation required to provide evidence of eligibility shall be:-

	<b>Eligibility Requirement</b>	<b>Documentary Evidence to be Provided by the Contractor</b>
(a)	The Contractor has legal capacity to enter into contract	<ul style="list-style-type: none"> <li>(i) Certificate of Incorporation or Registration</li> <li>(ii) Certified Trading License for the current year</li> <li>(iii) CIC Registration with C3</li> <li>(iv) Valid VAT Registration Certificate</li> <li>(v) Form J and Form C Certified by the Registrar of companies</li> <li>(vi) Proof of work compensation</li> <li>(vii) IDs for Company directors</li> </ul>
(b)	The Contractor is not insolvent, in receivership, bankrupt or being wound up, its affairs are not	A written declaration signed by the authorised representative of the Contractor

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## Part 1: Section 4 Tendering Forms

	being administered by a court or a judicial officer, its business activities have not been suspended, and it is not the subject of legal proceedings for any of the foregoing	Or  Any other evidence
(c)	The Contractor has fulfilled its obligations to pay taxes	Tax Compliance Certificate issued by Tax Regulator
(d)	The Contractor has fulfilled its obligations to social security contributions	Certified Eswatini National Provident Fund Compliance Certificate <i>[for Swati firms only]</i> Social Security Compliance Certificate or equivalent <i>[for foreign firms]</i>
(e)	The Contractor adheres to basic labour legislation	Certified Labour Compliance Certificate <i>[for Swati firms]</i>
(f)	The Contractor does not have a conflict of interest in relation to the procurement requirement	A written declaration signed by the authorised representative of the Contractor
(g)	The Contractor, or any of its directors or officers, have not been convicted of any criminal offence relating to professional conduct or the making of false statements or misrepresentations as to its qualifications to enter into a procurement contract within a period of five years preceding the commencement of procurement proceedings	A written declaration signed by the authorised representative of the Contractor  A Certificate or Letter of Good Conduct Issued by a Competent Authority in the Contractor's Country <i>[for foreign firms]</i>  Police clearance or Affidavit for company directors  <i>[the document(s) above should relate to the professional and criminal conduct of the contractor]</i>
(f)	The Contractor is not subject to suspension in accordance with section 55 [of the Public Procurement Act, 2011] <sup>1</sup> , and none of its directors or officers have been involved in a Contractor or supplier currently subject to suspension	A written declaration signed by the authorised representative of the Contractor

### 3.3 For Joint Venture or Consortiums or Associations;

- a) A registered Power of Attorney from each member or partner if drawn and signed in Eswatini; or a notarised Power of Attorney if drawn and signed outside

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## Part 1: Section 4 Tendering Forms

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Eswatini, nominating a representative to conduct all business on its behalf during the Tender preparation, Tendering process and contract execution in case of award of the contract.

- b) The documentation in Section 3.2 for each member or partner and a copy of the Joint Venture / Consortium / Association Agreement which is legally binding on all partners or members stating that:
- (i) The partners or members shall jointly submit a Tender;
  - (ii) One of the parties will be nominated as lead member or partner to act for and on behalf of all members or partners;
  - (iii) The authorized representative of the lead member or partner who was granted power of attorney shall sign the Tender;
  - (iv) In the event that the Tender is successful, the contract shall be executed in the name of the Joint Venture (JV), Consortium or Association and each member or partner shall sign the contract agreement; and
  - (v) All partners shall be jointly and severally liable for the implementation of the contract in accordance with the contract terms.

### 4. Administrative Compliance Criteria

The evaluation of Administrative Compliance criteria shall be conducted in accordance with ITT Clause 34.3.

### C. Technical Evaluation Criteria

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### EXPERIENCE OF THE TENDERER (15 POINTS)

The experience of the tenderer as a company (as opposed to key staff members) in the construction or maintenance or rehabilitation of water treatment works and associated infrastructure as a main contractor for municipalities and other organs of state over the last 10 years.

The information shall be within the previous 10 years and can include contracts that are not complete prior to closing date for submissions.

Note: Signed completion letters with contactable references on the client's letterhead should be included for each project for ease of reference. Only projects with completion letters will be evaluated.

The scoring of the tenderer's experience will be as follows:

1. Construction, refurbishment and or upgrade of Wastewater Treatment Works Completed (completion certificate must be attached) 5 points

- a) 1 project = 1 points
- b) 2 projects = 2 points
- c) 3 projects = 3 points
- d) 4 projects = 4 points
- e) 5 or more projects = 5 points

2. Highest value of project completed (completion certificate and appointment letter for the highest wastewater treatment project completed must be attached). 10 points

- a)  $\geq$  R1 M but  $<$  R3 M = 2 points
- b)  $\geq$  R 3 M but  $<$  R5 M = 4 points
- c)  $\geq$  R 5 M but  $<$  R10 M = 6 Points
- d)  $\geq$  R 10 M but  $<$  R20 M = 8 Points
- e)  $\geq$  R 20 M = 10 points

Total 15 points

### EXPERIENCE OF KEY PERSONNEL (50 POINTS)

The scoring of the experience of key person (contracts manager) staff will be as follows:

1. Contracts Manager – 15 points

1.1. Number of years of relevant (in construction, refurbishment and or upgrade of Wastewater Treatment Works) experience post qualification. 10 points

- a)  $<$  5 years = 0 points
- b)  $\geq$  5 years but  $<$  7 years = 5 points
- c)  $\geq$  7 years but  $<$  10 years = 8 points
- d)  $\geq$  10 years = 10 points

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### 1.2 Qualifications for Contracts Manager 5 points

- a) Degree or B Tech = 3 points
- b) Honours Degree = 5 points

### 2. Site Agent – 10 points.

#### 2.1. Number of years of relevant (in construction, refurbishment and or upgrade of Wastewater Treatment Works) experience post qualification. 5 points

- a) < 5 years = 0 points
- b)  $\geq 5$  years but < 7 years = 2 points
- c)  $\geq 7$  years but < 10 years = 3 points
- d)  $\geq 10$  years = 5 points

#### 2.2 Qualifications for Site Agent (points will only be awarded if CV has relevant experience in 2.1 above)

5 points

- a) Diploma in Civil Engineering = 3 points
- b) Degree or B Tech in Civil Engineering = 5 points

### 3. Foreman / Supervisor (1x Civil, 1x Electrical, 1x Mechanical) – 15 points.

#### 3.1. Number of years of relevant (in Construction, refurbishment and or upgrade of Wastewater Treatment Works - Civil engineering) experience post qualification. 3 points

- a) < 5 years = 0 points
- b)  $\geq 5$  years but < 7 years = 1 points
- c)  $\geq 7$  years but < 10 years = 2 points
- d)  $\geq 10$  years = 3 points

#### 3.2 Qualifications for Foreman (points will only be awarded if CV has relevant experience in 3.1 above)

2 points

- a) N6 certificate in civil engineering = 1 points
- b) Diploma in Civil Engineering = 2 points

#### 3.3. Number of years of relevant (in Construction, refurbishment and or upgrade of Wastewater Treatment Works – Electrical Engineering with wireman's licence) experience post qualification.

3 points

- a) < 5 years = 0 points
- b)  $\geq 5$  years but < 7 years = 1 points
- c)  $\geq 7$  years but < 10 years = 2 points
- d)  $\geq 10$  years = 3 points

#### 3.4 Qualifications for Foreman (points will only be awarded if CV has relevant experience in 3.3 above)

2 points

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- a) N6 certificate in Electrical engineering = 1 points
- b) Diploma in Electrical Engineering = 2 points

3.5. Number of years of relevant (in Construction, refurbishment and or upgrade of Wastewater Treatment Works – Mechanical Engineering) experience post qualification. 3 points

- a) < 5 years = 0 points
- b) ≥ 5 years but < 7 years = 1 points
- c) ≥ 7 years but < 10 years = 2 points
- d) ≥ 10 years = 3 points

3.6 Qualifications for Foreman (points will only be awarded if CV has relevant experience in 3.5 above)  
2 points

- a) N6 certificate in Mechanical engineering = 1 points
- b) Diploma in Mechanical Engineering = 2 points

4. Health and Safety Officer - 10 points.

4.1. Number of years of relevant (as a health and safety officer in construction municipal infrastructure projects)  
5 points

- a) < 5 years = 0 points
- b) ≥ 5 years but < 7 years = 2 points
- c) ≥ 7 years but < 10 years = 3 points
- d) ≥ 10 years = 5 points

4.2 Qualifications for Health and Safety Officer  
5 points

- a) SAMTRAC or equivalent = 3 points
- b) Diploma in Health and Safety = 4 points
- c) B Tech Degree in Health and Safety = 5 points

### PLANT AND EQUIPMENT (10 POINTS)

Resources available to organisation including plants and equipment but not limited to:

Excavator = 4 Points, (invoices accepted as proof of ownership),

Tipper Truck = 2 Points,

Hand-held Roller Compactor = 2 Points, (invoices accepted as proof of ownership),

TLB = 2 Points

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### APPROACH AND METHODOLOGY (25 POINTS)

Evaluating Point	Assessment Criteria	Maximum allocated point(s)
<b>Approach Paper</b>		<b>25 points</b>
Sub-contracting methodology	Outline approach to be used for subcontracting local enterprises (3) and employment of local people (3).	6 points
Project implementation Risks and Risk Management	Adequacy of understanding of project risks (2) and appropriateness of proposed mitigation measures (2)	4 points
Quality Control and Quality Assurance mechanism to be adopted	Appropriateness and adequacy of tools (3) and processes (2) to ensure quality control and assurance in all phases of the project as part of the quality plan.	5 points
Construction method statement including OH&S and Environmental issues	Detailed explanation of step by step construction stages indicating the sequencing and how the works are carried out (6). These should include methods used to ensure correct occupational health and safety environment acceptable practices (4).	10 Points

**NB: THE MINIMUM SCORE TO OBTAIN IN ORDER TO QUALIFY TO BE EVALUATED IN THE NEXT STAGE IS 75%.**

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## Part 1: Section 4 Tendering Forms

### D. Financial Comparison Criteria

#### 7. Costs to be included in the Tender Price

- 7.1 The financial comparison shall be conducted in accordance with ITT Clause 37. The following costs shall be included in the Tender price:
- (a) the total price given in the Activity Schedule/Bills of Quantities;
  - (b) day works, if any.
- 7.2 The following costs shall be excluded from the Tender price:
- (a) provisional sums;
  - (b) the provision for contingencies in the Activity Schedule/ Bills of Quantities.
- 7.3 The PE will evaluate and compare only the Tenders determined to be substantively responsive (75% and above) through a process of inviting only the bidders qualified for the next evaluation stage.
- 7.4 The formula for determining the financial scores is the following:  $S_f = 100 \times \frac{F_m}{F}$ , in which  $S_f$  is the financial score,  $F_m$  is the lowest price and  $F$  the price of the proposal under consideration.

#### 8. Margin of Preference

- 8.1 If the TDS specifies a margin of preference is applicable, for the purpose of Tender comparison, the following procedures will apply:
- 8.2 The PE will first review the Tenders that have reached financial comparison to confirm the appropriateness of the classification, and to identify the Tender group classification of each based upon Contractors' declarations in the Tender Submission Sheet and supporting evidence on ownership/shareholding of the Contractors in accordance with ITT 38.2.
- 8.3 All evaluated Tenders in each group will then be compared to determine the lowest evaluated Tender of each group. The Tender prices for Contractors in Group A and Group B will be increased by the respective percentages of preference as specified in the Tender Data Sheet. *[For Example: (Tender Price of Contractor Z) - (Tender Price of Contractor Z x percentage specified in the Tender Data Sheet ITT 35.2)].* After application of the preferences, all the Tenders shall be compared, with the lowest-evaluated Tender determined from this comparison selected for the award.

#### 9. Determination of Best Evaluated Tender or Tenders

The weights given to the Technical (T) and Financial Proposals (P) are:  $T = 0.7$  and  $P = 0.3$

Final Evaluated score = (Technical score (T) x 0.7) + (Financial Score (P) x 0.3)

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[This Tender Submission Sheet should be on the letterhead of the Contractor and should be signed by a person with the proper authority to sign documents that are binding on the Contractor]

### Tender Submission Sheet

Date: *[insert date (as day, month and year) of Tender Submission]*

Procurement Reference No: *[insert Procurement Reference number]*

To: *[insert complete name of Procuring Entity]*

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Tendering Document, including Addenda No.: *[insert the number and issue date of each Addenda]*;
- (b) We offer to execute in conformity with the Tendering Document and in accordance with the completion schedule specified in the Statement of Requirements and the terms and conditions of the Tendering Document, the following works *[insert a brief description of the Works]*;
- (c) The total price of our Tender, excluding any discounts offered in item (d) below, is \_\_\_\_\_
- (d) The discounts offered and the methodologies for their application are:  
Unconditional discounts. If our Tender is accepted, the following discounts shall apply. *[Specify in detail each discount offered (eg amount/percentage) and the specific item of the Statement of Requirements to which it applies.]*  
Methodology of application of the unconditional discounts. The unconditional discounts shall be applied using the following method: *[Specify precisely the method that shall be used to apply the discounts]*;  
Cross discounts. If our Tenders for more than one lot are accepted, the following discounts shall apply. *[Specify precisely each discount offered (eg amount/percentage) and the conditions for its application.]*  
Methodology of application of the cross discounts. The cross discounts shall be applied using the following method: *[Specify in detail the method that shall be used to apply the discounts]*;
- (e) Our Tender shall be valid until the date specified in ITT Sub-Clause 19.1 and it shall remain binding upon us and may be accepted at any time before that date;
- (f) If our Tender is accepted, we commit to obtain a Performance Security in accordance with the Tendering Document in the amount of *[insert amount in words and figures of the Performance Security]* for the due performance of the Contract;
- (g) We, including any subcontractors for any part of the contract resulting from this procurement process, are eligible to participate in public procurement in accordance with ITT Clause 4.1;
- (h) We, including any subcontractors for any part of the contract, have nationals from eligible countries *[insert the nationality of the Contractor, including that of all parties that comprise the Contractor, if the Contractor is a joint venture, consortium or association, and the nationality of each subcontractor]*;
- (i) We are eligible for a Margin of Preference in accordance with ITT Clause 38;

*[or]*

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We are not eligible for a Margin of Preference in accordance with ITT Clause 38;

- (j) We have signed and undertake to abide by the Code of Ethical Conduct for Contractors and Providers during the procurement process and the execution of any resulting contract;
- (k) We accept the appointment of *[name proposed in GCC 35.1]* as the Adjudicator.

*[or]*

We do not accept the appointment of *[name proposed in GCC 35.1]* as the Adjudicator, and propose instead that *[name]* be appointed as Adjudicator, whose daily fees and biographical data are attached.

- (l) We are not participating, as Contractors, in more than one Tender in this Tendering process, other than alternative Tenders in accordance with the Tendering Document;
- (m) We, including any subcontractors, do not have any conflict of interest as stated in ITT 4.4 and are not associated, nor have been associated in the past, directly or indirectly, with the consultant or any other entity that has prepared the design, specifications, and other documents for the Project or that is being proposed as Project Manager for the Contract;
- (n) We, including any subcontractors for any part of the contract, have not been suspended by the Eswatini Public Procurement Regulatory Agency from participating in public procurement;
- (o) We understand that you are not bound to accept the lowest Tender or any other Tender that you may receive.
- (p) **We understand that the tender submission is two envelope system where technical and price offer are separated and failure to adhere to the submission requirements will lead to disqualification.**

Signed: *[signature of person whose name is shown below]*

Name: *[insert complete name of person signing the Tender]*

In the capacity of *[insert designation of person signing the Tender]*

Duly authorised to sign the Tender for and on behalf of: *[insert complete name of Contractor/Joint Venture]*

Dated on \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ *[insert date of signing]*

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## Part 1: Section 4 Tendering Forms

### Code of Ethical Conduct in Business for Contractors

#### 1. Ethical Principles

Contractors and providers shall at all times-

- (a) Maintain integrity and independence in their professional judgement and conduct;
- (b) Comply with both the letter and the spirit of-
  - (i) The laws of Eswatini; and
  - (ii) Any executed contract.
- (c) Avoid associations with businesses and organisations which are in conflict with this code.

#### 2. Standards

Contractors and providers shall-

- (a) Strive to provide works, services and goods of high quality and accept full responsibility for all works, services or goods provided;
- (b) Comply with the professional standards of their industry or of any professional body of which they are members.

#### 3. Conflict of Interest

Contractors and providers shall not accept contracts which would constitute a conflict of interest with any prior or current contract with any Procuring Entity. Contractors and providers shall disclose to all concerned parties those conflicts of interest that cannot reasonably be avoided or escaped.

#### 4. Confidentiality and Accuracy of Information

- (a) Information given by Contractors and service providers in the course of procurement processes, or the performance of contracts shall be true, fair and not designed to mislead.
- (b) Service providers shall respect the confidentiality of information received in the course of performance of a contract and shall not use such information for personal gain.

#### 5. Gifts and Hospitality

Contractors and providers shall not offer gifts or hospitality directly or indirectly, to staff of a Procuring Entity that might be viewed by others as having an influence on a procurement decision of the Entity.

#### 6. Inducements

- (a) Contractors and service providers shall not offer or give anything of value to influence the action of a public official in the procurement process or in contract execution.
- (b) Contractors and service providers shall not ask a public official to do anything which is inconsistent with the Act, Regulations, Guidelines or the Code of Ethical Conduct in Business.

#### 7. Fraudulent Practices

Contractors and service providers shall not-

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- (a) Collude with other businesses and organisations with the intention of depriving a Procuring Entity of the benefits of free and competitive competition;
- (b) Enter into business arrangements that might prevent the effective operation of fair competition;
- (c) Engage in deceptive financial practices, such as bribery, double billing or other improper financial practices;
- (d) Misrepresent facts in order to influence a procurement process or the execution of a contract to the detriment of the Procuring Entity; or utter false documents;
- (e) Unlawfully obtain information relating to a procurement process in order to influence the process or execution of a contract to the detriment of the PE;
- (f) Withholding information from the PE during contract execution to the detriment of the PE.

I ..... agree to comply with the above code of ethical conduct in business.

---

**AUTHORISED SIGNATORY**

**NAME OF CONTRACTOR<sup>2</sup>**

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*[This Tender Security should be on the letterhead of the issuing Financial Institution and should be signed by a person with the proper authority to sign the Tender Security. It should be included by the Contractor in its Tender, if so indicated in the TDS]*

### Form of Tender Security (Bank Guarantee)

Date: *[insert date (as day, month and year) of Tender Submission]*

Procurement Reference No.: *[insert Procurement Reference number]*

To: *[insert complete name of Procuring Entity]*

Whereas, *[insert complete name of Contractor/Joint Venture/Consortium/Association]* (hereinafter called “the Contractor”) has submitted its Tender dated *[insert date (as day, month and year) of Tender submission]* for Procurement Reference number *[insert Procurement Reference number]* for the construction of *[insert brief description of the Works]*.

KNOW ALL PEOPLE by these presents that We *[insert complete name of institution issuing the Tender Security]* of *[insert city of domicile and country of nationality]* having our registered office at *[insert full address of the issuing institution]* (hereinafter called “the Guarantor”) are bound unto *[insert complete name of Procuring Entity]* (hereinafter called “the Procuring Entity”) in the sum of *[specify in words and figures the amount and currency of the Tender Security]* for which the Guarantor binds itself, its successors or assignees to make payment to the Procuring Entity.

Sealed with the Common Seal of the said Guarantor this *[insert day in numbers]* day of *[insert month]*, *[insert year]*.

THE CONDITIONS of this obligation are:

- (1) If the Contractor withdraws its Tender during the period of Tender validity specified in the Tender submission sheet or as provided in ITT Sub-Clause 19.3 or refuses to accept the correction of its Tender price pursuant to ITT Clause 32.5; or
- (2) If the Contractor having been notified of the acceptance of its Tender by the Procuring Entity during the period of Tender validity fails or refuses to:
  - (a) Sign the Contract in accordance with the ITT Clause 43.2, if required; or
  - (b) Furnish the Performance Security, in accordance with the ITT Clause 45.2 and, if required, the Environmental, Social, Health and Safety (ESHS) Performance Security, in accordance with the Instructions to Contractors (“ITT”).

We undertake to pay to the Procuring Entity up to the above amount upon receipt of its first written demand, without the Procuring Entity’s having to substantiate its demand, provided that in its demand the Procuring Entity states that the amount claimed by it is due to it, owing to the occurrence of one or more of the above conditions, specifying the occurred conditions.

This security shall remain in force up to and including \_\_\_\_\_ *[insert date, (day, month and year) in accordance with ITT Clause 19.1 or 19.3]* and any demand in respect thereof should be received by the Guarantor no later than the above date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758, except that sub – article 20 (a) is hereby excluded.

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## Part 1: Section 4 Tendering Forms

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Signed: *[insert signature of person whose name is shown below]*

Name: *[insert complete name of person signing the Tender Security]*

In the capacity of *[insert designation of person signing the Tender Security]*

Duly authorised to sign the Tender Security for and on behalf of: *[insert complete name of Financial Institution]*

Dated on \_\_\_\_\_ day of \_\_\_\_\_ (month), \_\_\_\_\_ (year) *[insert date of signing]*

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## Part 1: Section 4 Tendering Forms

[Use Contractor's Letterhead]

[Name of Contractor]

[Physical Address of Contractor]

### Form of Tender-Securing Declaration

Date: *[insert date (as day, month and year)]*

Subject of procurement and Ref number.: *[insert reference number of procurement process]*

To: *[insert complete name of Procuring Entity]*

I/We\*, the undersigned, declare as follows:

I/We\* understand that, according to the conditions of the Tendering Document, Tenders must be supported by a Tender Securing Declaration valid until the date indicated in the Tender Data Sheet (TDS).

I/We\* accept that I/we\* may be suspended by the Agency from being eligible for Tendering in any public procurement or disposal process if we are in breach of our obligations under the conditions in the Tendering document, because we:

- (a) Have withdrawn our Tender during the period of Tender validity specified by us in the Tender Submission Sheet or as provided in ITT Sub-Clause 19.3 or have refused to accept the correction of our Tender price pursuant to ITT Clause 32.5; or
- (b) Having been notified of the acceptance of our Tender by the PE during the period of Tender validity, (i) fail or refuse to sign the Contract, if required, or (ii) fail or refuse to furnish the Performance Security, in accordance with ITT 45.2 or and, if required, the Environmental and Social (ES) performance securing declaration.

I/We\* understand this Tender Securing Declaration shall cease to be valid if I am/we are\* not the successful Contractor, upon the earlier of:

- (i) The expiry of the notice of best evaluated Contractor without any pending administrative review application; or
- (ii) Twenty-eight (28) days after the expiration of the validity of my/our\* Tender.

Signed: *[insert signature of person whose name is shown below]* In the capacity of *[insert designation of person signing the Tender Securing Declaration]*

Name: *[insert complete name of person signing the Tender Securing Declaration]*

Duly authorized to sign the Tender for and on behalf of: *[insert complete name of Contractor]*

Dated on \_\_\_\_\_ day of \_\_\_\_\_ (month), \_\_\_\_\_ (year) *[insert date of signing]*  
Corporate Seal (where appropriate)

*[Note: In case of a Joint Venture, Consortium or Association the Tender Securing Declaration must be in the name of all partners that submit the Tender and signed by the representative duly authorized by the partners.]*

***\*Please delete as appropriate***

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## Part 1: Section 4 Tendering Forms

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.....  
Signature of person authorized to sign Tender.

.....  
Date

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## Part 1: Section 4 Tendering Forms

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### Technical Documentation

1. Site Organization
2. Approach and Methodology
3. Mobilization Schedule
4. Construction Programme and Projected Cashflow
5. Environmental and Social Management Plan
6. Code of Conduct for Contractor's Personnel
7. *[Insert any other relevant documentation]*

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### Site Organization

*Provide a detailed description/illustration of the proposed site organization in terms of personnel, offices, materials storage, workshops etc.*

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## Part 1: Section 4 Tendering Forms

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### Approach and Methodology

*Provide a detailed description of the proposed approach and methodology to execute the works*

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### Mobilization Schedule

*Provide a detailed description/illustration of the proposed mobilization schedule for materials, equipment, labour etc. including sources.*

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## Part 1: Section 4 Tendering Forms

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### Construction Programme and Cashflow

*Provide a detailed description/illustration of the proposed construction programme and projected cashflow.*

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## Part 1: Section 4 Tendering Forms

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### Environmental and Social Management Plan

- a) *The Contractor shall submit comprehensive and concise Environment Social Health and Safety Management Plan as required by ITT 15.1 (i) of the Tender Data Sheet. This plan shall describe in detail the actions and management processes etc. that will be implemented by the Contractor, and its subcontractors.*
- b) *In developing these strategies and plans, the Contractor shall have regard to the ESHS provisions of the contract including those as may be more fully described in the Statement of Requirements in Section 6.*

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## Part 1: Section 4 Tendering Forms

### Code of Conduct for Contractor's Personnel Form

#### Note to the Contractor:

The minimum content of the Code of Conduct Form as set out by the Employer shall not be substantially modified. However, the Contractor may add requirements as appropriate, including to take into account Contract-specific issues/risks.

The Contractor shall initial and submit the Code of Conduct Form as part of its bid.

### CODE OF CONDUCT FOR CONTRACTOR'S PERSONNEL

We....., [enter name of Contractor], undertake that once we are awarded the contract for .....[enter description of the works] to be carried out at [enter the site and other locations where the works will be carried out] shall implement measures to address environmental and social risks related to the works, including the risks of sexual exploitation and assault and gender-based violence.

This Code of Conduct is part of our measures to deal with environmental and social risks related to the works. It applies to all our staff, labourers and other employees at the Works Site or other places where the works would be carried out. It also applies to the personnel of each subcontractor and any other personnel assisting us in the execution of the Works. All such persons are referred to as “Contractor's Personnel” and are subject to this Code of Conduct.

This Code of Conduct identifies the behaviour that we require from all Contractor's Personnel.

Our workplace is an environment where unsafe, offensive, abusive or violent behaviour will not be tolerated and where all persons should feel comfortable raising issues or concerns without fear of retaliation.

#### REQUIRED CONDUCT

Contractor's Personnel shall:

1. Carry out his/her duties competently and diligently;
2. Comply with this Code of Conduct and all applicable laws, regulations and other requirements, including requirements to protect the health, safety and well-being of other Contractor's Personnel and any other person;
3. Maintain a safe working environment including by:
  - a. Ensuring that workplaces, machinery, equipment and processes under each person's control are safe and without risk to health;
  - b. Wearing required personal protective equipment;
  - c. Using appropriate measures relating to chemical, physical and biological substances and agents; and
  - d. Following applicable emergency operating procedures.
4. Report work situations that he/she believes are not safe or healthy and remove himself/herself from a work situation which he/she reasonably believes presents an

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## Part 1: Section 4 Tendering Forms

5. Treat other people with respect, and not discriminate against specific groups such as women, people with disabilities, migrant workers or children;
6. Not engage in any form of sexual harassment including unwelcome sexual advances, requests for sexual favours, and other unwanted verbal or physical conduct of a sexual nature with other Contractor's or Employer's Personnel;
7. Not engage in Sexual Exploitation, which means any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another.
8. Not engage in Sexual Assault, which means sexual activity with another person who does not consent. It is a violation of bodily integrity and sexual autonomy and is broader than narrower conceptions of "rape", especially because (a) it may be committed by other means than force or violence, and (b) it does not necessarily entail penetration.
9. Not engage in any form of sexual activity with individuals under the age of 18, except in case of pre-existing marriage;
10. Complete relevant training courses that will be provided related to the environmental and social aspects of the contract, including on health and safety matters, and Sexual Exploitation and Assault (SEA);
11. Report violations of this Code of Conduct; and
12. Not retaliate against any person who reports violations of this Code of Conduct, whether to us or the Employer, or who makes use of the [Project Grievance [Redress] Mechanism].

### RAISING CONCERNS

If any person observes behaviour that he/she believes may represent a violation of this Code of Conduct, or that otherwise concerns him/her, he/she should raise the issue promptly. This can be done in either of the following ways:

1. Contact [*enter name of the Contractor's Social Expert with relevant experience in handling gender-based violence, or if such person is not required under the Contract, another individual designated by the Contractor to handle these matters*] in writing at this address .....[ ] or by telephone at [ ..... ] or in person at [..... ]; or
2. Call [..... ] to reach the Contractor's hotline (*if any*) and leave a message.

The person's identity will be kept confidential, unless reporting of allegations is mandated by the law. Anonymous complaints or allegations may also be submitted and will be given all due and appropriate consideration. We take seriously all reports of possible misconduct and will investigate and take appropriate action. We will provide warm referrals to service providers that may help support the person who experienced the alleged incident, as appropriate.

There will be no retaliation against any person who raises a concern in good faith about any behaviour prohibited by this Code of Conduct. Such retaliation would be a violation of this Code of Conduct.

### CONSEQUENCES OF VIOLATING THE CODE OF CONDUCT

Any violation of this Code of Conduct by Contractor's Personnel may result in serious consequences, up to and including termination and possible referral to legal authorities.

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## Part 1: Section 4 Tendering Forms

### FOR CONTRACTOR'S PERSONNEL:

I have received a copy of this Code of Conduct written in a language that I comprehend. I understand that if I have any questions about this Code of Conduct, I can contact ..... [enter name of Contractor's contact person with relevant experience in handling gender-based violence] requesting an explanation.

Name of Contractor's Personnel: [insert name]

Signature: \_\_\_\_\_

Date: (day month year): \_\_\_\_\_

Countersignature of authorized representative of the Contractor:

Signature: \_\_\_\_\_

Date: (day month year): \_\_\_\_\_

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## Part 1: Section 4 Tendering Forms

### Forms for Key Personnel

#### Form – 1: Proposed Personnel

Contractors should provide the names of suitably qualified personnel to meet the specified requirements for each of the positions listed in Section 3: Evaluation Methodology and Criteria. The data on their experience should be supplied using the Form below for each candidate.

1.	Title of position: Contracts Manager
	Name:
	Duration of commitment for this position
2.	Title of position: Site Agent
	Name:
	Duration of commitment for this position
3.	Title of position: Foreman/Supervisor (Civil)
	Name:
	Duration of commitment for this position
4.	Title of position: Foreman/Supervisor (Electrical)
	Name:
	Duration of commitment for this position
3.	Title of position: Foreman/Supervisor (Mechanical)
	Name:
	Duration of commitment for this position
3.	Title of position: Health and Safety Officer
	Name:
	Duration of commitment for this position

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## Part 1: Section 4 Tendering Forms

### Form – 2: CVs of Proposed Personnel

The Contractor shall provide all the information requested below.

#### 1. Contracts Manager

<b>Position: Contracts Manager</b>	
<b>Personnel Information</b>	Name <span style="float: right;">Date of birth</span>
	Professional qualifications
	Academic qualifications
<b>Present Employment</b>	Name of Employer
	Address of Employer
	Telephone <span style="float: right;">Contact (manager / personnel officer)</span>
	Fax <span style="float: right;">E-mail</span>
	Job title <span style="float: right;">Years with present Employer</span>

Summarize professional experience in reverse chronological order. Indicate particular contracts and managerial experience relevant to the project.

From	To	Project	Role	Duration in Involvement	Relevance Experience
<i>[Date, Month and Year]</i>	<i>[Date, Month and Year]</i>	<i>[main project details]</i>	<i>[role and responsibilities on the project]</i>	<i>[time in role i.e. Months and Years]</i>	<i>[describe the experience relevant to this position]</i>

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## Part 1: Section 4 Tendering Forms

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### Declaration

I, the undersigned ....., certify that to the best of my knowledge and belief, the information in reference to my data contained in the Forms for Key Personnel correctly describes myself, my qualifications and my experience.

I confirm that I am available as certified in the following table and throughout the expected time schedule for this position as provided in the Tender:

<b>Commitment</b>	<b>Details</b> [ <i>insert period (start and end dates) for which this Contractor's Key Personnel is available to work on this contract</i> ]
<b>Commitment to duration of contract:</b>	

I understand that any misrepresentation or omission in this Form may:

1. Be taken into consideration during Tender evaluation.
2. Result in my disqualification from participating in the procurement process.

**Name of Key Personnel:** [*insert name*]

Signature: \_\_\_\_\_

Date: (day, month, year): \_\_\_\_\_

**Countersignature of authorized representative of the Contractor:**

Signature: \_\_\_\_\_

Date: (day month year): \_\_\_\_\_

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## Part 1: Section 4 Tendering Forms

### 2. Site Agent

<b>Position: Site Agent</b>	
<b>Personnel Information</b>	Name <span style="float: right;">Date of birth</span>
	Professional qualifications
	Academic qualifications
<b>Present Employment</b>	Name of Employer
	Address of Employer
	Telephone <span style="float: right;">Contact (manager / personnel officer)</span>
	Fax <span style="float: right;">E-mail</span>
	Job title <span style="float: right;">Years with present Employer</span>

Summarize professional experience in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.

<b>From</b>	<b>To</b>	<b>Project</b>	<b>Role</b>	<b>Duration in Involvement</b>	<b>Relevance Experience</b>
<i>[Date, Month and Year]</i>	<i>[Date, Month and Year]</i>	<i>[main project details]</i>	<i>[role and responsibilities on the project]</i>	<i>[time in role i.e. Months and Years]</i>	<i>[describe the experience relevant to this position]</i>

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## Part 1: Section 4 Tendering Forms

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### Declaration

I, the undersigned ....., certify that to the best of my knowledge and belief, the information in reference to my data contained in the Forms for Key Personnel correctly describes myself, my qualifications and my experience.

I confirm that I am available as certified in the following table and throughout the expected time schedule for this position as provided in the Tender:

<b>Commitment</b>	<b>Details</b> [ <i>insert period (start and end dates) for which this Contractor's Key Personnel is available to work on this contract</i> ]
<b>Commitment to duration of contract:</b>	

I understand that any misrepresentation or omission in this Form may:

1. Be taken into consideration during Tender evaluation;
2. Result in my disqualification from participating in the procurement process.

**Name of Key Personnel:** .....

Signature: \_\_\_\_\_

Date: (day, month, year): \_\_\_\_\_

**Countersignature of authorized representative of the Contractor:**

Signature: \_\_\_\_\_

Date: (day month year): \_\_\_\_\_

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## Part 1: Section 4 Tendering Forms

### 3. Forman/Supervisor (Civil)

<b>Position: Forman/Supervisor (Civil)</b>	
<b>Personnel Information</b>	Name <span style="float: right;">Date of birth</span>
	Professional qualifications
	Academic qualifications
<b>Present Employment</b>	Name of Employer
	Address of Employer
	Telephone <span style="float: right;">Contact (manager / personnel officer)</span>
	Fax <span style="float: right;">E-mail</span>
	Job title <span style="float: right;">Years with present Employer</span>

Summarize experience in reverse chronological order. Indicate particular technical and supervisory experience relevant to the project.

<b>From</b>	<b>To</b>	<b>Project</b>	<b>Role</b>	<b>Duration in Involvement</b>	<b>Relevance Experience</b>
<i>[Date, Month and Year]</i>	<i>[Date, Month and Year]</i>	<i>[main project details]</i>	<i>[role and responsibilities on the project]</i>	<i>[time in role i.e. Months and Years]</i>	<i>[describe the experience relevant to this position]</i>

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## Part 1: Section 4 Tendering Forms

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### Declaration

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<b>Commitment to duration of contract:</b>	

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2. Result in my disqualification from participating in the procurement process.

**Name of Key Personnel:** .....

Signature: \_\_\_\_\_

Date: (day, month, year): \_\_\_\_\_

**Countersignature of authorized representative of the Contractor:**

Signature: \_\_\_\_\_

Date: (day month year): \_\_\_\_\_

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## Part 1: Section 4 Tendering Forms

### 4. Forman/Supervisor (Electrical)

<b>Position: Forman/Supervisor (Electrical)</b>	
<b>Personnel Information</b>	Name <span style="float: right;">Date of birth</span>
	Professional qualifications
	Academic qualifications
<b>Present Employment</b>	Name of Employer
	Address of Employer
	Telephone <span style="float: right;">Contact (manager / personnel officer)</span>
	Fax <span style="float: right;">E-mail</span>
	Job title <span style="float: right;">Years with present Employer</span>

Summarize experience in reverse chronological order. Indicate particular technical and supervisory experience relevant to the project.

<b>From</b>	<b>To</b>	<b>Project</b>	<b>Role</b>	<b>Duration in Involvement</b>	<b>Relevance Experience</b>
<i>[Date, Month and Year]</i>	<i>[Date, Month and Year]</i>	<i>[main project details]</i>	<i>[role and responsibilities on the project]</i>	<i>[time in role i.e. Months and Years]</i>	<i>[describe the experience relevant to this position]</i>

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## Part 1: Section 4 Tendering Forms

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### Declaration

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<b>Commitment to duration of contract:</b>	

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**Name of Key Personnel:** .....

Signature: \_\_\_\_\_

Date: (day, month, year): \_\_\_\_\_

**Countersignature of authorized representative of the Contractor:**

Signature: \_\_\_\_\_

Date: (day month year): \_\_\_\_\_

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## Part 1: Section 4 Tendering Forms

### 5. Foreman/Supervisor (Mechanical)

<b>Position: Foreman/Supervisor (Mechanical)</b>	
<b>Personnel Information</b>	Name <span style="float: right;">Date of birth</span>
	Professional qualifications
	Academic qualifications
<b>Present Employment</b>	Name of Employer
	Address of Employer
	Telephone <span style="float: right;">Contact (manager / personnel officer)</span>
	Fax <span style="float: right;">E-mail</span>
	Job title <span style="float: right;">Years with present Employer</span>

Summarize experience in reverse chronological order. Indicate particular technical and supervisory experience relevant to the project.

<b>From</b>	<b>To</b>	<b>Project</b>	<b>Role</b>	<b>Duration in Involvement</b>	<b>Relevance Experience</b>
<i>[Date, Month and Year]</i>	<i>[Date, Month and Year]</i>	<i>[main project details]</i>	<i>[role and responsibilities on the project]</i>	<i>[time in role i.e. Months and Years]</i>	<i>[describe the experience relevant to this position]</i>

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## Part 1: Section 4 Tendering Forms

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### Declaration

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2. Result in my disqualification from participating in the procurement process.

**Name of Key Personnel:** .....

Signature: \_\_\_\_\_

Date: (day, month, year): \_\_\_\_\_

**Countersignature of authorized representative of the Contractor:**

Signature: \_\_\_\_\_

Date: (day month year): \_\_\_\_\_

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## Part 1: Section 4 Tendering Forms

### 6. Health and Safety Officer

<b>Position: Health and Safety Officer</b>	
<b>Personnel Information</b>	Name <span style="float: right;">Date of birth</span>
	Professional qualifications
	Academic qualifications
<b>Present Employment</b>	Name of Employer
	Address of Employer
	Telephone <span style="float: right;">Contact (manager / personnel officer)</span>
	Fax <span style="float: right;">E-mail</span>
	Job title <span style="float: right;">Years with present Employer</span>

Summarize experience in reverse chronological order. Indicate particular technical and supervisory experience relevant to the project.

<b>From</b>	<b>To</b>	<b>Project</b>	<b>Role</b>	<b>Duration in Involvement</b>	<b>Relevance Experience</b>
<i>[Date, Month and Year]</i>	<i>[Date, Month and Year]</i>	<i>[main project details]</i>	<i>[role and responsibilities on the project]</i>	<i>[time in role i.e. Months and Years]</i>	<i>[describe the experience relevant to this position]</i>

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## Part 1: Section 4 Tendering Forms

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### Declaration

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2. Result in my disqualification from participating in the procurement process.

**Name of Key Personnel:** .....

Signature: \_\_\_\_\_

Date: (day, month, year): \_\_\_\_\_

**Countersignature of authorized representative of the Contractor:**

Signature: \_\_\_\_\_

Date: (day month year): \_\_\_\_\_

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## Part 1: Section 4 Tendering Forms

### Forms for Equipment

The Contractor shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment listed in Section 3: Evaluation Methodology and Criteria. A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Contractor. The Contractor shall provide all the information requested below, to the extent possible:

#### FORM 3 (Excavator)

Type of Equipment		
Equipment Information	Name of manufacturer	Model and power rating
	Capacity	Year of manufacture
Current Status	Current location	
	Details of current commitments	
Source	<p>Indicate source of the equipment</p> <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	
	<p>[Attach evidence of ownership, lease or hire in the form of registration books, agreements or memoranda or purchaser order]</p>	
	<p>[For Specially Manufactured Equipment, attach evidence in form of Proforma Invoices, Quotation or Sales Agreement between the Contractor and the prospective equipment manufacturer]</p>	

The following information shall be provided only for equipment not owned by the Contractor.

#### FORM 3A

Owner	Name of owner	
	Address of owner	
	Telephone	Contact name and title
	Fax	Telex
Agreements	<p>Details of rental / lease / manufacture agreements specific to the project.          (Attach evidence of lease or hire in the form of registration books, agreements or memoranda or purchaser order)</p>	

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## Part 1: Section 4 Tendering Forms

### FORM 3 (Tipper Truck)

Type of Equipment		
Equipment Information	Name of manufacturer	Model and power rating
	Capacity	Year of manufacture
Current Status	Current location	
	Details of current commitments	
Source	<p>Indicate source of the equipment</p> <p><input type="checkbox"/> Owned</p> <p><input type="checkbox"/> Rented</p> <p><input type="checkbox"/> Leased</p> <p><input type="checkbox"/> Specially manufactured</p> <p>[Attach evidence of ownership, lease or hire in the form of registration books, agreements or memoranda or purchaser order]</p> <p>[For Specially Manufactured Equipment, attach evidence in form of Proforma Invoices, Quotation or Sales Agreement between the Contractor and the prospective equipment manufacturer]</p>	

The following information shall be provided only for equipment not owned by the Contractor.

