

TENDER DOCUMENT GOODS AND SERVICES		 CITY OF CAPE TOWN ISIXEKO SASEKAPA STAD KAAPSTAD
SUPPLY CHAIN MANAGEMENT		
SCM - 542	Approved by Branch Manager: 03/04/2020	Version: 8 Page 1 of 279

TENDER NO: 60G/2022/23

TENDER DESCRIPTION: PROCUREMENT OF NEW CREMATORS AND ASSOCIATED WORKS

CONTRACT PERIOD: FROM DATE OF COMMENCEMENT OF CONTRACT, NOT EXCEEDING A PERIOD OF 36 MONTHS.

VOLUME 1: TENDERING PROCEDURES

CLOSING DATE: 20 September 2022

CLOSING TIME: 10:00 a.m.

TENDER BOX NUMBER: 154

TENDER FEE: **R200** Non-refundable tender fee payable to City of Cape Town (CCT) for a hard copy of the tender document. This fee is not applicable to website downloads of the tender document.

TENDERER	
NAME of Company/Close Corporation or Partnership / Joint Venture/ Consortium or Sole Proprietor /Individual	
TRADING AS (if different from above)	

NATURE OF TENDER OFFER (please indicate below)	
Main Offer (see clause 2.2.11.1)	
Alternative Offer (see clause 2.2.11.1)	

TENDER SERIAL NO.:
SIGNATURES OF CITY OFFICIALS AT TENDER OPENING
1
2
3

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**VOLUME 1: THE TENDER
(1) GENERAL TENDER INFORMATION**

- TENDER ADVERTISED** : **05 August 2022**
- SITE VISIT/CLARIFICATION MEETING** : Thursday, 18 August 2022 @ 11:00am
(Not compulsory, but strongly recommended)
- VENUE FOR SITE VISIT/CLARIFICATION MEETING** : Maitland Crematorium, Crematorium Road, Maitland, CapeTown
- TENDER BOX & ADDRESS** : **Tender Box as per front cover at the Tender & Quotation Boxes Office, 2nd Floor (Concourse Level), Civic Centre, 12 Hertzog Boulevard, Cape Town.**
- : The Tender Document (which includes the Form of Offer and Acceptance) completed in all respects, plus any additional supporting documents required, must be submitted in a sealed envelope with the name and address of the tenderer, the endorsement **60G/2022/23 : PROCUREMENT OF NEW CREMATORS AND ASSOCIATED WORKS**, the tender box No. and the closing date indicated on the envelope. The sealed envelope must be inserted into the appropriate official tender box before closing time.
- If the tender offer is too large to fit into the abovementioned box or the box is full, please enquire at the public counter (Tender Distribution Office) for alternative instructions. It remains the tenderer's responsibility to ensure that the tender is placed in either the original box or as alternatively instructed.
- CCT TENDER REPRESENTATIVE** [Name: Renee Weyers.....]
Tel. No.: (021) 400 7461.....]
Cell no.: 084 459 1161
Email: renee.weyers@capetown.gov.za.....

TENDERERS MUST NOTE THAT WHEREVER THIS DOCUMENT REFERS TO ANY PARTICULAR TRADE MARK, NAME, PATENT, DESIGN, TYPE, SPECIFIC ORIGIN OR PRODUCER, SUCH REFERENCE SHALL BE DEEMED TO BE ACCOMPANIED BY THE WORDS 'OR EQUIVALENT'

(2) CONDITIONS OF TENDER

2.1 General

2.1.1 Actions

2.1.1.1 The City of Cape Town (CCT) and each tenderer submitting a tender offer shall comply with these Conditions of Tender. In their dealings with each other, they shall discharge their duties and obligations as set out in these Conditions of Tender, timeously and with integrity, and behave equitably, honestly and transparently, comply with all legal obligations.

The parties agree that this tender, its evaluation and acceptance and any resulting contract shall also be subject to the Employer's Supply Chain Management Policy ('SCM Policy') that was applicable on the date the bid was advertised, save that if the Employer adopts a new SCM Policy which contemplates that any clause therein would apply to the contract emanating from this tender, such clause shall also be applicable to that contract. Please refer to this document contained on the Employer's website.

Abuse of the supply chain management system is not permitted and may result in the tender being rejected, cancellation of the contract, restriction of the supplier, and/or the exercise by the City of any other remedies available to it as described in the SCM Policy.

2.1.1.2 The CCT, the tenderer and their agents and employees involved in the tender process shall avoid conflicts of interest and where a conflict of interest is perceived or known, declare any such conflict of interest, indicating the nature of such conflict. Tenderers shall declare any potential conflict of interest in their tender submissions. Employees, agents and advisors of the CCT shall declare any conflict of interest to the CCT at the start of any deliberations relating to the procurement process or as soon as they become aware of such conflict, and abstain from any decisions where such conflict exists or recuse themselves from the procurement process, as appropriate.

2.1.1.3 The CCT shall not seek, and a tenderer shall not submit a tender, without having a firm intention and capacity to proceed with the contract.

2.1.2 Interpretation

2.1.2.1 The additional requirements contained in the returnable documents are part of these Conditions of Tender.

2.1.2.2 These Conditions of Tender and returnable schedules which are required for tender evaluation purposes, shall form part of the contract arising from the invitation to tender.

2.1.3 Communication during tender process

Verbal or any other form of communication, from the CCT, its employees, agents or advisors during site visits/clarification meetings or at any other time prior to the award of the Contract, will not be regarded as binding on the CCT, unless communicated by the CCT in writing to suppliers by its Director: Supply Chain Management or his nominee.

2.1.4 The CCT's right to accept or reject any tender offer

2.1.4.1 The CCT may accept or reject any tender offer and may cancel the tender process or reject all tender offers at any time before the formation of a contract. The CCT may, prior to the award of the tender, cancel a tender if:

- (a) due to changed circumstances, there is no longer a need for the services, works or goods requested;
or
- (b) funds are no longer available to cover the total envisaged expenditure; or
- (c) no acceptable tenders are received;
- (d) there is a material irregularity in the tender process; or
- (e) the parties are unable to negotiate market related pricing.

The CCT shall not accept or incur any liability to a tenderer for such cancellation or rejection, but will give written reasons for such action upon receiving a written request to do so.

2.1.5 Procurement procedures

2.1.5.1 General

Unless otherwise stated in the tender conditions, a contract will be concluded with the tenderer who scores the highest number of tender adjudication points.

The CCT intends to appoint a single tenderer (“the winner”) and in addition, a standby tenderer, for the allocation of work. If insufficient responsive bids are received, the CCT reserves the right not to appoint a tenderer at all.

The supplier, once appointed and subject to operational requirements, will be invited to deliver the goods or services on a “winner-takes-all” basis, whereby the order will always be offered and, if accepted, allocated to the highest ranked tenderer (“the winner”), and only if he refuses will the work be offered to the next highest ranked tenderer (the standby tenderer).

The contract period shall be from date of commencement of contract, not exceeding a period of 36 months.

2.1.5.2 Proposal procedure using the two stage-system

A two-stage system will not be followed.

2.1.5.3 Nomination of Alternative Bidder

Alternative Bidder means a bidder, identified at the time of awarding a bid, which will be considered for award should the contract be terminated for any reason whatsoever. In the event that a contract is terminated during the execution thereof, the CCT may consider the award of the contract, or non-award, to the alternative bidder in terms of the procedures included its SCM Policy.

2.1.6 Objections, complaints, queries and disputes/ Appeals in terms of Section 62 of the Systems Act/ Access to court

2.1.6.1 Disputes, objections, complaints and queries

In terms of Regulations 49 and 50 of the Local Government: Municipal Finance Management Act, 56 of 2003 Municipal Supply Chain Management Regulations (Board Notice 868 of 2005):

- a) Persons aggrieved by decisions or actions taken by the City of Cape Town in the implementation of its supply chain management system, may lodge within 14 days of the decision or action, a written objection or complaint or query or dispute against the decision or action.

2.1.6.2 Appeals

- a) In terms of Section 62 of the Local Government: Municipal Systems Act, 32 of 2000 a person whose rights are affected by a decision taken by the City, may appeal against that decision by giving written notice of the appeal and reasons to the City Manager within 21 days of the date of the notification of the decision.
- b) An appeal must contain the following:
 - i. Must be in writing
 - ii. It must set out the reasons for the appeal
 - iii. It must state in which way the Appellant’s rights were affected by the decision;
 - iv. It must state the remedy sought; and
 - v. It must be accompanied with a copy of the notification advising the person of the decision
- c) The relevant City appeal authority must consider the appeal and **may confirm, vary or revoke** the decision that has been appealed, but no such revocation of a decision may detract from any rights that may have accrued as a result of the decision.