### FORM 3A

Owner	Name of owner	
	Address of owner	
	Telephone	Contact name and title
	Fax	Telex
Agreements	<p>Details of rental / lease / manufacture agreements specific to the project.</p> <p>(Attach evidence of lease or hire in the form of registration books, agreements or memoranda or purchaser order)</p>	

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## Part 1: Section 4 Tendering Forms

### FORM 3 (Tipper Truck)

Type of Equipment		
Equipment Information	Name of manufacturer	Model and power rating
	Capacity	Year of manufacture
Current Status	Current location	
	Details of current commitments	
Source	<p>Indicate source of the equipment</p> <p><input type="checkbox"/> Owned</p> <p><input type="checkbox"/> Rented</p> <p><input type="checkbox"/> Leased</p> <p><input type="checkbox"/> Specially manufactured</p> <p>[Attach evidence of ownership, lease or hire in the form of registration books, agreements or memoranda or purchaser order]</p> <p>[For Specially Manufactured Equipment, attach evidence in form of Proforma Invoices, Quotation or Sales Agreement between the Contractor and the prospective equipment manufacturer]</p>	

The following information shall be provided only for equipment not owned by the Contractor.

### FORM 3A

Owner	Name of owner	
	Address of owner	
	Telephone	Contact name and title
	Fax	Telex
Agreements	<p>Details of rental / lease / manufacture agreements specific to the project.</p> <p>(Attach evidence of lease or hire in the form of registration books, agreements or memoranda or purchaser order)</p>	

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## Part 1: Section 4 Tendering Forms

### FORM 3 (Tipper Truck)

Type of Equipment		
Equipment Information	Name of manufacturer	Model and power rating
	Capacity	Year of manufacture
Current Status	Current location	
	Details of current commitments	
Source	<p>Indicate source of the equipment</p> <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	
	<p>[Attach evidence of ownership, lease or hire in the form of registration books, agreements or memoranda or purchaser order]</p> <p>[For Specially Manufactured Equipment, attach evidence in form of Proforma Invoices, Quotation or Sales Agreement between the Contractor and the prospective equipment manufacturer]</p>	

The following information shall be provided only for equipment not owned by the Contractor.

### FORM 3A

Owner	Name of owner	
	Address of owner	
	Telephone	Contact name and title
	Fax	Telex
Agreements	<p>Details of rental / lease / manufacture agreements specific to the project.          (Attach evidence of lease or hire in the form of registration books, agreements or memoranda or purchaser order)</p>	

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## Part 1: Section 4 Tendering Forms

### FORM 3 (TLB)

Type of Equipment		
Equipment Information	Name of manufacturer	Model and power rating
	Capacity	Year of manufacture
Current Status	Current location	
	Details of current commitments	
Source	<p>Indicate source of the equipment</p> <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	
	<p>[Attach evidence of ownership, lease or hire in the form of registration books, agreements or memoranda or purchaser order]</p> <p>[For Specially Manufactured Equipment, attach evidence in form of Proforma Invoices, Quotation or Sales Agreement between the Contractor and the prospective equipment manufacturer]</p>	

The following information shall be provided only for equipment not owned by the Contractor.

### FORM 3A

Owner	Name of owner	
	Address of owner	
	Telephone	Contact name and title
	Fax	Telex
Agreements	<p>Details of rental / lease / manufacture agreements specific to the project.            (Attach evidence of lease or hire in the form of registration books, agreements or memoranda or purchaser order)</p>	

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## Part 1: Section 4 Tendering Forms

### FORM 3 (Hand-held Roller Compactor)

Type of Equipment		
Equipment Information	Name of manufacturer	Model and power rating
	Capacity	Year of manufacture
Current Status	Current location	
	Details of current commitments	
Source	<p>Indicate source of the equipment</p> <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	
	<p>[Attach evidence of ownership, lease or hire in the form of registration books, agreements or memoranda or purchaser order]</p> <p>[For Specially Manufactured Equipment, attach evidence in form of Proforma Invoices, Quotation or Sales Agreement between the Contractor and the prospective equipment manufacturer]</p>	

The following information shall be provided only for equipment not owned by the Contractor.

### FORM 3A

Owner	Name of owner	
	Address of owner	
	Telephone	Contact name and title
	Fax	Telex
Agreements	<p>Details of rental / lease / manufacture agreements specific to the project.          (Attach evidence of lease or hire in the form of registration books, agreements or memoranda or purchaser order)</p>	

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## Part 1: Section 4 Tendering Forms

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### Qualification Forms

To establish its qualifications to perform the contract in accordance with Section 3: Evaluation Methodology and Criteria. The Contractor shall provide the information requested in the corresponding Information Sheets included hereunder:

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## Part 1: Section 4 Tendering Forms

### Form 4

## Contractor Information Sheet

Date: \_\_\_\_\_

Procurement Reference Number:  
\_\_\_\_\_

1. Contractor's Name <sup>1</sup> :
2. In case of JV / Consortium / Association, state name of each party in Form 4A
3. Contractor's Country of Registration / Incorporation <sup>2</sup> :
4. Contractor's Year of Registration / Incorporation <sup>3</sup> :
5. Contractor's Address in Country of Registration / Incorporation <sup>4</sup> :
6. Contractor's Authorized Representative Information Name: Address: Telephone/Fax numbers: Email Address:
7. Attached are copies of original documents of: <input type="checkbox"/> Certificate of Incorporation or Registration of firm named in 1, above. <input type="checkbox"/> In case of JV / Consortium / Association, the JV / Consortium / Association Agreement <input type="checkbox"/> In case of government owned entity from the Procuring Entity's country, documents establishing legal and financial autonomy and compliance with the principles of commercial law.

<sup>1</sup>In case of JV / Consortium / Association, Fill in Form 4A

<sup>2</sup>In case of JV / Consortium / Association, Fill in Form 4A

<sup>3</sup>In case of JV / Consortium / Association, Fill in Form 4A

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## Part 1: Section 4 Tendering Forms

### Form 4 A

## Party to JV / Consortium / Association Information Sheet

Date: \_\_\_\_\_

Procurement Reference Number:  
\_\_\_\_\_

1. Legal Name of party to JV / Consortium / Association:
2. Country of Registration of party to JV / Consortium / Association:
3. Year of Registration of party to JV / Consortium / Association:
4. Legal Address in Country of Registration for party to JV / Consortium / Association:
6. Authorized Representative Information for party to JV / Consortium / Association Name: Address: Telephone/Fax numbers: Email Address:
7. Attached are copies of original documents of: <input type="checkbox"/> Certificate of Incorporation or Registration of firm named in 1, above. <input type="checkbox"/> In case of government owned entity from the Purchaser's country, documents establishing legal and financial autonomy and compliance with the principles of commercial law.

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**Part 1: Section 4 Tendering Forms**

**Form 5**

**Historical Contract Non-Performance**

Contractor's Name: \_\_\_\_\_ Date: \_\_\_\_\_

JV/ Consortium / Association Partner Names: \_\_\_\_\_

Procurement Reference No.: \_\_\_\_\_

Non-Performing Contracts in accordance with the Technical Criteria			
<input type="checkbox"/> Contract non-performance did not occur during the stipulated period, in accordance with Sub-Factor 6.2.1 of Section III.			
<input type="checkbox"/> Contract non-performance during the stipulated period, in accordance with Sub-Factor 6.2.1 of Section III.			
Year	Outcome as Percent of Total Assets	Contract Identification	Total Contract Amount
_____	_____	Contract Identification: _____  Name of Employer: _____  Address of Employer: _____  Matter in dispute: _____	_____
_____	_____	Contract Identification: _____  Name of Employer: _____  Address of Employer: _____  Matter in dispute: _____	_____

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## Part 1: Section 4 Tendering Forms

Non-Performing Contracts in accordance with the Technical Criteria			
		Contract Identification: _____	
		Name of Employer: _____	
_____	_____	Address of Employer: _____	_____
		Matter in dispute: _____	

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**Part 1: Section 4 Tendering Forms**

**Form 5A**

**Pending Litigation**

Pending Litigation, in accordance with Section III			
<input type="checkbox"/> No pending litigation in accordance with Sub-Factor 6.2.2 of Section III <input type="checkbox"/> Pending litigation in accordance with Sub-Factor 6.2.2 of Section III, as indicated below			
Year	Outcome as Percent of Total Assets	Contract Identification	Total Contract Amount
_____	_____	Contract Identification: Name of Employer: Address of Employer: Matter in dispute:	_____
_____	_____	Contract Identification: Name of Employer: Address of Employer: Matter in dispute:	_____
_____	_____	Contract Identification: Name of Employer: Address of Employer: Matter in dispute:	_____

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**FORM 5 B**

**Environmental, Social, Health and Safety Performance Declaration**

**Environmental, Social, Health, and Safety Performance Declaration**  
in accordance with Section III, Qualification Criteria, and Requirements

- No suspension or termination of contract:** An employer has not suspended or terminated a contract and/or called the performance security for a contract for reasons related to Environmental, Social, Health, or Safety (ESHS) performance since the date specified in Section III, Qualification Criteria, and Requirements, Sub-Factor 6.2.3.
- Declaration of suspension or termination of contract:** The following contract(s) has/have been suspended or terminated and/or Performance Security called by an employer(s) for reasons related to Environmental, Social, Health, or Safety (ESHS) performance since the date specified in Section III, Qualification Criteria, and Requirements, Sub-Factor 6.2.3. Details are described below:

<b>Year</b>	<b>Suspended or terminated portion of contract</b>	<b>Contract Identification</b>	<b>Total Contract Amount (value, currency, exchange rate and Lilangeni equivalent)</b>
<i>[insert year]</i>	<i>[insert amount and percentage]</i>	Contract Identification: <i>[indicate complete contract name/ number, and any other identification]</i> Name of Employer: <i>[insert full name]</i> Address of Employer: <i>[insert street/city/country]</i> Reason(s) for suspension or termination: <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>
<i>[insert year]</i>	<i>[insert amount and percentage]</i>	Contract Identification: <i>[indicate complete contract name/ number, and any other identification]</i> Name of Employer: <i>[insert full name]</i> Address of Employer: <i>[insert street/city/country]</i> Reason(s) for suspension or termination: <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>
...	...	<i>[list all applicable contracts]</i>	...

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## Part 1: Section 4 Tendering Forms

<b>Environmental, Social, Health, and Safety Performance Declaration</b> in accordance with Section III, Qualification Criteria, and Requirements		
<b>Performance Security called by an employer(s) for reasons related to ESHS Performance</b>		
Year	Contract Identification	Total Contract Amount (current value, currency, exchange rate and Lilangeni equivalent)
<i>[insert year]</i>	Contract Identification: <i>[indicate complete contract name/ number, and any other identification]</i> Name of Employer: <i>[insert full name]</i> Address of Employer: <i>[insert street/city/country]</i> Reason(s) for calling of performance security: <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>

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## Part 1: Section 4 Tendering Forms

### Form 6

#### Current Contract Commitments / Works in Progress

*[The following table shall be filled in for the Contractor, each member of a Joint Venture / Consortium / Association]*

Contractor's Name: *[insert full name]* .....

Date: *[insert day, month, year]* .....

Joint Venture / Consortium / Association Member's Name: *[insert full name]*

Proc. Reference No: *[insert Reference Number]* .....

*[Contractors and each partner to a JV/ Consortium / Association should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.]*

Name of contract	Employer, contact address/tel	Value of outstanding work	Estimated completion date	Average monthly invoicing over last six months (Lilangeni /month)
1.				
2.				
3.				
4.				
5.				
etc.				

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## Part 1: Section 4 Tendering Forms

### FORM 6 A

## Financial Situation Historical Financial Performance

Contractor's Name: \_\_\_\_\_ Date: \_\_\_\_\_

JV/ Consortium / Association Partner Legal Name: \_\_\_\_\_

Procurement Reference No.: \_\_\_\_\_

To be completed by the Contractor and, if JV/ Consortium / Association, by each partner

Financial information in Lilangeni equivalent	Historic information for previous _____ ( ) years (Lilangeni equivalent)						
	Year 1	Year 2	Year 3	Year ...	Year n	Avg.	Avg. Ratio
<b>Information from Balance Sheet</b>							
Total Assets (TA)							
Total Liabilities (TL)							
Net Worth (NW)							
Current Assets (CA)							
Current Liabilities (CL)							
<b>Information from Income Statement</b>							
Total Revenue (TR)							
Profits Before Taxes (PBT)							

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## Part 1: Section 4 Tendering Forms

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- Attached are copies of financial statements (balance sheets, including all related notes, and income statements) for the years required above complying with the following conditions:
  - Must reflect the financial situation of the Contractor or partner to a JV, and not sister or parent companies
  - Historic financial statements must be audited by a certified accountant
  - Historic financial statements must be complete, including all notes to the financial statements
  - Historic financial statements must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted)

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## Part 1: Section 4 Tendering Forms

### Form 8

#### Financial Resources

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total construction cash flow demands of the subject contract or contracts as indicated in Section 3: Evaluation Methodology and Criteria.

Source of financing	Amount (Lilangeni equivalent)
1.	
2.	
3.	
4.	

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## Part 1: Section 4 Tendering Forms

### FORM 9

#### Experience

#### General Experience

Contractor's Name: \_\_\_\_\_ Date: \_\_\_\_\_

JV/ Consortium / Association Partner Name: \_\_\_\_\_

Procurement Reference No.: \_\_\_\_\_

Startin g Month / Year	Ending Month / Year	Years*	Contract Identification	Role of Contractor
_____	_____		Contract name: Brief Description of the Works performed by the Contractor: Name of Employer: Address:	_____
_____	_____		Contract name: Brief Description of the Works performed by the Contractor: Name of Employer: Address:	_____
_____	_____		Contract name: Brief Description of the Works performed by the Contractor: Name of Employer: Address:	_____
_____	_____		Contract name: Brief Description of the Works performed by the Contractor: Name of Employer: Address:	_____
_____	_____		Contract name: Brief Description of the Works performed by the Contractor: Name of Employer: Address:	_____
_____	_____		Contract name: Brief Description of the Works performed by the Contractor: Name of Employer: Address:	_____

\*List calendar year for years with contracts with at least nine (9) months activity per year starting with the earliest year

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## Part 1: Section 4 Tendering Forms

**Form 10A** (*Contractor to duplicate form 10A where more than one projects is available*)

### Specific Experience

Contractor's Name: \_\_\_\_\_ Date: \_\_\_\_\_

JV/ Consortium / Association Partner Name: \_\_\_\_\_

Procurement Reference No.: \_\_\_\_\_

<b>Similar Contract Number: ___ [insert specific number] of ___ [insert total number of contracts required].</b>	<b>Information</b>		
Contract Identification	_____		
Award date	_____		
Completion date	_____		
Role in Contract	<input type="checkbox"/> Contractor	<input type="checkbox"/> Management Contractor	<input type="checkbox"/> Subcontractor
Total contract amount	_____		Lilangeni _____
If partner in a JV or subcontractor, specify participation of total contract amount	_____ %	_____	Lilangeni _____
Employer's Name:	_____		
Address:	_____ _____		
Telephone number:	_____		
E-mail:	_____		

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## Part 1: Section 4 Tendering Forms

### Form 10 A (cont.)

### Specific Experience (cont.)

Contractor's Name: \_\_\_\_\_ Date: \_\_\_\_\_

JV/ Consortium / Association Partner Name: \_\_\_\_\_

Procurement Reference No.: \_\_\_\_\_

<b>Similar Contract No. <i>[insert specific number]</i> of <i>[insert total number of contracts]</i> required</b>	<b>Information</b>
Description of the similarity in accordance with Sub-Factor 6.2.8a) of Section 3: Evaluation Methodology and Criteria.:	
Amount	_____
Physical size	_____
Complexity	_____
Methods/Technology	_____
Physical Production Rate	_____

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## Part 1: Section 4 Tendering Forms

### Form 10 A (b)

## Specific Experience in Key Activities

Contractor's Name: \_\_\_\_\_

Date: \_\_\_\_\_

JV/ Consortium / Association Partner Name: \_\_\_\_\_

Procurement Reference No.: \_\_\_\_\_

	Information		
Contract Identification	_____		
Award date	_____		
Completion date	_____		
Role in Contract	<input type="checkbox"/> Contractor	<input type="checkbox"/> Management Contractor	<input type="checkbox"/> Subcontractor
Total contract amount	_____		_____
If partner in a JV / Consortium / Association, specify participation of total contract amount	_____ %	_____ -	_____ -
Employer's Name:	_____		
Address:	_____ _____ _____		
Telephone number:	_____		
E-mail:	_____		

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**Part 1: Section 4 Tendering Forms**

**Form 10 (b) (cont.)**

**Specific Experience in Key Activities (cont.)**

Contractor's Name: \_\_\_\_\_ Date: \_\_\_\_\_

JV/ Consortium / Association Partner Name: \_\_\_\_\_

Procurement Reference No.: \_\_\_\_\_

	Information
Description of the key activities in accordance with Sub-Factor 6.2.9 b) of Section III:	

We, the undersigned, declare that the information contained in and attached to these forms is true and accurate as of the date of Tender submission:

Signed: *[signature of person whose name and capacity are shown below]*

.....  
Name: *[insert complete name of authorized person signing the Qualification Form]*  
.....

Duly authorised to sign the Qualification Form for and on behalf of: *[insert complete name of Contractor or name of Joint Venture/ Consortium / Association]*

Dated on \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ *[insert day / month / year of signing]*

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## **Section 5: Eligible Countries**

### **Procurement Reference Number:**

All countries are eligible except countries subject to the following provisions.

A country shall not be eligible if:

- (a) As a matter of law or official regulation, the Government of Eswatini prohibits commercial relations with that country, provided that the Government of Eswatini is satisfied that such exclusion does not preclude effective competition for the provision of goods or related services required; or
- (b) By an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Government of Eswatini prohibits any import of Goods from that country or any payments to persons or entities in that country.

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## **Scope of Works**

The scope consists of Refurbishment of Waster Water Treatment Plant

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## **Project Specifications: General**

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## Part 2: Section 6 Statement of Requirements

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### D.1 DESCRIPTIVE

This Contract covers the supply, delivery, transport, handling, storage, erection, installation, commissioning, testing, adjustment, handing over in complete working order and upholding during the Defects Liability Period of all mechanical plant to be incorporated in the refurbishment of the Nhlangano WWTP.

### D.2 SCOPE AND SUB-DIVISION OF CONTRACT

The contract consists of six sections as follows:

Section F-100 :	Inlet Works Mechanical Equipment
Section F-400:	Pumps
Section F-500:	Mechanical Stirrers
Section F-600:	Aeration Equipment
Section F-700:	Final Clarifier Tank Equipment
Section F-800:	Miscellaneous Equipment
Section F-900:	Chlorination Equipment
Section F-1000:	Chemical Preparation and Dosing
Section F-1100:	Air Blower / Compressor

Nhlangano WWTW is currently in operation. All necessary structures necessary to accommodate and render complete the plant and equipment are in place.

### D.3 SITE OF WORKS

The location of the Site of Works is in Nhlangano behind Zeng Young factory the site is presently developed and is accessible by road.

Tenderers must visit the Site of Works and satisfy themselves as to the means of access and everything affecting the delivery, storage, handling and complete erection and installation of the plant and equipment.

Altitude above sea level: ..... m

Barometric pressure: .....mm Hg

Atmosphere: temperate, moderately rainy, and corrosive.

### D.4 SITE CONDITIONS

Water and electricity will be available on site and the contractor shall make arrangements with the Employer for obtaining these services. The Tenderer shall make allowance in his Tender Prices for use of these services.

The Contractor will be required to make own arrangements for water and electricity for commissioning the plant.

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## Part 2: Section 6 Statement of Requirements

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The contractor shall provide, maintain and supervise all ablution facilities and latrine accommodation necessary for his employees in accordance with the requirements for the Authority/ties concerned and shall clear the Site properly on completion of the work, if directed by the Engineer, on completion of any portion of it. The Contractor shall provide his own office facilities.

The Contractor shall also be required to make his own arrangements in respect of telephone services.

The Contractor shall be held responsible for any damage caused by his employees to Site buildings, structures, buried and overhead services, work under construction or other assets, and for safeguarding traffic, man and beast against injury from the presence and execution of his works. He is to provide suitable watchmen, guard rails, lights and warning for plant, equipment, stacks of materials or open trenches in his care. All the measures he adopts are subject to the approval of the Engineer.

### D.5 COMPLIANCE WITH REGULATIONS

All equipment including temporary works and construction equipment must comply with the requirements of the Occupational Safety and Health Act, 2001 (Act No. 9 of 2001). The Contractor must meet all costs involved should alteration be necessary to secure compliance with the regulations mentioned.

### D.6 POWER SUPPLY

The power supply at the site of works is 230 V (AC), 50 Hz, ( $\pm 5\%$ ) for single phase and 400V (AC) at 50 z, ( $\pm 5\%$ ) for three phase.

### D.7 ACCEPTANCE OF TENDERS

Although preference will be given to complete Tenders, Tenderers may submit offers for any one or more sections of the Schedule of Prices. The Employer reserves the right to consider separately each section and to award any one or more sections to a Contractor. Should a Contractor be prepared to reduce his prices in the event of more than one section being awarded to him, he must clearly state the basis of such reduction in a covering letter accompanying his Tender.

The Employer does not bind itself to accept the lowest or any Tender and reserves the right to SUBDIVIDE the Contract in the manner specified above.

Tenders will be assessed on the Employer's estimate of the best value offered and to be able to do this, the Employer will itself estimate, at current rates, the cost of civil engineering works associated with each tender. In adjudicating the Tenders, account will also be taken of:

- a. Delivery period
- b. Annual cost of running the plant during the period of its normal life
- c. Ease of maintenance
- d. Technical resources and previous experience of the Tenderer
- e. General soundness and robustness of design
- f. Reliability of components

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## Part 2: Section 6 Statement of Requirements

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- g. Any special conditions or qualifications put forward by the Tenderer

### **D.8 INFORMATION TO BE SUPPLIED BY TENDERER**

(Refer to Clauses 5 and 6 of the General Conditions of Contract)

To facilitate assessment of Tenders on the basis indicated in Clause D.7 above, Tenderers shall supply the following information with their Tenders:

- a) Dimensioned scale drawings, size A3 of the layout of all the plant in relation to each other and to the structure to house them and in sufficient detail to permit assessment of the cost of the civil engineering works by the Employer. Full information regarding space, requirements, loading and supporting structures and major openings to be left in the structure must be included.
- b) A full and detailed description and illustrations or drawings of the plant and ancillaries and of materials used in the construction thereof.

Drawings, illustrations, etc. referred to in this clause shall be submitted with the Tender, and in the event of the Tender being accepted, two further copies of the abovementioned drawings, illustrations, etc. shall be submitted by the Tenderer for inclusion in copies of the formal Contract Document.

The information called for in either the Specification or Technical Data Sheets shall be supplied at the time of tendering. However, these are not necessarily comprehensive and the responsibility for the supply of sufficient information rests with the Tenderer.

Any additional information shall be given either in the form “Alterations by Tender” or in a covering letter referred to in “alterations by Tenderer” and all drawings, sketches, pamphlets, etc. submitted with the Tender shall be listed in “Alterations by Tenderer”.

### **D.9 DATA TO BE SUPPLIED BY SUCCESSFUL TENDERER**

(Refer to Clause 5 of the General Conditions of Contract and D.28 of the Project Specifications)

Within four weeks of the acceptance of his Tender for any portion of the Contract, the Contractor shall supply the Engineer, in duplicate, with fully dimensioned drawings of the plant ordered from him, the necessary data concerning the geometry of structures housing the plant, the positions and sizes of all foundations, bolt holes, openings in walls or floors and all other special features affecting the design and construction on the Works. The Contractor shall then arrange for the necessary concrete work, foundations, bolt holes, openings for pipes, cable ducts etc. for the proper erection and installation of the plant.

### **D.10 DOCUMENTS**

(Refer to Clauses 4, 5 and 6 of the General Conditions of Contract)

The whole of this Specification, together with all Schedules and Parts thereof and any drawings or information submitted by the successful Tenderer, will be considered as part of the Contract Document.

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## Part 2: Section 6 Statement of Requirements

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### D.11 PERIOD FOR WHICH TENDER HOLDS GOOD

The submission of a Tender shall be deemed to constitute an agreement between the Tenderer and the Employer whereby such Tender shall remain open for acceptance by the Employer for a period of 90 (ninety) days from date on which tenders are, in terms of the advertisement calling for Tenders, returnable, during which period the Tenderer agrees not to withdraw his Tender or derogate from its effect.

### D.12 SUFFICIENCY OF TENDER

(Refer to Clause 10.2 of the General Conditions of Contract)

The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his Tender and of the prices stated in the Schedule of Prices which prices shall cover all his obligations under the Contract and all matters and things necessary for the proper completion and upholding of the Works.

Since there may be minor operations, items of materials, matters and details necessary for the proper execution and completion of the Works under the Contract, which are neither shown on the drawings nor particularly mentioned in the Specification, the Contracts shall include for such minor operations, materials, matters and details as if they had been expressly detailed and described. The Contractor shall execute as part of this Contract every requisite for the full and perfect completion of the whole Works, except as may be specifically accepted in the Contract

### D.13 INTENT OF SPECIFICATION

The Specifications supplied with the Tender Document are not intended to be either complete in detail or to prescribe rigidly the plant to be offered or the general layout of the works, but are intended only as guide to Tenderers. The Specification details the minimum requirements of the Employer and Tenderers must provide everything necessary, whether mentioned or not, to provide a satisfactory, efficient and workmankile installation. Should Tenderers consider that deviations from or additions to the plant as specified by the Employer are necessary, these must be described and accounted for in detail as set out in Clause D.14. any exclusion by the Tenderer to the installation as specified shall be itemized and described in detail.

### D.14 VARIATION FROM SPECIFICATION

Should the Tenderer desire to make any alterations to the Specification with regard to the material or plant offered to the conditions testing or other procedure, he shall set out his proposals in detail on the forms provided in this Document, or alternatively, shall set them out in detail in a separate letter accompanying his Tender. No alteration, amendment or exclusion will be recognized unless adequately set out as described above.

### D.15 SHCEDULE OF PRICES

The prices quoted in the Schedule of Prices shall cover the cost of all work required for the execution of the Contract and each piece shall be considered as the full value of the work described in each item and as covering all contingent expenses.

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## Part 2: Section 6 Statement of Requirements

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No special item has been provided in the Schedule of Prices to cover costs such as establishment charges, royalties, insurances, etc. and Tenderers shall allow for these costs in their prices for the supply, erection, installation and upholding of the plant offered.

### D.16 MARKING

All plant delivered under this Contract shall have painted or marked thereon or on the container the relative item number given in the Schedule of Prices.

### D.17 OFF-LOADING, STACKING AND LIABILITY FOR BREAKAGES

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

The Contractor shall be fully responsible for the protection of all plant delivered by him to Site but still in storage, against damage by water, weather, fire and any other interference until such time as it is erected and installed, put into satisfactory operation and accepted by the Employer as complete.

### D.18 STORAGE

Facilities for extended storage at Site for plant may not always be available and the Contractor shall therefore make his own arrangements for any off-site storage which may be required for plant which become available before installation thereof can be commenced. Tenderers shall state in their tenders what the cost of such off-site storage will be.

Should the Contractor claim payment of a portion of the value of some or all of the plant held in off-site stores, the items concerned must be clearly marked: "The property of the Eswatini Investment Promotion Authority" and a certificate to this effect shall accompany his claim detailing the items and serial numbers included in his claim as well as the street address of the store where the plant is held. In addition, a certificate must also be finished by the company with whom the plant has been insured in terms of the requirements of Clause 17.1 of the General Conditions of Contract, in which it is certified that the plant for which the Contractor is claiming payment is fully covered by the insurance policy concerned while the plant is stored away from the Site (street address of store to be stated).

### D.19 INSPECTION AT SITE

All plant will be carefully examined upon delivery at the Site by the Engineer's representative and all items showing defects or damage of any description shall be laid aside as not being in accordance with the requirements of the contract and these shall be removed and replaced by the Contractor at his own cost.

### D.20 TEMPORARY HOUSING, STORES, ETC.

The Contractor shall provide and maintain at his own cost all sheds of a temporary nature necessary for the convenience of his workmen and for the accommodation and proper protection of plant from damage and loss. These are erected only on sites which shall have been approved by the Engineer

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## Part 2: Section 6 Statement of Requirements

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and they shall be removed as soon as their necessity ceases and the site thereof stored to its original condition and the ground left clean and sanitary.

### D.21 ERECTION, INSTALLATION, ADJUSTMENT AND OPERATION

Installation of the plant is to be carried out by skilled artisans, experienced in the type of work to be executed, under the personal supervision of the Contractor's Erection Engineer, whose qualifications and experience to supervise this work must be acceptable to the Engineer. The plant, when erected and installed, shall be of neat and workmanlike appearance, solidly and evenly supported, true to line and level, plump and in proper working order. The methods used and equipment employed will be subject to the approval of the Engineer.

Before handing over the plant, the Contractor is to ensure that every component is operating satisfactorily. The Contract will not be deemed to have been completed until the Engineer is fully satisfied in this connection.

### D.22 PROGRAMME OF WORK

(Refer to Clause 12 of the General Conditions of Contract)

Where the work must of necessity be carried out in conjunction with the work of other contractors or with that of the employer, it shall be co-ordinated and arranged in such a manner as to interfere as little as possible with the progress of such other work, and so as to offer every reasonable facility to other contractors or to employees of the Employer.

The contractor shall allow for the presence on site of other contractors engaged with other contracts on the same site. He shall assure them of access to their places of work and make allowance for short delays while they perform certain work.

### D.23 TIME OF DELIVERY AND COMPLETION

(Refer to Sub-Clause 26 of the Special Conditions of Contract).

The Tender is to state in the Schedule of Prices:

- a) The period in which he undertakes to effect complete delivery of all plant purchased by the Employer in terms of the Contract.
- b) The period, from the date of notification from the Engineer to proceed, he requires to complete the erection and installation.
- c) The period, from the date of notification from the Engineer to proceed, he requires to complete the putting into operation, testing and handing over to the Employer of the plant in a clean and proper operating condition.

Subject to any requirements in the Specification as to completion of any portion of the Works, it shall be completed within the times mentioned at the end of the Schedule of Prices, subject to any extension of time that may be granted in accordance with the Contract.

### D.24 PERFORMANCE TESTS

(Refer to Clause 29 of the General Conditions of Contract)

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On the completion of erection and installation the Contractor must carry out the following tests, where applicable, in addition to any other tests which may be specified elsewhere:

Before commissioning:

- a) Installation tests are required by the Council's By-Laws.
- b) Earth continuity tests.
- c) Tests for correct direction of rotation of motors and reverse if necessary.
- d) Test for correct operation of control gear setting of overload protection equipment, etc.
- e) Test for correct alignment of shaft bearings

After commissioning:

Checking overall functions of the unit under specified conditions.

On completion of installation and putting into proper operation all the plant and equipment, the Contractor will be required to make suitable arrangements for the testing of all plant and equipment supplied under this Contract, in presence of the Engineer or his representative.

The entire cost of testing, including supply of test equipment, must be borne by the Contractor and an adequate allowance for such tests must be made in the tendered price.

### D.25 DEFECTS LIABILITY PERIOD

(Refer to Clause 33 of the General Conditions of Contract)

During this period the Contractor must visit the Site at least three times, 1, 6 and 12 months respectively, after the Commissioning Date, to inspect and check all the plant supplies and installed by him for proper operation and to adjust where necessary, and to satisfy himself that the regular maintenance of the plant is being carried out correctly and in accordance with the written instructions supplied by him.

A provisional item has been provided in each section of the Schedule of Prices for these visits. Should a Contractor be awarded more than one section of the Contract, such visits will naturally coincide with each other and in which case the Contractor will be reimbursed at the rates submitted under one section only.

### D.26 OPERATING AND MAINTENANCE INSTRUCTIONS

(Refer to Clause 5.6 of the General Conditions of Contract)

Before completion of the testing of the plant, the Contractor shall provide the Employer with adequate and complete working, operating and maintenance instructions in triplicate, with the necessary drawings and diagrams clarifying the instructions.

Instructions are to be made up in book form and particular reference is to be made to:

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## Part 2: Section 6 Statement of Requirements

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- a) maintenance of equipment
- b) types of lubricants to be used
- c) bearings and moving parts which require particular attention, including a spare part list and drawings showing the individual items
- d) frequency of lubrication services
- e) precautions to be taken in running the plant
- f) maintenance of speed producers/increasers
- g) all instruments and components must be fully described in data sheets supplied by the relevant suppliers
- h) wiring diagrams of the complete electrical installation

the manual must be specific for the plant supplied and all extraneous material not connected with the relevant plant shall be deleted, leaving the manual as a comprehensive coherent document, bound in a professional way such that it may be used frequently without falling apart. Standard pamphlets may be supplied as addenda, bound separately in a good quality file to serve as a reference but will not be allowed as part of the main manual. The Contractor shall allow in his tender price for the supply of these operating maintenance instructions.

### D.27 QUALITY OF MATERIALS AND EQUIPMENT

All material, plant and equipment shall be the best quality available and shall, where applicable, comply with the relevant standard specifications of the SWASA. In cases where no specification of the SWASA exists, the relevant British, German or American specifications will be applicable as determined by the Engineer. The latest amendments of these specifications shall apply.

The Contractor shall submit for the approval of the Engineer and before any orders are placed, the names of the firms from which he proposed to obtain his supplies of materials and manufactured articles.

He shall also apply samples as and when required by the Engineer.

The Engineer may also, in exercising the powers vested in him, order the Contractor to remove all or any of the material and equipment which, in his opinion, is of an inferior quality and to replace them with proper materials or equipment at his own expense.

### D.28 CONTRACTOR'S DRAWINGS, DATA AND DESCRIPTIONS

Sufficient preliminary information shall be submitted with the tender, in respect of the mechanical equipment offered, to enable the Engineer to assess the offer.

The drawings shall contain the following:

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- a) All dimensions of the equipment offered including all details of the foundations, holes, ducts, layout, etc.
- b) Wiring diagrams for motor control centres.

If the Engineer requires any modifications to be made, the relevant Drawings will be returned to the Contractor, suitably marked up with the modification required. He shall amend his Drawings and submit these in triplicate to the Engineer within 14 days after the Engineer has posted or given the Drawings to the Contractor. The Engineer will sign one copy of each Drawing approved in principle and return it to the Contractor. Only if such approved Drawings have been received, will interim certificates be considered for payment. The full responsibility for the Drawings shall rest with the Contractor notwithstanding the Engineer's approval thereof.

All construction Drawings of structures in which equipment will be fixed or operated will be supplied by the contractor.

Fabrication (vendor) Drawings shall be submitted to the Engineer for approval in principle only.

### D.29 ENGINEER TO APPROVE PLANT

It is a condition of this Contract that the Contractors shall submit details of all equipment (i.e. motors, gearboxes, electrical equipment, etc) to the Engineer for his written approval before placing final orders for such equipment. This is to ensure that the equipment ordered is in accordance with that offered according to the Technical Data Sheets.

The shop details for all fabricated steel items shall be submitted to the Engineer for checking prior to commencing fabrication. The Engineer shall require the Contractor to change any design details that on checking are found not to comply with the Specifications given herein, and no extra payment will be made for such changes. The Engineer's approval will not relieve the Contractor of his full responsibilities for the due performance of the equipment installed.

The design of all methods of joining and fixing concrete structures shall be submitted to the Engineer for approval. Such approval will not relieve the Contractor of his full responsibility for the proper performance of the Works.

Mechanical joints subject to vibration or movement during the working life of the equipment, or those in inaccessible places, shall have the nuts locked or pinned, or the bolts peened over.

He shall also supply samples as and when required by the Engineer.

The Engineer may also, in exercising the powers vested in him, order the contractor to remove all or any of the material and equipment which, in his opinion, is of an inferior quality and to replace them with proper materials or equipment at his own expense.

### D.30 DEWATERING, INSTALLATION, ERECTION AND AFFIXING OF MECHANICAL AND ELECTRICAL EQUIPMENT TO STRUCTURES

Dewatering of structures in which installation of the plant is to take place will also be the responsibility of the Contractor and he must either allow therefore in his rates or give a rate for the use of a pump of specified size and pumping capacity in his covering letter.

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The Contractor shall be responsible for ensuring that any work carried out by his own staff or any sub-contractor working for him is carried out to his satisfaction and that the equipment meets all the requirements of the Specification as well as of all laws and all statutory regulations applicable to the Works.

All connectors such as anchor bolts (cast in situ or grouted), expansion bolts, base plates, etc, shall be designed by the Contractor to suit the equipment supplied by him and to ensure compliance with these Specifications.

All mechanical/electrical equipment supplied and delivered under this Contract shall be placed and firmly fixed in position by the Contractor on holding bolts supplied by him to ensure that it will operate efficiently to the satisfaction of the Engineer. Affixing shall mean the supply and installation of all nuts, bolts, plates, grout etc. and shall include for all labour and other activities such as sawing, cutting, filing, grinding, drilling, welding, repair of corrosion protection, grouting, etc. required for fixing the equipment. If the Contractor does not have the qualified personnel at his disposal he shall appoint the necessary specialists at his own cost.

The Contractor shall be responsible for providing all bolts, nuts and washers. Bolts, nuts and washers below water level shall be of stainless steel 316L unless otherwise specifically approved by the Engineer. All other bolts, nuts and washers shall be galvanized in accordance with SWASA 769 for Class B2 articles.

All dimensions of all equipment shall be checked by the Contractor after manufacture and on delivery.

### D.31 TESTING AND COMMISSIONING OF EQUIPMENT

Before starting up any section of the mechanical plant or filling tanks and sumps with liquid, the Contractor shall clean out the tanks or structures or, if necessary, arrange with the Civil Contractor to remove any building rubble from the structures, check that all nuts are tightened correctly, that all equipment is complete and ready for start-up, that the plant has been installed correctly and that three copies of the operating manuals have been handed over.

Each section of the equipment shall be started up by the contractor and he shall ensure that all oil fillings, lubrication, vibration monitoring, etc. have been correctly completed. In addition, he shall be responsible for the first re-filling of all lubricating oils as well as for adjusting the plant to operate according to Specification. These costs shall be allowed for his Tender.

The Contractor shall carry out his own tests on the equipment and only when these tests meet the requirements of the Specification shall he notify the Engineer, giving him 24 hours' written notice, that he is ready to commence with official commissioning tests.

The contractor shall carry out his own tests required to satisfy the Engineer that the plant is capable of performing the duties prescribed in the Specification, and shall allow for this in his Tender. Any defects detected during the testing operation shall be made good by and at the expense of the Contractor, including all additional costs incurred by the Employer and his representatives and the engineer. These tests shall be carried out to certify that the plant as installed on Site, is operating in accordance with the specified and guaranteed hydraulic, mechanical and electrical performance of the equipment and must be witnessed by the Engineer. Three copies of reports on all tests shall be submitted within two weeks after the tests have been carried out.

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When all the tests required before commissioning of the Works have been completed and accepted by the Engineer, the commissioning may proceed. The Contractor shall instruct the operating staff in the correct procedure of operating the plant in all circumstances of operation, including emergency conditions, the correct servicing of every part, type of oil or grease to use, and similar instructions. This shall be done by demonstration and confirmation in writing, and operating manuals shall be referred to for this purpose.

All tests that have not been carried out shall be completed during the commissioning period and be approved before handing over the equipment to the Employer.

During the commissioning period the Contractor shall be responsible for providing all labour and materials (including testing equipment) and shall carry out all servicing and any adjustment of plant required to ensure that it operates as specified.

Testing of the plant shall include operating at conditions as guaranteed and required in the Contract for hydraulic requirements, process requirements and power consumption of all equipment. All safety devices, standby plant, automatic controls and protection devices shall be adequately tested for reliability and correct functioning.

### D.32 DRAWINGS AND MANUALS

One month before the Works are commissioned the Contractor shall provide the Engineer with the following, for which he shall have provided for in his Tender:

- a) three sets of paper prints of all mechanical as-built Drawings, A3 size.
- b) three sets of operating manuals, operating and maintenance instructions of each item of mechanical/electrical plant, made up in book form.

A high standard of draughtsmanship shall be required for the as-build Drawings. Apart from complying with SWASA 0143, the following requirements shall apply:

- a) Each drawing shall be A3 size
- b) No drawing shall have lettering that is less than 3mm in height.

The Engineer will scrutinize all Drawings submitted to him and may reject any Drawing of which the standard of draughtsmanship is not to his approval. It goes without saying that all technical information on all Drawings shall be correct.

Particular reference is to be made in the operating manual to:

- a) precautions to be taken in running the plant,
- b) maintenance instructions, including bearings and moving parts that required special attention,
- c) types of lubricants to be used,

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- d) maintenance and routine tests which the Contractor suggests be carried out on the plant to ensure that the plant is kept in good repair,
- e) wiring diagrams of the complete electrical installation (as installed).

The Certificate of Completion will not be issued, nor will the Works be deemed to be completed before the operating and maintenance instructions and Drawings have been supplied and approved.

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### Project Specifications: Materials and Workmanship

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### E.1 GENERAL

All materials and components used in the manufacture and fabrication of plant to be supplied under this Contract shall be the best quality and suitable for the purposes for which they are intended and shall, where applicable, comply with the relevant standard specifications of the SWASA. In cases where no specifications will be applicable as determined by the Engineer, the latest amendments of these Specifications shall apply.

### E.2 QUALITY MANAGEMENT

#### E.2.1 Applicable Quality Assurance Standards

The Tenderer shall provide a co-ordinated and formally documented statement of his quality management system, including quality management objectives, policies, organization and procedures, for the compulsory implementation of SZNS ISO 9001, Code of Practice for Quality Management Systems. Monitoring and control by the Engineer may be done at any time on any material.

The Contractor shall submit with his tender an assessment report on his quality management and quality control system issued by an independent Quality assurance Authority approved by the Engineer. The inspection on which this assessment report is based shall have taken place not more than twelve months prior to the closing date of this tender.

Responsibility for and all associated costs of compliance with this sub-clause shall rest with the Contractor.

#### E.2.2 Quality Assurance Enhancement

Should the Contractor or any of the proposed sub-contractors not comply with Sub-Clause 1 at the time of tender a Contract may be awarded subject to a written undertaking to enhance his own and/or sub-contractor's quality assurance system to the satisfaction of the Engineer before commencement of the Contract.

#### E.2.3 Quality Assurance Staff

The Contractor shall satisfy the Engineer that a quality specialist together with sufficient and suitably qualified staff will be assigned to control the quality of material used by the Contractor and to monitor the quality of the material used by each sub-contractor engaged in the supply of critical and major components and major assemblies.

The curriculum vitae of the quality specialist shall be submitted to the Engineer at the time of tender. The Engineer shall approve the proposed quality staff in writing and changes of staff shall require the written agreement of the Engineer.

If the Engineer considers that the proposed quality specialist and/or quality staff is inadequate or becomes inadequate during the course of the Contract due to staff changes or for any other reason, the Contractor shall employ for the period of the Contract and at his own cost an independent specialist and/or sufficient and suitably qualified staff approved by the Engineer.

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### E.2.4 Engineers Quality Assurance Representative

The Engineer may elect to appoint an independent quality assurance representative to act in a surveillance capacity on his behalf for part or all of the Contract.

### E.2.5 Classification of Material

The quality system for manufacture and installation, will apply only to certain critical material, products and services indicated in the tender documents, of which the engineer considers the manufacturing and the installation stages of such critical importance that quality assurance by the Contractor shall be of an even higher level than that prescribed in ISO 9001.

### E.2.6 Sub-letting

All enquiries made and contracts placed by the Contractor for critical components shall require that sub-contractors comply with the requirements of the preceding Sub-Clauses. Responsibility for and all associated costs of compliance shall rest with the Contractor. In instances where SZNS ISO 9001 is not applicable, Tenderers must indicate what equivalent alternative Code of Practice is being implemented.

### E.2.7 Disqualification

Tenderers who do not include the formally documented statements called for in Sub-Clause 1 and who do not respond in terms of Sub-Clause 2 above will be disqualified.

## E.3 STANDARD SPECIFICATIONS

Reference made hereinafter to specifications of the Eswatini Bureau of Standards, (SWASA) or the British Standards Institution (BS) shall be deemed to include all revisions of and/or additions to such specifications ruling at the closing date of tenders.

## E.4 PROTECTION AGAINST CORROSION

Where corrosion of metal may be expected, the Contractor shall supply materials which are resistant to corrosion, any material showing signs of corrosion, tuberculation or pitting before expiry of the Defects Liability Period must be replaced by the Contractor. The tendered prices will be held to include the cost of all painting or other surface treatment which is not separately specified or scheduled but which is nevertheless necessary for the protection of surfaces against corrosion. All corrosion protection shall conform to the Corrosion Protection Specification for Civil, Mechanical and Electrical Engineering Construction specified in SZNS ISO 12944 (coatings) and SZNS ISO 1461 (galvanization), alongside IEC-based electrical protection standards.

## E.5 STRUCTURAL STEELWORK

The design of structural steelwork and the materials and workmanship used in the construction of same shall comply with the requirements of SZNS ISO 1993 / SZNS ISO 10162 (harmonized with SANS 10162) – Structural use of steel, limit-states design of hot-rolled steelwork and SZNS ISO/EN 10025 series – Hot-rolled products of structural steels (grades S235, S275, S355, etc.). Grade 300 W steel shall be used.

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In the case of welded connections, in addition to welds required for structural strength, a sealing weld shall be carried right around the connection so as to facilitate protection against corrosion.

### E.6 SCREWED AND SOCKETED STEEL PIPES AND MALLEABLE CAST IRON FITTINGS

All screwed and socketed pipes shall be solid-drawn, seamless, medium duty and shall comply with the requirements of SWASA 62. Welding will not be permitted on galvanized piping. Malleable cast iron fittings used in conjunction with screwed and socketed pipes shall comply with the requirements of SWASA 14. Pipes and fittings shall be galvanized inside and outside in accordance with SWASA 32.

### E.7 STEAM, GAS AND COMPRESSED AIR PIPEWORK

Pipework for conveying steam, gas and compresses air in sizes up to and including 150 mm nominal bore shall comply with the requirements of SWASA 60 for seamless steel pipes. Unless otherwise specified, these pipes shall be heavy quality with flanged joints, the latter suitable for a working pressure of 1.6 MPa.

### E.8 POLYTHYLENE PIPES AND FITTINGS

Polyethylene pipes shall be of high density type complying with the requirements of SWASA 33-2 type IV and shall be of type(s) and class(es) as specified for each application. Pipe fittings shall be of the compression type.

### E.9 UNPLASTICIZED POLIVINYL CHLORIDE PIPES AND FITTINGS

Unplasticized Polyvinyl Chloride (uPVC) pipes and fittings shall comply with the requirements of SWASA 966 and shall be of the clas9es) as specified for each application and shall be fitted with spigot and socket Z-joints with rubber sealing rings. Except for bends, which shall be of uPVC with a factory-applied Z-joint at one end, all fittings for use with uPVC pipes shall be of cast iron with wall thickness in accordance with SWASA 546 and socket dimensions in accordance with SWASA 966 for larger diameters and of uPVC with equal or higher strength class for smaller diameters.

### E.10 COPPER TUBES

Copper tubes shall be of light gauge conforming to SWASA 460. Where bends are required they shall be formed with a proper tube-bending machine. Joints shall be brass compression fittings conforming to BS 864.

### E.11 CAST IRON PIPES AND FITTINGS

All cast iron pipes and fittings shall comply with the requirements of BS and unless otherwise specified, shall be of class D quality for straight pipes and of class CD quality for fittings. Materials used shall comply with the requirements of SWASA 1034 Grade 300 for “Grey Iron Castings”. Before leaving the foundry all cast iron pipes and fittings shall be protected against corrosion in accordance with the Standardised Corrosion Protection Specification.

For treatment of mating faces and flanges see Clause E.14

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### E.12 MILD STEEL PIPES, FITTINGS AND SPECIALS

All Pipework up to and including 150 mm diameter shall comply with the requirements of SWASA 62, medium wall standard welded pipes.

All mild steel pipes and fittings with diameter greater than 150 mm shall comply with the requirements of SWASA 719 Grade A. specials shall be manufactures from straight pipes in accordance with the relevant requirements of BS 534. All welding in pipes and specials shall be electric fusion welding.

Before leaving the factory all mild steel pipes and fittings shall be protected against corrosion in accordance with the Standardised Corrosion Protection Specification.

For treatment of mating faces of flanges see Clause E.14

Plain ends of pipes and fittings shall be recovered and protected against damage while being transported from the factory to the Site.

Wall thickness of pipes and fittings shall be 6 m, unless specified otherwise in the Detailed Specifications.

### E.13 VALVES

- (a) Gate valves shall be double flanked with non-rising spindle and shall be fitted with gun metal seats, bronze spindles and gun metal nuts. The direction of closing, which shall be clockwise when viewed from above, must be clearly indicated on the handwheel of each valve. Gate valves shall be of standard waterworks pattern complying with the requirements of SWASA 664 for working pressures as specified for each application.
- (b) Reflux valves shall, except where otherwise specified, be Nitrite covered single door swing type and shall be double flanged and mounted horizontally. The design shall be such that the gate rests against the seat in the absence of flow or of differential pressure, without the aid of springs. Reflux valves shall comply with the requirements of SWASA 1551-1 for working pressures as specified for each application.
- (c) Butterfly valves shall be either of double flanged lugged or wafer type as may be approved, and shall conform where applicable to the requirements of BS 5155 for tight shut-off type with resilient seats. Butterfly valves shall be suitable for a working pressure as specified for each application. Closure of valves shall be by clockwise movement of the handwheel or ratchet handle and the fully open and fully closed position shall be positively stopped.
- (d) Pinch valves shall be double flanged and shall be suitable for fitting and electrically operated actuator to the valve if required and shall close in a clockwise direction when viewed from above. The valve body shall be manufactured in S.G iron in accordance with BD EN 10213-2 Grade 680. The sleeve shall be manufactured in neoprene and reinforced with steel cord. The valves shall be suitable for a working pressure as specified for each application.

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- (e) Plug valves shall be flanged and shall be suitable for fitting as electrically operated actuator to the valve if required and shall close in a clockwise direction if viewed from above.

Port arrangements shall be specified for each application. The valve shall be antistatic and the body shall be manufactured in S.G iron in accordance with BS EN 10213-2 Grade 480. The plug shall be manufactures in stainless steel. The body of the valve shall be suitable for a working pressure as specified for each application.

- (f) Resilient Seal Gate Valves shall be double flanged with non-rising spindle and shall conform to the requirements of SWASA 664 for working pressures as specified for each application. Spindles shall be in stainless steel with bronze nuts. The direction of closing, which shall be clockwise when viewed from above, must be clearly indicated on the handwheel of each valve.
- (g) Air Valves shall have single or double openings as specified and shall be manufactured, when applicable, to the same standards of quality and finish as laid down in SWASA 664 for gate valves.

Each single acting air valve shall incorporate either a large or a small orifice, s specified, and shall be fitted with a detachable copper-alloy isolating gate valve.

Each double-acting air valve shall incorporate both a large and a small orifice as well as an isolating valve that forms an integral part of the air valve. Such isolating valves shall have bronze or stainless-steel spindles fitted with CI cap tops and shall close clockwise.

Tenderers shall, with their tenders, furnish the minimum working pressure at which the specified air valves are watertight.

- (h) Knife gate valves shall have a solid body casting, and shall be suitable for mounting between flanges or as a terminal valve. The knife gate valve shall have a polished 304 stainless steel gate with chamfered edge at the base. The gate shall seal either on a replaceable nitrile O ring or P.T.F.E. seal secured in the body. The seal shall be an internal resilient seal, mechanically retained, to ensure that the blade is guided throughout its travel and that bi-directional drop tight leak proof sealing is obtained.

Knife gate valves shall be fitted with non-rising Grade 304 stainless steel spindles. The direction of closing, which shall be clockwise when viewed from above, shall be indicated clearly on the handwheel. The knife gate valves shall comply with the requirements of SWASA 664, for working pressures as specified for each application.

- (i) General Before leaving the factory valve bodies shall be treated as follows:

Internally:	150 mm diameter and smaller: manufacturer's Standard Corrosion Protection Treatment
Internally:	larger than 150 mm diameter: as specified in the Standard Corrosion Protection Specification.
Externally;	as specified in the Standardised Corrosion Protection Specification.

For treatment of mating faces of flanges see Clause E.14

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### E.14 FLANGES

The dimensions and the drilling of standard flanges shall comply with the requirements of SWASA 1123 for a working pressure of 1 MPa. Flanges shall be machined flat, i.e. without a raised joint face. Puddle flanges shall have the same dimensions as standard flanges but shall be undrilled.

Faces of flanges which will be in contact with jointing gaskets shall receive a protective coating of such thickness and consistency as will not impair the air/gas/water tightness of the joint.

### E.15 JOINTING MATERIAL FOR FLANGED JOINTS

Bolts for flanges shall comply with the requirements for BS 4504 for the working pressures specified and shall furthermore, together with the nuts and washers used in conjunction therewith, be of the material as specified in Clause E.16. The jointing gaskets shall comply with the requirements of BS 3063 and shall be cut to the full width of the flange and holed for bolts.

### E.16 BOLTS, NUTS AND WASHERS

All mild steel bolts and nuts shall comply with the requirements of SWASA 135. Washers shall be provided at each nut and shall be of the same material (or coating where applicable) to match the bolt and nut. Nuts and bolts subject to vibration shall be machine finished, fitted with plain washers and treated with “Loctite” or equivalent.

Bolts other than jacking bolts shall project not less than 3 mm and not more than 10 mm from the heads of the nuts after tightening.

Bolts to be built into concrete work as well as to be installed above ground level (outside buildings), directly above and under water shall be of stainless steel Grade 304. Bolts for underground installation of flexible couplings and flanges as well as bolts to be installed inside buildings shall be hot-dip galvanized except where otherwise specified. Galvanizing shall be in accordance with Clause 7 of the Standardised Corrosion Protection Specification (Heavy coating).

Suitable plastic sleeves and/or washers shall be used for protection against corrosion caused by bimetallic action.

### E.17 SPARES, TOOLS AND LUBRICANTS

Tenderers must submit in the appropriate Schedule in the Data Sheets a list of spare parts which is recommended to be kept by the Employer for maintenance of the plant. All spares must be packed separately and the cases appropriately marked. All spares must be new and unused. A full range of spares must be kept locally for not less than 15 years.

Tenderers must also submit in the appropriate Schedules in the Document a list of spanners, keys and special tools required for the operation, adjustment and overhaul of the plant supplied. All spanners, keys and tools shall be new and unused.

In addition to the lubricating oil to be provided for commissioning the plant an additional quantity of oil adequate for at least two refills of such plant must also be provided.

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A grease gun suitable for use in conjunction with all the grease nipples on the plant must be provided together with at least 5 kg of the appropriate grease to be used. If more than one type of grease is required, a separate grease gun for each type of grease and 5 kg of each type of grease must be provided.

Supply of the above must be included in the rates of the equipment.

### E.18 METAL WALKWAYS

All metal walkways shall be made of square pattern type approved open grid flooring manufactured with 40 x 5 m minimum thickness bearer bars spaced at not more than 40 mm centres.

Individual panels shall be fully banded.

Open grid flooring shall be made of 3CR12 steel. Pickling and passivation shall be carried out in accordance with the Standardised Corrosion Protection Specification.

### E.19 HANDRAILING

Stanchions for hand railing shall be approved prefabricated ball type made in one piece without welding at ball joints to accept the hand and knee rails and shall have 150 x 75 x 10 mm base plates drilled for M12 bolts at 100 mm centres.

Hand and knee rails shall consist of 25 mm nominal inside diameter tubing cut and bent to shape. Stanchions shall be spaced not more than 1.5 meters apart. Unless otherwise shown, all hand railing shall be 900 mm above walkway level.

All tubing, stanchions and base plates shall either be manufactured in galvanized mild steel or in grade 304 stainless steel called for in the detailed specification. Galvanizing of handrails shall comply with the Standardised Corrosion Protection Specification. Stainless steel handrails shall have a No. 1 surface finish and pickling and passivation shall be carried out in accordance with the Standardised Corrosion Protection Specification.

Bolts shall comply with the requirements of Clause E.16 of the Specification.

### E.20 ELECTRIC ACTUATORS FOR VALVE AND SLUICE GATE CONTROL

Electric actuators for valve (other than plug valves) and sluice gate control shall be equal and similar to Auma Modulating type actuator complete with Auma Matic Profibus-DP for indication and control. Optional Analog/digital inputs are to be provided as well.

Electric actuators for plug valve control shall be suitable for valve position selection by means of a local as well as a remote non-maintained signal and limit switches built into the actuator to facilitate positive positioning of the plug valve in any of the positions selected. The actuator shall be provided with local valve position indicating as well as facilities for remote position indication.

NB:gears of Synthetic materials will not be acceptable in these units.

### E.21 GENERAL REQUIREMENTS FOR THE SUPPLY AND INSTALATION OF ELECTRICAL MATERIALS AND EQUIPMENT

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### E.21.1 Standards

All material and equipment supplied and/or installed under this Contract shall be new and the best of their respective kinds and shall comply with the requirements laid down in the latest editions of the relevant SWASA or BS Specifications and their amendments (if any) and the requirements of this Specification. In the event of items bearing the SWASA mark being available in respect of the materials and equipment required, only items bearing this mark will be acceptable.

This workmanship and finish of work shall be of a high standard throughout and to the satisfaction of the Engineer Equipment of the same rating and function shall be identical, of the same manufacture and inter-changeable.

### E.21.2 Compliance with Laws and Regulations

The work shall be carried out strictly in accordance with and all material and equipment supplied shall comply with the following laws and regulations where applicable:

- a) The latest edition of the “Code of Practice for the Wiring of Premises”, SWASA 0142, as amended;
- b) the Occupational Health and Safety Act No. 85 of 1993;
- c) the “Electricity Supply By-laws and Regulations” of the Supply Authority;
- d) the local Fire-Office Regulations;
- e) the Regulations of the Department of Communications;
- f) the Acts and Regulation applicable to the use of Explosives; and
- g) “The Code of Practice for the Installation and Maintenance of Electrical Equipment used in Explosive Atmospheres” (SWASA 086).

The Contractor will be responsible for serving all notices and paying all fees due in terms of the above laws and regulations.

### E.21.3 Radio and TV Interference

All equipment installed under this Contract shall comply with the Government Notice No. R 2246 and any other applicable rules and regulations in respect of radio and TV interferences. Any equipment found producing interference subsequent to commissioning, shall be suppressed or replaced to the satisfaction of the Engineer without any additional cost.

### E.21.4 Site Conditions

The following climatic and general conditions are prevalent on site and all equipment supplied and built into the works shall operate satisfactorily under these conditions at the total specified capacities:

Maximum ambient temperature: 37 deg. C

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Minimum ambient temperature: -9 deg. C

24-hour average maximum temperature: 24 deg. C

Altitude: 1 450 m.a.s.l.

Humidity: Up to saturation point

Atmosphere: dusty and highly corrosive; organic acids from sewage works.

Solar: long periods of sunshine giving rise to high temperatures in enclosed outdoor housings; high breakdown incidence due to effect of ultra violet rays of outdoor synthetic materials

Lighting: a very high lighting rate is encountered.

The electricity supply system will be a 380/230 V, 50Hz, three phase, four wire system with solidly earthed neutral and all material and equipment supplied and installed under this Contract shall be rated, designed and manufactured for satisfactory operation on this system.

It must be noted that severe voltage surges and/or spikes may be experienced on the electricity supply system due to lightning or switching operations and where necessary the Contractor shall provide the necessary protective devices against such surges and spikes for the equipment supplied and installed by him with special reference to electronic devices.

### E.21.5 Drawings And Operating Instructions

The Contractor shall use the ENGLISG language on all drawings.

The Tenderer shall submit with the Tender, certified drawings, which show dimensions of the cabinets he intends using in the outstations, as well as all the drawings, which he deems necessary to describe the equipment. The electrical Contractor will provide the necessary accommodation required inside the various motor control centres.

The Tenderer shall within two weeks after the placing of an order, provide the Engineer with 4 paper copies of the drawings showing the dimensions of all equipment to ensure that the necessary accommodation for the monitoring and control system is provided for timeously.

The Contractor shall provide the Engineer with 2 complete sets and an electronic format copy of drawings for approval within 1 month after the order has been placed.

A set of drawings shall contain the following:

- a) General arrangement drawing of equipment
- b) Circuit diagrams showing the incorporation systems to be monitored or controlled.
- c) Drawings or schedules showing cable connections to field and system equipment.

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A provisional set of instruction manuals containing complete instructions, descriptions, drawings and diagrams to describe the complete operation of the system and of each equipment shall be handed to the Engineer before construction work commences for comments and acceptance.

Within 1 month after the completion of the Contract, the Tenderer shall supply the Engineer with:

One complete set of sepia copies of all the drawings (as built) with all the latest versions.

Two months before commissioning of the system the Contractor shall hand over four sets of handbooks that contain the following:

- i. Technical description and specifications of equipment;
- ii. Erection and commissioning instructions;
- iii. Operating instructions of the equipment and system as a whole;
- iv. Description of operation, tuning, fault finding and maintenance of each individual equipment; and
- v. Spare parts list with illustrations and serial numbers for correct identification of spares for ordering.

Wiring schedules

Electronic format copies of all drawings and PLC programming.

An amount of E 15 000-00 will be withheld from each and every payment certificate until such time as the requirements of this clause have been fully met.

### E.21.6 Protection Of Equipment Against Voltage Surges And Spikes

Tenderers shall allow in their Tender prices for adequate protection of the equipment supplied and installed under this Contract against direct as well as induced voltage surges and spikes which may be experienced on the system. Surge arresters shall be provided on each phase as well as neutral on the incoming power supply terminals of each board.

Electronic equipment shall be adequately protected on both the incoming and outgoing terminals by means of suitable arresters compatible with the relevant equipment.

Arresters shall be of DEHN manufacture (as supplied by Pontis Earthing and Lightning Services (Pty) (Ltd)) or equal and similar thereto.

All arresters shall be connected directly to earth along the shortest possible route and only conductors of adequate rating for the discharge currents catered for shall be used for connections to arresters.

Tenderers shall submit full particulars of the arresters offered as well as written confirmation that it will provide adequate protection for the relevant equipment against possible voltage surges and spikes on the system.

### E.21.7 Fixing and Support Materials

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All fixing and support materials for outdoor use in connection with the installation of electrical material and equipment such as surface mounted cable sleeve pipes, conduit, saddles, clamps, brackets, bolts, nuts, washers and screws shall be grade 304 stainless steel.

### E.21.8 Paint Finishes For Electrical Materials And Equipment

The paint finishes for electrical materials and equipment where applicable shall strictly comply with the Corrosion Protection Specification, New Revised 2001 Edition, published by Wates, Meiring and Barnard (Pty) Ltd.

### E.21.9 Low Voltage Electric Motors

Motors of local manufacture shall fully comply with the following standards:

Single phase motors :  
SWASA 1189

Three phase motors :  
SWASA 948

Imported motors shall fully comply with either BS 4999 and BS 5000 or IEC 34 and IEC 72.

When ordering electric motors for a specific application the Contractor shall ensure that the orientation of the terminal on the motors are suitable for vertical cable entry from below with motor installed in position and provided with suitable cable entry holes to accommodate the specific cable glands (Holes to be tapped in case of cast boxes).

All three phase low voltage motors shall be of the squirrel cage induction type.

Unless a power rating of a motor is specified, all motors shall be rated for continuous operation (Duty Class S1) at an output of 10 % in excess of the maximum power requirements of the associated driven plant when operating at the maximum specified duty at an ambient temperature of 37°C and an altitude of 1 450 m.a.s.l.

The motors shall be of a recommended standard rating and if the requirements given above fall between two standard ratings, motors of the next higher standard rating must be provided.

The motors shall be either fixed speed or dual speed units, as required.

The motor speed shall match that of the driven plant but shall not be in excess of 1 500 r.p.m.

All motors shall be suitable for “direct-on-line” starting unless “star/delta” or other starting methods are prescribed by the supply authority.

The maximum starting current of these motors under locked rotor conditions with specified voltage applied to the motor terminals shall not exceed six times normal full load current.

The motors shall be suitably rated for 15 starts per hour at an ambient temperature of 37°C and an altitude of 1 450 m.a.s.l.

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All submersible motors shall be of the IP 68 type and all other motors shall be of the IP 55 IC 01 41 type.

Anti-condensation heating shall be provided on motors rated at 7.5 kW and above and shall be effected by means of an internally fitted 230 V tape heater. Motors rated at 22 kW and above shall each be equipped with three thermistors with a positive temperature coefficient to resistance embedded in the overhang of the stator windings (one per phase) to facilitate the operation of protective devices on overheating of the relevant motor. These thermistors and heaters shall be wired to suitable separate terminal boxes on the outside of the motors.

All submersible motors shall be supplied complete with adequately rated underwater cables factory connected onto the motors, of power supply as well as sensing where applicable. These cables shall be sufficient length to reach the connection points, i.e. the nearest readily accessible dry area, without straining the cables and shall have watertight connections onto the motor. Exact lengths of cables required shall be verified on site before finalizing orders.

Each motor shall be provided with a Grade 304 stainless steel or brass nameplate.

The following information shall be submitted with each Tender in respect of all the three phase low voltage motors offered:

- a) Two copies of an outline drawing showing main overall dimensions
- b) Guaranteed continuous rating under site conditions.
- c) Guaranteed number of starts per hour at an ambient temperature of 37°C.
- d) Guaranteed maximum starting current under locked rotor conditions with the normal voltage connected to the incoming terminals.
- e) Guaranteed efficiency of the motor at 50 % and 100 % normal full load with motor windings connected in delta.
- f) Guaranteed power factor of the Motor at 50 % and 100 % normal full load with the motor windings connected in delta.
- g) The mass of each motor
- h) Copies of SWASA test reports if these motors carry the SWASA mark.

The following tests shall be carried out at the Manufacturer's Works on these motors after manufacture:

- a) If the motors do not carry the SWASA mark, performance and efficiency tests shall be carried out to prove the guaranteed information submitted with the successful Tender
- b) All motors shall be subjected to routine tests as prescribed in Appendix D to SWASA 948.

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The manufacturer must submit to the Engineer two certified copies of the test certificates reflecting the conditions and results of the test carried out on each motor.

After installation on Site, but prior to commissioning, the following tests shall be carried out:

- a) Ensure that the bearings are properly lubricated
- b) Ensure that all power and earth connections are properly made.
- c) Check all ventilation openings for obstruction
- d) Measure the insulation resistance between phases mutually and between each phase and earth to ensure that the windings are dry.
- e) Spin the motor by briefly switching the supply on to check the correctness of the direction of rotation.

After the motor has been started the following shall be observed:

- f) Smoothness and period of acceleration up to maximum speed.
- g) Noise, vibration and temperatures of motor and bearings.

### E.21.10 Electric Cables, Cable Terminating Glands and Earth Wires

All multicore cables used in this Contract shall comply with the requirements laid down in SWASA 1507-1970 as amended to date for PVC SWA PVC cables with copper conductors and installed for either 600/1000 volt.

Cables for 4-20mA signals shall consist of the requisite number of 1 mm<sup>2</sup> copper twisted pairs, individually and overall screened, PVC sheathed, steel wire armored and PVC covered, complying with the requirements of SWASA 1507 where applicable.

Cables and earth wires for a specific application shall be selected strictly in accordance with the requirements laid down in SWASA 0142 in respect of current rating and voltage drop. Where practicable the earth continuity conductor shall form an integral part of the cable.

Each multicore cable connection shall be terminated at each end by means of a suitable sized adjustable chromium plated, brass terminating gland complete with armour clamp and neoprene shroud. Cable terminating glands for outdoor use shall be provided with waterproofing inner seals as well as waterproofing seals on nipples. Cable armouring shall be earthed at each end but may not be used as earth continuity conductor.

Each earth wire shall be terminated at each end by means of a suitably sized bolted lug either sweated or crimped onto the wire. The lugs shall be bolted onto the relevant earth bars or earthing terminals

Cables on walls and structures shall be installed on galvanized stainless steel, as may be required; cable trays shall be properly supported and firmly fixed at suitable regular intervals to prevent it from sagging under its own weight.

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All exposed cable runs shall be installed neatly horizontally and vertically and all exposed vertical cable runs between ground level and 2 m above ground level shall be installed in cable sleeve pipes or stainless steel pipes. These pipes shall extend to at least 300 mm below ground level. Intervals between fixing points for sleeves and conduit shall not exceed 1 m.

Only plugging materials of an approved type may be used for fixing to brick walls and concrete – wood will not be acceptable. Plugging in joints of brick walls will not be acceptable.

Cable trenches shall be deep enough to facilitate the laying of cables at depth of 750 mm below final ground level. Cable trench floors shall be smooth and free from boulders and sharp rock projections.

All cables shall be laid in a bedding of river sand or sifted soil 75 mm over and 75 mm below the cables, clayish soil will not be accepted as bedding. Once the cables have been laid, straightened, inspected, approved and covered with the top layer of bedding soil, the trenches shall be backfilled with soil which does not contain more than 40 % rock or shale and which will pass through a sieve with 100 mm diameter holes.

Backfilling of cable trenches shall be done in easy stages with thorough consolidation at each stage in order to prevent subsequent subsidence.

Cable sleeves shall be installed across road sections and paved vehicle entrances. Cable sleeves shall be similar and equal to Kableflex type cable sleeves. Cable sleeves shall extend at least 450 mm beyond the edge of the road or vehicle entrances.

The separation between power cables shall be 150 mm and between any cable for 4-20 mA signal and the nearest parallel power cable not be less than 500 mm. the separation between power cables connected to frequency converters for variable speed applications and signal cables shall be 500 mm.

Earthing of cable screens shall be carried out in accordance with the requirements dictated by the associated equipment.

### E.21.11 Electrical Switchboards And Motor Control Boards

#### a) Type and construction

All electrical switchboards and motor control boards shall be either of the surface mounting or floor standing type depending on the physical size of the board with IP 55 insect proofed closure, consisting of a bounding tray removable front panel and chassis all constructed of at least 2 mm thick metal plate. Sufficient provision shall be made for heat dissipation and ventilation of the board.

Switchboards for outdoor use shall be of the waterproof type constructed of grade 304 stainless steel.

Switchboards for indoor use shall be constructed of sheet steel and painted in compliance with the Corrosion Protection Specification for Civil, Mechanical and Electrical Engineering Construction, New Revised 2001 Edition, published by Wates, Meiring and Barnard (color B26, SWASA 1091-1975).

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The type of plant to be used on internal surfaces shall not cause corrosion of cadmium plated or zinc plated surfaces.

These boards shall comply with the requirements of SWASA 1180: Part I where applicable.

The bonding tray for any specific board shall be big enough to accommodate all the relevant equipment without cramping. All trays shall be substantially braced by means of suitable gussets.

Doors shall be rigid and shall be secured in position by means of robust grade 304 stainless steel hinges. No single door shall be wider than 600 mm.

The doors shall each be provided with at least two “square key” panel locks – one at the top and one at the bottom of the lock side of the door.

The chassis shall be rigid and facilities shall be provided in the chassis for mounting all the relevant equipment.

The panel shall be rigid and readily removable without necessitating the disturbance of any of the equipment on the board. Panels shall be mounted in such a way that all equipment are flush behind the panel with only operating handles, instrument faces, indicator lights, push buttons projecting through neat machine punched slots and holes in the panel. All panels shall be provided with chromium plated brass handles to facilitate removal and shall be secured in position by means of knurled captive thumb screws.

Each board shall be provided with suitably rated main switch machinery interlocked with the removable front panel in such a way that it will be impossible to remove the front panel without switching off the main switch.

It shall be possible to adjust control equipment e.g. Time switches without having to remove the front panel

All screws, studs, bolts, nuts and washers used for these boards shall be rustproofed. The use of self tapping screws will not be permissible.

### b) Busbars for switchboards and motor control boards

The board shall be provided with one set of four solid, copper busbars in the top section and extending over the entire length of the board. Provision shall be made at the end of each busbar for future extensions.

Busbars shall comply with the requirements of BS 1433 and the relevant clauses of BS 159.

Busbars shall be rigidly supported at suitable intervals to prevent undue damage resulting hereunder short circuit conditions. Ceramic or other approved busbar insulators shall be used. The busbars shall be arranged horizontally with the longer sides of the cross sections in the vertical plane and one above the other, in the horizontal plane.

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Busbars shall be clearly and indelibly marked Red, Yellow and Blue for the three phases and Black for Neutral.

Connections to busbars shall be effected by means of cable lugs and suitably sized cadmium-plated, high tensile steel and nuts with cadmium-plated up washers or lock washers.

A solid copper earthbar shall be provided inside the board at the back and along the entire length at the bottom.

The earthbar shall be drilled and provided with the required number of 6 mm dia and 10 mm dia cadmium-plated, high tensile steel bolts and nuts complete with cadmium-plated washers and cup washers or lock washers, from making the earth connections. The earthing positions shall be evenly spaced along the entire length of the busbar.

c) Internal wiring for switchboards and motor control boards

The internal wiring of the boards shall consist of the coloured PVC insulated conductors of adequate copper cross-section, which shall be neatly installed horizontally and vertically and bunched where possible by means of perforated plastic tape. (String will not be applicable). Numbered ferrules of an approved type shall be provided on each end of each wire, to facilitate the tracing of circuits. Wiring for external circuits shall be terminated on suitably sized DIN rail mounted “Klippon” or equal terminal blocks at the bottom.

d) Labelling of switchboards and motor control boards

A screwed on engraved label of the black and white “trefolite” type shall be provided below each item of equipment on the front panel of each board as well as on the chassis in the close proximity to the relevant equipment to identify such equipment in English in 6.5 mm high lettering.

Each board shall further be provided with a screw-on reverse engraved yellow Perspex nameplate with black 20 mm high lettering to identify the board in English on the outside of the door at the top thereof.

e) Equipment for switchboards and motor control boards

Each switchboard or motor control board shall be provided with all the necessary equipment to ensure proper functioning of the plant it controls as well as a main switch as specified above and a busbar connected voltmeter with a 4 position selector switch to measure busbar voltage on all three phases and switch the voltmeter off in the remaining position.

All switchboards or motor control boards with more than one motor starter and with a total connected load in excess of 50 kW shall be equipped with maximum demand ammeters.

The equipment shall comply with the specifications below where applicable.

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### f) Motor Starters

#### i. Direct-On-Line Starters for motors rated 5 kW or less

A direct-on-line air break contractor type starter shall be provided for each motor below 5 kW. The starter shall be complete with the following:

- a) A suitably rated isolating switch
- b) Adjustable thermal overload trip relays with adjustable time lags in each phase for motors below 5kW.
- c) An under voltage release
- d) Protection against single phasing – the operation of which shall be independent of the settings of the overload trip relay.
- e) HRC back-up protection fuses.
- f) An ammeter in one of the phases for all motors rated below 5kW as well as a running hour meter.
- g) A selector switch to facilitate the selection of either off, local manual control or remote automatic control where applicable.
- h) A set of normally open and a set of normally closed potential free auxiliary contacts on the starter Contractor wired for remote indication.
- i) A set of “STOP” and “START” push buttons for local manual control.
- j) A set of “GREEN”, “AMBER” and “RED” indicator lights for local indication of motor “Power-on”, “Running” and “Tripped” conditions respectively.

It shall further be possible to trip and lock-out the starter by means of a remote emergency stop button to be provided at the relevant monitor.

Provision shall also be made for locking the mains fused switch handle in the OFF position.

#### ii. Direct-on-Line Starters for motors rated above 5kW

These starters shall be of the manually operated (locally and remotely) type and each starter shall be contained in its own separate compartment on the relevant motor control board.

Each of these units shall comprise amongst other the following components:

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- 1 Only mains fused switch connected to the busbars of the board and interlocked with the door of the compartment to prevent opening of the door with the switch closed and to prevent closing of the switch with the door open.
- 1 Set HRC control fused links with carriers and basis;

All necessary relays as required;

- 4 Lightning arrestors;
  - 1 Only mains contractor;
  - 1 Set of START and STOP push buttons;
  - 1 A selector switch to facilitate the selection of either off, manual or automatic control where applicable;
  - 1 Only mains operated timing device to limit starts to 15 starts per hour;
  - 1 Only mains operated timing device to delay automatic starting after a power failure where applicable;
  - 1 Only power factor correction capacitor unit

The following protective and indicating devices complete with the necessary suitable rated potential fuses, current transformers, test blocks and auxiliary relays;

- 1 Only motor protection relay equal and similar to CET4 Sprecher & Schuh;
- 1 Only instantaneous indicating ammeter for motor current;
- 1 Only ammeter selector switch;
- 1 Current transformers;
- 1 Only running hour meter;
- 1 Only anti-dither circuit;
- 1 Only anti-cycle timer;
- 4 Only indicator lights as follows:

Green - Supply 'On';  
Amber – 'Motor Running';  
Red – 'Motor Tripped'  
Blue – 'Time delayed starting period'

Potential free contacts for monitoring purposes

It shall further be possible to trip and lock-out the starter by means of a remote stop button to be provided at the relevant motor.

Provision shall also be made for locking the mains fused switch handle in the OFF position.

### iii. Star/Delta Starters for motors rated below 5kW

These starters shall be of the automatic star/delta type and each starter shall be contained in its own separate compartment on the relevant motor control board.

Each of these units shall comprise amongst others the following components:

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- 1 Main Isolator connected to the busbars of the board and interlocked with the door of the compartment to prevent opening of the door with the switch closed and to prevent closing of the switch with the door open;
- 3 HRC fuses rigidly attached to the load side of the abovementioned Mains Isolator and the rating of which shall be carefully selected for back-up protection for the relevant motor;
- 1 Set of HRC control fused links with carriers and bases;

All necessary relays as required;

- 4 lightning arrestors;
- 1 only Mains Contractor;
- 1 only Star Contractor;
- 1 only Delta Contractor
- 1 only Star to Delta timer of the clockwork or electromagnetic type;
- 1 only mains operated timing device to delay automatic starting after power failure where applicable;
- 1 only Mains operated timing device to limit the starts to 15 starts per hour;
- 1 Selector switch to facilitate the selection of either off, manual or automatic control where applicable;
- 1 set START or STOP pushbuttons;
- 1 only Three phase Power Factor Correction Capacitor unit; and  
All necessary relays.

The following protective and indicating devices complete with the necessary suitably rated potential fuses, current transformers and auxiliary relays shall be provided:

- 1 only Motor Protection Relay, equal and similar to CET4 Sprecher & Schun.
- 1 only instantaneous indicating Ammeter for motor current;
- 1 only Ammeter selector switch;
- 3 current transformers;
- 1 only Blue Indicator light to indicate time delayed starting period;
- 1 only Running Hour Meter;
- 1 only Earth Leakage Relay Unit; and
- 3 only indicator lights as follows:

Green – “Supply On”  
Amber – “Motor Running”  
Red – “Motor Tripped”.

It shall further be possible to trip and lock-out the starter by means of a remote stop button to be provided at the relevant motor.

Potential free contacts for monitoring purposes

Provision shall also be made for locking the mains fused switch handle in the OFF position.

### g) Switch-and Control Board Components

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### I. Isolators

All isolators shall be of the “Load-breaking” and “Fault-Making” type and shall comply with the requirements of BS 5419-1977 where applicable.

### II. Fused Switches

All fused switches shall be of the “load-breaking” and “fault-making” type complying with BS 5419 where applicable and fitted with HRC cartridge fused links to BS 88.

### III. Moulded case circuit breaker

All moulded case circuit breakers shall comply with the requirements of SWASA 156-1977 and shall be equal and similar to Heinemann manufacture.

These circuit breakers shall be fitted with copper terminal collector bars where more than one cable tail has to be terminated on the same terminal.

### IV. Air break contractors

All contractors shall be of the totally enclosed three pole, double air break per pole, automatic magnetic type complying with the requirements of IEC 158-1 for Class AC 3 contractors of Intermittent Duty Class 0,3.

All contractors shall be provided with arc extinguishers and readily replaceable silver or silver-alloy contacts rated for at least 2-million “on” and “off” switching operations at rated current.

Each contractor shall be provided with a closing coil suitable for continuous operation and at least 15 closing operations per hour.

An adequate number of auxiliary contacts shall be fitted.

The contractor may not hum or chatter in service and the contacts may not bounce on closing.

All contractors shall be equal and similar to Telemecanique manufacture.

### V. Current transformers

All current transformers shall be of the air insulated type complying in all respects with the requirements laid down in BS 3938: 1973.

The Contractor shall carefully select the ratio, burden and accuracy class to suit its specific application in accordance with the recommendations and requirements of BS 3938: 1973.

### VI. Indicating instruments

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All indicating instruments shall comply with the requirements laid down in BS 89: Part I : 1970 for instruments of a 2,5 Accuracy Class. All indicating instruments shall have 96 mm square dials.

The maximum demand ammeters shall be of the 6 Amp combined maximum demand registering and instantaneous indicating type having MISC movement and thermal demand indication with an integrating time lag of 15 minutes. The ammeter scales shall be direct reading with a full scale deflection corresponding to 120% of the rated primary current of the relevant current transformer. Each ammeter shall be clearly and indelibly marked to indicate the colour of the phase to which it is connected.

The ammeters for motor starters shall be instantaneous indicating meters with MISC movement and direct reading scales. The meters shall be able to withstand overcurrents resulting under starting conditions and the full load current of the relevant motor shall be clearly marked in red on the face of the meter.

Voltmeters shall be of the direct reading moving iron suppressed zero type.

The running hour meters shall have cyclometer dials indicating up to 5 digits and two decimals.

### VII. Selector switch

A rotary type instrument selector switch shall be mounted in such a way that only the selector knob and indicator plate are on the panel, and the switch itself is behind the panel.

The selector knob shall consist of Bakelite, and shall have an arrow engraved on it, indicating the switch position.

The switch shall have a positively driven switching mechanism.

The indicator plate shall consist of Bakelite and shall have the positions for the three phases and "OFF" engraved in it in 5 mm high lettering. Selector switches shall be equal and similar to Krus & Naimer manufacture.

### VIII. Indicator lights

All indicator lights shall be equal and similar to Mimic Craft Type MAC-22 220 volt LED pilot lights of the specified colours.

### IX. Auxiliary relays

Auxiliary relays shall be adequately rated for their respective duties and shall be silent in operation. All switching relays shall be fitted with robust silver or silver-alloy self-cleaning contacts which shall not bounce or chatter on closing

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and which shall be designed and manufactured to limit arcing, welding and putting an absolute minimum.

### X. Earthleakage relays

Earthleakage relays for low voltage distribution boards shall comply with the requirements of SWASA 767 and shall have a sensitivity of 30 mA.