2.1.6.3 Right to approach the courts and rights in terms of Promotion of Administrative Justice Act, 3 of 2000 and Promotion of Access to Information Act, 2 of 2000

The sub- clauses above do not influence any affected person’s rights to approach the High Court at any time or its rights in terms of the Promotion of Administrative Justice Act (PAJA) and Promotion of Access to Information Act (PAIA).

- 2.1.6.4** All requests referring to sub clauses 2.1.6.1 and 2.1.6.2 must be submitted in writing to:

The City Manager - C/o the Manager: Legal Compliance Unit, Legal Services Department, Corporate

Services Directorate

Via hand delivery at: 20th Floor, Tower Block, 12 Hertzog Boulevard, Cape Town 8001

Via post at: Private Bag X918, Cape Town, 8000

Via fax at: 021 400 5963 or 021 400 5830

Via email at: MSA.Appeals@capetown.gov.za

2.1.6.5 All requests referring to clause 2.1.6.3 ns must be submitted in writing to:

The City Manager - C/o the Manager: Access to Information Unit, Corporate Services Directorate

Via hand delivery at: 20th Floor, Tower Block, 12 Hertzog Boulevard, Cape Town 8001

Via post at: Private Bag X918, Cape Town, 8000

Via fax at: 086 202 9982

Via email at: Access2info.Act@capetown.gov.za

2.1.7 City of Cape Town Supplier Database Registration

Tenderers are required to be registered on the CCT Supplier Database as a service provider. Tenderers must register as such upon being requested to do so in writing and within the period contained in such a request, failing which no orders can be raised or payments processed from the resulting contract. In the case of Joint Venture partnerships this requirement will apply individually to each party of the Joint Venture.

Tenderers who wish to register on the City of Cape Town's Supplier Database may collect registration forms from the Supplier Management Unit located within the Supplier Management / Registration Office, 2nd Floor (Concourse Level), Civic Centre, 12 Hertzog Boulevard, Cape Town (Tel 021 400 9242/3/4/5). Registration forms and related information are also available on the City of Cape Town's website www.capetown.gov.za (follow the Supply Chain Management link to Supplier registration).

It is each tenderer's responsibility to keep all the information on the CCT Supplier Database updated.

2.1.8 National Treasury Web Based Central Supplier Database (CSD) Registration

Tenderers are required to be registered on the National Treasury Web Based Central Supplier Database (CSD) as a service provider. Tenderers must register as such upon being requested to do so in writing and within the period contained in such a request, failing which no orders can be raised or payments processed from the resulting contract. In the case of Joint Venture partnerships this requirement will apply individually to each party of the Joint Venture.

Tenderers who wish to register on the National Treasury Web Based Central Supplier Database (CSD) may do so via the web address <https://secure.csd.gov.za>.

It is each tenderer's responsibility to keep all the information on the National Treasury Web Based Central Supplier Database (CSD) updated.

2.2 Tenderer's obligations

2.2.1 Eligibility Criteria

2.2.1.1 Tenderers are obligated to submit a tender offer that complies in all aspects to the conditions as detailed in this tender document. Only those tenders that comply in all aspects with the tender conditions, specifications, pricing instructions and contract conditions will be declared to be responsive.

2.2.1.1.1 Submit a tender offer

Only those tender submissions from which it can be established that a clear, irrevocable and unambiguous offer has been made to CCT, by whom the offer has been made and what the offer constitutes, will be declared responsive.

2.2.1.1.1.a Tendering Entity Track Record

Only those tenders submitted by tenderers who can show a proven track record as stated below will be declared responsive.

Bidders must comply with all requirements as listed under 2.2.1.1.1(a) in order to be considered responsive. Bidders, in order to qualify for further evaluation, must submit the required proof in terms of points 1 to 3 below.