### XI. Power factor correction capacitors for 400 volt motors

Each of these capacitors shall be of the indoor switchboard mounting 400 Volt 50 cps three phase self-contained type with a dead casing and shall fully comply with the requirements laid down in BS 1650-1971 as amended.

Each capacitor unit shall be of carefully selected rating to correct the power factor of its isolated motor to 0,95 at full load and should not exceed a value which compensates for 85 % of the no-load magnetizing current.

The dielectric shall consist of plastic film and low-loss paper situated between aluminum foil and impregnated with a synthetic liquid agent with scavenger additive.

The capacitor losses shall not exceed 1 watt/kV.Ar

The capacitor units shall have the following admissible overloads at an ambient temperature of 40 deg. C and an altitude of 1 550 m.a.s.l.:

- a) 10 % excess volts continuously ;
- b) 50 % excess current continuously ; and
- c) 30 % excess kV.A continuously.

Each of these capacitor units shall be provided with discharge resistors and the fuse for each winding element which will disconnect the affected element in event of a dielectric breakdown.

### XII. Lightning arrestors

Adequate protection shall be provided for all equipment supplied and installed against direct as well as induced voltage surges and spikes which may be experienced on the system.

Surge arrestors shall be provided on each phase as well as neutral on the incoming power supply terminals of each board.

Electronic equipment shall be adequately protected on both the incoming and outgoing terminals by suitable arrestors compatible with the relevant equipment.

### h) Information To Be Submitted With Tenders In Respect Of Switch Boards And Motor Control Boards

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The following information shall be submitted with each Tender in respect of all boards offered:

- a) Full technical details and descriptive literature regarding all equipment and instruments offered; and
  - b) Three paper prints of an outline drawing of each board indicating the main overall dimensions and general layout of the boards.
- i) Information To Be Submitted By The Successful Tenderer In Respect Of All Boards

The successful Tenderer shall submit three paper prints of each of the following drawings, in respect of each of the boards to the Engineer for approval prior to manufacture:

- I. Outline the general arrangement drawings, showing main overall dimensions and construction details ;
- II. A wiring diagram ; and
- III. A schematic line diagram

Plastic transparent prints of the following diagrams shall be supplied by the successful Tenderer in respect of each of the final layouts of the boards:

- a) Outline and general arrangement drawings of each board;
  - b) A wiring diagram of each board;
  - c) A schematic line diagram of each board
  - d) A paper unit of the schematic line diagram for that specific switch board, shall be framed and installed behind perplex on the side of the door of each of the switch boards; and
  - e) A paper print of the schematic line diagrams for each LT starter panel shall be installed behind perplex on the side of the door of each starter panel.
- j) Testing Of Switch/Motor Control Boards At The Manufacturer's Works

Each switch/motor control board shall be subjected to the following tests in the manufacturer's works after manufacture:

- a) A thorough inspection shall be carried out to ensure compliance with the Specification and approved drawings and wiring diagrams and to ascertain that all connections are properly made.
- b) A high voltage test on all primary connections to check the installation between phases mutually and between each phase and earth.
- c) The polarities and ratios of all potential and current transformers shall be checked

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- d) Primary and secondary injection tests shall be carried out on all switching, protection, metering interlocking and indication circuits.
- e) The manufacturer shall submit three copies of test certificates giving details of conditions and results of tests carried out to the Engineer.
- k) Testing And Commissioning Of Switch/Motor Control Boards After Installation On Site

After installation on site but prior to commissioning the following inspections and tests shall be performed on each switch/motor control board:

- a) Check all components to ensure that they are free from dust and protective packing material;
- b) Check the operation of all components liable to damage in transit such as meters and protection relays;
- c) The insulation of all primary circuits between phases mutually and between each phase and earth shall be measured.
- d) All fused links shall be checked for electrical continuity; and
- e) All control supplies shall be checked.

All adjustable protection devices shall then be set and the boards commissioned all in consultation with and to the instructions of the Engineer.

### E.21.12 External Control And Sensing Units Associated With Electrical Switch Boards And Control Boards

Each Emergency Stop Push Button Station shall consist of a totally enclosed outdoor weatherproof type heavy duty pad lockable stop push button station with a cable gland entry at the bottom to accommodate a 3 core, 1,5 mm<sup>2</sup> LT PVC SWA PVC cable. The unit shall have an IP 55 insect proofed enclosure.

This push button station shall be mounted on an approved rigid 1 meter high Grade 304 stainless steel pedestal designed to be bolted to a concrete slab or against the structure at the height of 1,0 m above ground level.

The pedestal shall be manufactured as per the drawings at the end of the document

### E.21.13 Conduit And Conduit Accessories

All conduit and conduit accessories shall comply with the requirements of SWASA 162 and shall bear the SWASA mark.

All conduit and conduit accessories shall either be finished in black stove enamel on the inside as well as on the outside, or shall be hot-dip galvanized on the inside as well as on the outside, depending on the circumstances. All conduit fittings shall be of malleable cast iron, zinc base alloy or die cast fittings will not be acceptable.

Only brass bushes and bush nuts will be acceptable.

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### E.21.14 Standard 100 x 100 x 50 mm And 100 x 50 x 50 mm Boxes

These boxes shall be heavy gauge, hot-dip galvanized, pressed steel boxes, complying with SWASA 518.

### E.21.15 Light Switches

All light switches shall comply with the requirements of SWASA 163 and shall be suitable for mounting in a standard 100 x 50 x 50 mm box

The switches shall be equal and similar to Crabtree flush switches.

### E.21.16 PVC Insulated Conductors

These conductors shall be of high conductivity, stranded copper with Polyvinyl Chloride insulation of 600/1 000 volt grade, complying with the requirements of SWASA 150, with special reference to table H.

### E.21.17 Three Phase and Multipin Plug Outlets

Three phase plug outlets shall be of the 63 A, 380 V, 5 pin units complete with plug and interlocked isolating switch.

These units shall be equal and similar to the WACO CEE Metal-Clad-Industrial Plugs and socket type.

The 7 pin plug outlets shall be of the 32 A, 7 pin units complete with plug and interlocked isolating switch.

### E.21.18 Light Fittings

All light fittings shall be complete with lamps and control equipment as prescribed. Lamps for fluorescent fittings shall have colour temperature of 3 000K unless otherwise specified.

Although catalogue numbers are used to describe the light figures, equal and similar fittings will also be accepted.

Fluorescent light fittings shall conform to the requirements of SWASA 1119 and SWASA 890.

Where light fittings with filament lamps are used, the wiring between the terminal box and the lamp holder shall have heat resisting insulation.

### E.21.19 Site Light Poles

The site light poles are specified in the detail specification.

### E.21.20 Luminaires

Cable ladders shall be of the heavy-duty type, equal and similar to O-line.

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Cable ladders shall not be hot dipped galvanized the height of the sides shall be 76 mm with the width to suit the number and size of cables to be installed.

The cable ladders shall be secured on the suitable lengths, which shall be suspended from the roof slab by means of suitable lengths 8 mm dia threaded hot, dipped galvanized steel rods.

The threaded rods shall be secured to the roof slab with suitable sized hot dipped galvanized steel rawl bolts and shall be secured to the channel sections by means of two hot dipped galvanized nuts and washers

Clamps of the “K” series, suitable for the specific cable shall be employed to secure the cable onto the tray.

### E.21.22 Lightning Protection

#### a) Plant

The lightning protection of the lighting structures, poles and plant of the works, including buildings and handrails on the new plant, form part of this Contract.

The lightning protection must be a SWASA approved scheme and SWASA approved drawings of the scheme must be submitted to the Engineer.

#### b) Lightning Arrestors

Tenderers shall show in their Tender prices for adequate protection of the equipment supplied and installed under this Contract against direct as well as induced voltage surges and spikes which may be experienced on the system. Surge arrestors shall be provided on each phase as well as neutral on the incoming power supply terminals of each board.

Electronic equipment shall be adequately protected on both the incoming and outgoing terminals by means of suitable arrestors compatible with the relevant equipment. 4-20mA signal cables shall be protected on both sides of the cable against surges. Arrestors shall be of DEHN manufacture (as supplied by Surgetech (Pty) Ltd. or equal and similar thereto.

All arrestors shall be connected directly to earth along the shortest possible route and only conductors of adequate rating for the discharge currents catered for shall be used for connections to arrestors.

Tenderers shall submit full particulars of the arrestors offered as well as written confirmation that it will provide adequate protection for the relevant equipment against possible voltage surges and spikes on the system. (Also see item 6.30 and 6.32)

### E.21.23 Earth Slabs

The cable slabs supplied and installed under this Contract shall be formed solidly out of concrete with steel reinforcing and shall have dimensions of 1 000 x 350 x 100 mm. alternative block sizes will be considered. The following concrete mixture is desired:

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1. Portland cement (dry) – 1 part per volume
2. Clean dry river sand – 3 parts per volume
3. Crushed stone (size 10 mm) – 6 parts per volume

### E.21.25 Underground Cable Sleeves

All cable sleeves shall be of the Kabelflex type, manufactured and supplied by Nextube (Pty) Ltd. unless sleeve ends shall be sealed by means of Nextube Closure Caps.

Cable sleeves to be installed across roads shall extend at least 450 mm beyond the edge of the road on each side. Each run of cable sleeve shall be laid straight and without any projections on the inside, which may cause damage to or obstruct the threading through the cable.

### E.21.26 Notices And Danger Plates

#### a) Scope

This specification deals with the provision of Notices and Danger Plates as required in terms of the Occupational Health and Safety Act No. 85 of 1983, as well as any other notices that may be required by law or by the nature of the finished works.

The following standard specifications are referred to in this specification:

SWASA 0140; Parts I to IV : Identification colour marking.

SWASA 1186: Symbolic safety signs.

Occupational Health and Safety Act No. 85 of 1993

#### b) Materials And Finish

Outdoor signs shall be either of vitreous enameled type or of cast aluminum with raised or embossed letters.

Indoor notices shall be of non-deteriorating plastic, Perplex or fiberglass.

The colours and sizes of letters and colours of background shall be in accordance with requirements of SWASA 0140 and as approved by the Engineer.

Symbolic signs shall conform to the requirements of SWASA 1186.

Signs shall be pre-drilled for mixing.

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All fixing accessories shall be of non-corrosive material.

c) Installation And Erection

The Contractor shall supply and fix permanently in position the signs and notices required by law for all the relevant working area of the Works. Positions of signs shall be prescribed by the relevant Regulations and as agreed by the Engineer.

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### Project Specifications: Retailed Specifications, Equipment Data Sheets, Preamble to the Schedule of Prices and Schedule of Prices

100: INLET WORKS MECHANICAL EQUIPMENT

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### 101 SCOPE

This section of the Contract covers the supply, delivery, transport, handling, storage, erection, installation, commissioning, testing, adjustment, handing over in complete working order and upholding during the

Defects Liability Period of the following equipment:

- ONE front raked screen
- ONE spiral conveyor
- ONE screenings press
- TWO grit removal pumps and pinework
- TWO grit screw classifiers

### 102 FRONT RAKED SCREEN

#### 102.1 Description

Two front raked screens are required at the Inlet Works. Each screen shall be capable of handling a maximum flow of 100L/s. The channel is 600 mm wide and 1750 mm deep while the maximum downstream depth of the screened sewage will be 1 000mm at maximum flow. (The Contractor shall confirm these dimensions on site.) The cleaner opening between the rack bars shall not exceed 8 mm. The material from which the frame, chutes and panels shall be fabricated, shall be heavy duty galvanized mild steel. The layout and details of the existing inlet works is shown in Drawing 1065-M2-101. The material from which the screws, frame, chutes, rakes and panels shall be fabricated, shall be stainless steel grade 304.

#### 102.2 General requirements of the Screen

##### 102.2.1 Frame

The rectangular frame shall be formed entirely from the plate of a minimum of 4.5 mm thick and shall be recessed to accommodate the chain guides and idler sprockets.

The screen shall be set in the channel at approximately 75° to the horizontal. The frame shall be grouted into position in recesses in the channel walls and invert or, for screens of the removable variety, either braes at coping level on a spindle bar permitting the unit to be swiveled, or rested against brace-plates affixed to the channel walls, permitting the unit to be hoisted from above.

The frame shall be fully welded to the sole plate, the debris plate and the discharge chute. At the upstream face of the unit, box-section cross-members shall be securely welded to the side members of the frame at regular intervals between a point above the maximum water level and the head of the screen. The cross-members shall form the supports for removable cover panels

##### 102.2.2 Screen Bars

The screenfield bars shall be accurately set at the required spacing and solidly secured to the brace-plates for bolting onto the screen frame, for easy removal of the screenfield. The bars shall be approximately 50 mm deep and 10 mm thick, of a tapered profile with the thickness of the bars at the

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downstream edge of approximately 6 mm. the bars shall extend from the sole plate to a point at least 1 650 mm above the floor of the channel.

Intermediate stiffening supports perpendicular to the bars shall be used to brace the screen bars at the downstream surface of the screenfield. The supports shall be welded to the screen bars for strengthening as necessary and each screen bar shall be individually welded to the stiffening support.

### 102.2.3 Sole plate

The sole plate shall be profiled to induce screenings and debris in the lower level of the flow to be directed into the lower portion of the screen bars and not to accumulate at the foot of the screen. The leading edge of the sole plate shall be level with the channel invert.

### 102.2.4 Raking mechanism

The rakes and tines shall be formed from single continuous bars of sufficient depth to ensure complete stiffness across the full width of the bar. The rake shall have a minimum thickness of 8 mm and shall have tines of appropriate profile to suit the screen bar spacing, laser or plasma-cut on the leading edge. The tines shall make an angle of 5° to the plane of the screenfield when engaged.

The raking bars shall be attached to the drive chains within the side members of the screen frame utilizing suitably fabricated links. The raking bars shall be accurately aligned to ensure that, for the full width of each bar, the tines penetrate the screen bars to the necessary amount of the full extent of travel of the tines whilst engaged within the screen bars.

### 102.2.5 Chains, guides and sprockets

The chains shall be of the roller-ball type with links of minimum length of 100mm. the side-plates shall be of stainless steel grade 304, with pins, bushes and rollers made of stainless steel grade 304 heat treated. The chain guides shall be securely fixed to the side of members of the screen frame for the full length of travel of the chains.

Idler sprockets shall be located at the lower end of each side member of the screen frame and shall have a minimum thickness of 20mm. a bush housing shall be continuously welded on both faces to the sprocket. The sprocket shall be mounted on stub axles utilizing self lubricating bush-bearings. The sprockets shall be retained on their stub axles by a suitable, easily removable, mechanism to ensure ease of replacement of the bearing should this be necessary.

The drive shaft at the end of the screen shall have two chain sprockets mounted thereon and shall be securely keyed to the shaft. The bearing of the shaft within the screen frame shall be self-lubricating.

### 102.2.6 Drive unit

The drive unit shall be suitably rated for continuous operation and shall be selected to match the duty of the particular screen. The drive unit shall be directly coupled to the screen drive shaft through the gearbox.

A facility shall be incorporated within the drive mechanism mounting arrangement to enable the scraping mechanism drive chains to be correctly tensioned and the raking bars to be accurately

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positioned across the screen face. Such adjustment shall be possible without the dismantling of any part of the screen frame and without necessity for any special tools.

The following electrical control equipment shall be supplied and installed with the screens:

A current sensing overload device with a built-in intelligent control facility shall be incorporated within the screen starter compartment in the motor control centre. The device shall have the facility to be able to reverse the direction of travel of the scraping mechanism, should a blockage occur on the screen and cause the overload device to trip the normal operation of the screen.

The device shall have the additional facility to enable this reversing action to be affected twice for any on occurrence, before tripping the alarm. Further, the device shall either re-set automatically if the blockage causing initial overload conditions is cleared, or should the blockage remain upon completion of the second attempt at automatic clearance, the alarm shall be generated.

### 102.2.7 Cleaning mechanism

The cleaning mechanism shall comprise a single bar which shall engage each raking bar as it rises above the upper edge of the screening retention plate.

The scrapper bar shall be fabricated and mounted so that it efficiently cleans the full width of each raking bar. The bearing for the scrapper bar shall be self-lubricating.

### 102.2.8 Discharge chute

The discharge chute shall be set to guide all the screenings removed by the screen as efficiently as possible onto a second chute. The chutes shall form an integral part of the screen. The discharge point of the screenings outlet shall be at least level with the top of the platform of the structure housing the screen to allow for the deposition of the screenings into a wheelbarrow standing next to the channel.

### 102.2.9 Electrical Installation

The Contractor shall supply all electric motors. The motors shall comply with the Standard Motor Specification, Section E.

The supply and installation of motor control switchgear, local stop/start stations and cables shall form part of a separate electrical installation Contract. Any special requirements of the Contractor completing this contract shall be specifically identified.

Both Mechanical and Electrical Contractors shall be in attendance during the testing and commissioning phase.

## 103 SPIRAL CONVEYOR

### 103.1 Description

The screenings of the screens shall be deposited on the spiral conveyor running intermittently below the delivery side of the screen and transporting the solids to the screenings press. The spiral conveyor shall be reversible and shall deposit screenings onto a platform in the case of the malfunctioning of the screenings press. The centreless spiral conveyor shall be 400 mm wide and approximately 2.3 m

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long, circular and completely enclosed to prevent the spiraling of water down the side before reaching the screenings press platform.

The spiral flights shall be manufactured from stainless steel grade 304 and shall have a width of at least 70 mm and a thickness of not more than 10mm and shall be continuous for the full length of the flight. The spiral conveyor shall be designed such that all silt and fine material shall be positively removed and deposited in the screenings press.

The trough shall have side walls high enough to enable the water to gravitate back to the inlet channels. Tenderers shall include for stainless steel pipes from the spiral conveyor to the inlet channels.

The framework supporting the conveyor shall be manufactured in stainless steel grade 304 plates (at least 4.5 mm thick) and shall be sturdy and capable of supporting the conveyor without undue stressing and buckling.

### 103.2 Drive Unit

The drive unit shall be directly coupled to the spiral conveyor shaft through the gearbox.

### 103.3 Electrical Installation

The supply and installation of a switchboard (including starters) and power cables will form part of this Contract and shall be mounted in a mild steel cabinet, corrosion protected as specified in Clause 107.

Power and control cables shall run in ducts provided for this purpose such that it would not impede access or cleaning.

Three sets of potential free contacts shall be provided for each motor to facilitate remote indication of the status of the motor, i.e. "Running", "Stopped", or "Tripped".

These contacts shall be wired to clearly marked terminal blocks to facilitate connecting to the outgoing signal cables.

Each of these sets of contacts shall close in order to activate the relevant status signal. Power shall be supplied under another contract to the take-off point indicated by the Tenderer.

The spiral conveyor shall be electrically interlocked with the mechanical screens and screenings press.

The conveyor shall furthermore operate, once running, for a sufficient time to allow all the screenings deposited on the conveyor to be deposited into the screenings press.

### 103.4 Safety Measures

A tip wire complete with supports and switch shall be provided and installed along the entire length of the conveyor, all in accordance with the requirements of the Machinery and Occupational Safety Act, Act No. 85 of 1993.

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### 104 SCREENINGS PRESS

#### 104.1 General Description

ONE screenings press is required for dewatering the screenings from the front raked screens. The layout of the screenings press at the inlet works shall be as shown in Drawings 1065-M2-102.

The wet screenings from the front raked screens with a moisture content of 85 to 90 % are fed from the conveyor (supplied under item 103) directly to the holding hopper mounted directly over the screw chamber.

The press must be capable of pressing the solids to at least 70 % dryness.

The screenings press must be capable of pressing 1,5 – 2 m<sup>3</sup> per hour.

It shall be capable of conveying the solids in a pipe over a distance of 3,0 m at an angle of 30°.

The press must be of the screw type.

Holes or slots shall be provided for the drainage of the liquid squeezed from the press.

Water sprays shall also be provided underneath the screw to ensure that organic matter in the screenings is washed out and returned to the channel.

The supply of water for washing the screenings shall be controlled automatically by activating a solenoid valve on the water supply line when the press is in operation. The press and the solenoid valve will be interlocked. Water shall be supplied under another contract to take-off point indicated by the Tenderer.

#### 104.2 Construction

The press shall be of robust construction.

The chute shall have a funnel like top extending to at least 800 mm above the screw compartment to ensure clean operation.

The doctor blade of the conveyor will be situated inside the chute funnel to prevent any material from missing the chute.

The exit shall be in grade 3CR12 steel of sturdy construction to allow for some rough handling.

A water discharge trough shall be provided along the bottom of the press to collect any liquid oozing from the press and shall be manufactured in grade 304 stainless steel.

The operation shall be clean and hygienic.

Access to parts that need maintenance and cleaning must be provided, the covers being corrosion free and sturdy to prevent damage during maintenance or cleaning operations.

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The screw tube, frame, discharge pipe, chute housing and trough shall be manufactured in 3CR12 steel.

The screw shall be of heavy duty type mild steel, hardfaced, and must be easily removable for maintenance.

The press unit shall be mounted on a concrete platform which will be constructed by others in accordance with the requirements of the Tenderer. The entire unit must be designed for easy cleaning and spraying down to reduce fly nuisance.

Junctions between dissimilar metals shall be insulated to prevent bimetallic reaction.

### 104.3 Drive unit

The drive unit shall match the requirements of the press without overloading and shall be situated to allow unimpeded access to the press. The screens and conveyor belt will operate intermittently and the press and drive mechanism shall be activated by an electrical impulse from the conveyor belt. They shall be electrically interlocked under a separate electrical contract.

In the case of overloading, the press must automatically reverse for a few seconds before commencing a forward motion again. This sequence of reverse and forward operation shall be allowed to occur three times after which the press must trip and sound an alarm. The alarm shall form part of the supply of the press.

### 104.4 Switchgear

The switchgear and control system for the press will form part of another contract.

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### 105 GRIT REMOVAL AND PIPE WORK

#### 105.1 Scope

This section of the Specification covers the design, manufacture, supply, support, delivery, offloading, handling, storage, erection, installation, commissioning, adjustment, testing and handing over in complete working order and upholding during the Defects Liability Period of mechanical and electrical plant requirements as follows:

- Three positive displacement air-compressors.
- Low-pressure air Pipework, valves and supports.
- Wash water Pipework, valves and supports and booster pump.
- Grit slurry Pipework, valves and supports.

The electrical switchgear, control gear, and instrumentation for automatic and manual control of the plant and equipment shall be provided under this contract.

#### 105.2 General Arrangement and Description

The vortex degritters and classifier are required to remove organic and inorganic grit including stones, bones and fat.

The low-pressure air services, wash water system, Pipework, valves and ancillary equipment are required to operate the 'air lift' design grit removal system from the vortex degritters.

Tenderers are required to verify or alter the design and design parameters given hereinafter and shall be responsible for the correct operation of their equipment. Tenderers shall also be responsible for the layout of the proposed grit removal system including the design of all structural elements to complete the installation.

#### 105.3 Duties

Each vortex degritter is required to remove all grit, sand and inorganic particles of above 1,0 mm in diameter and specific gravity greater than 2,0 from the raw sewage inflow.:

The vortex degritters have a diameter of 2.5 m each and the layout is as shown on the Drawings 1065-M2-103, 1065-M2-104.

The grit removal system shall be designed to provide a slurry flow of not less than 9,5ℓ/s with one airlift pump operating at a time. Each compressor shall have a capacity of not less than 115 m<sup>3</sup>/hr measured at the suction, when operating at the design pressure of not less than 40kPa. The washwater system shall be designed to handle a flow of 3 ℓ/sec and control of the flow shall be by means of gate valves.

The following minimum pipe sizes shall be provided.

Low pressure air	:	50 mm
Washwater	:	80 mm
Slurry discharge	:	100 mm

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The grit classifier shall be capable of handling a flow of not less than 10 ℓ/sec (0,18 t/h) of slurry containing grit, organic and inorganic particles and gross solids which can pass the 8 mm mechanical fine screen and may not have been removed in the degritter during the disturbing and washing cycle.

### 105.4 Blowers

Blowers shall be of Rootes air cooled positive displacement type. The blower housing and rotor shall be of high quality spheroidal graphite or cast iron. The motor shall be mounted on a high tensile steel shaft and the complete assembly shall be supported on ball and roller bearings located in housings in the end plates.

The rotors shall be linked to accurately and hardened timing gears mounted on the shaft. The end covers shall cover the gears and form the reservoir for lubricating oil, as oil sight glass shall be provided on the reservoir. Each end cover shall be effectively sealed from the compression chamber to prevent ingress of air, oil or water. A drain pipe with stainless steel lever operated ball valve and cup shall be provided to extend beyond the baseplate to facilitate oil drainage.

Each Blower and its respective motor shall be mounted on a rigid mild steel bed or baseplate manufactured from channel section and be supported from the concrete foundation with foundation bolts.

The blowers shall be driven directly or through an adequately rated V-belt or wedge belt drive selected in accordance with the requirements of BS 3790 with a service factor for not less than 1,4 at a speed not exceeding 2 000 rpm.

Each blower shall be provided with a lockable adjustable pressure relief valve which shall be capable of passing full compressor capacity and which shall connect to a common manifold for discharge outside the blower building.

The pressure relief valves shall be manufactured from spheroidal or close cast iron or gunmetal body and cap and be fitted with gunmetal trim.

An inlet filter/silencer with renewable cartridge element shall be provided on the suction side of each blower. The filter shall be provided with manometric or equal approved system giving a positive indication of pressure drop across the filter and cleaning/renewal level. A discharge silencer shall be provided on the outlet from each blower.

Each blower shall be contained in a fan ventilated weather proof acoustic enclosure with hinged access and security locks.

Final details of the acoustic enclosures shall be provided with the Tender.

### 105.5 Low Pressure Air Pipework Valves and Supports

Isolating wafer pattern butterfly valves and wafer pattern reflux valves shall be provided on the discharge side of each compressor.

The butterfly valve body, blade and trim shall be manufactured from stainless steel grade 304.

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The reflux valve body, gate and hinge pin shall be manufactured from stainless steel 304 and be provided with a spring assisted closure.

Isolating wafer pattern butterfly or ball valves shall be provided for interconnection and duty isolation.

Flexible couplings with flanged connections shall be provided on the discharge side of each compressor rated for the maximum air discharge temperature.

All air pipework within the blower building and to the air supply valve at each degritter shall be manufactured from carbon steel and shall be flanged in accordance with the requirements of clause E.14 of the Specification. Pipework from the air supply valve to the connection to the slurry discharge pipe shall be manufactured from stainless steel 304. A nozzle shall be provided on the discharge line from each compressor to accommodate a pressure switch.

All pipework equal or less than 80 mm NB shall be “hot dip” galvanized and flanged in accordance with Clause E.14 of the Specifications.

### 105.6 Washwater Pipework, Valves, Supports and Booster Pump

Water required for the washwater systems at the degritters will be available from the recycled effluent system. Connection to the effluent system at a point approximately 10 meters from the inlet works shall be included in this Contract. A booster pump with controls including a no-flow switch, shall also be supplied and installed to ensure the rate of flow at a pressure as required by the Tenderers proposed systems.

Washwater pipework shall be manufactured from carbon steel. Wash-water control valves shall be gate valves in accordance with Clause E.13 of the Specification.

All pipework equal or less than 80 mm NB shall be “hot dip” galvanized and flanged in accordance with Clause E.14 of the Specifications.

### 105.7 Grit Slurry Pipework, Valves and Supports

The vertical slurry discharge pipe from the bottom of the vortex separator and the pipes discharging to the classifier shall be manufactured from stainless steel grade 340L with a wall thickness of not less than 10 mm. pipe lengths shall not exceed 3,0 m and be provided with flanged connections to permit rapid dismantling of sections. All bends shall be of the long radius type fitted with a flanged rodding tree. A discharge pipe shall be supplied up to the classifier for each degritter.

Pipework shall be properly supported.

## 106 GRIT SCREW CLASSIFIERS

### 106.1 Description

The grit mixture shall be pumped into a receiving hopper which shall be provided with an inclined grit washing-dewatering screw.

The grit must be conveyed from the bottom of the hopper by a screw, washing the below the water level in the hopper and dewatering the grit efficiency along the remainder of the inclined screw.

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## Part 2: Section 6 Statement of Requirements

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The screw must deposit the dewatered grit into a container another (supplied under another section of the Contract).

The discharge level must be at least 2,0 m above the ground level.

It is essential that the grit and organic matter are separated effectively to ensure minimal contamination of the classified grit. Elimination of organics results in maximum drainage of water to obtain a dry grit. The location of the grit classifier is shown on Drawing 1065-M2-103.

### 106.2 Construction

The screw conveyor shall be of robust construction. The screw hopper and trough, the steel pipe and the access chute shall be constructed of 4,5 mm thick 304 Stainless Steel.

The screw flight shall be manufactured from 10 mm thick 304 Stainless Steel plates.

The helix of the screw conveyor shall be welded to the tubular shaft to form a smooth and continuous flight with its outer edges ground to an accurate cylindrical shape.

The flights shall be accurately positioned and shall be at right angles to the tube axis at all points.

The tubular shaft shall be manufactured of a single piece of tubing having a longitudinal seam.

The tube must be straight and cylindrical over its entire length and shall be free of irregularities.

End plates shall be firmly welded to the tube to form a water and airtight container.

The end plates shall be machined to provide a surface perpendicular to the longitudinal axis of the screw.

Axis of the stub axles attached to the endplates must be exactly concentric to the axis of the screw.

The finished screw shall be tested for shaft alignment and centricity before dispatch to the Site.

The screw conveyor shall be fitted with a polythene liner at a minimum thickness of 12 mm.

The entire drive assembly including reducer must be enclosed and the enclosure shall be of stainless steel grade 304 sheeting 1.6 mm thick and shall be equipped with inspection facilities to provide access to moving parts for maintenance.

The Tenderer shall submit full details regarding the plant offered by him and shall submit full details of the requirements for fitting the nits into the civil structure.

He must demonstrate the operation of the screw and the way in which water will be drained to facilitate drying of the grit.

Junctions between dissimilar metals shall be insulated to prevent bimetallic action.

### 106.3 Bearings

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## Part 2: Section 6 Statement of Requirements

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The bottom bearing assembly, being permanently under the liquid level, shall consist of a sealed bearing of approved design to completely prevent the ingress of dirt and water.  
The bearing housing shall be manufactured in grade 304 stainless steel.

No gland packing or hydraulic seals will be allowed.

Grease shall be fed to the bottom bearing from a lubricating pump on a continuous basis.

Grease pipes running from the grease pump to the bottom bearing shall be of a non-metallic material such as is used on hydraulic pressure systems with couplings which will be resistant to corrosion when working under submerged conditions.

The rate of grease supply shall be adjustable and shall be metered and adjusted by means of a setting on the lubricator.

The lubricating pump shall be electrically driven with its drive motor electrically interlocked with the drive motor for the screw to ensure that the pump will not run without lubrication.

The bottom bearing assembly must only support its share of the mass of the screw without taking any thrust load whatsoever.

The design of the bearing house shall be such that it will offer little resistance to the flow.  
In the event of the necessity for the removal of the lower bearing, the design shall allow for the operation to take place without removing the base of the lower bearing or the screw itself.

The upper bearing assembly must be adequate to support the screw thrust loads and any radial loads that might develop in addition to its share of the mass of the screw.

All bearings shall be of robust construction and designed for a life of 100 000 hours at a B10 rating.

### 106.4 Speed Reducers

Refer to Clause 107.5 for specification of speed reducers.

### 106.5 Duty

The grit classifiers shall be capable of discharging at least 1 m<sup>3</sup> of grit per hour.

### 106.6 Control of grit classifiers

The grit classifiers shall be controlled both manually or by means of an adjustable timer supplied and installed under another Contract.

### 106.7 Electrical Installation

All equipment shall be supplied complete with drive motors. The motors shall comply with the Standard Specification Clause E.21

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## Part 2: Section 6 Statement of Requirements

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The supply and installation of motor control switchgear, local stop/start station and cables shall form part of a separate electrical installation Contract. Any special requirements of the contract completing this contract shall be specifically identified e.g. type of motor starting required etc..

The Contractors shall be in attendance during the testing and commissioning of the electrical equipment (supplied under a separate contract).

### 107 GENERAL

#### 107.1 Corrosion Protection

Corrosion protection must be carried out strictly in accordance with the requirements of the Corrosion Protection Specification and to the following systems:

All steelwork other than stainless steel :Above water – System B.1.A  
Below water – System B.1

Motor, speed reducer and baseplate :System A.1, A.2, or A.3 (colours to confirm colour scheme selected by Engineer). If existing paints on these are incompatible with alkyd paint, the Contractor shall provide suitable alternatives approved by the Engineer.

All painted equipment installed above water level shall receive further coat of paint after installation.

#### 107.2 Spares, Tools and Lubricants

Lubricants are to be supplied with the equipment included under this Contract as specified in Clause E.17

Details of squares are to be listed in the Data Sheets.

#### 107.3 Bolts

Holding down bolts which are both to be built into concrete work for securing the plant shall be supplied, installed and grouted up under this section of the Contract. All bolts and nuts shall be as specified in Clause E.16

#### 107.4 Bearings

The upper bearing assembly must be adequate to support the thrust loads and any radial loads that might develop in addition to its share of the mass of the equipment. All bearings shall be of robust construction and designed for a life of 100 000 hours at a B10 rating.

#### 107.5 Speed reducers

Speed reducers shall be settled for continuous operation 24 hours per day. Mechanical power ratings (according to AGMA) shall be not less than twice the installed power. Thermal power ratings shall be based on an ambient temperature of 40°C.

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## Part 2: Section 6 Statement of Requirements

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All gears and pinions must be hardened and ground after cutting.

Casings shall be of close grained cast iron.

Tenderers shall provide a catalogue of the make of speed reducer offered and indicate how the selection of the unit was made.

Each speed reducer shall be fitted with a name plate showing at least the following information:

- i. Speed reducer type or model number;
- ii. Serial number;
- iii. AGMA rating;
- iv. Nominal reduction rates and
- v. Approximate oil quantity required.

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## Part 2: Section 6 Statement of Requirements

(See diagrams)

### SECTION F-100 : INLET WORKS MECHANICAL EQUIPMENT TECHNICAL DATA

FRONT RAKED SCREEN	
Name of manufacturer	
Place of manufacture	
Mass of complete unit (kg)	
Number of screen rakes	
Width of unit (mm)	
Total height of unit (mm)	
Height of discharge chute above platform (mm)	
MOTOR	
Name of manufacturer	
Place of manufacture	
Type of motor	
Class of insulation	
Comply with SWASA 948	YES/NO
Speed of rotation (r.p.m)	
Rated output (kW)	
% Utilization at rated output of motor	
SPEED REDUCER	
Name of manufacturer	
Mechanical power rating (kW)	
Thermal power rating (kW)	
Maximum torque capacity (Nm)	

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## Part 2: Section 6 Statement of Requirements

### SECTION F-100 : INLET WORKS MECHANICAL EQUIPMENT TECHNICAL DATA

SPIRAL CONVEYOR	
Name of manufacturer	
Place of manufacture	
Speed of rotation of conveyor	
Length of conveyor (internal) (mm)	
Model of conveyor	
Internal dimensions (mm)	
Lubrication systems provided	
Material of liner	
MOTOR	
Name of manufacturer	
Place of manufacture	
Type of motor	
Class of insulation	
Comply with SWASA 948	
Speed of rotation (r.p.m)	
Rated output (kW)	
% Utilization at rated output of motor	
SPEED REDUCER	
Name of manufacturer	
Place of manufacture	
Type	
Mechanical power rating (kW)	
Thermal power rating (kW)	

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## Part 2: Section 6 Statement of Requirements

### SECTION F-100 : INLET WORKS MECHANICAL EQUIPMENT TECHNICAL DATA

SCREENINGS PRESS	
Name of manufacturer	
Place of manufacture	
Total mass of unit (kg)	
Size of inlet chute	
Size of screw	
MOTOR	
Name of manufacturer	
Place of manufacture	
Type of motor	
Class of insulation	
Speed of rotation (r.p.m)	
Rated output (kW)	
% utilization at rated output motor	
SPEED REDUCER	
Name of manufacturer	
Place of manufacture	
Mechanical power rating (kW)	
Thermal power rating (kW)	

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## Part 2: Section 6 Statement of Requirements

### SECTION F-100 : INLET WORKS MECHANICAL EQUIPMENT TECHNICAL DATA

DEGRITTING EQUIPMENT	
BLOWERS	
Name of manufacturer	
Place of manufacture	
Type of blower	
Model of blower	
Oil free discharge	
Design operating pressure (kPa)	
Design volumetric throughput (m <sup>3</sup> /h @ 760mm Hg & 20°C)	
Speed of rotation @ design pressure and volumetric (r.p.m)	
Power absorbed at maximum possible operating conditions	
Maximum operating pressure (kPa)	
Maximum volume throughput (m <sup>3</sup> /h @ 760mm Hg & 20°C)	
Speed of rotation at maximum pressure and volumetric throughput (r.p.m)	
Power absorbed at maximum possible operating conditions (kW)	
MATERIAL OF CONSTRUCTION	
Casing	
Base plate	
Shaft	
Silencers	
Type of shaft seal	
Type of bearings	
Type of drive	
Inlet pipe diameter (mm)	
Outlet pipe diameter (mm)	
ELECTRIC MOTORS	
Name of manufacturer	
Place of manufacture	
Type of motor	
Type of casing	
Class of insulation	

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## Part 2: Section 6 Statement of Requirements

DEGRITTING EQUIPMENT	
Speed of rotation (r.p.m)	
Rated output (kW)	
Efficiency at:	
Full load (5)	
<sup>3</sup> / <sub>4</sub> load (5)	
AIR LIFT PUMPS	
Diameter of educator pipe (vertical slurry discharge pipe) (mm)	
Diameter of slurry discharge pipe from the air lift pump to classifier (mm)	
Diameter of air supply pipe (mm)	
Minimum pumping rate of air lift pump (ℓ/s)	
Minimum volumetric air throughput measured at suction (m <sup>3</sup> /h)	
Air design pressure at inlet to educator pipe (kPa)	
WASHWATER BOOSTER PUMP	
Pump:	
Name of manufacturer	
Place of manufacture	
Model number	
Speed of rotation (r.p.m)	
Operations at suction pressure of 20 kPa;	
Delivery (m <sup>3</sup> /h)	
Head (m)	
Type of impeller	
Motor:	
Name of manufacturer	
Place of manufacture	
Type of motor	
Class of insulation	
Speed of rotation (r.p.m)	
Rated output at site (kW)	
Full current load (A)	
Operating voltage	
DOL starting current (A)	

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## Part 2: Section 6 Statement of Requirements

### SECTION F-100 : INLET WORKS MECHANICAL EQUIPMENT TECHNICAL DATA

GRIT CLASSIFIER	
SCREW	
Name of manufacturer	
Place of manufacture	
Speed of rotation (r.p.m)	
Diameter of screw (mm)	
Length of screw (mm)	
Inclination of screw	
Mass of screw (kg)	
MOTOR	
Name of manufacturer	
Place of manufacture	
Type of motor	
Degree of motor protection (IP)	
Class of insulation	
Speed of rotation (r.p.m)	
Rated output (kW)	
% Utilization at rated output of motor	
SPEED REDUCER	
Name of manufacturer	
Place of manufacture	
Type	
Mechanical power rating(kW)	
Thermal power rating (kW)	

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## Part 2: Section 6 Statement of Requirements

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### SECTION F-100 : INLET WORKS MECHANICAL EQUIPMENT

#### SCHEDULE OF PRICES

##### PREAMBLE TO THE SCHEDULE OF PRICES

1. All costs involved in meeting the obligations and liabilities imposed by the Conditions of Contract and in complying generally with the requirements of the Contract shall be deemed to be apportioned to and included under the various items, and the price quoted against each item must cover the full inclusive cost of all work to be completed under that item, plus such appointment of the general costs.
2. The Tenderer must also provide in his prices for anything not specially mentioned but obviously required to enable the plant and equipment as described to function correctly as specified.
3. Should a Tenderer wish to exclude certain items of plant and/or operations from his offer he must clearly state such exclusions in a schedule accompanying his tender. Any items of plant and/or operation which are specified in the Specification but which are not so scheduled will be deemed to be included in the Tender.
4. Any additional charges in connection with off-site storage which there may be over and above the prices quoted in the various sections of this Schedule of Prices shall be set out in detail in a separate schedule accompanying the Tender.
5. A price is to be entered against each item in the Schedule of Prices. Items against which no price is entered will be considered to be covered by other prices in the Schedule.
6. The Tenderer must price each item in the Schedule of Prices in BLACK INK or type script.
7. Mistakes made by the Tenderer in the completion of the Schedule of Prices shall not be erased or painted out. A line shall be drawn through the incorrect entry and the correct entry shall be written above and the correction initialed by the Tenderer. Failure to observe this Condition of Contract may lead to the Tender being disqualified.
8. The Council reserves the right to sub-divide the Contract. Prices quoted in this Schedule are deemed to apply for that section only. The Tenderer may offer a reduction in price if awarded more than one section.
9. Where an item has been allowed to cover the cost of maintenance of equipment during off-site storage in accordance with Clause D.18 of the Specification payment shall be made to the Contractor after the equipment has been delivered to site.

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## Part 2: Section 6 Statement of Requirements

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Time required for delivery of complete plant from the date of notification to commence fabrication.

.....weeks

Time required for erection and installation of plant from date of notification of availability of structures for erection and installation, or from time of completion of delivery, whichever is later.

.....weeks

Time required for testing, commissioning and putting into proper working order of complete plant from date of notification.