1. Each bidder must have installed a minimum of **two (2)** new Cremators / Incinerators/ Furnaces in order to be eligible for further evaluation. The information shall be for projects completed within the last 10 years, as per below, with reference letters attached to be eligible in qualifying to the next stage.
2. Performance test results, undertaken by an accredited tester **OR** a Reference Letter from the client stating that the installations are performing in compliance to Atmospheric Emission Licence Conditions in terms of the Minimum Emission Standards for "new plant" as prescribed in regulation 893 of 22 November 2013 (Government Gazette No. 37054) as amended by GN1207 dated 31 October 2018 (GG 42013), promulgated in terms of the NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT, 2004 (ACT NO. 39 OF 2004) applicable as amended in the year of completion (at the time of installation or as specified in the appointment), must be submitted for at least **two (2)** new cremators installed. Performance test results, undertaken by an accredited tester or a reference letter from clients, for cremators installed outside of the Republic of South Africa is permissible. **Failure to submit the performance test results OR reference letter from clients with the tender submission, or a written request from CCT to submit, may result in the tenderer being deemed non-responsive.**
3. A **signed undertaking from a specialist sub-contractor** having the required experience, stating that they will undertake the necessary work on behalf of the tenderer, will be acceptable. **Proven track record and all required information as per point 1 and 2 above will be applicable.**

Tenderers shall ensure that all relevant information is submitted with the tender offer in the prescribed format to ensure optimal evaluation of this responsiveness criteria. Failure to provide all information IN THIS TENDER SUBMISSION could result in the tenderer being deemed non-responsive. **Complete Schedule 16A: Tendering Entity Track Record.**

2.2.1.1.2 Compliance with requirements of CCT SCM Policy and procedures

Only those tenders that are compliant with the requirements below will be declared responsive:

- a) A completed **Details of Tenderer** to be provided (applicable schedule to be completed);
- b) A completed **Certificate of Authority for Partnerships/ Joint Ventures/ Consortiums** to be provided authorising the tender to be made and the signatory to sign the tender on the partnership /joint venture/consortium's (applicable schedule to be completed);
- c) A copy of the partnership / joint venture / consortium agreement to be provided.
- d) A completed **Declaration of Interest – State Employees** to be provided and which does not indicate any non-compliance with the legal requirements relating to state employees (applicable schedule to be completed);
- e) A completed **Declaration – Conflict of Interest and Declaration of Bidders' past Supply Chain Management Practices** to be provided and which does not indicate any conflict or past practises that renders the tender non-responsive based on the conditions contained thereon (applicable schedules to be completed);
- f) A completed **Certificate of Independent Bid Determination** to be provided and which does not indicate any non-compliance with the requirements of the schedule (applicable schedule to be completed);

- g) The tenderer (including any of its directors or members), has not been restricted in terms of abuse of the Supply Chain Management Policy,
- h) The tenderer's tax matters with SARS are in order, or the tenderer is a foreign supplier that is not required to be registered for tax compliance with SARS;
- i) The tenderer is not an advisor or consultant contracted with the CCT whose prior or current obligations creates any conflict of interest or unfair advantage,
- j) The tenderer is not a person, advisor, corporate entity or a director of such corporate entity, involved with the bid specification committee;
- k) A completed **Authorisation for the Deduction of Outstanding Amounts Owed to the City of Cape Town** to be provided and which does not indicate any details that renders the tender non-responsive based on the conditions contained thereon (applicable schedules to be completed);
- l) The tenderer (including any of its directors or members), has not been found guilty of contravening the Competition Act 89 of 1998, as amended from time to time;
- m) The tenderer (including any of its directors or members), has not been found guilty on any other basis listed in the Supply Chain Management Policy.

2.2.1.1.3 Compulsory clarification meeting

Not compulsory, but strongly recommended.

2.2.1.1.4 Minimum score for functionality

Not applicable.

2.2.1.1.5 Local production and content

The City promotes the procurement of goods manufactured by local suppliers. The Department of Trade and Industry and National Treasury has identified specific designated sectors which require local content compliance. The current designated sectors are listed below:

Tenderers are required to ensure that they comply with these designated Sector requirements by ensuring that the products provided to the City are locally manufactured. Failure to comply with the designated sector requirements for local content will result in a bid been disqualified.