.....weeks

.....  
SIGNATURE OF TENDERER

.....  
DATE

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## Project Specifications: Pumps

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## Part 2: Section 6 Statement of Requirements

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## Part 2: Section 6 Statement of Requirements

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### SECTION F-400 : PUMPS

#### 401SCOPE

This section of the Contract covers the supply, delivery, transport, handling, storage, erection, installation, commissioning, testing, adjustment, handing over incomplete working order and upholding during the Defects Liability Period of the following equipment:

- a) i) TWO Return Activated Sludge Pumps;  
ii) Pipework and accessories for the above pumps;
- b) i) TWO Waste Activated Sludge Pumps;  
ii) Pipework and accessories for the above pumps;
- c) i) TWO Backwash Pumps;  
ii) Pipework and accessories for the above pumps;
- d) i) TWO Effluent Recycle Pumps;  
ii) Pipework and accessories for the above pumps;

#### 402 GENERAL

Dry-well pumping equipment shall mean pumping equipment of which the motors may or may not be submersible, but which operate in a non-submersible mode.

The design of the pumps shall be in accordance with BS 5257.

All working parts of the pumps shall be removable and serviceable and shall under no circumstances be integrated into the body of the pumps.

All pipework and support structures for the pumps for the conveyance of fluid, as shown on the drawing, must be supplied by the mechanical contractor under this section of the contract. The pipework shall include all fittings.

The construction of the civil works shall form part of another Contract.

All steelwork for the supporting of the pumps, as shown on the drawing must be supplied by the mechanical contractor under this section of the contract.

#### 403 CENTRIFUGAL PUMPS

##### 403.1 General

Dry-well pumps supplies under this contract shall be of the centrifugal non-clogging self priming type. If applicable it shall be suitable to pump the media mentioned in the particular specification for each type of application (sludge or settled sewage, etc.).

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### 403.2 Pump Layout

Together with their tenders, Tenderers shall provide full details of any proposed pump layout, including all pipework to comply with the requirements of the pumping systems and as shown on the drawings for consideration by the Engineer.

### 403.3 Material of construction and casing

The pumps shall be of maker's standard and approved design, low maintenance and robust.

The pump casing shall be manufactured from high grade cast iron, rigidly secured to a bed plate and shall be finished off smoothly before a high quality corrosion protection system is applied in accordance with Clause 407 below.

The casing shall be selected for a minimum of 1 000 kPa or 1.5 times actual discharge pressure, whichever is the greater.

All pumps shall be provided with removable coverplates for quick and easy access to the pump interior without disturbing the pipework.

### 403.4 Speed Pumps

The pumps shall have a rotational speed of 1 450 r.p.m and shall be so balanced that there will be no end thrust when the pumps are new or after wear has taken place, or alternatively suitable heavy duty thrust bearings shall be provided.

Pumps shall be of the self-regulating type where the power consumption characteristic is such that with an increase in delivery beyond a certain limit the power consumption decreases thereby ensuring that the motor is not overloaded in the event of a large deduction in pumping head.

### 403.5 Pumping Impellers

The impellers shall be carefully bored and keyed. All parts inaccessible to machining shall have a smooth finish. Impellers shall be made of high grade cast iron.

### 403.6 Pump Shafts

The shaft will be manufactured of high-tensile steel. Where the shaft passes through stuffing boxes it shall be fitted with renewable sleeves of high-quality, wear resistant alloys. The shaft shall be so designed that the running speed is well below the first critical speed and the rotor shall be accurately balanced after assembly. The rotating elements shall be accurately balanced statistically and dynamically to eliminate noise and vibration when running.

### 403.7 Bearings

All pumps shall be fitted with either ball or roller bearings. Suitable lubrication arrangements shall be provided for the bearings, as well as sufficient bearing area.

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Special bearings shall be provided to absorb any axial thrust that may be caused by the characteristic of the impeller or by the type of coupling selected between the pump and the motor.

All numbers shall be given for all bearings in the pumps to facilitate replacement.

Bearings shall have a B10-life of 50 000 hours.

### 403.8 Wearing rings

Pumps containing wearing rings shall be fitted with high-quality wearing rings which shall be easily replaceable.

### 403.9 Stuffing boxes

Pumps fitted with stuffing boxes shall have packings of adequate depths. A lantern or water seal shall be housed between the inner and outer packing rings and shall be connected by copper tubing to the discharge volute. A hand cock shall be fitted in this line to control the flow of water through the seal.

The packing shall be designed to permit high speed rotation without the possibility of seizing and charring the material. An automatic water seal shall be provided to prevent entry of air into the pump.

Drains from the pump seals shall be provided. These shall discharge visibly into funnel-shaped receivers before discharging to waste.

### 403.10 Coupling between pump and motor

The pumps and motors shall be directly coupled with a suitable type of coupling which will satisfactorily take up minor misalignment or off-setting of the motor and pump shaft.

The coupling shall be designed in such a manner that no thrust will be transmitted from the motor to the pump or vice versa,

The coupling shall be robust and shall be readily dismantled and reassembled. A strong steel cover shall be provided over the coupling for the prevention of accidents. Pumps shall not be fitted with V-belt coupling systems.

### 403.11 Pump Motors

Unless otherwise specified each pump shall be fitted with an electric motor. Each electric motor shall comply with the requirements as specified in Clause E.21.9.

### 403.12 Base Plate and Alignment

The pump and electric motor shall be mounted on a combination base plate of fabricated steel construction. Machined facings shall be provided to receive the pump motor.

The base plate shall be bolted down onto a concrete base. The concrete base will be constructed by others. Detailed drawings of the combination bases including their exact positions in buildings shall be submitted to the Engineer for approval before fabrication is commenced.

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The contractor shall be responsible for the rectification of any excessive noise and/or vibration caused by the operation of the pump installation.

If required by the pump manufacturer, or excessive vibration can be expected, vibration isolating mounting shall be installed in accordance with the manufacturer's instructions. However, the contractor shall be responsible to ensure that the amplitude of motion and vibration transmission will not exceed the specified limits.

### 403.13 Accessories

All pumps shall be fitted with air cocks, drain cocks, lifting eyes if the weight of the pump is more than 30 kg and all guards, etc. required in terms of the Occupational Health and Safety Act, (Act 85 of 1993). Furthermore, the pump shall be fitted with adequate protection devices, e.g. positive displacement pumps shall be fitted with pressure relief devices set at maximum working head of the pump and piped back to the pump sump.

All dry-well pumps shall be equipped with a facility for attaching mechanical pressure gauges on the delivery and suction sides of the pumps. These facilities shall be equipped with isolating cocks to allow removal of gauges when not in use. The facilities shall be located two diameters from the inlet and outlet flanges of pumps, as per BS 5316.

Each pump set shall be fitted with necessary approved and calibrated glycerine filled pressure gauges suitably dampened against vibration. One pressure gauge shall be supplied on the delivery side of each pump and one pressure gauge on the suction side. Gauges shall be filled with clog free in-line pressure sensors with flexible rubber sleeves of the membrane type.

- i. The discharge pressure gauge shall have a maximum reading of not more than 40% in excess of the closed valve pressure of the pump.
- ii. The suction pressure gauge shall have a scale reading from at least -50 kPa to at least +50 kPa.

The location of pressure gauges shall also be such that the gauge is easily accessible and can be clearly seen from the pump stop/start box.

### 403.14 Pump Technical Details

The pump shall be a currently catalogued product. Documentation shall include performance curves or selection tables, indicating flow, head, NPSH required, power absorbed, speed and efficiency for the expected range of operational conditions.

Performance curves and selection tables shall be based on a reproducible and certified test carried out in an approved laboratory.

The flow rate at break-off point of the curve for the impeller selected shall be at least 1.5 times that of the maximum flow rate specified.

The head at zero delivery of the curve for the impeller selected shall be at least 1.2 times the maximum head in the pump's duty range.

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The pump shall be installed on a vibration-isolated steel and concrete base and shall be leveled.

The pump and electric motor shall be aligned to within 0.05mm, both radially and directionally, to avoid vibration, and shall be bolted to the base.

Construction: Pumps shall be of the horizontal or vertical pull-out, in-line block design, with pump and motor having separate shafts. Standard flange-mounted motors shall be used in order to facilitate easy replacement of either pump or motor in the event of failure.

Pumps shall be easily designed and selected for quiet operation.

All pumps shall be supplied complete with electrical motors.

Complete overhauling of the pump shall be positive without damaging the piping.

Water shall not be spilt over the pump house floor; condensate and gland leakage shall be piped to the outside of the pump house.

A metal lubrication plate shall be attached to the pump where it is clearly visible. The plate shall indicate the recommended lubricant, points of lubrication and the recommended frequency of lubrication.

The engineer or his representative reserves the right to call for:

- a) Test certificates and reports from the manufacturer's quality control laboratory or an independent test laboratory such as SWASA, and/or
- b) Site inspection, customer reports/references and user's interviews, and/or
- c) Full engineering, design and component selection details in order to check the correctness of the service life claimed.

### 403.15 Air Release

All horizontal spindle pumps and delivery pipework with local high points or positions upstream of the reflux valves where air can be trapped shall be equipped with the necessary drains and air cocks or automatic air release equipment with pipe connections for discharging from the drains to the drainage system in the pump house.

### 403.16 Gland Sealing

The pumps shaft shall be sealed against leakage by a mechanical seal. Both the stationary sealing member and mated rotating member shall be tungsten titanium carbide alloy. Each of the mating surfaces shall be lapped to a flatness of one-half light band (5.8 millionths of an inch), as measured by the optical flat monochromatic light. The stationary seal seat shall be double floating so that faces will not lose alignment during periods of shock loads that will cause deflation, vibration, and axial or radial movement of the pump shaft.

The seal shall be lubricated with oil from a separate oil-filled reservoir. The same oil shall not be used to lubricate both shaft seal and shaft bearing.

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### 403.17 Pipework

Layouts of pumps and pipework are shown on the drawings. Should the Tenderer consider alternative layouts then fully detailed drawings showing the proposed layout of pumps and pipework shall be submitted with the tender.

The delivery pipework shall terminate (unless otherwise shown on the drawing) in a flanged puddle pipe 300 mm clear of the wall outside the structure, suitable for connection to the delivery pipes.

The pipework shall be of mild steel as specified hereinbefore with corrosion protecting as specified in Clause 407 below and unless otherwise stated shall be flanged and drilled to SWASA 1123 for a working pressure of 1 000kPa (10 bar). Bends and branches shall provide non-turbulent flow conditions and the layout of paperwork shall be such as to facilitate dismantling and inspection. The pipes are to be properly supported and so arranged that all stresses created in the pipeline by static and dynamic forces, including recoil shock, will be taken up by suitable anchors. Unless a specific size is specified, pipework shall be sized so as to limit maximum flow velocities to 1.5 metres per second.

All suction pipework shall be provided with a flexible coupling in a convenient position ( downstream of the gate valve if applicable) to facilitate removal and reinstallation of a pump. Any reducers used on the suction pipework shall have level soffits (as installed) and the length of such reducers shall be four times the difference in diameters.

All suction pipework shall start with a suitable bellmouth, equipped with adequate anti-vortex baffles.

Suction pipework for self priming pumps shall not contain horizontal (or downwards sloping) sections exceeding 1.5m in length.

Check valves on delivery mains shall only be used in a horizontal position.

All brackets and supports in dry wells of pump stations shall be of galvanized mild steel and of grade 304 stainless steel in wet wells of pump stations.

### 404 SITE TESTING OF PUMPING PLANT

On completion of erection of the pumps and of rendering them operational, the Contractor shall make suitable arrangements to test them in the presence of the Engineer.

Each pump shall be tested individually over its whole range of delivery. Where pumps are to operate in parallel, tests shall also be carried out to check these operating conditions.

The rate of delivery during testing shall be determined by cutting off the inflow to the sump and timing the drop in water level therein.

During the tests, the average values of voltage and current drawn by the motor shall be noted and recorded. Motor efficiencies and power factors shall be used as supplied by the maker.

The test results shall be compared with the tendered pump characteristics and the following tolerances will be allowed:

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Delivery rate:	0+10%
Overall efficiency	-5%

In the event of a pump failing to achieve the tendered performance in regard to discharge or efficiency within the tolerance allowed, then the Employer shall have the right to reject the pumps, to recover all monies paid to the Contractor under the Contract for such pumps and to confiscate the surety by way of agreed and liquidated damages; where upon the Contractor at his own expense shall remove all rejected plant where ordered to do so by the Engineer. Alternatively the Engineer shall have the right to negotiate with the Contractor a reduction in the price of the pumping plant based on the increased power consumption over a twelve (12) year life.

Each pump shall be operated and checks made that no undesirable effects occur when it is tripped.

### 405 CONTROL OF PUMPS

All control and switchgear will form the subject of another contract.

### 406 ELECTRICAL INSTALLATION

The electrical scope of supply for the pumping equipment shall be the electric motors. The motors shall comply with the specifications.

The supply and installation of motor control switchgear, stop/start station and cables shall form part of a separate electrical installation contract. All special requirements of the Contractor completing this contract shall be specifically identified e.g. single line diagrams indicating the exact electrical requirements and interlocks of all the equipment. The electrical equipment forms an integral part of the mechanical equipment and should be included in the scope of supply of the Contractor thereby completing this section.

### 407 CORROSION PROTECTION

Corrosion protection shall be carried out strictly in accordance with the requirements of the Standardised Corrosion Protection Specification, to the following systems:

- a) Motors, baseplates, speed reducers and pipework in dry wells (above water level)

:System A.1, A.2 or A.3 (to conform with colour scheme selected by Engineer). If existing paints on these items are incompatible with alkyd paints, the Contractor shall provide suitable alternatives to the approval of the Engineer.

- b) Pipework, Valves and Fittings

- |  |              |
|--|--------------|
| i. Above ground (outside):             | System B.1.A |
| ii. Below water level or below ground: | System B.1   |

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### c) General

Equipment inside buildings and above ground level not painted on System B.1.A, shall not receive a further coat of paint after installation.

### 408 SPARES, TOOLS AND LUBRICANTS

As required in Clause e.17 lubricants are to be supplied with the equipment included under this Contract.

Spares and special tools are to be listed in the Schedules following the Technical Data Sheets. Provisional items have been allowed in the Schedule of Prices to cater for this.

### 409 BOLTS

Holding down bolts which are to be built into concrete work for securing the plant shall be supplied and installed under this section of the Contract.

All bolts and nuts shall be specified in Clause E.16 of the project specification.

### 410 LIFTING GEAR FOR PUMPS

The Tenderer shall provide lifting gear (where applicable) (travelling trolley, block and tackle) for the pumps.

The crawl beam for the lifting gear shall be supplied and installed under another Contract but the Contractor under this section of the Contract shall supply and install suitable manually operated lifting gear for the pumps. Full detail of the lifting gear shall be provided with the tender.

### 411 PARTICULAR REQUIREMENTS OF PUMPS

#### 411.1 Return Activated Sludge Pumps

FOUR pumps with available frequency control are required to pump the underflow from the secondary clarifiers to the return activated sludge (RAS) respiration tank. One pump will operate at each clarifier at a time with the other two serving as stand-by pumps.

Each pump shall be selected to deliver a maximum of 30 ℓ/s against a total system head of at least 8,0m.

#### 411.2 Waste Activated Sludge Pumps

Two pumps with variable frequency control are required to pump the waste activated sludge (WAS) from the BNR Reactor to the aerobic sludge digesters. Only one pump will operate at a time with the other one serving as a stand-by pump.

Each pump shall be selected to deliver 30ℓ/s against a total head of at least 4 m.

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### 411.3 Backwash Pumps

Two (vertical turbine) pumps are required for backwashing the Rapid Gravity Sand Filters. One pump will act as duty and one pump as standby. Each pump shall be selected to deliver 85L/s at 10m head.

#### Control System for the Backwash Pumps

- Programmable Logic Controller (PLC):
- Sequences the backwash cycle (air scour → water wash → rinse).
- Controls pump start/stop, valve actuation, and timing.
- Interfaces with level sensors in the clear water tank to ensure adequate supply.

#### Motor Control (MCC / VFD):

- Pumps are usually fitted with Variable Frequency Drives (VFDs) to adjust flow rate and ramp up/down smoothly.
- Prevents hydraulic shock to the filter bed.
- Allows fine-tuning of backwash velocity depending on filter loading.

#### Instrumentation & Feedback:

- Flow meters and pressure sensors monitor backwash rate and head.
- Interlocks prevent pump operation if valves are not correctly positioned or if tank levels are too low.

### 411.4 Effluent Recycle Pumps

TWO vertical turbine pumps sized for 34L/s at 40 m head pumps are required to pump the final effluent for re-use at the factories within the industrial complex. One pump will operate at a time with the other serving as a stand-by pump.

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### SECTION F-400

#### TECHNICAL DATA

MOTORS	RAS PUMPS	WAS PUMPS	BACKWASH PUMPS	EFFLUENT RECYCLE PUMPS
Name of manufacturer				
Place of manufacture				
Pump model				
Speed of rotation (r.p.m)				
Suction diameter (mm)				
Delivery diameter (mm)				
Operation at duty point:				
Delivery :ℓ/s				
Head : m				
Efficiency : (%)				
Absorbed power : (kW)				
Type of bearings				
Type of impeller				
Diameter of impeller				
Material of impeller				
Method of lubrication				
Is pump of non-over-loading type?				
If so, what is maximum power demand				

MOTORS	RAS PUMPS	WAS PUMPS	BACKWASH PUMPS	EFFLUENT RECYCLE PUMPS
Name of manufacturer				
Place of manufacture				
Type of motor				
Type of frame				
Class of insulation				
Speed of rotation (r.p.m)				

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MOTORS	RAS PUMPS	WAS PUMPS	BACKWASH PUMPS	EFFLUENT RECYCLE PUMPS
Rated output (kW)				
% Utilization at rated output of motor				
Fill load current (A)				
Efficiency at : Full load (%)				
Power factor at : Full load (%)				
Operating voltage (V)				
DOL starting current (A)				

### LIFTING GEAR

Make and model				
Place of manufacture				
Safe lifting capacity				
Dimension between soffit of crawl beam and uppermost position of work (mm)				
Reach of hook from highest position to lowest position (mm)				

### PRESSURE GAUGES

Make and model				
Diameter of indicator dial				
Scale range and divisions				

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## Part 2: Section 6 Statement of Requirements

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### SCHEDULE OF PRICES

#### PREAMBLE TO THE SCHEDULE OF PRICES

1. All costs involved in meeting the obligations and liabilities imposed by the Conditions of Contract and in complying generally with the requirements of the Contract shall be deemed to be apportioned to and included under the various items, and the price quoted against each item must cover the full inclusive cost of all work to be completed under that item, plus such appointment of the general costs.
2. The Tenderer must also provide in his prices for anything not specially mentioned but obviously required to enable the plant and equipment as described to function correctly as specified.
3. Should a Tenderer wish to exclude certain items of plant and/or operations from his offer he must clearly state such exclusions in a schedule accompanying his tender. Any items of plant and/or operation which are specified in the Specification but which are not so scheduled will be deemed to be included in the Tender.
4. Any additional charges in connection with off-site storage which there may be over and above the prices quoted in the various sections of this Schedule of Prices shall be set out in detail in a separate schedule accompanying the Tender.
5. A price is to be entered against each item in the Schedule of Prices. Items against which no price is entered will be considered to be covered by other prices in the Schedule.
6. The Tenderer must price each item in the Schedule of Prices in BLACK INK or type script.
7. Mistakes made by the Tenderer in the completion of the Schedule of Prices shall not be erased or painted out. A line shall be drawn through the incorrect entry and the correct entry shall be written above and the correction initialed by the Tenderer. Failure to observe this Condition of Contract may lead to the Tender being disqualified.
8. The Council reserves the right to sub-divide the Contract. Prices quoted in this Schedule are deemed to apply for that section only. The Tenderer may offer a reduction in price if awarded more than one section.
9. Where an item has been allowed to cover the cost of maintenance of equipment during off-site storage in accordance with Clause D.18 of the Specification payment shall be made to the Contractor after the equipment has been delivered to site.

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## Part 2: Section 6 Statement of Requirements

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Time required for delivery of complete plant from the date of notification to commence fabrication

.....weeks

Time required for erection and installation of plant from date of notification of availability of structures for erection and installation, or from time of completion of delivery, whichever is later.

.....weeks

Time required for testing, commissioning and putting into proper working order of complete plant from date of notification.

.....weeks

.....  
SIGNATURE OF TENDERER.

.....  
DATE

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500 : MECHANICAL STIRRERS

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## Part 2: Section 6 Statement of Requirements

### SECTION F-500 : MECHANICAL STIRRERS

#### 501 SCOPE

This section of the Contract covers the supply, delivery, transport, handling, commissioning, testing, adjustment and handing over in complete working order and upholding during the Defects Liability Period of:

- a) **ONE** vertical Shaft stirrer in the Mixing Basin of the Biological Reactor;

#### 502 MECHANICAL STIRRERS

##### 502.1 Description

ONE vertical shaft stirrer is required in Mixing Basin of the Biological Reactor.

**Table 1: Biological Reactor Operating Conditions**

Compartment	No. of Stirrers	Length (m)	Width (m)	Water Depth (m)	Volume (m <sup>3</sup> )	Maximum Sludge Concentration Mg/ℓ	Height from floor to top of platform m
Mixing Tank	1					5 000	

The stirrer is required to keep the solids in suspension and for gently mixing contents of the basin without introducing oxygen through surface agitation. Raw sewage and return activated sludge will be introduced into the Biological Reactor. Preferably, the horizontal zones of maximum turbulence should be as close to the floor of the basin as possible. Scour velocities near the bottom shall be such that sludge, which has settled during a power failure, will be lifted and brought back into suspension. The positions of the stirrer is shown on Drawing 1065-M2-601.

The impellers of the stirrer must be selected such that good pumping action is obtained. Curved blade impellers are preferred for the vertical stirrers but the blades shall nevertheless be shaped such as to minimize the accumulation of rags thereon.

In the design of the drive shafts, the Tenderer shall pay special attention to the slenderness ratio (length to diameter) of the shaft to prevent whip lashing.

##### 502.2 Duties of Vertical Shaft Stirrers

The requirements of Clause E.21.9 of the Specification regarding motors shall apply to the motors of these stirrers. The rated output power of the motors shall be in excess of 115 % of the maximum power requirement at the stirrer shaft. The vertical shaft stirrers shall be designed to achieve mixing intensity of between 10 W/m<sup>3</sup> to 12 W/m<sup>3</sup>.

The minimum power requirements for the vertical shaft stirrers are given below in Table 2.

**Table 2 : Minimum Power Requirements**

Compartment	No. Of Stirrers	Minimum Power requirements per Stirrer kW
Mixing Tank	1	8.25

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The speed of rotation of the vertical shaft stirrer shall not exceed 25 r.p.m. The Tenderer shall supply all relevant information for the proper adjudication of all the units, giving information regarding:

- Type of impeller
- Size and shape of impeller
- Tip speed of impeller
- Pattern of flow in the basin
- Shaft length and diameter

### 503 CHLORINE DOSING FLASH MIXER

#### 503.1 Description

One flash mixer is required in the mixer chamber next to the chlorine contact tank as shown on Drawing 1065-M2-901. The volume of the chamber varies from 1.6 m<sup>3</sup> at ADWF to 1.9 m<sup>3</sup> at PWWF, with water depths of 1.1 m and 1.3 m respectively.

One low speed, low shear mixer shall be installed in the feed chamber to the chlorine contact tank. The ratio of the impeller to the size of the mixing chamber shall be such as to ensure that optimum mixing of the contents occurs. The mixer shall be of such a design that it is able to operate efficiently and reliably with varying effluent levels in the chamber.

All parts below water level shall be manufactured from stainless steel.

The mixer in the mixing box shall be mounted on a stainless steel supports and the supports form part of this contract. Full details are to be supplied in the Tender.

### 504 GENERAL

#### 504.1 Electrical Installation

The equipment shall be supplied complete with drive motors. The motors shall comply with the Standard Specification Clause E.21.

The supply and installation of motor control switchgear, local stop/start station and cables shall be part of a separate electrical installation Contract. Any special requirements of the Contractor completing this contract shall be specifically identified e.g. type of motor starting equipment etc..

The Contractor shall be in attendance during the testing and commissioning of the electrical equipment (supplied under a separate contract).

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### 504.2 Speed Reducers

Speed Reducers shall be selected for continuous operation 24 hours per day. Mechanical power ratings (according to AGMA) shall be greater than twice the installed power and shall account for D.O.L. starting of the unit at full load conditions (maximum immersion). Thermal power ratings shall be based on an ambient temperature of 40°C.

Speed Reducers shall be units specially selected for vertical shaft aerator duties and shall employ Standardised components. The helical and spur gears shall be manufactured from alloy steel and shall be thoroughly hardened and ground after machining. The gears shall have a high durability factor, maximum strength and low noise level.

Tenderers will be required to prove catalogue of the make of speed reducer offered and to indicate how the selection was made.

All bearings shall be designed for a life of at least 100 000 hours at a B10 rating. Proof of such rating shall accompany the tender. In addition, the bearings on the output shall be capable of withstanding the resultant forces caused by the combination of radial and axial loads (imposed by the aerator) acting simultaneously, and shall be selected such that the following condition is complied with:

$$\frac{\text{Actual radial load.}}{\text{Permissible radial load}} + \frac{\text{actual axial load}}{\text{permissible axial load}} \leq 1$$

The ‘permissible loads’ are the manufacturer’s figures for 5 000 hours at a B10 rating. Tenderers shall indicate what these forces are and how they are accommodated.

Casings shall be made of close-grained cast iron and shall be designed such as to prevent moisture from entering. A dry-well for the output shaft lower bearing is required.

All speed reducers must be provided with jacking bolts of stainless steel 304 allowing at least 100 mm adjustment upwards and downwards.

The housing shall be equipped with a breather, drain and oil, which shall be accessible above the mounting frame.

The motor shall be mounted on the speed reducer via an accurately located lantern housing. A precision high speed flexible coupling, incorporating rubber buffers shall transmit power from the motor to the speed reducer.

The speed reducer shall be fitted with an effective and accessible oil filling plug, oil level indication mechanisms and a drain plug. Speed reducers rated at more than 75kW shall have oil pressure limit switches fitted for protection purposes.

All bearings shall be located within the speed reducer and shall be lubricated by means of a positive splash-action system. Oil levels shall be easily controlled. Should greasing of certain bearings be required, the movement of the speed reducer shall drive the grease pump.

The speed reducer shall be mounted on a suitable base plate.

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Each speed reducer shall be fitted with a nameplate showing at least the following information:

- Speed reducer type and model number
- Serial number
- AGMA reduction ratio
- Approximate oil quantity required

### 504.3 Corrosion Protection

Corrosion protection must be carried out strictly in accordance with the requirements of the Standardised Corrosion Protection Specification to the following systems:

Impeller and shaft: System B.1

Baseplates: System A.1 or A.2, as applicable

Motor and speed reducer: System A.1, A.2 or A.3 (where applicable) (colour to conform with the Colour scheme selected by Engineer). If existing paint on this item is incompatible with Alkyd paints, the contractor shall provide suitable alternatives approved by the Engineer. A further coat of finish paint shall be applied after erection except for areas which will be inaccessible after erection.

### 505 SPARES, TOOLS AND LUBRICANTS

As required by the Project Specifications (see Clause E.17), lubricants are to be supplied with the plant under this section of the contract. Spares and Special Tools are to be listed in the Data Sheets.

### 506 BOLTS

All bolts and nuts shall be as specified in Clause E.16.

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## Part 2: Section 6 Statement of Requirements

### SECTION F-500 : MACHANICAL STIRRERS

#### TECHNICAL DATA

<b>VERTICAL SHAFT STIRRERS</b>	Mixing Tank
Name of manufacturer	
Place of manufacture	
Speed of rotation(r.p.m)	
Impeller size and type	
Impeller tip speed (m/s)	
Pattern of flow in basin	
Shaft length	
Shaft diameter	
Power demand at required duty (at stirrer shaft)	
<b>SPEED REDUCER</b>	
Name of manufacturer	
Place of manufacture	
Type number	
Mechanical power rating (kW)	
Thermal power rating	
Maximum torque capacity (Nm)	
<b>ELECTRIC MOTORS</b>	
Name of manufacturer	
Place of manufacture	
Class of insulation	
Degree of protection (IP)	
Comply with SWASA 948 Yes/No	
Continuous rating under site conditions (kW)	
Maximum starting current under locked rotor conditions (A)	
Speed of rotation (r.p.m)	
Efficiency at 100 % load	
<b>VERTICAL SHAFT STIRRERS</b>	
Power factor at 100 % load	
Power factor at 50 % load	
Mass of motor only (kg)	
Mass of complete unit (kg)	

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### 600 : AERATION EQUIPMENT

#### 600: AERATION EQUIPMENT

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### 601 SCOPE

This section of the contract covers the supply, delivery, transport, handling, storage, re-erection, installation, commissioning, resting, adjustment, handing over in complete working order and upholding during the Defects Liability Period of:

- ONE 45 kW vertical shaft aerator for the Aerobic Basin of the Biological Reactor;
- ONE 37 kW vertical shaft aerator for the Aerobic basin of the Biological Reactor;
- ONE 30 kW vertical shaft aerator for the Aerobic basin of the Biological Reactor.

### 602 DESCRIPTION

The ONE 45 kW, ONE 37kW and ONE 30 kW Aerators shall be installed in the Aerobic Baisn of the Biological Reactor for the treatment of screened raw sewage and return activated sludge as shown in Figure 1065-M2-601. The volume of mixed liquor that each 30/37/45 kW Aerator must mix is 825 m<sup>3</sup> with a liquid depth of 4.0 m.

### 603 AERATORS IN BIO-REACTOR

The aerators in the Bio-Reactor shall work in conjunction with draught tubes. The main body of the draught tubes shall consist of a concrete pipe to be installed by the Civil Contractor. The cylindrical part of the aerator shall fit inside the concrete draught tube and shall be clear of the internal surface of the concrete pipe.

If the aerators offered require a stationary funnel fixed to the draught tube, this funnel section must be supplied and installed in place as part of this Contract. The funnel shall be manufactured in 4.5 mm thick stainless steel grade 304. Fixing bolts shall be in stainless steel grade 304. The fixing bolts shall allow some movement for accurate centering of the funnel under the aerator.

It is essential that the aerators shall be capable of mixing the contents of the aeration basin at all times, especially when the oxygen demand is low. Since the pumping capacity of the aerators varies inversely with the tip speed of the aerators, preference shall be given to aerators having a good pumping action when operating at a low rational velocity. The aerators tip speed shall not exceed 5.3 m/s with a maximum rotational velocity of the aerators not exceeding 45 r.p.m OFFERS OF AERATORS EXCEEDING THIS ROTATIONAL VELOCITY SHALL BE DEEMED AS NOT COMPLYING WITH THE SPECIFICATION.

The aerators shall be of self-cleansing open type. The supporting plate and aerator blades shall be manufactured in mild steel and protected as specified in Clause 610 and shall allow a high flow of liquid through the unit. At no point shall the liquid pressure reduce to lower than 10 % above the vapour pressure of the liquid, in order to prevent cavitation. Full details of the impeller design shall be supplied with the tender.

The aerators impeller shall be accurately coupled with a bolted flange to a tubular drive shaft, which shall be adequately designed to withstand the combined torsion and bending moments encountered during operation. The design and selection of shafts and bearings shall be carefully done to allow for maximum stiffness, life and overhung-load capability for the unit. The aerator and shaft shall be balanced as a unit.

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The aerator shaft shall be of carbon steel and shall be designed to be adequate for the transmission of torque and to run well below the first critical speed and shall be able to operate in air and all liquid levels, even totally submerged.

Tenderers must submit a detailed description and a clearly labeled cross sectional drawing of the aerators with their tenders. Failure to submit this drawing and description will render incomplete and as such liable to rejection.

### 604 POWER REQUIREMENTS

The requirements of Clause E.21.9 of the Specification regarding motors shall apply to all aerator motors. The rated output power of the motors shall be in excess of 115% maximum power required at the shafts of the aerators.

The fixed speed aerators shall have a power requirement as specified at the aerator shafts. Maximum power shall be drawn at the maximum immersion depth of the aerators. Variable speed and two speed aerators shall have rotational speeds variable between 20 r.p.m and shall have motors suitable for frequency converter control.

### 605 SPEED REDUCERS

Speed reducers shall be selected for continuous operation of 24h/d. mechanical power ratings (according to AGMA) shall be greater than twice the installed power and shall account for D.O.L. starting of the unit at full load conditions (maximum immersion). Thermal power ratings shall be based on a maximum ambient temperature of 40°C.

Speed reducers shall be units especially selected for vertical shaft aerators duties and shall employ standardized components. The helical and spur gears shall be manufactured from alloy steel and shall be thoroughly hardened and ground after machining. The gears shall have a high durability factor, maximum strength and low noise level.

Tenderers will be required to provide a catalogue of the make of speed reducer offered and to indicate how the suction was made.

All bearings shall be designed for a life of at least 100 000 hours at a B10 rating. Proof of such rating shall accompany the tender. In addition, the bearings on the output shaft shall be capable of withstanding the resultant forces caused by the combination of radial and axial loads (imposed by the aerators) acting simultaneously, and shall be selected such that the following condition is complied with:

$$\frac{\text{Actual radial load}}{\text{Permissible radial load}} + \frac{\text{actual axial load}}{\text{permissible axial load}} < 1$$

The “permissible” loads are the manufacturer’s figures for 5 000 hours at a B10 rating. Tenderers shall indicate what these forces are and how they are accommodated.

Casings shall be made of close-grained cast iron and shall be designed such as to prevent moisture from entering. A dry well for the output shaft lower bearing is required.

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All speed reducers must be provided with jacking bolts of stainless steel 304 allowing at least 100 mm adjustment upwards and downwards.

The housing shall be equipped with a breather, drain and oil, which shall be accessible above the mounting frame.

The motor shall be mounted to the speed reducer via an accurately located lantern housing. A precision high speed flexible coupling, incorporating rubber buffers shall transmit power from the motor to the speed reducer.

Inspection of the speed reducer gears shall be possible without dismantling the speed reducer. The speed reducer shall have lifting plugs for lifting purposes. The coupling on the drive shaft between the aerators and the speed reducer shall be such that the aerators can be easily removed without shifting the speed reducer.

The speed reducer shall be fitted with an effective and accessible oil filling plug, oil level indication mechanisms and a drain plug. Speed reducers rated at more than 75 kW shall have oil pressure indicators and oil pressure limit switches fitted for protection purposes.

The speed reducer and motor shall be mounted on a suitable base plate.

Each speed reducer shall be fitted with a nameplate showing at least the following information:

- Speed reducer type and model number
- Serial number
- AGMA rating
- Nominal reduction ratio
- Approximate oil quantity required

### 606 DRAUGHT TUBES

The draught tubes shall consist of concrete pipes constructed on a baffled plinth by the Civil Contractor. Unless otherwise required by the supplier of the aeration equipment, the concrete pipe shall have an internal diameter of 1 829mm and an outside diameter of 2 019mm. The exact positioning of the concrete pipe will be as shown on the drawings unless otherwise indicated by the Tenderer. The cylindrical part of the aerator shall fit inside the concrete pipe but shall not touch the pipe during rotation of the aerator. The height of the platform above the top water level and the level of the top of the concrete draught tube will be determined by the supplied equipment. Once the concrete pipe is installed it will not be possible to adjust it. The concrete pipe will be installed to be concentric with the shaft hole in the concrete platform and within 5mm of the actual level specified by the Tenderer. If a funnel is required, the Contractor under this section of the Contract shall install the funnel accurately on top of the draught tube. The funnel shall be fixed to the pipe in at least eight positions around the periphery of the pipe.

### 607 OXYGENATION EFFICIENCY

Oxygenation efficiency, where called for in the Technical Data Sheets, shall be expressed as kilograms oxygenation capacity per kilowatt-hour i.e. as the mass of oxygen measured in kilograms which the aerators can introduce over a period into a body of water/liquid divided by the power input to the motor over the same period, measured in kilowatt-hours.

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The special mechanical aerator sizes are based on the following oxygenation efficiency:

- Field condition

Oxygen efficiency = 1.2 kgO<sub>2</sub>/kW hr where field conditions refer to:

- Liquid is a mixed liquor containing 3 000-4 000 mg/ℓ suspended biological solids;
  - Liquid temperature could vary in the range of 15°C to 25°C;
  - 1 300 meter above sea level;
  - Atmospheric pressure variable depending on the weather, can be assumed to be 650 mm Hg;
  - Dissolved oxygen in mixed liquor of 2.0 mg/ℓ;
- Standard conditions:

Oxygenation efficiency = 2.4 kgO<sub>2</sub>/kW hr where standard conditions refer to:

- Liquid is a clear water with a TDS < 600 mg/ℓ ;
- Liquid temperature = 20 °C ;
- Atmospheric pressure = 760 mm Hg ;
- Dissolved oxygen in clear water = 0.00 mg/ℓ.

### 608 CERTIFICATION

Tenderers shall provide proof of sufficient evidence of oxygenation capacities and oxygenation efficiencies (for instance by submitting a report on performance by some recognized testing organization) and must state clearly how the aerator's performance was assessed. Failure to submit this information may lead to the rejection of the tender on the grounds of it being incomplete.

### 609 IN-SITU OXYGENATION EFFICIENCY DETERMINATION

In-Situ oxygenation efficiency tests may be conducted once the plant is operating effectively and Tenderers shall price the Provisional Item in the Schedule of Prices for conducting such tests.

The test shall utilize the steady state method and shall be carried out as per the requirements below:

Steady state oxygenation Capacity Determination.

In the aeration of activated sludge mixed liquor, at a temperature of T°C, the following relationship holds:

$$dC = K(T) \chi [C_s(T) - C] - R$$

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## Part 2: Section 6 Statement of Requirements

dt

where:

$\frac{dC}{dt}$  =  
rate of range of oxygen concentration (mg/ℓ/hr)

$K(T)$  =  
oxygen transfer co-efficient in mixed liquor at T°C (hr<sup>-1</sup>)

$C_S(T)$  =  
saturation concentration of oxygen in mixed liquor at T°C

and at the

ambient barometric pressure (mg/ℓ)

minimum of 2.0

$C$  =  
actual concentration of oxygen in the mixed liquor, with a

mg/ℓ under peak loading conditions.

$R$  =  
oxygen uptake rate of the mixed liquor (mg/ℓ/hr)

It is assumed that, under normal operating conditions, a state of equilibrium exists in the system then:

$$\frac{dC}{dt} = 0$$

$$C] = \frac{R}{K(T) \chi [C_S(T) - C]}$$

i.e.  $K(T) = \frac{R}{[C_S(T) - C]}$  (1)

The value of  $C_S(T)$  to be used in equation (1) is calculated from the following relationship:

$$C_S(T) = \frac{468 - 2,65S}{31,6 + T} \cdot \frac{P - P_W}{760 - P_W} \quad (2)$$

where  $C_S(T)$  = saturation concentration of oxygen in mixed liquor at T°C and P mm pressure (mg/ℓ).

S = dissolved solids in mixed liquor (parts per 1 000)

T = temperature of mixed liquor (°C)

P = barometric pressure (650 mm Hg or physically measured on site when executing the test.)

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## Part 2: Section 6 Statement of Requirements

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$P_w$ =saturation vapour pressure of water at  $T^\circ\text{C}$  (mm Hg)

In equation (1), R and C can be determined, and  $C_s(T)$  can be obtained from equation (2), so that the value of  $K(T)$  can be calculated. The value of K at  $20^\circ\text{C}$  can be obtained by the use of the following relationship:

$$K(T) = K(20) \times 1,024^{(T-20)}$$

$$K(20) = K(T) \times 1,024^{(20-T)}$$

$$OC = K(20) \times C_s^1(20) \times V \times 10^{-3} \text{kg/hr}$$

where

$C_s^1(20)$ =saturation concentration of oxygen in mixed liquor containing 600 mg/ℓ dissolved solids, at  $20^\circ\text{C}$  and 760 mm pressure (mg/ℓ)

$$= 9,02 \text{ mg/ℓ}$$

V=volume of mixed liquor in basin under consideration ( $\text{m}^3$ )

OC = oxygenation capacity (kg  $\text{O}_2$ /hr)

The oxygenation capacity is obtained using the following relationship:

$$OE = \frac{OC}{p}$$

where

OE=oxygenation efficiency (kg  $\text{O}_2$ /kW-hr)

OC=oxygenation capacity (kg  $\text{O}_2$ /hr)

p=power drawn by the motor (kW)

The calculated OE is taken to be the field oxygenation efficiency, at  $20^\circ\text{C}$ .

### Test Requirements

The actual test procedure shall be executed by the Contractor, but must be approved by the Engineer before it is implemented.

Nevertheless, the following points shall be incorporated in the test procedure:

- The Contractor shall provide four dissolved oxygen meters of approved make, all standardized and calibrated in accordance with the instructions supplied by the manufacturers.
- The Contractor shall provide all meters, etc. required for conducting the oxygen uptake rate tests.

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## Part 2: Section 6 Statement of Requirements

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- The position of the DO probes shall be to the satisfaction of the Engineer.
- The Contractor shall provide all meters, etc. required to assess the power consumption of the aerators during the steady state oxygenation capacity test.
- At least three consecutive tests shall be conducted.

### 610 CORROSION PROTECTION

The corrosion protection must be carried out strictly in accordance with the Standardised Corrosion Protection Specification and to the following systems:

Impeller and shaft :System B.1  
Baseplate :System A., and A.2 or A.3 (where applicable)(colour to conform with scheme selected by Engineer). If existing paints on these items are incompatible with Alkyd paints, the contractor shall provide suitable alternatives approved by the Engineer.

Stainless steel: As per chapter 7

3CR12 Steel: As per chapter 8

All painted equipment installed above water level shall receive a further coat of paint after installation.

### 611 ELECTRICAL INSTALLATION

The Contractor shall supply all electric motors. The motors shall comply with the Standard Motor Specification, Section E.

The supply and installation of motor control switchgear, local stop/start stations and cables shall form part of a separate electrical installation Contract. Any special requirements of the Contractor completing this contract shall be specifically identified.

Both Mechanical and Electrical Contractors shall be in attendance during the testing and commissioning phase.

### 612 SPARES, TOOLS AND LUBRICANTS

Lubricants are to be supplied with the plant included under this section of the Contract as required in Clause E.17. Details of spares and special tools (see Clause E.17) are to be listed in the schedule following the Data Sheets. A provisional item has been allowed in the Price Schedule to cater for this.

### 613 BOLTS

Holding down bolts which are to be built into concrete work for securing the plant shall be supplied and installed under this section of the Contract. All bolts and nuts shall be as specified in Clause E.16.

### 600 : AERATION EQUIPMENT

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## Part 2: Section 6 Statement of Requirements

### TECHNICAL DATA

ITEM			
AERATORS AT BIO-REACTOR	45 kW	37 kW	30kW
Name of manufacturer			
Place of manufacture			
Make and model of aerators			
Material of aerators			
Speed of aeration (r.p.m)			
Tip speed of aerators blade (m/s)			
CONDITIONS OF ENERGY INPUT	45 kW	37 kW	30kW
Power required at the aerators shafts (kW)			
Installed motor power (kW)			
Max depth of immersion (mm)			
Optimum depth of immersion (mm)			
OC of individual aerators (kg.O <sub>2</sub> /h at 760 mm Hg and 20°C in tap water)			
OC of individual aerators at site (kg.O <sub>2</sub> /h at 637 mm Hg and 20°C in mixed liquid with a suspended solids concentration of 5 000 mg/l)			
Oxygen efficiency (shaft to water), kg.O <sub>2</sub> /kW.hr at optimum immersion			
Oxygen efficiency (wire to water), kgO <sub>2</sub> /kW.hr at optimum immersion			
SPEED REDUCERS	45 kW	37 kW	30kW
Name of manufacturer			
Place of manufacture			
Type number			
Mechanical power rating (kW)			
Thermal power rating (kW)			
Max. torque capacity (Mn)			

ELECTRIC MOTORS	45 kW	37 kW	30kW
Name of manufacturer			
Place of manufacture			
Type of motor			
Type of frame			
Class of insulation			
Compliance with SWASA 948 Yes/No			
Speed of rotation (r.p.m)			
Rated output (kW)			
% Utilization at rated output of motor			
Full load current (A)			
Efficiency:			
At full load (%)			
At ½ load (%)			
Power factor :			
At full load (%)			
At ½ load (%)			
Operating voltage (V)			
Starting method			
Starting current (V)			
Starting time with connected load (sec)			

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## Part 2: Section 6 Statement of Requirements

ELECTRIC MOTORS	45 kW	37 kW	30kW
Number of consecutive starts of motor at its specified load per hour			
TEMPERATURE DETECTORS IN WINDINGS	45 kW	37 kW	30kW
Type			
Number			
Position in windings			
TEMPERATURE DETECTORS ON BEARINGS	45 kW	37 kW	30kW
Type			
Number			
Voltage (V)			

### 600 : AERATION EQUIPMENT

#### SCHEDULE OF PRICES

##### PREAMBLE TO THE SCHEDULE OF PRICES

1. All costs involved in meeting the obligations and liabilities imposed by the Conditions of Contract and in complying generally with the requirements of the Contract shall be deemed to be apportioned to and included under the various items, and the price quoted against each item must cover the full inclusive cost of all work to be completed under that item, plus such appointment of the general costs.
2. The Tenderer must also provide in his prices for anything not specially mentioned but obviously required to enable the plant and equipment as described to function correctly as specified.
3. Should a Tenderer wish to exclude certain items of plant and/or operations from his offer he must clearly state such exclusions in a schedule accompanying his tender. Any items of plant and/or operation which are specified in the Specification but which are not so scheduled will be deemed to be included in the Tender.
4. Any additional charges in connection with off-site storage which there may be over and above the prices quoted in the various sections of this Schedule of Prices shall be set out in detail in a separate schedule accompanying the Tender.
5. A price is to be entered against each item in the Schedule of Prices. Items against which no price is entered will be considered to be covered by other prices in the Schedule.
6. The Tenderer must price each item in the Schedule of Prices in BLACK INK or type script.
7. Mistakes made by the Tenderer in the completion of the Schedule of Prices shall not be erased or painted out. A line shall be drawn through the incorrect entry and the correct entry shall be written above and the correction initialed by the Tenderer. Failure to observe this Condition of Contract may lead to the Tender being disqualified.

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## Part 2: Section 6 Statement of Requirements

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### 700 : CLARIFLOCCULATOR TANK EQUIPMENT

#### 700: : FINAL CLARIFIER TANK EQUIPMENT

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#### 702 TANK SHAPE

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#### 708 ELECTRICAL INSTALLATION

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## Part 2: Section 6 Statement of Requirements

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### 701 SCOPE

This section covers the design, manufacture, supply, delivery, transport, handling, storage, erection, installation, testing, commissioning, adjustment, handing-over, and compliance with the Defects Liability Period of all mechanical equipment for one complete circular clariflocculator, consisting of:

- An inner flocculation tank with a mechanically driven paddle flocculator.
- An outer clarification tank equipped with a peripheral-driven rotating bridge carrying the sludge-scraper mechanism.

All equipment shall be delivered complete with all mountings, fasteners, couplings, lifting eyes, guards, lubrication systems, shafting, bearings, surface skimmers (if required), electrical accessories, and corrosion protection.

### 702 GENERAL ARRANGEMENT AND TANK SHAPE

#### 702.1 Main Geometry

The Clari flocculator consists of two concentric tanks:

1. Inner Flocculation Tank
  - o Diameter: As shown on civil drawings
  - o Water depth: As shown on civil drawings
  - o Floor: Flat or gently sloped as per design
  - o Access: Central walkway or via bridge ladder
2. Outer Clarifier Tank
  - o Diameter: As shown on civil drawings
  - o Side water depth: As shown on drawings
  - o Floor slope: Typically 1:12 to central sludge hopper
  - o Peripheral effluent launder: Cast in concrete, serrated weirs installed on inner launder face

#### 702.2 Flow Conditions

Typical flows (to be confirmed in Data Sheets):

- Inflow (raw water):
  - o Minimum: ... ℓ/s
  - o Normal: ... ℓ/s
  - o Maximum: ... ℓ/s
- Sludge withdrawal: Continuous, up to design maximum
- Flocculation retention time: As per process design (tenderer to confirm paddle speed/diameter combinations)

### 703 ROTATING ACCESS BRIDGE – OUTER CLARIFIER

#### 703.1 General

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## Part 2: Section 6 Statement of Requirements

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The rotating bridge shall:

- Be supported at the centre by a kingpost bearing and at the periphery by driving and supporting wheels.
- Provide a minimum 900 mm wide walkway constructed of open grid flooring per Clause E.18.
- Include handrails and knee rails both sides per Clause E.19.
- Be designed for a uniformly distributed live load of 2 500 N/m<sup>2</sup>.
- Incorporate camber to eliminate dead-load deflection during operation.

### 703.2 Drive System

The bridge shall be peripheral driven:

- Drive motor: TEFC, suitably rated for outdoor duty
- Speed reducer: Sized for continuous 24-hr duty
- Bridge rotational speed:  $\leq 2.5$  m/min at periphery
- Drive protection:
  - o Shear pin or torque-limiting coupling
  - o Overload protection on motor
- Wheels:
  - o Tyres of approved heavy-duty synthetic wear-resistant material
  - o Alignment tolerances to prevent tyre wear
  - o Protective wheel covers and debris-deflecting guards

### 703.3 Lubrication & Maintenance

- All lubrication points to be mounted on bridge, accessible without entering tank.
- Grease lines in stainless steel conduit.
- All structural steel submerged or intermittently wetted shall be minimum 6 mm thickness.

## 704 SLUDGE SCRAPER MECHANISM – OUTER TANK

### 704.1 Construction

The scraper mechanism shall:

- Sweep entire tank floor.
- Be suspended from the rotating bridge by adjustable hanger rods.
- Include scraper blades consisting of:
  - o 3CR12 backing plates (min. 6 mm thick)
  - o Neoprene rubber squeegees shaped for tank floor curvature
- Allow  $\pm 30$  mm vertical adjustment during setup.

### 704.2 Sludge Hopper Interface

- Scraper arms shall direct sludge to the central hopper.

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## Part 2: Section 6 Statement of Requirements

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- Scrapers shall not rely on supporting wheels—no metal-to-concrete contact allowed.
- All hanger rods sized to prevent vibration, bending, or misalignment.

### 705 PADDLE FLOCCULATOR – INNER TANK

#### 705.1 General Description

A vertical-shaft, mechanically driven paddle flocculator shall be installed in the inner tank, consisting of:

- Central drive unit
- Vertical flocculator shaft
- Multiple paddle arms and blades
- Optional baffling if required by process design

#### 705.2 Drive Assembly

- Motor: TEFC, suitable for outdoor flocculator duty
- Gearbox: Vertical output shaft, high-torque, continuous service
- Speed range: Typically 0.5–3 rpm (tenderer to confirm)
- Coupling: Flexible type with removable spacer
- Baseplate: Fabricated steel with machined mounting surfaces

#### 705.3 Shafting

- Material: 3CR12 or stainless steel (304/316), sized against torsional and bending stresses
- Shaft sections shall be flanged or keyed for ease of removal
- Lower shaft guided by water-lubricated bearing in suitable housing

#### 705.4 Paddle Assemblies

- Paddle arms: 3CR12 or stainless steel
- Paddles: Flat or slotted as required
- Fixings: Stainless steel bolts with locking devices
- Length and width per process retention-time calculation

#### 705.5 Bearing & Support System

- Top thrust bearing designed to carry full hydraulic load
- Bottom guide bearing with removable bushings
- All bearings rated for  $\geq 100\,000$  operating hours

### 706 SCUM BAFFLE, SKIMMER (IF APPLICABLE)

- Scum baffle and skimmer shall be provided only for outer clarifier, as flocculator zone operates under controlled mixing.
- Baffle: 3CR12 steel plate, min. 4.5 mm thick

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## Part 2: Section 6 Statement of Requirements

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- Skimmer: 300 mm wide, matching clarifier surface area
- Scum hopper: Braced 3CR12 steel with adjustable beach overflow
- Discharge valve: Weighted bung or equivalent auto-opening design

### 707 OVERFLOW WEIR – OUTER TANK

- Adjustable serrated weir fabricated from 4.5 mm 3CR12 steel
- Installed on inner launder wall
- Even circumferential overflow with no dead zones
- Joints sealed with closed-cell neoprene

### 708 PIPEWORK (MECH. SCOPE)

The contractor shall supply & install:

- Scum discharge pipework
- Any interconnecting pipework between inner and outer zones if specified
- Overflow drain pipes
- All stainless steel fasteners, flanges, gaskets

All other embedded or under-tank pipework by Civil Contractor.

### 709 CORROSION PROTECTION

- All surfaces coated per Standardised Corrosion Protection Specification:
  - o System D.1 for bridge steelwork
  - o System A.1/A.2/A.3 for motors and reducers
- All equipment above water receives one additional final coat after installation.

### 710 ELECTRICAL INSTALLATION

#### 710.1 Slip Ring / Collector System

A slip-ring assembly shall be mounted on the kingpost to feed power/control signals to the rotating bridge:

- Four (4) main-circuit brass slip rings
- Three (3) control-circuit slip rings
- Seven (7) spring-loaded carbon brushes (Morganite or equal)
- Housed in IP55 grade 304 stainless steel enclosure
- Drainage and ventilation designed to prevent condensation

#### 710.2 Cabling

- Motor and instrument cables installed in 304 stainless steel conduit under the bridge
- Emergency stop push-button mounted near the drive unit
- All materials and workmanship per Section E.21

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## Part 2: Section 6 Statement of Requirements

### 711 SPEED REDUCERS – BOTH FLOCCULATOR & BRIDGE

- Continuous 24-hour duty
- Mechanical power rating  $\geq$  twice installed motor power
- Thermal rating for 40°C ambient
- Hardened & ground gears
- Bearings:  $\geq$ 100 000 hours (B10)
- Cast iron housing, moisture-sealed

### 712 SPARES, TOOLS & LUBRICANTS

As per Clause E.17:

- Start-up lubricants
- Two-year operational spare set
- Special tools, pullers, key extractors, alignment tools
- Grease guns, spare grease cartridges

### 713 BOLTS & FASTENERS

- Holding-down bolts to be supplied and installed by mechanical contractor
- Materials per Clause E.16
- Stainless steel for submerged or splash-zone duty
- Hot-dip galvanised for dry areas unless otherwise specified

### 700 : CLARIFLOCCULATOR TANK

#### TECHNICAL DATASHEET

ITEM	DESCRIPTION
BRIDGE (Outer Clarifier Tank)	
Diameter of tank	
Size of electric motor (kW) – Bridge Drive	
Mass of bridge, scraper mechanism & attachments	_____
Material of scraper blade wearing edges	Neoprene rubber or approved elastomer on 3CR12 backing
Peripheral speed of scraper (m/min)	_____ ( $\leq$ 2.5 m/min recommended)
Sealing material behind overflow weir	Closed-cell expanded neoprene or approved equivalent
CENTRAL BEARING SUPPORT (Kingpost Assembly – Bridge)	
Name of manufacturer	
Place of manufacture	
Type	Central pivot bearing / thrust bearing assembly
Bearing	Heavy-duty thrust bearing + radial guide bearing ( $\geq$ 100 000 hr design life)
PADDLE FLOCCULATOR (Inner Tank)	
Name of manufacturer	
Place of manufacture	

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## Part 2: Section 6 Statement of Requirements

ITEM	DESCRIPTION
Type	Vertical-shaft, multi-paddle flocculator
Rated power of flocculator motor (kW)	
Paddle rotational speed (rpm)	(Typically 0.5–3 rpm)
Shaft material	3CR12 / Stainless steel (304/316)
Bearing type	Top thrust bearing + bottom water-lubricated guide bearing
SPEED REDUCER (Bridge Drive)	
Name of manufacturer	
Place of manufacture	
Type number	
Mechanical power rating (kW)	
Thermal power rating (kW)	
Max. torque capacity (Nm)	
SPEED REDUCER (Flocculator Drive)	
Name of manufacturer	
Place of manufacture	
Type number	
Mechanical power rating (kW)	
Thermal power rating (kW)	
Max. torque capacity (Nm)	
ELECTRIC MOTOR (Bridge Drive)	
Name of manufacturer	
Place of manufacture	
Rated output (kW)	
% Utilization at rated output	
Speed of rotation (r.p.m)	
ELECTRIC MOTOR (Flocculator Drive)	
Name of manufacturer	
Place of manufacture	
Rated output (kW)	
% Utilization at rated output	
Speed of rotation (r.p.m)	
SUB-CONTRACTORS	
Fabrication	

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## Part 2: Section 6 Statement of Requirements

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### AERATION EQUIPMENT

### SCHEDULE OF PRICES

#### PREAMBLE TO THE SCHEDULE OF PRICES

1. All costs involved in meeting the obligations and liabilities imposed by the Conditions of Contract and in complying generally with the requirements of the Contract shall be deemed to be apportioned to and included under the various items, and the price quoted against each item must cover the full inclusive cost of all work to be completed under that item, plus such appointment of the general costs.
2. The Tenderer must also provide in his prices for anything not specially mentioned but obviously required to enable the plant and equipment as described to function correctly as specified.
3. Should a Tenderer wish to exclude certain items of plant and/or operations from his offer he must clearly state such exclusions in a schedule accompanying his tender. Any items of plant and/or operation which are specified in the Specification but which are not so scheduled will be deemed to be included in the Tender.
4. Any additional charges in connection with off-site storage which there may be over and above the prices quoted in the various sections of this Schedule of Prices shall be set out in detail in a separate schedule accompanying the Tender.
5. A price is to be entered against each item in the Schedule of Prices. Items against which no price is entered will be considered to be covered by other prices in the Schedule.
6. The Tenderer must price each item in the Schedule of Prices in BLACK INK or type script.
7. Mistakes made by the Tenderer in the completion of the Schedule of Prices shall not be erased or painted out. A line shall be drawn through the incorrect entry and the correct entry shall be written above and the correction initialed by the Tenderer. Failure to observe this Condition of Contract may lead to the Tender being disqualified.
8. The Council reserves the right to sub-divide the Contract. Prices quoted in this Schedule are deemed to apply for that section only. The Tenderer may offer a reduction in price if awarded more than one section.
9. Where an item has been allowed to cover the cost of maintenance of equipment during off-site storage in accordance with Clause D.18 of the Specification payment shall be made to the Contractor after the equipment has been delivered to site.

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## Part 2: Section 6 Statement of Requirements

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(Check Excel table)

Time required for delivery of complete plant from the date of notification to commence fabrication

.....weeks

Time required for erection and installation of plant from date of notification of availability of structures for erection and installation, or from time of completion of delivery, whichever is later.

.....weeks

Time required for testing, commissioning and putting into proper working order of complete plant from date of notification.

.....weeks

.....

**SIGNATURE OF TENDERER**

.....

**DATE**

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## Part 2: Section 6 Statement of Requirements

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### 900 : CHLORINATION EQUIPMENT

#### 900 : CHLORINATION EQUIPMENT

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##### 901SCOPE

##### 902 CHLORINATOR

##### 903INJECTOR FEED PUMPS AND IN-LINE STRAINERS

##### 904 WEIGHING APPARATUS

##### 905 LIFTING GEAR

##### 906 ACCESSORIES

##### 907CORROSION PROTECTION

##### 908 ELECTRICAL INSTALLATION

##### 909 SPARES, TOOLS AND LUBRICANTS

##### 910 BOLTS

### 900 : CHLORINATION EQUIPMENT (2.5 ML/DAY WORKS)

#### 901 SCOPE

This section covers the supply, delivery, transport, handling, installation, storage, erection, testing, commissioning, adjustment, and handing-over in complete working order, and compliance with the Defects Liability Period, of the following equipment for a chlorination system designed for a 2.5 ML/day wastewater treatment plant (with allowance for moderate future expansion):

- ONE (1) gas chlorinator with rate-of-dosing indicator suitable for 68 kg (150 lb) chlorine cylinders
- TWO (2) 68 kg chlorine cylinders (one duty, one standby)
- ONE (1) injector feed pump (plus ONE (1) standby pump)
- ONE (1) weighing apparatus suitable for 68 kg cylinders
- ALL interconnecting vacuum and chlorine-solution pipework
- ONE (1) manual lifting hoist/yoke suitable for 68 kg cylinders
- Heating equipment to prevent freeze-off
- ONE (1) emergency breathing apparatus set with oxygen

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## Part 2: Section 6 Statement of Requirements

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### 902 CHLORINATOR

#### 902.1 Capacity

The chlorinator shall:

- Be capable of dosing up to 0.7 kg/h chlorine, with accurate control down to 0.07 kg/h. (Scaled from 2 kg/h for larger works.)
- Provide steady, linear control over entire dosing range.

#### 902.2 Type

The chlorinator shall:

- Be a vacuum-operated, water-induced system, rugged and simple in construction.
- Include:
  - o Vacuum regulator for 68 kg cylinders
  - o Calibrated rotameter (kg/h)
  - o Injector assembly
  - o Diffuser
  - o Vacuum relief valve
  - o Moisture trap/heated catchpot
- Automatically shut down if motive-water supply fails.
- Provide flow- proportional chlorination using a 4–20 mA signal from the effluent flow meter.
- Include all safety mechanisms to prevent gas leakage under any operational scenario.
- Include an audible gas-leak alarm.

All materials in gas contact shall be chlorine-resistant.

A typical layout shall be provided by the tenderer.

### 903 INJECTOR FEED PUMPS AND IN-LINE STRAINERS

#### 903.1 Pumping Arrangement

- Motive water for the injector shall be extracted from the chlorine contact tank.
- Static level may be below pump suction; pumps must be capable of priming accordingly.
- Provide two (2) pumps: duty/standby, each sized for the required injector motive flow.

#### 903.2 Strainers

- Each pump discharge shall include a 50 mm in-line strainer, 0.5 mm apertures, with manual flush valve.

#### 903.3 Pipework

- Injector pump suction and delivery shall tie into existing pipework as shown on drawings.
- All motive-water pipework shall be PVC or HDPE, suitable for chlorinated water.

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## Part 2: Section 6 Statement of Requirements

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- All valves as indicated on project drawings.

### 904 WEIGHING APPARATUS

The smaller system uses 68 kg cylinders, thus:

- Provide one (1) weighing device suitable for 68 kg cylinders.
- Load cell shall be stainless steel with roller bearings and local digital indicator.
- Frame may be mild steel corrosion-protected to System B.1.A.
- Cylinder cradle shall be fitted with non-metallic wheels/castors for positioning.

### 905 LIFTING GEAR

- Provide manually operated lifting gear suitable for 68 kg cylinders, including lifting yoke and chain block.
- Lifting height: minimum 2.5 m.
- Minimum SWL: 0.25 ton (250 kg).
- Contractor shall ensure compatibility with existing building structure or supply a mounting frame.

### 906 ACCESSORIES

The following accessories shall be supplied:

- Tube set suitable for the chlorinator's 0–0.7 kg/h range
- Pressure gauges (90 mm dial), isolation valves, safety valves
- Moisture trap/filter assembly
- Atmospheric chlorine-gas detector with fan, indicator, and audio/visual alarm
- Load-cell indicator station
- Special spanner for cylinder
- Laminated wall-mounted instruction sheet for 68 kg cylinder
- Warning signage (multilingual)
- Self-contained breathing apparatus (complete) with wall-mounted GRP holder
- Heating equipment for freeze-protection
- Three (3) complete O&M manuals

### 907 INSTALLATION & TESTING

Upon installation:

- Entire system shall be fully pressure-tested on the solution side.
- Full vacuum-tightness tests shall be conducted prior to first gas introduction.
- Complete function test of motive water failure interlock

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## Part 2: Section 6 Statement of Requirements

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- Simulation test of leak-alarm system.

Contractor must provide as-built drawings and commissioning reports.

### 908 Corrosion protection

Corrosion protection must be carried out strictly in accordance with the requirements of the Protection Specification for Civil, Mechanical and Electrical Engineering Construction, New Revised 2001 Edition, prepared by Wates, Meiring and Barnard (Pty) Ltd, to the following systems:

Chlorinator and all non metallic components System D.2  
(colours to pipes, valves and chlorinators to

conform to colour scheme selected by Engineer). If existing paints on these items are incompatible with vinyl paint the contractor shall provide suitable alternatives approved by the Engineer. The equipment shall be painted with a further coat of paint after installation.

All steelwork other than items in stainless steel or 3CR12 : System B.1.A

Motors, speed reducers, bearing blocks, etc. System A.1, A.2 or A.3 (colours to conform to the colour scheme selected by Engineer). If existing paints on these items are incompatible with alkyd paint, the Contractor shall provide suitable alternatives approved by the Engineer.

Stainless steel As per chapter 7

3CR12 steel As per chapter 8

All painted equipment installed above water level shall receive a further coat after installation.

### 909 ELECTRICAL INSTALLATION

The electrical scope of supply for the pumping equipment shall be the electronic motors. The motors shall comply with the specifications.

The supply and installation of motor control switchgear, stop/start station and cables shall form part a separate electrical installation contract. All special requirements of the Contractor completing this contract shall be specifically identified, e.g. single line diagrams indicating the exact electrical requirements and interlocks of all the equipment. The electrical equipment forms an integral part of the mechanical equipment and shall be included in the scope of supply for the Contractor thereby completing this section.

### 910 SPARES, TOOLS AND LUBRICANTS

Details of spares and tools are to be listed in the Tender Document.

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## Part 2: Section 6 Statement of Requirements

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### 911BOLTS

All bolts which are to be built into concrete work for securing the plant shall be supplied and installed under this section of the Contract.

All bolts and nuts shall be in Grade 304 Stainless Steel.

### 900 : CHLORINATION EQUIPMENT

#### TECHNICAL DATA

CHLORINATOR	
Name of manufacturer	
Place of manufacture	
Type and model number	
Maximum dosing capacity (kg/h)	
Material of injector	
INJECTOR FEED PUMPS	
Name of manufacturer	
Place of manufacture	
Capacity at duty point (ℓ/s)	
Head at duty point (kPa)	
Absorbed power (kW)	
Motor rating (kW)	

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## Part 2: Section 6 Statement of Requirements

CHLORINATOR	
Speed of rotation (r.p.m)	
CONTROL EQUIPMENT	
Name of supplier of all necessary equipment	
Give brief description of control equipment of automatic operation	

PIPEWORK AND VALVES (from feed pump via chlorinator to dosing point)	
Diameter (mm)	
Length on which tendered price is based	
Price per meter length for supply and installation of pipework 9for adjustment up or down of tendered price according to actual length installed).	
LOAD CELLS	
Make and model	
Place of manufacture	
Capacity and increments (kg)	
RESPIRATOR	
Name of manufacturer	
Make and model	
Place of manufacture	
LIFTING GEAR	
Make and model	
Place of manufacture	
Safe lifting capacity	
Operated by chains and geared pulleys – Yes/No	
If No – give description	
Dimension between soffit of crawl beam and uppermost position of hook (mm)	

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## Part 2: Section 6 Statement of Requirements

PIPEWORK AND VALVES (from feed pump via chlorinator to dosing point)	
Nett reach of hook from uppermost position to lowermost position (mm)	

### CHLORINATION EQUIPMENT

### SCHEDULE OF PRICES

#### PREAMBLE TO THE SCHEDULE OF PRICES

1. All costs involved in meeting the obligations and liabilities imposed by the Conditions of Contract and in complying generally with the requirements of the Contract shall be deemed to be apportioned to and included under the various items, and the price quoted against each item must cover the full inclusive cost of all work to be completed under that item, plus such appointment of the general costs.
2. The Tenderer must also provide in his prices for anything not specially mentioned but obviously required to enable the plant and equipment as described to function correctly as specified.
3. Should a Tenderer wish to exclude certain items of plant and/or operations from his offer he must clearly state such exclusions in a schedule accompanying his tender. Any items of plant and/or operation which are specified in the Specification but which are not so scheduled will be deemed to be included in the Tender.
4. Any additional charges in connection with off-site storage which there may be over and above the prices quoted in the various sections of this Schedule of Prices shall be set out in detail in a separate schedule accompanying the Tender.
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## Part 2: Section 6 Statement of Requirements

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9. Where an item has been allowed to cover the cost of maintenance of equipment during off-site storage in accordance with Clause D.18 of the Specification payment shall be made to the Contractor after the equipment has been delivered to site.

(Check Excel table)

Time required for delivery of complete plant from the date of notification to commence fabrication

.....weeks

Time required for erection and installation of plant from date of notification of availability of structures for erection and installation, or from time of completion of delivery, whichever is later.

.....weeks

Time required for testing, commissioning and putting into proper working order of complete plant from date of notification.

.....weeks

.....  
SIGNATURE OF TENDERER

.....  
DATE

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## Part 2: Section 6 Statement of Requirements

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1000: POLMER MAKEUP STATION

1000 : POLYMER MAKE-UP STATION

1001 SCOPE

This section covers the design, manufacture, supply, delivery, transport, handling, storage, erection, installation, testing, commissioning, adjustment and handing-over in complete working order, and upholding during the Defects Liability Period, of a three-stage polymer make-up and dosing system comprising:

- Preparation stage (wetting/initial dissolution).
- Ageing/Maturation stage (polymer hydration).
- Storage/holding stage (ready solution buffer).
- Automatic dosing of prepared polymer solution to the specified MLSS mixer stage / aeration basin via dosing pumps and closed-loop control.

The system shall handle dry powder polyelectrolyte and include provision (adaptor/kit) for liquid polymer. It shall be fully automated, complete with all interconnecting pipework, valves, instrumentation, control panels and safety devices as specified herein.

1002 PROCESS DESCRIPTION AND DUTY

1002.1 Service

The installation shall make up polyelectrolyte solution for solids flocculation downstream, with batch or continuous batch operation across three compartments: Preparation → Ageing → Storage.

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## Part 2: Section 6 Statement of Requirements

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Make-up water shall be potable or treated works water (supply point by others), with all tie-ins confirmed on site.

### 1002.2 Performance Requirements

- Nominal dry polymer feed: ... kg/h (Tenderer to size for process requirement stated in the Schedule of Prices and Data Sheets).
- Solution concentration set-range: typically 0.05%–0.5% (m/m) adjustable.
- Net batch volume (each compartment): Preparation ... L; Ageing ... L; Storage ... L (Tenderer to select for not less than 30–45 min age time at maximum solution draw-off).
- Make-up water pressure/flow: to suit wetting cone/eductor; Tenderer to state minimums.
- Dosing duty to MLSS mixer stage: ... to ... L/h (turndown  $\geq 10:1$ ) with automatic flow-proportional control (4–20 mA from flow signal provided under E&I).

### 1003 MECHANICAL DESIGN

#### 1003.1 General Construction

The station shall be a multi-compartment polypropylene (PP) or HDPE tank set, or 316L stainless steel vessels, mounted on a common skid with drip tray, levelled base and lifting points. All fasteners exposed to chemical environment shall be A4/316. All wetted polymer solution components shall be polymer-compatible (316L, PVDF, PP, PTFE, EPDM or FKM as appropriate).

#### 1003.2 Dry Polymer Handling

- Bag unloader/hopper with low-dust inlet and hinged cover, ~50–100 L working capacity (Tenderer to state).
- Loss-in-weight screw feeder or volumetric feeder, stepless speed control,  $\geq 10:1$  turndown.
- Wetting cone/eductor designed to prevent fisheyes and ensure wetting across specified range.
- Dust extraction stub provided (cap or connect by others).

#### 1003.3 Liquid Polymer Adaptor

Provide factory kit and manifold to accept bulk liquid polymer (tote/IBC), including anti-syphon non-return valve, isolation valves, calibration cylinder and flushing line.

#### 1003.4 Compartmentation & Inter-compartment Transfer

- Preparation tank with top wetting cone inlet, level switches (LL/L/H), and overflow to safe drain.
- Ageing tank with minimum 30 min residence at max demand, slow-speed agitator ( $\leq 100$  rpm) with 316L shaft/impeller or mag-drive mixer; vortex breakers where needed.

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## Part 2: Section 6 Statement of Requirements

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- Storage tank with duty/standby dosing suction manifolds, calibration cylinder ( $\geq 5$  L, graduated), and automatic top-up from ageing stage.
- Overflow/vent lines to drain/odor control as applicable.

### 1003.5 Dosing Pumps and Pipework

- Two (2) metering pumps (duty/standby) – diaphragm type (mechanical or solenoid), stroke-length and/or speed controlled, turn-down  $\geq 100:1$ , with PTFE diaphragms, PVDF heads, PTFE ball checks, and EPDM/FKM elastomers to suit polymer.
- Suction with anti-vortex foot, isolation, Y-strainer and degassing head where required.
- Discharge with pulsation dampener, pressure relief valve piped back to storage, anti-siphon valve, flow indicator/flow switch, and non-return valve.
- Pipework: Schedule 80 uPVC/CPVC or 316L (site chemical compatibility to be confirmed). All dosing lines to MLSS mixer stage shall be anchored, protected and clearly labelled.

### 1003.6 Instrumentation

- Load cell / LIW on dry feeder (if selected), local rate/total display.
- Level: LL/L/H (each compartment), interlocked to protect pumps/feeder.
- Flow: Dosing line indication with 4–20 mA retransmission.
- Conductivity (optional) for solution concentration monitoring.
- Local panel indicators and HMI as described in 1005.

## 1004 CORROSION PROTECTION & MATERIALS

Corrosion protection shall comply with the Standardised Corrosion Protection Specification referenced in Section E (systems A/B/D as applicable to motors, reducers and steelwork). Stainless steel and 3CR12 finishing shall follow Sections E.4, E.18–E.20. All coatings shall be compatible with polymer solutions.

## 1005 CONTROL, AUTOMATION & SAFETY

### 1005.1 Automation Philosophy

The system shall be fully automatic, with local PLC or integrated I/O to the works PLC/SCADA (to be confirmed). Control functions:

- Make-up sequence (Preparation → Ageing → Storage) with inter-tank interlocks.
- Constant concentration control by coordinated feeder speed and make-up water flow.
- Automatic dosing flow-proportional to MLSS/Aeration Basin control signal (4–20 mA).
- Duty/standby dosing pump auto-changeover on fault or programmable runtime.

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## Part 2: Section 6 Statement of Requirements

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- Alarms: low level, low solution, hopper low, pump fault, feeder fault, over-/under-concentration (if installed), cabinet door open, emergency stop.

### 1005.2 Panels & Enclosures

- Polymer MCC/Control Panel: IP54 (indoor) / IP65 (field), 304SS cabinet, forced ventilation/filter, engraved labels, panel schedule, terminal rails.
- Starters/Drives shall follow Section E.21 equipment conventions (protection, indication, interlocking, naming).

### 1005.3 Health, Safety & Environment

- Dry polymer handling to include dust control, bag rest, and operator platform with handrails per Section E.19.
- Emergency stop push-button near dosing pumps, and on the panel face.
- Chemical spill containment drip tray with drain to sumps (by others or as specified).
- MSDS/SDS and signage in English/siSwati.
- All work to comply with Eswatini OSH requirements as set out in the Contract.

## 1006 ELECTRICAL INSTALLATION

The Contractor shall supply all motors and instrumentation cables for the polymer system. All electrical installation work shall comply with SZNS SANS 10142-1 (Wiring of Premises – Low Voltage) as already called up in the Special/Project Specifications (Section E). Interfaces to the works power supply and MCC shall follow Section E.21, including surge protection, earthing, IP ratings, labelling, and drawings/manuals deliverables.

## 1007 CABLING

- Power cables: sized per duty and derating, PVC SWA PVC to SWASA 1507 where applicable; glands and shrouds per Section E.21.10.
- Signal cables: individually/overall screened twisted pairs for 4–20 mA, in segregated containment, minimum 500 mm separation from VFD/AC power as per Section E.21.10.
- All outdoor runs in 304SS conduit/tray per Section E.21.7; terminations on DIN rail with numbered ferrules and engraved labels.

## 1008 TESTING & COMMISSIONING

The Contractor shall perform all installation checks, IOQ/FAT where applicable, wet commissioning with clean water, and polymer performance testing to demonstrate:

- Solution concentration within set-range across min–max demand.
- Pump turndown, stroke/flow linearity, and stable closed-loop control with MI SS signal

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## Part 2: Section 6 Statement of Requirements

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- Alarm and interlock functionality.  
Provide as-built drawings, I/O lists, logic diagrams, and O&M manuals as per Section D.32 & E.21.5.

### 1009 SPARES, TOOLS & LUBRICANTS

Supply spares, tools and lubricants in accordance with Section E.17 and list them in the Data Sheets:

- Two years' operational spares (minimum): pump diaphragms/valves, feeder auger seals, wetting cone parts, NRVs, gaskets, instrument spares, panel fuses, indicator lamps.
- Lubricants for gearboxes/mixers: initial fill + two refills.
- Special tools for pump/feeder maintenance and calibration.

### 1010 BOLTS & FASTENERS

All holding-down bolts to be built into concrete for securing skids, mixers and panels shall be supplied and installed under this section. Bolts and nuts shall comply with Section E.16: 316L below/near chemical exposure zones; hot-dip galvanised elsewhere unless otherwise specified. Isolation kits to be used where dissimilar metals are joined.

### 1011 MEASUREMENT & PAYMENT

Unless scheduled separately, all obligations are deemed included in the rates and sums for this Section, consistent with the Preamble to the Schedule of Prices conventions used across Section F.

### SECTION F-1000 : POLYMER MAKE-UP STATION – TECHNICAL DATASHEET

Complete and submit with Tender (match the formatting of Technical Data sheets in other F-sections).

#### GENERAL

- Manufacturer ..... Model ..... Country .....
- Overall skid footprint (L×W×H) ... × ..... ×..... mm Mass (operational) ..... kg

#### DUTY & SIZING

- Dry polymer type (Anionic/Cationic/Non-ionic) ..... Charge density ..... %
- Nominal polymer feed ..... kg/h (min ..... / max ..... kg/h)
- Solution concentration set-range ..... % to ..... % (m/m)
- Ageing (maturation) time at max demand ..... min
- Preparation/Ageing/Storage volumes ..... / ..... / ..... L

#### DRY POLYMER HANDLING

- Hopper working volume ... L Feeder type (LIW/Volumetric) ..... Turndown .....:1

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## Part 2: Section 6 Statement of Requirements

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- Wetting cone/eductor type ..... Min water flow/pressure ..... L/min @ ..... kPa

### LIQUID POLYMER ADAPTOR

- Connection type ..... Hoses ..... Check/anti-syphon .....

### MIXING

- Ageing mixer: Type ..... Speed ..... rpm Power ..... kW Materials (shaft/impeller) .....
- Storage re-circulation (if applied): Pump ..... Flow ..... L/h

### DOSING PUMPS (DUTY/STANDBY)

- Make/Model ..... Type ..... Head material ..... Diaphragm .....
- Capacity range ..... to ..... L/h @ ..... kPa Turndown  $\geq$  .....:1
- Relief valve set ..... kPa Pulsation dampener ..... Calibration cylinder .....L

### PIPEWORK & VALVES

- Suction line material/size ..... Discharge line material/size .....
- NRVs/PRV materials ..... Dampener volume .....

### INSTRUMENTATION

- Level switches (LL/L/H) – vendors ... Dosing flow indicator – range..... 4–20 mA: Yes/No
- Conductivity meter (if fitted) – range ..... Output 4–20 mA: Yes/No

### ELECTRICAL & CONTROLS

- Supply ..... V, 3-phase, 50 Hz Total connected load ..... kW
- Local control panel IP ..... (304SS) PLC/Remote I/O ..... HMI .....
- Signals: Flow in (4–20 mA)  Level DI  Pump status DI  Alarms DO  Comms (Modbus/Profibus/Profinet) .....

### MATERIALS

- Tanks ..... Skid ..... Fasteners ..... Seals ..... Painting/finishes .....

### SPARES (2 Years, list quantities)

- Pump heads/diaphragms ..... Valve kits ..... Feeder seals ..... NRVs ..... Instruments spares ..... Panel fuses/lamps .....

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## Part 2: Section 6 Statement of Requirements

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### COMPLIANCE

- Electrical installation per SZNS SANS 10142-1: Yes/No
- Corrosion protection per Section E / Standardised CPS: Yes/No
- Documentation per Section D.32 / E.21.5: Yes/No

1000 : POLMER MAKEUP STATION

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## Part 2: Section 6 Statement of Requirements

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### SCHEDULE OF PRICES

#### PREAMBLE TO THE SCHEDULE OF PRICES

1. All costs involved in meeting the obligations and liabilities imposed by the Conditions of Contract and in complying generally with the requirements of the Contract shall be deemed to be apportioned to and included under the various items, and the price quoted against each item must cover the full inclusive cost of all work to be completed under that item, plus such appointment of the general costs.
2. The Tenderer must also provide in his prices for anything not specially mentioned but obviously required to enable the plant and equipment as described to function correctly as specified.
3. Should a Tenderer wish to exclude certain items of plant and/or operations from his offer he must clearly state such exclusions in a schedule accompanying his tender. Any items of plant and/or operation which are specified in the Specification but which are not so scheduled will be deemed to be included in the Tender.
4. Any additional charges in connection with off-site storage which there may be over and above the prices quoted in the various sections of this Schedule of Prices shall be set out in detail in a separate schedule accompanying the Tender.
5. A price is to be entered against each item in the Schedule of Prices. Items against which no price is entered will be considered to be covered by other prices in the Schedule.
6. The Tenderer must price each item in the Schedule of Prices in BLACK INK or type script.
7. Mistakes made by the Tenderer in the completion of the Schedule of Prices shall not be erased or painted out. A line shall be drawn through the incorrect entry and the correct entry shall be written above and the correction initialed by the Tenderer. Failure to observe this Condition of Contract may lead to the Tender being disqualified.
8. The Council reserves the right to sub-divide the Contract. Prices quoted in this Schedule are deemed to apply for that section only. The Tenderer may offer a reduction in price if awarded more than one section.
9. Where an item has been allowed to cover the cost of maintenance of equipment during off-site storage in accordance with Clause D.18 of the Specification payment shall be made to the Contractor after the equipment has been delivered to site.

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## Part 2: Section 6 Statement of Requirements

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Time required for delivery of complete plant from the date of notification to commence fabrication

.....weeks

Time required for erection and installation of plant from date of notification of availability of structures for erection and installation, or from time of completion of delivery, whichever is later.

.....weeks

Time required for testing, commissioning and putting into proper working order of complete plant from date of notification.

.....weeks

.....  
SIGNATURE OF TENDERER

.....  
DATE

### 1100: RAPID GRAVITY SAND FILTER AIR BLOWER / COMPRESSOR

### 1100 : RAPID GRAVITY SAND FILTERS – AIRBLOWER / COMPRESSOR

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## Part 2: Section 6 Statement of Requirements

### 1101 SCOPE

This section of the Contract covers the design, manufacture, supply, delivery, transport, handling, storage, erection, installation, testing, commissioning, adjustment, handing-over in complete working order and upholding during the Defects Liability Period of the air blower/compressor system for air agitation of the Rapid Gravity Sand Filters (RGSF) backwash process at Nhlangano WWTW.