Further details of designated sectors are available on http://www.thedti.gov.za/industrial_development/ip.jsp and http://ocpo.treasury.gov.za/Buyers_Area/Legislation/Pages/Practice-Notes.aspx

In addition to the above:

- a) The supplier shall study the terms and conditions as stated in the **Local Content Declaration / Annexure C** returnable schedule.
- C.2.1.1.5.1 The stipulated minimum threshold percentages for local production and content for the
 - **Valve Products and Actuators sector** ("the designated sector") is **70%**, and
 - **Steel Products and Components for Construction sector** ("the designated sector") is **100%**, and will include all sub-sectors from the applicable National Treasury Instruction Note.
 - C.2.1.1.5.2 Only tenders with locally produced or locally manufactured raw material or input will be considered. If the raw material or input to be used for a specific item is not available locally, bidders should obtain written authorisation from the Department of Trade and Industry (DTI) (Chief Director: Industrial Procurement, tel. 012 394 3927 and fax 012 394 4927) should there be a need to import such raw material or input.
 - C.2.1.1.5.3 A copy of the authorisation letter must be submitted together with the bid document at the closing date and time of the bid.
 - C.2.1.1.5.4 The Employer is obliged and must ensure that contracts for **the designated sector** are awarded at prices that are market related taking into account, among others, benchmark prices designated by the DTI for the sector, value for money and economies of scale. Where appropriate, prices may be negotiated with preferred bidders in accordance with provisions for Negotiation with Preferred Bidders as set out in the City of Cape Town SCM Policy.

C.2.1.1.5.5 A bid will be declared non-responsive / disqualified if the **Local Content Declaration / Annexure C** returnable schedule as well as the authorisation letter referred to above (if applicable) are not submitted as part of the bid documentation at the closing date and time of the bid.

C.2.1.1.5.6 For further information relating to the local production and content legislation, bidders may refer to website http://www.thedti.gov.za/industrial_development/ip.jsp, or may contact the Chief Director: Industrial Procurement at the DTI at telephone number (012) 394 3927 and fax (012) 394 4927, the Director: Fleet Procurement, Ms Cathrine Matidza, at telephone number (012) 394 3927 and e-mail CMatidza@thedti.gov.za, or the DTI Contact Centre no 0861 843384.

2.2.1.1.6 Pre-qualification criteria for preferential procurement

Not applicable.

2.2.1.1.7 Provision of samples

Not applicable.

2.2.2 Cost of tendering

The CCT will not be liable for any costs incurred in the preparation and submission of a tender offer, including the costs of any testing necessary to demonstrate that aspects of the offer complies with requirements.

2.2.3 Check documents

The documents issued by the CCT for the purpose of a tender offer are listed in the index of this tender document.

Before submission of any tender, the tenderer should check the number of pages, and if any are found to be missing or duplicated, or the figures or writing is indistinct, or if the Price Schedule contains any obvious errors, the tenderer must apply to the CCT at once to have the same rectified.

2.2.4 Confidentiality and copyright of documents

Treat as confidential all matters arising in connection with the tender. Use and copy the documents issued by the CCT only for the purpose of preparing and submitting a tender offer in response to the invitation.

2.2.5 Reference documents

Obtain, as necessary for submitting a tender offer, copies of the latest versions of standards, specifications, Conditions of Contract and other publications, which are not attached but which are incorporated into the tender documents by reference.

2.2.6 Acknowledge and comply with notices

Acknowledge receipt of notices to the tender documents, which the CCT may issue, fully comply with all instructions issued in the notices, and if necessary, apply for an extension of the closing time stated on the front page of the tender document, in order to take the notices into account. Notwithstanding any requests for confirmation of receipt of notices issued, the tenderer shall be deemed to have received such notices if the CCT can show proof of transmission thereof via electronic mail, facsimile or registered post.

2.2.7 Clarification meeting

Attend, where required, a clarification meeting at which tenderers may familiarise themselves with aspects of the proposed work, services or supply and pose questions. Details of the meeting(s) are stated in the General Tender Information.

Tenderers should be represented at the site visit/clarification meeting by a person who is suitably qualified and experienced to comprehend the implications of the work involved.

2.2.8 Seek clarification

Request clarification of the tender documents, if necessary, by notifying the CCT at least one week before the closing time stated in the General Tender Information, where possible.