The Works include:

- Two (2) RGSF units installed (1 duty; 1 standby), sized for 2.5 ML/day ADWF (air system to serve a single filter backwash at a time unless stated otherwise in the Data Sheets).
- Oil-free air supply for air scour during filter backwash, complete with duty/standby blower(s)/compressor(s), silencers, suction filters, non-return valves, pressure relief and isolation valves, discharge pipework/manifolds, flexible connections, instrumentation, controls/protection, and local control panel(s).
- Interfaces to the backwash pumps and filter backwash sequences provided elsewhere in the Contract (see Sections F-400 and F-600 conventions for pumps/electrical integration).

### 1102 BASIS OF DESIGN & DUTY

#### 1102.1 Backwash Air Duty

The air system shall provide uniform air scour across the filter floor to assist media loosening and solids release prior to/and during backwash. The Tenderer shall size and guarantee performance based on the following design basis:

- Number of filters: 2 (operate one at a time for air scour).
- Filter plan area (per filter): ..... m<sup>2</sup> (to be confirmed from civil drawings).
- Required air rate (at standard conditions):  $v_{\text{air}} = \dots\dots\dots$  Nm<sup>3</sup>/m<sup>2</sup>·h (Tenderer to propose, typically within the manufacturer's recommended range for the media and nozzle floor supplied), for ..... minutes per air scour cycle.
- Total air flow (per operating filter):

$$Q_{\text{air}} = v_{\text{air}} \times A_{\text{filter}} [\text{Nm}^3/\text{h}]$$

- Simultaneous operation: 1 filter (N = 1) unless indicated otherwise in the Data Sheets.
- Discharge pressure at blower outlet (gauge): not less than ..... kPa at design flow, including allowances for static head above floor, diffuser/nozzle losses, headers/laterals, valves and fittings (Tenderer to submit a pressure loss calculation).
- Air quality: oil-free, non-contaminating to potable-grade media.

#### 1102.2 Configuration

Supply two (2) identical blowers/compressors (1 duty; 1 standby), each capable of delivering 100 % of the required duty at site conditions. Automatic duty/standby changeover shall be provided.

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## Part 2: Section 6 Statement of Requirements

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### 1103 MECHANICAL REQUIREMENTS

#### 1103.1 Blower/Compressor Type & Construction

- Type: Oil-free positive-displacement rotary lobe blower or oil-free side-channel/compressor suitable for continuous intermittent duty in backwash cycles; direct-coupled or V-belt drive (where proposed, provide guarding and alignment data).
- Materials: Casing and end plates: close-grained cast iron or aluminium alloy per OEM; rotors/impellers per OEM; shafts in high-tensile steel; fasteners A2/A4 stainless as appropriate.
- Accessories (each machine):
  - Inlet filter-silencer with replaceable element; inlet vacuum gauge.
  - Discharge silencer; non-return valve; pressure relief/safety valve (set above duty pressure; full capacity).
  - Flexible connectors on suction/discharge to limit vibration transmission.
  - Baseframe with anti-vibration mounts; lifting lugs.
  - Thermal probe(s) on bearings/air outlet (where available) for protection.
  - Drains/condensate taps on silencers.
- Noise: Enclosure or acoustic treatment to achieve  $\leq$  ..... dB(A) at 1 m (Tenderer to state).
- Nameplate: Model, serial number, duty flow, pressure, motor power, speed.

#### 1103.2 Pipework, Manifolds and Valves

- Materials: Above-ground air lines in galvanized carbon steel or 316L stainless steel; flanging per Section E.14; isolation by wafer butterfly valves (disc/shaft in SST) and NRVs; pressure gauge (glycerine-filled) at each machine discharge and on common header.
- Manifold arrangement:
  - Individual machine discharge to a common header with isolation valve, check valve and relief valve per machine branch.
  - Downstream branch to each filter with isolation and flow balancing device (orifice/restrictor as required for uniform distribution).
- Flexible hose sections at the machine nozzles; all piping properly bracketed and supported; allowance for thermal expansion.

#### 1103.3 Filter Air Distribution Interface

Interface to the filter air grid/nozzle floor (by others) shall be via the air scour header. The Tenderer shall co-ordinate connection locations, sizes and elevations and provide all mating flanges/gaskets/bolting

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## Part 2: Section 6 Statement of Requirements

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### 1103.4 Instrumentation & Protection

- Discharge pressure indication at each machine and common header (0–..... kPa).
- Inlet filter differential pressure (or vacuum gauge).
- Outlet air temperature (where provided).
- Vibration/overload trip via motor protection relay/VFD.
- Emergency stop local to the machines.

### 1104 CONTROLS & INTEGRATION

- Control philosophy: Local automatic sequence to enable air scour step within the filter backwash cycle (air-only or air-and-water phases) with interlocks to prevent operation when relevant valves are not in the correct position or when filter is in service.
- Duty selection: Auto duty/standby rotation on runtime or after fault; manual selection from HMI/panel.
- Signals & interlocks:
  - o Start/Stop command from filter backwash PLC logic (works PLC/SCADA).
  - o Running/Healthy/Trip feedbacks (dry contacts).
  - o Analogue (optional): discharge pressure and outlet temperature 4–20 mA.
- Local panel: 304SS, IP54/65 as installed; HOA switches, alarm beacons, push-buttons; terminals labelled to Section E.21 conventions.

### 1105 CORROSION PROTECTION

All steelwork, frames and pipework coatings shall comply with the Standardised Corrosion Protection Specification already cited in Section E, using Systems A/B as applicable to motors, reducers, indoor/outdoor exposures; stainless steel and 3CR12 finishing per relevant clauses. Touch-up after installation is required where damaged.

### 1106 ELECTRICAL INSTALLATION

The Contractor shall supply all motors and perform the electrical installation for the air blower/compressor system in accordance with Section E.21 and SZNS SANS 10142-1 (Wiring of Premises – LV) as called up in the Tender. This includes:

- Motor starters/VFDs (where specified), overload/earth-leakage protection, surge protection, labelling, and panel documentation per E.21.
- Isolation at each machine and local E-stop; earthing/bonding; cable ID and ferruling per conventions.
- Drawings & manuals: GA/schematics, I/O lists, settings and test records per D.32 / E.21.5.

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## Part 2: Section 6 Statement of Requirements

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### 1107 CABLING

- Power cables: PVC SWA PVC to SWASA 1507 (where applicable); sized to load and derating; glanding/shrouds as per E.21.10.
- Signal/Control: Individually and overall screened twisted pairs for 4–20 mA/DI/DO, segregated from power per E.21.10; maintain separation to VFD feeders ( $\geq 500$  mm where practicable); stainless support/containment per E.21.7 for outdoor runs.
- Terminations: Numbered ferrules; DIN-rail terminals; engraved labels.

### 1108 TESTING & COMMISSIONING

- Factory tests: As per OEM and this Specification (performance/run test certificates).
- Site tests: Mechanical inspection; rotation/check valves; pressure relief set-point verification; no-load runs; then airflow/discharge pressure demonstration at duty point(s) (or via calibrated differential device/flowmeter where installed); alarm/interlock testing within the backwash sequence.
- Provide as-built documentation, O&M manuals and training to operating staff in accordance with Sections D.32 and E.21.5.

### 1109 SPARES, TOOLS & LUBRICANTS

Provide in accordance with Section E.17 and list quantities in the Data Sheets:

- Two-years' operational spares, including inlet filter elements, V-belts (if used), gaskets, NRV kits, pressure relief valve kits, instrument spares, panel fuses/lamps.
- Lubricants: Initial oil/grease fills plus two refills per machine.
- Special tools for coupling alignment, filter element change, and valve maintenance.

### 1110 BOLTS & FASTENERS

All holding-down bolts to be built into concrete for securing blowers, bases, and pipe supports shall be supplied and installed under this section. Bolts, nuts and washers shall comply with Section E.16: Grade 316/316L in areas subject to moisture/chemical exposure and hot-dip galvanised elsewhere unless otherwise specified. Use isolation kits for dissimilar metals.

### 1111 MEASUREMENT & PAYMENT

Unless scheduled separately, all obligations are deemed included in the rates and sums for this Section, consistent with the Preamble to the Schedule of Prices used across Section F.

### SECTION F-1100 : AIRBLOWER / COMPRESSOR – TECHNICAL DATASHEET

To be completed and submitted with the Tender (format aligns with the Technical Data sheets in other F-sections).

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## Part 2: Section 6 Statement of Requirements

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### A. GENERAL

- Manufacturer ..... Model ..... Country .....
- Type (Rotary lobe / Side-channel / Other oil-free) .....
- Overall footprint (L×W×H) ..... × ..... × ..... mm
- Mass (operational) ..... kg Enclosure dB(A) @ 1 m .....

### B. DUTY & PERFORMANCE

- Number of machines offered ..... (Duty ..... / Standby .....
- Design air rate per operating filter  $v_{air}$  .....  $Nm^3/m^2 \cdot h$
- Filter plan area ( $A_{filter}$ ) .....  $m^2$
- Required total air flow ( $Q_{air} = v_{air} \times A_{filter}$ ) .....  $Nm^3/h$
- Discharge pressure (g) at  $Q_{air}$  ..... kPa
- Outlet temperature at  $Q_{air}$  ..... °C
- Backwash air duration ..... min; typical cycles per day .....

### C. DRIVE & POWER

- Motor manufacturer ..... Rated output ..... kW Voltage ..... V, 50 Hz
- Starting (DOL/Soft-starter/VFD) ..... Full-load current ..... A
- Efficiency class ..... Power factor ..... Speed ..... r/min

### D. MECHANICAL DETAILS

- Inlet filter-silencer model ..... Replacement element P/N .....
- Discharge silencer ..... Non-return valve size .....
- Pressure relief valve: set pressure ..... kPa; Cv .....
- Flexible connector rating ..... Pipe connections (suction/discharge) .....
- Casing/end plates material ..... Shaft/rotor material .....
- Bearing type & L10 life .....

### E. PIPEWORK & INSTRUMENTATION

- Discharge header size/material ..... Coating system .....
- Pressure gauges (machine/header) range ..... kPa

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## Part 2: Section 6 Statement of Requirements

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- Temperature probe (yes/no) .....
- Inlet filter  $\Delta P$  gauge (yes/no) .....
- Relief valve discharge arrangement .....

### F. CONTROLS & SIGNALS

- Local panel: enclosure IP ..... 304SS (Y/N) .....
- Signals provided: Run/Trip/Healthy (DI); Pressure (AI); Temp (AI) .....
- Duty/standby auto changeover (Y/N) ..... Method .....

### G. SPARES & LUBRICANTS (2 YEARS)

- Inlet filter elements ..... V-belts (if any) .....
- Gasket set ..... NRV/PRV kits .....
- Instrument spares ..... Lubricants (type/qty) .....

### H. COMPLIANCE

- Electrical installation per SZNS SANS 10142-1 (Y/N) .....
- Corrosion protection per Section E CPS (Y/N) .....
- Documentation per D.32 / E.21.5 (Y/N) .....

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## Part 2: Section 6 Statement of Requirements

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1100 : AIR-BLOWER / COMPRESSOR

### SCHEDULE OF PRICES

#### PREAMBLE TO THE SCHEDULE OF PRICES

1. All costs involved in meeting the obligations and liabilities imposed by the Conditions of Contract and in complying generally with the requirements of the Contract shall be deemed to be apportioned to and included under the various items, and the price quoted against each item must cover the full inclusive cost of all work to be completed under that item, plus such appointment of the general costs.
2. The Tenderer must also provide in his prices for anything not specially mentioned but obviously required to enable the plant and equipment as described to function correctly as specified.
3. Should a Tenderer wish to exclude certain items of plant and/or operations from his offer he must clearly state such exclusions in a schedule accompanying his tender. Any items of plant and/or operation which are specified in the Specification but which are not so scheduled will be deemed to be included in the Tender.
4. Any additional charges in connection with off-site storage which there may be over and above the prices quoted in the various sections of this Schedule of Prices shall be set out in detail in a separate schedule accompanying the Tender.
5. A price is to be entered against each item in the Schedule of Prices. Items against which no price is entered will be considered to be covered by other prices in the Schedule.
6. The Tenderer must price each item in the Schedule of Prices in BLACK INK or type script.
7. Mistakes made by the Tenderer in the completion of the Schedule of Prices shall not be erased or painted out. A line shall be drawn through the incorrect entry and the correct entry shall be written above and the correction initialed by the Tenderer. Failure to observe this Condition of Contract may lead to the Tender being disqualified.
8. The Council reserves the right to sub-divide the Contract. Prices quoted in this Schedule are deemed to apply for that section only. The Tenderer may offer a reduction in price if awarded more than one section.
9. Where an item has been allowed to cover the cost of maintenance of equipment during off-site storage in accordance with Clause D.18 of the Specification payment shall be made to the Contractor after the equipment has been delivered to site.

Time required for delivery of complete plant from the date of notification to

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## Part 2: Section 6 Statement of Requirements

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commence fabrication

.....weeks

Time required for erection and installation of plant from date of notification of availability of structures for erection and installation, or from time of completion of delivery, whichever is later.

.....weeks

Time required for testing, commissioning and putting into proper working order of complete plant from date of notification.

.....weeks

.....  
SIGNATURE OF TENDERER                      DATE

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## **Environmental, Social, Health and Safety Requirements**

*[The PE shall use the services of suitably qualified environmental, social, health and safety specialists to prepare the specifications for ESHS.*

*The PE shall attach or refer to the PE's environmental, social, health and safety policies that will apply to the project. If these are not available, the PE should use the guidance in the user guide in drafting an appropriate policy for the works].*

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## CONDITION ASSESSMENT REPORT

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**Activity Schedule/ Bills of Quantities**

**Activity Schedule (To be included under the financial submission envelop)**

Date:.....

Procurement Reference No.: .....

Name of Contractor: .....

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## Part 2: Section 6 Statement of Requirements

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### Summary of Bills of Quantities

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## Part 2: Section 6 Statement of Requirements

SUMMARY PAGE	AMOUNT
PART 1	
Civil Works	
PART 2	
Section F - 100	
Section F - 400	
Section F - 500	
Section F - 600	
Section F - 700	
Section F - 800	
Section F - 900	
Section F - 1000	
Section F - 1100	
PART 3	
Electrical Works	2,795,000.00
SUBTOTAL 1	
CIC Levy (0.5%)	
SUBTOTAL 2	
15% VAT	
TENDER SUM	
TENDER SUM IN WORDS	

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## Part 2: Section 6 Statement of Requirements

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### PART 2: BoQ FOR CIVIL WORKS

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## Part 2: Section 6 Statement of Requirements

Item No.	Payment Clause	Description	Unit	Qty	RATE	AMOUNT
1	SABS 1200A & 1200AB	SCHEDULE 1: PRELIMINARY AND GENERAL				
1.1	8.3	FIXED-CHARGE ITEMS				
1.1.1	8.3.1	Contractual requirements	Sum	1		
1.1.2	8.3.2	Provision of facilities on site:				
	8.3.2.1	1) Facilities for Engineer:				
		a)Engineers Office Type 2 and parking (No.=2)	Sum	1		
		b)Nameboards (No=2)	Sum	1		
		c) Communication	Prov Sum	1	10,000.00	10,000.00
		d) Overhead profit on item 1.1.2(c) above	%	10000		
		e) Meeting room Type 1	Sum	1		
		f) Latrine facilities	Sum	1		
	8.3.2.2	2) Facilities for the Contractor				
		a) Offices and storage sheds	Sum	3		
		b) Ablution and latrine facilities	Sum	2		
		c) Tools and equipment	Sum	1		
		d) Access (see sub-clause 5.8)	Sum	1		
		f) Water supplies, electric power and communications	Sum	1		
		g) Dealing with water	Sum	1		
1.1.3	PSA 8.3.5.2	OHS Act Obligations (Compilation of OHSAct file)	Sum	1		

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## Part 2: Section 6 Statement of Requirements

Item No.	Payment Clause	Description	Unit	Qty	RATE	AMOUNT
1.1.4	PSA 8.3.5.4	Compliance with all COVID fixed items Requirements	Sum	1		
1.1.5	PSA 8.3.5.3	EMP Obligations	Sum	1		
1.1.6	PSA 8.3.5.1	Issuing of notices to consumers also refer to PS6.6	Sum			
1.1.7	8.3.4	Removal of Site Establishment	Sum	1		
1.2	8.4	TIME RELATED ITEMS				
1.2.1	8.4.1	Contractual requirements	Month	7		
	8.4.2	Operation and maintainance of facilities on site.				
1.2.2	8.4.2.1	Facilities for Engineer:				
		a)Engineers Office Type 2 and parking (No.=2)	Month	7		
		b)Nameboards (No=2)	Month	7		
		c) Communication	Prov Sum	1	5,000.00	5,000.00
		d) Overhead profit on item 1.2.2(c) above	%	5000		
Balance Forward	Carried					
Balance Forward	Brought					
		e) Meeting room Type 1	Month	7		
		f) Latrine facilities	Month	7		
1.2.3	8.4.2.2	Facilities for the Contractor:				
		a) Offices and storage sheds	Month	7		
		b) Ablution and latrine facilities	Month	7		
		c) Tools and equipment	Month	7		

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## Part 2: Section 6 Statement of Requirements

Item No.	Payment Clause	Description	Unit	Qty	RATE	AMOUNT
		d) Access (see sub-clause 5.8)	Month	7		
		e) Plant	Month	7		
		f) Water supplies, electric power and communications	Month	7		
		g) Dealing with water	Month	7		
1.2.4	8.4.3	Supervision for the duration of construction	Month	7		
1.2.5	8.4.4	Company and head office overhead costs for the duration of the Contract	Month	7		
1.2.6	PSA 8.4.6.2	Security Services	Month	7		
1.3	OHS Spec.	Allow for compliance with all aspects of the OHS specification including:				
1.3.1	PSA 8.4.6.4	Risk assesment	Month	7		
1.3.2	PSA 8.4.6.1(1)	Complainece with Health and Safety Plan including Safety Officer Salary	Month	7		
1.3.3	PSA 8.4.6.1(4)	Complainece with all COVID requirements	Month	7		
1.4	EMP	Allow for compliance with all aspects of the EMP/Authorizations including				
1.4.1	PSA 8.4.6.1(2)	a)Environmental Officer Salary	Month	7		
1.4.2	PSA 8.4.6.1(3)	b) Environmental Control Officer	Prov Sum			
1.4.3		c) Overheads, charges and profit on item 1.4.2(b) above	%			
1.5	8.6	Prime cost items				
1.5.1		a) Materials used in the execution of dayworks	Prov Sum			

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## Part 2: Section 6 Statement of Requirements

Item No.	Payment Clause	Description	Unit	Qty	RATE	AMOUNT
1.5.2		b) Overheads, charges and profit on item 1.4.1(a) above	%			
1.6	8.8	TEMPORARY WORKS				
1.6.1	8.8.2	Dealing with traffic for the duration of the Contract	Sum			
1.6.2	8.8.6	Dealing with water	Sum			
Balance Forward	Carried Forward					
Balance Forward	Brought Forward					
1.6.3	8.8.4	Existing services				
1.6.4	PSA 8.8.4 (a)	a) Supply or hire of specialist equipment for the detection and Scanning of existing services.	Prov Sum	1	40,000.00	40,000.00
1.6.5		Profit on item 1.6.4 (a) above	%	40000		
1.6.6	PSA 8.8.4 (b)	b) Excavation by hand to expose existing services.	m <sup>3</sup>	20		
1.7	PSA 8.5	PROVISIONAL SUMS STATED BY ENGINEER				
		a) Reinstatement of asphalt	Prov Sum			
		b) Engineer's Equipment and Independent testing	Prov Sum	1	300,000.00	300,000.00
		c) Temporary protection of existing services	Prov Sum	1	45,000.00	45,000.00
		d) Community Liaison Officer	Prov Sum			

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## Part 2: Section 6 Statement of Requirements

Item No.	Payment Clause	Description	Unit	Qty	RATE	AMOUNT
		e) Landscaping and including irrigation system	Prov Sum	1	1,000,000.00	1,000,000.00
		f) Relocation of existing services	Prov Sum	1	25,000.00	25,000.00
		g) Training of local labour	Prov Sum	1	100,000.00	100,000.00
		h) Alterations and connection to Municipal services and repair to damaged services where approved by Engineer	Prov Sum			
		i) Disposal of Asbestos	Prov Sum			
		j) Investigations as ordered by the Engineer	Prov Sum	1	200,000.00	200,000.00
		k) Topographical Survey as per the Engineer's instruction. Rate to include for a CD with AutoCAD drawing/s and co-ordinates data in CSV or text format.	Prov Sum	1	50,000.00	50,000.00
		l) Overheads, charges and profit on items (a-i) above	%	1720000		
Balance Forward	Carried					
Schedule 1: Preliminary & General - Carried to Summary						
2	SABS 1200C	SCHEDULE 2: SITE CLEARANCE				
2.1	8.2.1	Clear and grub (2 metre width)	m	1200		
2.2	PSC 8.2.14	Protection of trees as ordered by Engineer	No			
2.3	8.2.10	Remove topsoil to nominal depth of 150mm and stockpile for re-use as directed by Engineer	m <sup>3</sup>	185		

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## Part 2: Section 6 Statement of Requirements

Item No.	Payment Clause	Description	Unit	Qty	RATE	AMOUNT
2.4.1		Desludging sludge lagoons including handling transport and disposal	m <sup>3</sup>	2000		
2.4.2		Removal and disposal of exiting media from existing rapid gravity sand filters	Lump Sum	1		
2.4.3		Granular Activated Carbon (GAC) media - supply and deliver (for 2 filters @ 5m x 4m; approxi. 1m depth)	tonne	20		
Balance Forward	Carried					
Schedule 2: Site Clearance - Carried to Summary						
3	SABS 1200DB	SCHEDULE 3: EARTHWORKS (PIPE TRENCHES)				
3.1	8.3.2	Excavation				
3.1.1	PSDB 8.3.2(a)	Excavate in all material for trenches, shore and dispose of surplus material for the depths of:				
		a) Over 0,0m and up to 1,5m	m <sup>3</sup>	1000		
		b) Over 1,5m and up to 2,5m	m <sup>3</sup>	1000		
		c) Over 2,5m	m <sup>3</sup>	1300		
3.1.2	PSDB 8.3.2(3)	Excavate by hand in all material for tie-ins, house connections, backfill and compact including disposal of surplus unsuitable material for depth:				
		a) Over 0,0m and up to 1,0m	m <sup>3</sup>			
		b) Over 1,0m and up to 1,5m	m <sup>3</sup>			
		c) Over 1,5m	m <sup>3</sup>			

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## Part 2: Section 6 Statement of Requirements

Item No.	Payment Clause	Description	Unit	Qty	RATE	AMOUNT
3.1.3	8.3.2(b)	Extra over Item 3.1.1 above for : Please refer to PSD 3.1.3 for Classification of materials for hand excavations				
		a) Intermediate excavation.	m <sup>3</sup>	1000		
		b) Hard excavation.	m <sup>3</sup>	100		
		c) Rock excavation	m <sup>3</sup>	80		
3.2	8.3.3	Excavation Ancillaries				
3.2.1	8.3.3.1	Make up deficiency in backfill material (Provisional)				
		a) from other necessary excavations on site	m <sup>3</sup>			
		b) by importation from designated borrow pits	m <sup>3</sup>			
		c) by importation from commercial or off site sources selected by the Contractor	m <sup>3</sup>			
3.3	8.3.3.3	a) Additional compaction to 95% mod AASHTO density in road crossings	m <sup>3</sup>			
3.4	8.3.4 (a)	a) Shore trench opposite structure or service (Provisional)	m			
3.5	PSDB 8.3.5(a)	a) Services that intersect a trench				
		i) Water house connections.	No.			
		ii) Sewer pipes up to 300mm Dia.	No.			
		iii) Cables.	No.			
		iv) Stormwater pipes up to 1050mm dia.	No.			
Balance Forward	Carried					

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## Part 2: Section 6 Statement of Requirements

Item No.	Payment Clause	Description	Unit	Qty	RATE	AMOUNT
		iv) DN225	m	1250		
		v) DN315	m			
		vi) DN355	m			
		b) Supply, lay, bed (class B bedding), all test and disinfect, backfill mPVC Class 16 spigot and socket pipes for 110mm at change of direction use end restraint couplings, for pipes greater than 110 at change of direction use thrust/anchor blocks to suit:				
		i) DN110	m			
		ii) DN160	m			
		iii) DN200	m			
		iv) DN250	m			
		v) DN315	m			
		vi) DN355	m			
		c) Supply, lay, bed (class B bedding), all test and disinfect, backfill complete joints to be butt welded or electro fusion, HDPE PE100 SDR11 PN16 pipes:				
		i) DN110	m			
		ii) DN160	m			
		iii) DN180	m			
		iv) DN200	m			
		v) DN225	m			
		vi) DN250	m			
		vii) DN315	m			
		viii) DN355	m			
		Fittings to suit High Impact Class 16 uPVC pipes				
5.2.1	8.2.2	a) Shouldered end Steel Bends Fusion Bonded Epoxy coated 250 microns including thrust blocks to suit high impact uPVC pipe:				
		DN110				
		i) 11¼°	No			

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## Part 2: Section 6 Statement of Requirements

Item No.	Payment Clause	Description	Unit	Qty	RATE	AMOUNT
		ii) 22.5°	No			
		iii) 45°	No			
		iv) 90°	No			
		DN160				
		i) 11¼°	No			
		ii) 22.5°	No			
		iii) 45°	No			
		iv) 90°	No			
Balance Forward	Carried					
Balance Forward	Brought					
		DN200				
		i) 11¼°	No			
		ii) 22.5°	No			
		iii) 45°	No			
		iv) 90°	No			
		DN225				
		i) 11¼°	No	2		
		ii) 22.5°	No	5		
		iii) 45°	No	4		
		iv) 90°	No	3		
		DN315				
		i) 11¼°	No			
		ii) 22.5°	No			
		iii) 45°	No			
		iv) 90°	No			
		DN355				
		i) 11¼°	No			
		ii) 22.5°	No			
		iii) 45°	No			
		iv) 90°	No			

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## Part 2: Section 6 Statement of Requirements

Item No.	Payment Clause	Description	Unit	Qty	RATE	AMOUNT
	8.2.2	b) Shouldered end Steel Reducer Fusion Bonded Epoxy coated 250 microns to suit High Impact uPVC pipe:				
		i) 150mm x 100mm dia.	No			
		ii) 200mm x 100mm dia.	No			
		iii) 200mm x 150mm dia.	No			
		iv) 250mm x 100mm dia.	No			
		v) 250mm x 150mm dia.	No			
		vi) 250mm x 200mm dia.	No			
		vii) 300mm x 100mm dia.	No			
		viii) 300mm x 150mm dia.	No			
		ix) 300mm x 200mm dia.	No			
		x) 300mm x 250mm dia.	No			
		xi) 350mm x 100mm dia.	No			
		xii) 350mm x 150mm dia.	No			
		xiii) 350mm x 200mm dia.	No			
		xiv) 350mm x 250mm dia.	No			
		xv) 350mm x 300mm dia.	No			
	8.2.2	c) Steel Tees Fusion Bonded Epoxy coated 250 microns to suit High Impact uPVC piping including thrust block				
		i) 100mm dia. equal tee	No			
		ii) 150mm dia. equal tee	No			
		iii) 200mm dia. equal tee	No			
		iv) 150mm x 100mm dia. reducing tee	No			
		v) 200mm x 100mm dia. reducing tee	No			
		vi) 200mm x 150mm dia. reducing tee	No			
		vii) 250mm equal Tee	No			
		viii) 250mm x 100mm dia reducing Tee	No			
		ix) 250mm x 150mm dia reducing Tee	No			
	Balance Carried Forward					
Schedule 5: Medium Pressure Pipelines - Carried to Summary						

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## Part 2: Section 6 Statement of Requirements

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### PART 2: BoQ FOR MECHANICAL EQUIPMENT

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## Part 2: Section 6 Statement of Requirements

SECTION F-100 : INLET WORKS MECHANICAL EQUIPMENT

RECOMMENDED SPARES

The Tenderer must fill in on this sheet any spares he considers the Employer should hold.

Description	Part Number	Number Required In Stock	Price Each	Total Price	
				R	C
TOTAL (Carry forward to item 1.20)					

.....  
 ....  
 SIGNATURE OF TENDERER

.....  
 .....  
 DATE

## Part 2: Section 6 Statement of Requirements

### SECTION F-100 : INLET WORKS MECHANICAL EQUIPMENT

#### RECOMMENDED TOOLS

The tenderer must fill in on this sheet any tools he considers the Employer should hold.

Item	Description	Total Price	
		R	C
TOTAL (Carried forward to Item 1.21)			

.....  
SIGNATURE OF TENDERER

.....  
DATE

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## Part 2: Section 6 Statement of Requirements

### SECTION F-100 : INLET WORKS MECHANICAL EQUIPMENT

#### SCHEDULE OF PRICES

Item	Description	Amount	
		R	C
	<b>PART A: SUPPLY, INSTALLATION AND COMMISSIONING</b>		
	Supply and delivery to Site of the following equipment including storage (where applicable), quality assurance and painting, (where specified) and all necessary insurance.		
1.01	ONE Mechanical Front Raked Screen complete, all as specified at existing inlet channel		
1.02	ONE spiral conveyor complete as specified		
1.03	ONE screenings press, complete as specified		
1.04	TWO airlift pumps, complete as specified at vortex degritters		
1.05	ONE grit classifier, complete as specified		
1.06	Electromagnetic flow meter at inlet works incl. cabling and calibration		
	Handling, (including doublehandling if stored), erection, installation, painting (if applicable) and quality assurance of the following plant, including transportation and accommodation of personnel.		
1.07	Plant supplied under item 1.01		
1.08	Plant supplied under item 1.02		
1.09	Plant supplied under item 1.03		
1.10	Plant supplied under item 1.04		
1.11	plant reinstalled under item 1.05		
1.12	plant reinstalled under item 1.06		
	Commissioning, testing and adjusting the following plant as a completely separate operation some time after completion of erection and installation, including transportation and accommodation for personnel		
1.13	Plant installed under item 1.07		
1.14	Plant installed under item 1.08		
1.15	Plant installed under item 1.09		
1.16	Plant installed under item 1.10		
1.17	Plant installed under item 1.11		
1.18	Plant installed under item 1.12		
	<b>TOTAL : PART A</b>		
	<b>PART B: PROVISIONAL ITEMS : TO BE APPLIED ONLY IF AND WHEN SPECIFICALLY ORDERED BY THE ENGINEER</b>		
1.19	Inspection visits to site during Defects Liability Period as specified in Clause D.25 (per visit R.....; No. of visits 3)		
1.20	Return visit to Site, if and when ordered by the Engineer (per visit R.....; No. of visits 2)		
1.21	Off-site storage of plant supplied under this section, if and when		

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## Part 2: Section 6 Statement of Requirements

	ordered by the Engineer, as specified in Clause D.18 (per visit R.....; 90 days)		
1.22	Spares recommended to be kept by the Engineer (brought forward from the attached schedule)		
1.23	Special tools recommended to be kept by the Employer (brought forward from the attached schedule)		
TOTAL : PART B			
PART C : HEALTH AND SAFETY (Refer ti Item 1.8 on page 1-14)			
1.24	General costs for health and safety (not covered under other measured items)		
1.25	Risk assessment		
1.26	Health and Safety Plan		
1.27	Provision of Construction Safety Officer and other appointments		
1.28	Training		
1.29	Medical assessment of employees		
TOTAL : PART C			
TOTAL : PARTS A, B AND C			
	TOTAL FOR SECTION F-100 (Carry to form of Tender)		

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**Part 2: Section 6 Statement of Requirements**

SECTION F-400 : PUMPS

RECOMMENDED SPARES

The Tenderer must fill in on this sheet any spares he considers the Employer should hold.

Item	Description	Part Number	Number Required In Stock	Price Each	Amount	
					R	C
TOTAL (Carry forward to Item 4.27)						

.....  
 ....  
 SIGNATURE OF TENDERER

.....  
 ....  
 DATE

**Part 2: Section 6 Statement of Requirements**

---

SECTION R-400 : PUMPS

RECOMMENDED TOOLS

The Tenderer must fill in on this sheet any special tools he considers the Employer should hold.

Item	Description	Total Price	
		R	C
TOTAL (Carried forward to Item 4.28)			

.....

SIGNATURE OF TENDERER

.....

.....

DATE

## Part 2: Section 6 Statement of Requirements

SECTION F-400 : PUMPS			
SCHEDULE OF PRICES			
		Amount	
Item	Description	R	C
	<b>PART A: SUPPLY, INSTALLATION AND COMMISSIONING</b>		
	Supply and delivery to Site of the following equipment including storage (where applicable), quality assurance and painting, (where specified) and all necessary insurance.		
4.01	TWO Rapid Gravity Sand Filter Backwash Pumps, complete with motors, bedplates, holding down bolts and all equipment as specified.		
4.02	All pipework, valves, pressure gauges, flexible couplings and supports necessary to complete the installation of pumps in item 4.01 above		
4.03	Lifting gear for all pumps in the Backwash Pump Station		
4.04	TWO Final Effluent Recycle pumps complete with motors, bedplates, holding down bolts and all equipment as specified.		
4.05	All pipework, valves, pressure gauges, flexible couplings and supports necessary to complete the installation of pumps in item 4.04 above		
4.06	Lifting gear for all pumps in the Final Effluent Pump Station		
4.07	TWO Return Activated Sludge Pumps complete with motor, bedplate, holding down bolts and all equipment as specified.		
4.08	Pipework, valves, pressure gauges, flexible couplings and supports necessary to complete the installation of pumps in item 4.07 above		
4.09	TWO Waste Activated Sludge Pumps complete with motor, bedplate, holding down bolts and all equipment as specified.		
4.10	Pipework, valves, pressure gauges, flexible couplings and supports necessary to complete installation pump in item 4.09 above		
4.11	Lifting gear for all pumps in RAS/WAS Pump Station. Handling (including double handling if stored), erection, installation, painting (if applicable) and quality assurance of the following plant, including transportation and accommodation for personnel, and removal for storage on site of existing pumps and fittings		
4.12	Plant supplied under item 4.01, 4.02 and 4.03		
4.13	Plant supplied under item 4.04, 4.05 and 4.06		

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**Part 2: Section 6 Statement of Requirements**

SECTION F-500 : MIXING  
EQUIPMENT

RECOMMENDED SPARES

The Tenderer must fill in on this form any spares he considers the Employer should hold.

Item	Description	Part Number	Number Required In Stock	Price Each	Total Price	
					R	C
TOTAL (Carry forward to Item 6.15)						

.....  
.....  
SIGNATURE OF TENDERER

.....  
.....  
DATE

## Part 2: Section 6 Statement of Requirements

### SECTION F-600 : MIXING EQUIPMENT

#### RECOMMENDED TOOLS

The Tenderer must fill in on this sheet any special tools he considers the Employer should hold.

Item	Description	Total Price	
		R	C
Total (Carried forward to Item 6.16)			

.....  
SIGNATURE OF TENDERER

.....  
DATE

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## Part 2: Section 6 Statement of Requirements

SECTION F-500 : MIXING EQUIPMENT			
SCHEDULE OF PRICES			
Item	Description	Amount	
		R	C
	PART A : SUPPLY, INSTALLATION AND COMMISSIONING		
5.00	Removal of existing Mixer, complete, and delivery to Employer for off-site storage		
	Supply and delivery to Site including storage, quality assurance and		
	painting, (where specified) complete with driving motor, speed reducer,		
	couplings, baseplate, all specified, for installation in the Biological Reactor		
	and all necessary insurance of the following:		
5.01	ONE 11 kW Mixer, complete with driving motors, speed reducers,		
	couplings, baseplates, all as specified.		
	Handling (including double handling if stored), erection, installation, painting		
	(I applicabl) and quality assurance of the following plant, including		
	transportation and accommodation for personnel and removal		
	to store on site of existing aerators.		
5.02	Plant supplied under item 5.01		
	Commissioning, testing and adjusting the following plant as a completely		
	separate operation some time after completion of erection and installation,		
	including transport and accommodation for personnel.		
5.03	Plant installed under item 5.02		
	TOTAL : PART A		
	PART B : PROVISIONAL ITEMS : TO BE APPLIED ONLY IF AND WHEN		
	SPECIFICALLY		
	ORDERED BY THE ENGINEER		
5.04	Inspection visits to Site during Defects Liability Period as specified in		
	Clause D.25 (per hour R.....; No of hours : 3)		
5.05	Return visit to Site, if and when ordered by the Engineer.		
	(per visit R.....; No of visits : 2)		
5.06	Off-site storage of plant supplied under this section, if and when ordered by		
	the Engineer, as specified in Clause D.18 (per visit R.....; 550		
	days)		
5.07	Spares recommended to be kept by the Employer (brought forward from		
	the attached schedule)		
5.08	Special tools recommended to be kept by the Employer (brought forward from		
	the attached schedule)		
5.09	Training of Operators (designated) to utilize equipment, including		
	liaison with Operators		
	TOTAL : PART B		
	PART C : HEALTH AND SAFETY (Refer to Item 1.8 on page 1-14)		
5.10	General costs for Health and Safety (not covered under other measured		
	items)		
5.11	Risk assesment		
0.01	Health and Safety Plan		

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## Part 2: Section 6 Statement of Requirements

5.12	Provision of Construction Safety Officer and other appointments		
0.02	Training		
5.13	Medical assesment of employees		
	TOTAL : PART C		
	TOTAL : PARTS A, B AND C		
	TOTAL FOR SECTION F-600 (Carry to Form of Tender)		

SECTION F-600 : AERATION  
EQUIPMENT

RECOMMENDED SPARES

The Tenderer must fill in on this form any spares he considers the Employer should hold.

Item	Description	Part Number	Number Required In Stock	Price Each	Total Price	
					R	C
TOTAL (Carry forward to Item 6.15)						

.....  
.....  
SIGNATURE OF TENDERER

.....  
.....  
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## Part 2: Section 6 Statement of Requirements

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### SECTION F-600 : AERATION EQUIPMENT

#### RECOMMENDED TOOLS

The Tenderer must fill in on this sheet any special tools he considers the Employer should hold.

Item	Description	Total Price	
		R	C
Total (Carried forward to Item 6.16)			

.....

SIGNATURE OF TENDERER

.....

.....

DATE

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## Part 2: Section 6 Statement of Requirements

SECTION F-600 : AERATION EQUIPMENT			
SCHEDULE OF PRICES			
Item	Description	Amount	
		R	C
<b>PART A : SUPPLY, INSTALLATION AND COMMISSIONING</b>			
	Supply and delivery to Site including storage, quality assurance and painting, (where specified) complete with driving motor, speed reducer, couplings, baseplate, all specified, for installation in the Aeration Basin and all necessary insurance of the following:		
6.01	ONE 45 kW aerator, complete with driving motor, speed reducer, couplings, baseplate, all as specified.		
6.02	ONE 37 kW aerator, complete with driving motor, speed reducer, couplings, baseplate, all as specified.		
6.03	ONE 30 kW aerator, complete with driving motor, speed reducer, couplings, baseplate, all as specified.		
	Handling (including double handling if stored), erection, installation, painting (if applicable) and quality assurance of the following plant, including transportation and accommodation for personnel and removal to store on site of existing aerators.		
6.04	Plant supplied under item 6.01		
6.05	Plant supplied under item 6.02		
6.06	Plant supplied under item 6.03		
	Commissioning, testing and adjusting the following plant as a completely separate operation some time after completion of erection and installation, including transport and accommodation for personnel.		
6.07	Plant installed under item 6.04		
6.08	Plant installed under item 6.05		
6.09	Plant installed under item 6.06		
	<b>TOTAL : PART A</b>		
<b>PART B : PROVISIONAL ITEMS : TO BE APPLIED ONLY IF AND WHEN SPECIFICALLY ORDERED BY THE ENGINEER</b>			
6.10	Inspection visits to Site during Defects Liability Period as specified in Clause D.25 (per hour R.....; No of hours : 3)		

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## Part 2: Section 6 Statement of Requirements

6.11	Return visit to Site, if and when ordered by the Engineer. (per visit R.....; No of visits : 2)		
6.12	Off-site storage of plant supplied under this section, if and when ordered by the Engineer, as specified in Clause D.18 (per visit R.....; 550 days)		
6.13	Spares recommended to be kept by the Employer (brought forward from the attached schedule)		
6.14	Special tools recommended to be kept by the Employer (brought forward from the attached schedule)		
6.15	Conducting in-situ oxygenation efficiency tests as specified		
6.16	Training of Operators (designated) to utilize equipment, including liaison with Operators (per hour R.....; No of hours : 4)		
	TOTAL : PART B		
	PART C : HEALTH AND SAFETY (Refer to Item 1.8 on page 1-14)		
6.17	General costs for Health and Safety (not covered under other measured items)		
6.18	Risk assesment		
6.19	Health and Safety Plan		
6.20	Provision of Construction Safety Officer and other appointments		
6.21	Training		
6.22	Medical assesment of employees		
	TOTAL : PART C		
	TOTAL : PARTS A, B AND C		
	TOTAL FOR SECTION F-600 (Carry to Form of Tender)		

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## Part 2: Section 6 Statement of Requirements

SECTION F-700 : CLARIFLOCCULATOR TANK EQUIPMENT

RECOMMENDED SPARES

The Tenderer must fill in on this sheet any spares he considers the Employer should hold

Item	Description	Part Number	Numbe Required In stock	Price Each	Total Price	
					R	C
TOTAL (Carry forward to Item 7.08)						

.....  
 .....  
 SIGNATURE OF TENDERER

.....  
 .....  
 DATE

## Part 2: Section 6 Statement of Requirements

### SECTION F-70 : CLARIFLOCCULATOR TANK EQUIPMENT

#### RECOMMENDED TOOLS

The Tenderer must fill in on this sheet any special tools he considers the Employer should hold.

Item	Description	Total Price	
		R	C
TOTAL (Carried forward to Item 7.09)			

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SIGNATURE OF TENDERER

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DATE

## Part 2: Section 6 Statement of Requirements

SECTION F-700 : CLARIFLOCCULATOR TANK EQUIPMENT			
SCHEDULE OF PRICES			
		AMOUNT	
ITEM	DESCRIPTION	R	C
	PART A : SUPPLY, INSTALLATION AND COMMISSIONING		
	Supply and delivery to Site of the following equipment including storage (where applicable), quality assurance and painting, (where specified) and all necessary insurance		
7.01	Plant for ONE Clariflocculator complete as specified		
	Handling (including double handling if required), erection, installation, painting (if applicable) and quality assurance of the following equipment, including transportation and accommodation for personnel.		
7.02	Plant supplied under Item 7.01 carried out in one continuous operation		
	Commissioning, testing and adjusting the following plant as a completely separate operation some time after completion of erection and installation, including transportation and accommodation for personnel.		
7.04	Plant installation under Item 7.02 carried out in one complete and continuous operation.		
	TOTAL : PART A		
	PART B: PROVISIONAL ITEMS : TO BE APPLIED ONLY IF AND WHEN SPECIFICALLY ORDERED BY THE ENGINEER		
7.05	Inspection visits to Site during Defects Liability Period as specified in Clause D.25 (per visit R .....; No of visits : 3)		
7.06	Return visit to Site, if and when ordered by the Engineer. (per visit R .....; No of visits : 2)		
7.07	Off-site storage of plant supplied under this section, if and when ordered by the Engineer. (per day R .....; 90 days)		
7.08	Spares recommended to be kept by the Employer (brought forward from the attached schedule)		
7.09	Special tools recommended to be kept by the Employer (brought forward from the attached schedule)		
	TOTAL: PART B		
	PART C : HEALTH AND SAFETY (Refer to Item 1.8 on page 1-14)		
7.10	General costs for health and safety (not covered under other measured items)		
7.11	Risk assessment		
7.12	Health and Safety Plan		

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## Part 2: Section 6 Statement of Requirements

7.13	Procision of Construction Safety Officer and other appointments		
7.14	Training		
7.15	Medical assessment of Employees		
	TOTAL : PART C		
	TOTAL : PARTS A, B AND C		
	TOTAL FOR SECTION F-700 (Carry to Form of Tender)		

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## Part 2: Section 6 Statement of Requirements

SECTION F-900 : CHLORINATION EQUIPMENT

RECOMMENDED SPARES

The Tenderer must fill in on this sheet any spares he considers the Employer should hold.

Description	Part Number	Number Required In Stock	Price Each	Total Price	
				R	C
TOTAL (Carry forward to item 9.30)					

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SIGNATURE OF TENDERER

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DATE

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**Part 2: Section 6 Statement of Requirements**

SECTION F-900 : CHLORINATIN EQUIPMENT

RECOMMENDED SPARES

The tenderer must fill in on this sheet any special tools he considers the Employer should hold.

Item	Description	Total Price	
		R	C
TOTAL (Carried forward to Item 9.31)			

.....  
SIGNATURE OF TENDERER

.....  
DATE

## Part 2: Section 6 Statement of Requirements

SECTION F-900 : CHLORINATION EQUIPMENT			
SCHEDULE OF PRICES			
			Amount
Item	Description	R	C
	PART A : SUPPLY, INSTALLATION AND COMMISSIONING		
	Supply and delivery to Site of the following equipment including storage, quality assurance, painting, (where specified) and all necessary insurance of:		
9.01	TWO gas chlorinators, complete with automatic valves and all accessories as specified.		
9.02	TWO injector feed pumps as specified		
9.03	All interconnecting pipework, in-line strainers, valves, diffuser, etc. all as specified.		
9.04	ONE lifting gear and trolley complete as specified		
9.05	ONE weighing device and all accessories as listed in Clause 904		
9.06	ONE weatherproof control panel and two controllers including all cabling and wiring as specified between control panel and control equipment (automatic valves, pumps and controller)		
9.07	ONE breathing apparatus specified.		
	Handling (including double handling if stored), erection, installation, painting (if applicable) and quality assurance of the following plant, including transportation and accommodation for personnel.		
9.08	Plant supplied under item 9.01		
9.09	Plant supplied under item 9.02		
9.10	Plant supplied under item 9.03		
9.11	Plant supplied under item 9.04		
9.12	Plant supplied under item 9.05		
9.13	Plant supplied under item 9.06		
9.14	Plant supplied under item 9.07		
	Commissioning, testing and adjusting the following plant as a completely separate operation some time after completion of erection and installation including transportation and accommodation for personnel.		
9.15	Plant installed under item 9.08		
9.16	Plant installed under item 9.09		
9.17	Plant installed under item 9.10		
9.18	Plant installed under item 9.11		
9.19	Plant installed under item 9.12		
9.20	Plant installed under item 9.13		
9.21	Plant installed under item 9.14		
	TOTAL PART A		
	PART B : PROVISIONAL ITEMS (to be applied only if and when specified by the Engineer)		

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## Part 2: Section 6 Statement of Requirements

9.22	Training of Operators (designated) to utilize equipment, including liaison with Operators (per hour R .....; No of hours : 4)		
9.23	Inspection visits to Site during Defects Liability Period as specified in Clause D.25 (per visit R .....; No. of visits 3)		
9.24	Return visit to Site, if and when ordered by the Engineer. (per visit R .....; No. of visits 3)		
9.25	Off-site storage of plant supplied under this section, as specified in Clause D.18 : (per day R .....; 90 days)		
9.26	Spares recommended to be kept by the Employer (brought forward from the attached schedule)		
9.27	Special tools recommended to be kept by the Employer (brought forward from the attached schedule)		
	TOTAL : PART B		
	PART C : HEALTH AND SAFETY		
9.28	General costs for health and safety (not covered under other measured items)		
9.29	Risk assessment		
9.30	Health and Safety Plan		
9.31	Provision of Construction Safety Officer and other appointments		
9.32	Training		
9.33	Medical assessment of employees		
	TOTAL : PART C		
	SUB-TOTAL : PARTS A, B AND C		
	TOTAL FOR SECTION F-900 (Carry to Form of Tender)		

### SECTION F-1000 : POLYMER MAKEUP STATION

#### RECOMMENDED SPARES

The Tenderer must fill in on this sheet any spares he considers the Employer should hold.

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**Part 2: Section 6 Statement of Requirements**

Description	Part Number	Number Required In Stock	Price Each	Total Price	
				R	C
TOTAL (Carry forward to item 9.30)					

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 SIGNATURE OF TENDERER

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 .....  
 DATE

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## Part 2: Section 6 Statement of Requirements

SECTION F-1000 : POLYMER MAKEUP STATION

RECOMMENDED SPARES

The tenderer must fill in on this sheet any special tools he considers the Employer should hold.

Item	Description	Total Price	
		R	C
TOTAL (Carried forward to Item 9.31)			

.....

SIGNATURE OF TENDERER

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..... DATE

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## Part 2: Section 6 Statement of Requirements

SECTION F-1000 : POLYMER MAKEUP STATION			
SCHEDULE OF PRICES			
Item	Description	Amount	
		R	C
	<b>PART A : SUPPLY, INSTALLATION AND COMMISSIONING</b>		
	Supply and delivery to Site of the following equipment including storage, quality assurance, painting, (where specified) and all necessary insurance of:		
10.01	ONE multi compartment 316L stainless steel polymer makeup station and all accessories as specified		
10.02	TWO dosing / metering pumps as specified		
10.03	All interconnecting pipework, in-line strainers, valves, etc. all as specified.		
10.04	ONE weatherproof control panel and controllers including all cabling and wiring as specified between control panel and control equipment (automatic dosing, pumps and controller) Handling (including double handling if stored), erection, installation, painting (if applicable) and quality assurance of the following plant, including transportation and accommodation for personnel.		
10.05	Plant supplied under item 10.01		
10.06	Plant supplied under item 10.02		
10.07	Plant supplied under item 10.03		
10.08	Plant supplied under item 10.04		
	Commissioning, testing and adjusting the following plant as a completely separate operation some time after completion of erection and installation including transportation and accommodation for personnel.		
10.09	Plant installed under item 10.05		
10.10	Plant installed under item 10.06		
10.11	Plant installed under item 10.07		
10.12	Plant installed under item 10.08		
	<b>TOTAL PART A</b>		
	<b>PART B : PROVISIONAL ITEMS (to be applied only if and when specified by the Engineer)</b>		
10.13	Training of Operators (designated) to utilize equipment, including liaison with Operators (per hour R .....; No of hours : 4)		
10.14	Inspection visits to Site during Defects Liability Period as specified in Clause D.25 (per visit R .....; No. of visits 3)		
10.15	Return visit to Site, if and when ordered by the Engineer. (per visit R .....; No. of visits 3)		
10.16	Off-site storage of plant supplied under this section, as specified in Clause D.18 : (per day R .....; 90 days)		
10.17	Spares recommended to be kept by the Employer (brought forward from the attached schedule)		

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## Part 2: Section 6 Statement of Requirements

10.18	Special tools recommended to be kept by the Employer (brought forward from the attached schedule)		
	TOTAL : PART B		
	PART C : HEALTH AND SAFETY		
10.19	General costs for health and safety (not covered under other measured items)		
10.20	Risk assessment		
10.21	Health and Safety Plan		
10.22	Provision of Construction Safety Officer and other appointments		
10.23	Training		
10.24	Medical assessment of employees		
	TOTAL : PART C		
	SUB-TOTAL : PARTS A, B AND C		
	TOTAL FOR SECTION F-900 (Carry to Form of Tender)		

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## Part 2: Section 6 Statement of Requirements

SECTION F-1100 : RAPID GRAVITY SAND FILTERS - REFURBISHMENT & AIR BLOWER / COMPRESSOR

RECOMMENDED SPARES

The Tenderer must fill in on this sheet any spares he considers the Employer should hold.

Description	Part Number	Number Required In Stock	Price Each	Total Price	
				R	C
TOTAL (Carry forward to item 9.30)					

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 SIGNATURE OF TENDERER

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 .....  
 DATE

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**Part 2: Section 6 Statement of Requirements**

**SECTION F-1100 : RAPID GRAVITY SAND FILTERS - REFURBISHMENT & AIR BLOWER / COMPRESSOR**

**RECOMMENDED SPARES**

The tenderer must fill in on this sheet any special tools he considers the Employer should hold.

Item	Description	Total Price	
		R	C
TOTAL (Carried forward to Item 9.31)			

.....  
SIGNATURE OF TENDERER

.....  
DATE

## Part 2: Section 6 Statement of Requirements

SECTION F-1100 : RAPID GRAVITY SAND FILTERS - REFURBISHMENT & AIR BLOWER / COMPRESSOR			
SCHEDULE OF PRICES			
Item	Description	Amount R	C
	PART A : SUPPLY, INSTALLATION AND COMMISSIONING		
	REFURBISHMENT OF EXISTING 2NO. RAPID GRAVITY SAND FILTERS		
10.01	Filter mechanical refurbishment (valves, underdrains checks, minor repairs)		
10.02	Installation, pipework tie-ins, cabling, testing		
	Supply and delivery to Site of the following equipment including storage, quality assurance, painting, (where specified) and all necessary insurance of:		
10.03	Oil-free positive-displacement rotary lobe blower compressor suitable for continuous intermittent duty in backwash cycles; direct-coupled all with accessories as specified		
10.04	All pipework, manifolds, valves, etc. all as specified		
	specified.		
10.05	Controls and integration all specified		
	Handling (including double handling if stored), erection, installation, painting (if applicable) and quality assurance of the following plant, including transportation and accommodation for personnel.		
10.06	Plant supplied under item 10.01		
10.07	Plant supplied under item 10.02		
10.08	Plant supplied under item 10.03		
	Commissioning, testing and adjusting the following plant as a completely separate operation some time after completion of erection and installation including transportation and accommodation for personnel.		
10.09	Plant installed under item 10.04		
10.10	Plant installed under item 10.05		
10.11	Plant installed under item 10.06		
	TOTAL PART A		
	PART B : PROVISIONAL ITEMS (to be applied only if and when specified by the Engineer)		
10.12	Training of Operators (designated) to utilize equipment, including liaison with Operators (per hour R .....; No of hours : 4)		
10.13	Inspection visits to Site during Defects Liability Period as specified in Clause D.25 (per visit R .....; No. of visits 3)		
10.14	Return visit to Site, if and when ordered by the Engineer. (per visit R .....; No. of visits 3)		
10.15	Off-site storage of plant supplied under this section, as specified in Clause D.18.		

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## Part 2: Section 6 Statement of Requirements

	(per day R .....; 90 days)		
10.16	Spares recommended to be kept by the Employer (brought forward from the attached schedule)		
10.17	Special tools recommended to be kept by the Employer (brought forward from the attached schedule)		
	TOTAL : PART B		
	PART C : HEALTH AND SAFETY		
10.18	General costs for health and safety (not covered under other measured items)		
10.19	Risk assessment		
10.20	Health and Safety Plan		
10.21	Provision of Construction Safety Officer and other appointments		
10.22	Training		
10.23	Medical assessment of employees		
	TOTAL : PART C		
	SUB-TOTAL : PARTS A, B AND C		
	TOTAL FOR SECTION F-900 (Carry to Form of Tender)		

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**Part 2: Section 6 Statement of Requirements**

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**PART 3: BoQ FOR ELECTRICAL WORKS & INSTRUMENTATION**

PART 3: ELECTRICAL WORKS & INSTRUMENTATION			
SCHEDULE OF PRICES			

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## Part 2: Section 6 Statement of Requirements

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Signed: *[signature of person whose name and capacity are shown below]* .....

Name: *[insert complete name of person signing the Tender]* .....

In the capacity of *[insert legal capacity of person signing the Tender]* .....

Duly authorised to sign the Tender for and on behalf of: *[insert complete name of Contractor/Joint Venture/Consortium/Association]*

Dated on \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ *[insert date of signing]*

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## **Completion Schedule**

*The Contractor should indicate the project timelines that shows the sequence of activities required to finish a project:*

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### Supplementary Information

*Supplemental information for a tender for works is any additional information that can be used to amend or add to in the tender documents, including extending time limits. It only becomes part of the contract if it explicitly states that it amends the contract documents.*

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**PART 3 - Contract**  
**Section 7: General Conditions of Contract for the**  
**Procurement of Works**

Any resulting contract shall be subject to the Government of Eswatini General Conditions of Contract (GCC) for the Procurement of Works (available on request) except where modified by the Special Conditions below.

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## **Section 8: Special Conditions of Contract**

The following Special Conditions of Contract (SCC) shall supplement the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

### **SPECIAL CONDITIONS OF SERVICE**

**to be read with the**

### **GENERAL CONDITIONS OF CONTRACT**

### **FOR USE IN CONNECTION WITH**

### **ELECTRICAL AND MECHANICAL ENGINEERING WORKS**

**(2023)**

**published by the Consulting Engineers South Africa**

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## Part 3: Section 8 Special Conditions of Contract

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#### C.1: STATUS OF THE GENERAL CONDITIONS OF SERVICE

#### C.2: AMMENDMETNS TO THE GENERAL CONDITIONS OF CONTRACT FOR USE IN CONNECTION WITH ELECTRICAL AND MECHANICAL ENGINEERING WORKS, UNDER THE CESA ACT, 2013

#### C.3: ADDITIONAL CONDITIONS OF CONTRACT

#### C.4: INFORMATIVE CONDITIONS

### SECTION C: SPECIAL CONDITIONS OF CONTRACT

#### C.1: STATUS OF THE GENERAL CONDITIONS OF CONTRACT

The General Conditions of Contract applying to this Contract for use in connection with Electrical and Mechanical engineering Works. The Special Conditions of Contract comprise the amendments, additions and omissions to the aforementioned General conditions of Contract (2013) and also include more specific and detailed information regarding requirements that are stated in more general terms in the General conditions of Contract (2013).

Where reference is made in the various documents which form part of this Contract to the General Terms of Contract, this shall where the context permits, be held to include also these Special Conditions of Contract.

#### C.2: AMMENDMENTS TO THE GENERAL CONDITIONS OF CONTRACT FOR USE IN CONNECTION WITH ELECTRICAL AND MECHANICAL ENGINEERING WORKS (2013).

##### Preamble and Application

These Special Conditions of Contract (SCC) amend and supplement the applicable General Conditions of Contract (GCC) for Mechanical and Electrical Works issued/used under CESA.

#### Clause 1 – Definitions (Amendments)

##### Sub-Clause 1.1(b) – Contractor (replace):

‘Contractor’ means the person, firm or company whose Tender has been accepted by the Employer and includes the Contractor’s heirs, executors, administrators, trustees, judicial managers or liquidators, as the case may be, but not, except with the written consent of the Employer, any assignee of the Contractor.

##### Sub-Clause 1.1(d) – Engineer (replace):

‘Engineer’ means the firm of Consulting Engineers stated in Section 4 (Information/Contract Data) of this Tender Document.

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## Part 3: Section 8 Special Conditions of Contract

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### Sub-Clause 1.1(j) – Time for Completion; Schedule of Prices (replace/add):

(i) ‘Time for Completion’ means the time for completion of the Works or any Section thereof as stated in the Contract (or as extended under Clause 30), calculated from the Commencement Date stated in the Letter of Acceptance.

(ii) ‘Schedule of Prices’ means the document forming part of the Contract in which estimated quantities and the tendered rates for pay items are entered.

### Clause 5.6 – Operating Instructions & Drawings (Add)

The Contractor shall furnish to the Employer [three] copies (or as stated in the Contract Data) of Operating Instructions together with the relevant Drawings.

### Clause 7.2 – Duties/Taxes (Modify)

Replace the phrase ‘borne by the Employer’ with ‘paid to the Contractor by the Employer’.

### Clauses 9.1 to 9.3 – Performance Security (Replace)

Within 28 days of the Letter of Acceptance, the Contractor shall furnish a deed of suretyship and indemnity from an approved insurer or registered commercial bank in the amount of ten percent (10%) of the Contract Sum as security for due performance. Provision of such suretyship shall be at the Contractor’s cost.

### Clause 12.1 – Programme (Add)

Not later than two (2) weeks after award, the Contractor shall submit to the Engineer a detailed programme showing activities, durations and dependencies. Once approved, the programme shall be used for monitoring; it shall be updated at each site meeting with progress reporting and recovery measures as necessary.

### Clause 14.3 – Utilities (Replace)

The Contractor shall make his own arrangements with the relevant local supply authority for electricity and water connections. Gas will not be supplied to the Site by the local authority.

### Clause 14.5 – Coordination with Others (Add)

The Engineer shall coordinate the works with other contractors engaged by the Employer. The Contractor shall attend coordination meetings when required, cooperate fully and adopt procedures to minimise disruption. If, due to an Engineer’s decision at such meeting, the Contractor foresees additional cost, he shall notify the Engineer at the meeting and, in any case, within seven (7) days submit details of the additional costs. The Engineer may adjust interim certificates to include a reasonable sum in respect of such procedures, or may withdraw his decision.

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## **Part 3: Section 8 Special Conditions of Contract**

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### **Clause 15.6 – Third-party Claims (Replace)**

If a claim is received by the Employer for matters for which the Contractor may be liable and which are not covered by the Employer's insurances, the Employer shall notify the Contractor. The Contractor shall promptly commence negotiations; failing which the Employer may conduct such negotiations without prejudice to the Contractor's liabilities. The Employer may require security for the estimated liabilities and may withhold payments until such security is provided, retaining such sureties until finality is reached (see Clause 57).

### **Clause 16.1 – Cooperation with Others (Add)**

The Contractor shall be liable to the Employer for claims arising from failure to afford reasonable opportunities or cooperate with others in accordance with Sub-Clause 14.5.

### **Clause 16.4 – [Deleted]**

### **Clause 18.1 – Electrical Installations (Replace)**

All electrical installations shall comply with Eswatini's adopted standard SZNS SANS 10142-1:2021 (The wiring of premises – Part 1: Low-voltage installations). Medium-voltage installations, where applicable, shall comply with SZNS SANS 10142-2. Authorisation and approvals shall be obtained from the relevant local supply authority in accordance with applicable regulations. All work shall be reported to, and approved by, the competent authority.

### **Clause 20.5 – Consents/Wayleaves (Replace)**

Before delivery of any Plant to Site, the Contractor shall obtain all consents, wayleaves and approvals required under applicable laws and by-laws. If difficulties are encountered, the Employer shall, upon written request, assist without relieving the Contractor of responsibility.

### **Clause 20.6 – Import Permits/Licences (Replace)**

The Contractor shall obtain all import permits or licences required for any part of the Plant or Works. If difficulties arise, the Employer shall, upon written request, assist without affecting the Contractor's obligations.

### **Clause 20.7 – Damage to Services (Add)**

The Employer may repair any services damaged by the Contractor. If, in the Engineer's opinion, the Contractor is responsible, the cost shall be deducted from the next interim certificate or recovered as a debt.

### **Clause 26 – Delivery and Removal of Plant and Equipment (Amend)**

Change heading as above. No Plant or Contractor's Equipment shall be removed from Site without the Engineer's written authorisation, not unreasonably withheld.

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## **Part 3: Section 8 Special Conditions of Contract**

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### **Clause 27.1 – Tests/Costs (Modify)**

Replace ‘borne and paid by the Employer’ with ‘paid to the Contractor by the Employer’.

### **Clause 29.4 – Testing Utilities (Replace)**

The Contractor shall bear all costs of electricity, fuel, water and gas required to carry out tests efficiently; such costs are deemed included in the Contract Sum.

### **Clause 30 – [Amendment]**

Delete line (d).

### **Clause 31.1 – Delay Damages**

Refer to Section 4 (Information/Contract Data) for the daily amount payable by the Contractor for delay in completion.

### **Clause 33.7 – Repetition Tests (Add)**

Such tests shall be considered repetition tests in terms of Sub-Clause 29.5.

### **Clause 33.9 – Visits to Works (Add)**

Prior to any visit to the Works, the Contractor shall notify the Employer of his intention and shall comply with all security and control measures instituted by the Employer or required by statute.

### **Clause 33.10 – Costs (Modify)**

Replace ‘borne by the Employer’ with ‘paid to the Contractor by the Employer’.

### **Clause 33.11 – [Deleted]**

### **Clauses 35.1 & 35.2 – Ownership of Plant (Replace)**

Plant delivered to Site or an approved off-Site store for use in the Works and agreed in writing to be governed by this Clause shall, upon delivery, be deemed sold by the Contractor to the Employer and shall become the property of the Employer. The Contractor shall be responsible for and indemnify the Employer against loss or damage to such Plant and shall insure the Employer’s interest as directed by the Engineer. Plant remains in the Contractor’s care and possession solely for the purposes of the Contract. The Engineer’s interim certificates are without prejudice to the Engineer’s power to reject non-conforming Plant, upon which property shall revert to the Contractor. Off-site Plant shall be set aside and marked as the Employer’s property as directed. No interim payment is due for Plant not governed by this Clause.

### **Clause 37 – Payment Certificates (Replace)**

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## Part 3: Section 8 Special Conditions of Contract

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37.1 Payment shall be made only upon the Engineer's written certificate. The Contractor may submit one claim per month for interim payment for: (a) work executed on Site; and (b) Plant delivered to Site or stored in an approved off-Site store for use in the Works, with supporting invoices, delivery notes and details as reasonably required by the Engineer.

37.2 Within seven (7) days of receipt of a claim and required documents, the Engineer shall measure the work and inspect the Plant and issue an interim payment certificate to the Employer, with a copy to the Contractor.

37.3 Each interim certificate shall certify the total value of work executed and qualifying Plant up to the claim date, less sums previously certified, excluding any work which does not comply with the Contract or Plant brought prematurely to Site or store. Payment is only for work actually done and accepted, and Plant manufactured complete and ready for installation and accepted by the Engineer. The Engineer may withhold or reduce certificates if instructions are not complied with, or upon determination of the Contract under Clause 44, without prejudice to the Employer's rights. No claim for loss of profit on unexecuted work shall be paid.

37.4 The Engineer may include in interim certificates the value of work or Plant with minor defects, deducting the estimated cost of rectification, to be released upon satisfactory rectification.

### Clause 38.1 – Provisional Sums (Replace)

'Provisional Sum' means a sum included in the Contract for execution of work or supply of goods, materials or services at the Engineer's direction. The Employer may withdraw all or part of any Provisional Sum and procure separately; in such case, the Contractor is not entitled to payment or profit in respect of the withdrawn portion, and the Contractor's liabilities under the Contract remain unaffected.

### Clause 39.1 – Contractors under Withdrawn Provisional Sums (Add)

Contractors appointed by the Employer to execute work against withdrawn Provisional Sums and paid directly by the Employer are not Nominated Sub-Contractors but are contractors under separate contracts.

### Clause 40 – Terms of Payment (Replace)

Supply & Delivery (incl. storage where applicable), QA, painting and insurances:

- 90% upon delivery to Site or approved storage.  
5% upon issuing of the Handing-Over Certificate.  
5% upon expiry of the Defects Liability Period and issue of the Final Certificate.

Handling/Erection/Installation (incl. transport & accommodation for personnel):

- 90% upon issuing of the Handing-Over Certificate.  
5% upon expiry of the Defects Liability Period and issue of the Final Certificate.

Commissioning/Testing/Adjusting as a separate operation (incl. transport &

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## Part 3: Section 8 Special Conditions of Contract

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- accommodation):  
90% upon issuing of the Handing-Over Certificate.
- [Balance as per Contract Data].

[NOTE: Source document shows a missing page reference at C.9. If additional staged payments are intended, insert here to suit the project's commercial model.]

### Clause 51.1 – Employer Default (Replace)

If the Employer (a) fails to pay any amount due under a certificate within 30 days of due date; or (b) interferes with the issue of a certificate; or (c) becomes insolvent; or (d) is unable to meet contractual obligations; then the Contractor may give written notice specifying the breach and requiring remedy within fourteen (14) days. Failing remedy, the Contractor may terminate his employment under the Contract without prejudice to other rights or remedies.

### Clause 51.2 – Removal of Equipment upon Termination (Replace)

Upon lawful termination under Sub-Clause 51.1, the Contractor shall, with all reasonable dispatch, remove from the Site all Contractor's Equipment brought thereon, subject to the Engineer's instructions regarding safety and preservation of the Works.

### Eswatini Regulatory Alignment (Add)

- (a) Procurement Framework: Where the Employer is a public entity, procurement, contracting and payments shall observe the Public Procurement Act, 2011 and the Public Procurement Regulations, 2020, including the use of standard documents and publication requirements, without prejudice to the GCC/SCC.
- (b) Standards & Approvals: Electrical works shall comply with SZNS SANS 10142-1 (and Part 2 where applicable) and approvals from the relevant local supply authority.
- (c) Industry Regulation: Parties shall comply with applicable directives or requirements issued by the Construction Industry Council (CIC) of Eswatini.

### Section 4 – Information/Contract Data (Extract Placeholders)

Engineer: [Name of Consulting Engineer/firm]  
Number of Operating Manuals & Drawings: [e.g., 3 sets hardcopy + 1 digital]  
Delay Damages (Clause 31.1): [E ... per day]  
Performance Security (Clause 9): 10% of Contract Sum (form approved by Employer)  
Precedence & Interpretation

These SCC form part of the Tender and Contract Documents. In case of conflict, the order of precedence shall be: (1) Form of Agreement; (2) Contract Data/Appendices; (3) Special Conditions of Contract; (4) General Conditions of Contract; (5) Specifications; (6) Drawings; (7) Other documents forming the Contract.

## C.3 ADDITIONAL CONDITIONS OF CONTRACT

The following Special Conditions of Contract shall apply in addition to the General Conditions of Contract, as amended, and new numbers are therefore assigned to these Conditions:

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## Part 3: Section 8 Special Conditions of Contract

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### Clause 54: Contingency Sum

A sum has been provided in the Schedule of Prices for contingencies, which sum may be used in whole or in part or not at all, at the discretion of the Engineer. The provision of this sum shall not be taken to mean that the Contractor has not otherwise allowed for everything required for the complete execution of the Contract.

### Clause 55: Powers to recover moneys owing to the Contractor

The Employer may recover from the Contractor any and all moneys which may become payable by the Contractor to the Employer under the provision of any Clause of this Contract. Such indebtedness may be deducted or recovered.

- a) From moneys due to become due to the Contractor under the Contract or under any other contract from any cause whatsoever,
- b) From any moneys deposited or held as security or from any retention moneys held under the Contract:
- c) From the proceeds of the sale of the plant or other assets of the Contractor or of any Sub-Contractor:
- d) In any other manner that the Contract may provide or that the Employer may decide.

Nothing herein contained shall affect the ipso jure legal operation of rights of set-off between the Employer and the Contractor.

### Clause 56: Standards of Samples

The latest additions and/or amendments of the following Standards and Codes shall be considered a minimum requirement. In the event of differing requirements, the most stringent Code of Standard shall apply:

3.1.1 Occupational Safety and Health Act, 2001 (Act No. 9 of 2001)

3.1.2 Eswatini Standards Authority (SWASA).

3.1.3 British Standard Specifications

3.1.4 N.O.A.A Safety Guidelines

Samples of equipment and material intended for use in the installation may be requested by the Engineer before work is commenced and such samples may be retained until completion of Contract. Copies of relevant SWASA and Inspection Authority Reports shall also be submitted to the Engineer on request.

All such samples and reports shall have securely attached thereto a designation label indicating by name the Contract, the Contractor and any further relevant information.

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## Part 3: Section 8 Special Conditions of Contract

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### C.4: INFORMATIVE CONDITIONS

The following Special Conditions of Contract supply information pursuant to the General Conditions of Contract for Use in Connection with Mechanical and Electrical Engineering Works, as amended:

#### Sub-Clause 1.1.a

The Employer is EIPA, also referred to as “Employer”.

#### Sub-Clause 1.1.d

On behalf of the Employer, the following firm of Consulting Engineers have been appointed to act as Engineers for the purpose of this Contract: RSZ Engineers and Project Managers

Postal Addresses: P.O Box 3265  
Manzini  
Eswatini

Street Addresses Matsapha Link  
1<sup>st</sup> Floor Offices

Email: [sihle@rszengineers.co.za](mailto:sihle@rszengineers.co.za)

#### Sub-Clause 4.1

The Language (which is also the ruling Language) in which the documents are drawn up is English.

#### Sub-Clause 4.2

The governing law shall be the law of the Kingdom of Eswatini.

#### Sub-Clause 4.3

Should there be any discrepancies between the General Conditions of contract for Use in connection with Electrical and Mechanical Engineering Works and the Special Conditions of Contract, the latter shall have precedence.

#### Sub-Clause 7.1

The time for Completion of the Contract shall be as stated by the Tenderer at the end of the Schedule of Prices for each Section.

#### Sub-Clause 9

The currency of the Surety Bond shall be that of the Kingdom of Eswatini.

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## Part 3: Section 8 Special Conditions of Contract

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### Sub-Clause 12.1

The time for the submission of the programme shall be 3 weeks after the commencement Date of Contract.

### Sub-Clause 14.1

The Employer shall not provide any equipment or facilities.

### Sub-Clause 14.2

The Contractor shall be responsible for the fencing, lighting and guarding of his plant and equipment to be utilized in the installation, erection, assembly and commissioning of the plant and equipment supplied by the Contractor in terms of the Contract.

### Sub-Clause 14.3

The Contractor shall make his own arrangements and pay all charges for water and electricity. Gas will not be supplied to the Site.

The standard low voltage supply in the electricity supply area of the Local Authority concerned is 230/400 volt,  $\pm 5\%$  at 50 c/s.

### Sub-Clause 14.4

Lifting equipment shall not be provided by the Employer.

### Sub-Clause 20.6

The contractor shall obtain and provide all the required import permits and licences.

### Sub-Clause 21.1

Normal working hours are between 07h00 to 17h00 from Monday to Saturday.

### Sub-Clause 21.2

The Contractor shall not work on Sundays and on statutory public holidays.

### Sub-Clause 31.1

The reduction (penalty) of the Contract Price for delay in completion is one percent (1%) of the Total Contract Price per week. The maximum reduction permissible for delay in completion is five percent (5%) of the Total Contract Price.

### Sub-Clause 31.3

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## Part 3: Section 8 Special Conditions of Contract

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This contract does not provide for the payment of a bonus in relation to the Works or any Section thereof.

### Sub-Clause 33.1

The Defects Liability Period is 12 months.

### Sub-Clause 33.3 and 33.4

The maximum permitted extension of the Defects Liability Period is 24 months.

### Clause 35

Subject to written agreement, the Plant becomes the property of the Employer on delivery to the Site or off-Site store.

### Sub-Clause 37.5

This Contract does not provide for progress payments or other payments in advance, before or during manufacture or before shipment.

### Clause 40

Payment in respect of Interim and Completion Certificates shall be made within 30dys of the receipt of such a Certificate by the receipt of such a Certificate by the Employer.

### Clause 41

No interest shall be paid on delayed payments. All payments shall be made at Nhlngano in the currency of the Kingdom of Eswatini.

### Clause 43

If tendered rates and prices are subject to the rate of exchange between the currency and the Kingdom of Eswatini in which payment under this Contract shall be made and any other currency, then the contractor shall in the appropriate form, included in this document or should the space in the form be insufficient, then in a covering letter to this Tender, state the rate of exchange on which his tender is based, as well as the amount of his tender which is subject to such exchange rate.

Price adjustments shall only be made on documented proof, which shall be submitted to the Engineer whenever required by him.

### Sub-Clause 50.2

Notice to Engineers:

Originals to:

RSZ Engineers and Project Managers

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## Part 3: Section 8 Special Conditions of Contract

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**Postal Address:**

P.O Box 3265  
Manzini

**Street Address:**

Matsapha Link  
1<sup>st</sup> Floor Offices

**Enquiries**

Mr S Zwane

**Email:** sihle@rszengineers.co.za

**Sub-Clause 51.1: Default of Employer**

Failure to pay the Contractor within 30 days from the due date of payment.

**Sub-Clause 52.1**

Prices shall be subject to adjustment in accordance with the Public Procurement Act, 2011 (Act No. 7 of 2011) and Public Procurement Regulations, 2020. Contract price adjustments in long-term projects shall be subject to approval by the Eswatini Public Procurement Regulatory Agency (ESPPRA).

Prices which are subject to adjustment in accordance with rate of exchange shall not be subject to further adjustment in terms of this Clause.

**Sub-Clause 53.1**

All customs and import duties shall be for the Contractor's account and shall be deemed to be included in the Contract Sum.

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## Section 9: Contract Forms

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## Part 3. Section 9. Contract Forms

# Contract Agreement

Procurement Reference No: \_\_\_\_\_

THIS CONTRACT AGREEMENT made this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, between \_\_\_\_\_ of \_\_\_\_\_ (hereinafter “the Procuring Entity - PE”), of the one part, and \_\_\_\_\_ of \_\_\_\_\_ (hereinafter “the Contractor”), of the other part.

Whereas the PE is desirous that the Contractor executes \_\_\_\_\_ (hereinafter called “the Works”) and the PE has accepted the Tender by the Contractor for the execution and completion of such Works and the remedying of any defects therein for the Contract Price of Eswatini Lilangeni \_\_\_\_\_.

NOW THIS CONTRACT AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Contract Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Contract referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Contract Agreement shall prevail over all other Contract documents.
  - (a) the Contractor’s Tender;
  - (b) the Special Conditions of Contract;
  - (c) the General Conditions of Contracts;
  - (e) the Scope of works;
  - (f) the Drawings; and
  - (g) the completed Schedules.
3. In consideration of the payments to be made by the PE to the Contractor as indicated in this Contract, the Contractor hereby covenants with the Procuring Entity to execute and complete the Works and remedy any defects therein in conformity in all respects with the provisions of the Contract.
4. The PE hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein the Contract Price of \_\_\_\_\_ or such other sum as may become payable under the provisions of the Contract, at the times and in the manner prescribed by the Contract.
5. The Contract Price or such other sum as may be payable shall be paid \_\_\_\_\_ in Eswatini Lilangeni , \_\_\_\_\_ in \_\_\_\_\_ and \_\_\_\_\_ in \_\_\_\_\_.

IN WITNESS whereof the parties thereto have caused this Contract to be executed in accordance with the law specified in the Special Conditions of Contract on the day, month and year indicated above.

Signed by \_\_\_\_\_ (for the Procuring Entity)

Name: \_\_\_\_\_ Position: \_\_\_\_\_

In the presence of:

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### Part 3. Section 9. Contract Forms

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Name: \_\_\_\_\_ Position: \_\_\_\_\_

Signed by \_\_\_\_\_ (for the Contractor)

Name: \_\_\_\_\_ Position: \_\_\_\_\_

In the presence of:

Name: \_\_\_\_\_ Position: \_\_\_\_\_

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## Part 3. Section 9. Contract Forms

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# Performance Security

*[The Performance Security should be on the letterhead of the issuing Financial Institution and should be signed by a person with the proper authority to sign documents that are binding on the Financial Institution. The draft is for an unconditional Security. The amount of the guarantee must represent the percentage of the Contract Price specified in the Contract and should be denominated either in the currency(ies) of the Contract or in a freely convertible currency acceptable to the Procuring Entity].*

Date: *[insert date (as day, month and year) of Performance Security]*

Procurement Reference No: *[insert Procurement Reference Number]*

To: *[insert complete name and address of Procuring Entity]*

WHEREAS *[insert name and address of Contractor]* (hereinafter called “the Contractor”) has undertaken, pursuant to the Contract referenced above, dated *[insert date (as day, month and year) of contract]* to execute *[insert brief description of Works]* (hereinafter called “the Contract”);

AND WHEREAS it has been stipulated by you in the aforementioned Contract that the Provider shall furnish you with a demand guarantee issued by a financial institution for the sum specified therein as security for compliance with the Provider’s performance obligations in accordance with the Contract;

AND WHEREAS the undersigned *[insert complete name of Guarantor]*, legally domiciled in *[insert complete address of Guarantor]*, (hereinafter the “Guarantor”), have agreed to give the Contractor a security;

THEREFORE WE hereby affirm that we are Guarantors and responsible to you, on behalf of the Contractor, up to a total of *[insert currency and amount of Guarantee in words and figures]*, such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand declaring the Contractor to be in default under the Contract, without cavil or argument, any sum or sums within the limits of *[insert currency and amount of Guarantee in words and figures]* as aforesaid without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this Guarantee, and we hereby waive notice of any such change, addition, or modification.

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## Part 3. Section 9. Contract Forms

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This Guarantee shall remain in force up to and including \_\_\_\_\_ \* *[insert date: day, month, year]*

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758, except that Sub-article 20(a) is hereby excluded.

Name: *[insert complete name of person signing the Performance Security]*

In the capacity of *[insert legal capacity of person signing the Performance Security]*

Signed: *[signature of person whose name and capacity are shown above]*

Duly authorized to sign the Performance Security for and on behalf of: *[insert complete name of Financial Institution]*

Dated on \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ *[insert date of signing]*

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*\* Insert the date twenty-eight (28) days after the intended completion date as stated in SCC 22.1. In the event of an extension of the intended completion date, the Entity shall request for an extension of this guarantee from the contractor. The request for extension shall be in writing and must be made prior to the expiration date stated in*

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## Advance Payment Security

*[The Advance Payment Security should be on the letterhead of the issuing Financial Institution and should be signed by a person with the proper authority to sign documents that are binding on the Financial Institution. The amount of the security is to be inserted by the Financial Institution and must represent the amount of the Advance Payment and be denominated either in the currency(ies) of the Advance Payment as specified in the Contract, or in a freely convertible currency acceptable to the PE].*

Date: *[insert date (as day, month, and year) of Payment Security]*  
Procurement Reference No.: *[insert Procurement Reference Number]*

To: *[insert complete name and address of Procuring Entity]*

In accordance with the payment provision included in the Contract referenced above, in relation to advance payments, *[insert complete name and address of Contractor]* (hereinafter called “the Contractor”) shall deposit with the PE a Bank Guarantee to guarantee its proper and faithful performance of the obligations imposed by said Clause of the Contract, in the amount of *[insert currency and amount of guarantee in words and figures]*.

We, the undersigned *[insert complete name of Guarantor]*, legally domiciled in *[insert full address of Guarantor]* (hereinafter “the Guarantor”), as instructed by the Contractor, agree unconditionally and irrevocably to guarantee as primary obligator and not as surety merely, the payment to the PE on its first demand without whatsoever right of objection on our part and without its first claim to the Contractor, in the amount not exceeding *[insert currency and amount of guarantee in words and figures]*.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between the PE and the Contractor, shall in any way release us from any liability under this Guarantee, and we hereby waive notice of any such change, addition, or modification.

This Security shall remain valid and in full effect from the date of the advance payment under the Contract until the PE receives full repayment of the same amount from the Contractor.

Name: *[insert complete name of person signing the Payment Security]*

In the capacity of *[insert legal capacity of person signing the Payment Security]*

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758, except that Sub-article 20(a) is hereby excluded.

Signed: *[signature of person whose name and capacity are shown above]*

Duly authorized to sign the Payment Security for and on behalf of: *[insert complete name of the Financial Institution]*

Dated on \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ *[insert date of signing]*

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