2.2.9 Pricing the tender offer

2.2.9.1 Comply with all pricing instructions as stated on the Price Schedule.

2.2.10 Alterations to documents

Do not make any alterations or additions to the tender documents, except to comply with instructions issued by the CCT in writing, or necessary to correct errors made by the tenderer. All signatories to the tender offer shall initial all such alterations.

2.2.11 Alternative tender offers

2.2.11.1 Unless otherwise stated in the tender conditions submit alternative tender offers only if a main tender offer, strictly in accordance with all the requirements of the tender documents, is also submitted.

If a tenderer wishes to submit an alternative tender offer, he shall do so as a separate offer on a complete set of tender documents. The alternative tender offer shall be submitted in a separate sealed envelope clearly marked "Alternative Tender" in order to distinguish it from the main tender offer.

Only the alternative of the highest ranked acceptable main tender offer (that is, submitted by the same tenderer) will be considered, and if appropriate, recommended for award.

Alternative tender offers of any but the highest ranked main tender offer will not be considered.

An alternative of the highest ranked acceptable main tender offer that is priced higher than the main tender offer may be recommended for award, provided that the ranking of the alternative tender offer is higher than the ranking of the next ranked acceptable main tender offer.

The CCT will not be bound to consider alternative tenders and shall have sole discretion in this regard.

In the event that the alternative is accepted, the tenderer warrants that the alternative offer complies in all respects with the CCT's standards and requirements.

2.2.11.2 Accept that an alternative tender offer may be based only on the criteria stated in the tender conditions or criteria otherwise acceptable to the CCT.

2.2.12 Submitting a tender offer

2.2.12.1 Submit one tender offer only on the original tender documents as issued by the CCT, either as a single tendering entity or as a member in a joint venture to provide the whole of the works, services or supply identified in the contract conditions and described in the specifications. Only those tenders submitted on the tender documents as issued by the CCT together with all Returnable Schedules duly completed and signed will be declared responsive.

2.2.12.2 Return the entire document to the CCT after completing it in its entirety, either electronically (if they were issued in electronic format) or by writing legibly in non-erasable ink.

2.2.12.3 Submit the parts of the tender offer communicated on paper as an original with an English translation for any part of the tender submission not made in English.

1 (One) copy(ies) of the following elements of the bid submission must be submitted separately bound in the same envelope where possible:

Part	Heading
5	Pricing Schedules
6	Supporting Schedules
	All other attachments submitted by bidder

2.2.12.4 Sign the original tender offer where required in terms of the tender conditions. The tender shall be signed by a person duly authorised to do so. Tenders submitted by joint ventures of two or more firms shall be accompanied by the document of formation of the joint venture or any other document signed by all parties, in which is defined precisely the conditions under which the joint venture will function, its period of duration, the

persons authorised to represent and obligate it, the participation of the several firms forming the joint venture, and any other information necessary to permit a full appraisal of its functioning. Signatories for tenderers proposing to contract as joint ventures shall state which of the signatories is the lead partner.

2.2.12.5 Where a two-envelope system is required in terms of the tender conditions, place and seal the returnable documents listed in the tender conditions in an envelope marked "financial proposal" and place the remaining returnable documents in an envelope marked "technical proposal". Each envelope shall state on the outside the CCT's address and identification details stated in the General Tender Information, as well as the tenderer's name and contact address.

2.2.12.6 Seal the original tender offer and copy packages together in an outer package that states on the outside only the CCT's address and identification details as stated in the General Tender Information. . If it is not possible to submit the original tender and the required copies (see 2.2.12.3) in a single envelope, then the tenderer must seal the original and each copy of the tender offer as separate packages marking the packages as "ORIGINAL" and "COPY" in addition to the aforementioned tender submission details.

2.2.12.7 Accept that the CCT shall not assume any responsibility for the misplacement or premature opening of the tender offer if the outer package is not sealed and marked as stated.

2.2.12.8 Accept that tender offers submitted by facsimile or e-mail will be rejected by the CCT, unless stated otherwise in the tender conditions.

2.2.12.9 By signing the offer part of the Form of Offer (**Section 2, Part A**) the tenderer warrants that all information provided in the tender submission is true and correct.

2.2.12.10 Tenders must be properly received and deposited in the designated tender box (as detailed on the front page of this tender document) on or before the closing date and before the closing time, in the relevant tender box at the Tender & Quotation Boxes Office situated on the 2nd floor, Concourse Level, Civic Centre, 12 Hertzog Boulevard, Cape Town. If the tender submission is too large to fit in the allocated box, please enquire at the public counter for assistance.

2.2.12.12 The tenderer must record and reference all information submitted contained in other documents for example cover letters, brochures, catalogues, etc. in the returnable schedule titled **List of Other Documents Attached by Tenderer**.

2.2.13 Information and data to be completed in all respects

Accept that tender offers, which do not provide all the data or information requested completely and in the form required, may be regarded by the CCT as non-responsive.

2.2.14 Closing time

2.2.14.1 Ensure that the CCT receives the tender offer at the address specified in the General Tender Information prior to the closing time stated on the front page of the tender document.

2.2.14.2 Accept that, if the CCT extends the closing time stated on the front page of the tender document for any reason, the requirements of these Conditions of Tender apply equally to the extended deadline.

2.2.14.3 Accept that, the CCT shall not consider tenders that are received after the closing date and time for such a tender (late tenders).

2.2.15 Tender offer validity and withdrawal of tenders

2.2.15.1 Warrants that the tender offer(s) remains valid, irrevocable and open for acceptance by the CCT at any time for a period of 120 days after the closing date stated on the front page of the tender document.

2.2.15.2 Notwithstanding the period stated above, bids shall remain valid for acceptance for a period of twelve (12) months after the expiry of the original validity period, unless the City is notified in writing of anything to the contrary by the bidder. The validity of bids may be further extended by a period of not more than six months subject to mutual agreement and administrative processes and upon approval by the City Manager.

2.2.15.3 A tenderer may request in writing, after the closing date, that the tender offer be withdrawn. Such withdrawal will be permitted or refused at the sole discretion of the CCT after consideration of the reasons for the withdrawal, which shall be fully set out by the tenderer in such written request for withdrawal. Should the tender offer be withdrawn in contravention hereof, the tenderer agrees that:

- a) it shall be liable to the CCT for any additional expense incurred or losses suffered by the CCT in having either to accept another tender or, if new tenders have to be invited, the additional expenses incurred or losses suffered by the invitation of new tenders and the subsequent acceptance of any other tender;
- b) the CCT shall also have the right to recover such additional expenses or losses by set-off against monies which may be due or become due to the tenderer under this or any other tender or contract or against any guarantee or deposit that may have been furnished by the tenderer or on its behalf for the due fulfilment of this or any other tender or contract. Pending the ascertainment of the amount of such additional expenses or losses, the CCT shall be entitled to retain such monies, guarantee or deposit as security for any such expenses or loss.

2.2.16 Clarification of tender offer, or additional information, after submission

Provide clarification of a tender offer, or additional information, in response to a written request to do so from the CCT during the evaluation of tender offers within the time period stated in such request. No change in the competitive position of tenderers or substance of the tender offer is sought, offered, or permitted.

Note: This clause does not preclude the negotiation of the final terms of the contract with a preferred tenderer following a competitive selection process, should the CCT elect to do so.

Failure, or refusal, to provide such clarification or additional information within the time for submission stated in the CCT's written request may render the tender non-responsive.

2.2.17 Provide other material

2.2.17.1 Provide, on request by the CCT, any other material that has a bearing on the tender offer, the tenderer's commercial position (including joint venture agreements), preferencing arrangements, or samples of materials, considered necessary by the CCT for the purpose of the evaluation of the tender. Should the tenderer not provide the material, or a satisfactory reason as to why it cannot be provided, by the time for submission stated in the CCT's request, the CCT may regard the tender offer as non-responsive.

2.2.17.2 Provide, on written request by the CCT, where the transaction value inclusive of VAT **exceeds R 10 million**:

- a) audited annual financial statement for the past 3 years, or for the period since establishment if established during the past 3 years, if required by law to prepare annual financial statements for auditing;
- b) a certificate signed by the tenderer certifying that the tenderer has no undisputed commitments for municipal services towards a municipality or other service provider in respect of which payment is overdue for more than 30 days;
- c) particulars of any contracts awarded to the tenderer by an organ of state during the past five years, including particulars of any material non-compliance or dispute concerning the execution of such contract;
- d) a statement indicating whether any portion of the goods or services are expected to be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality or municipal entity is expected to be transferred out of the Republic.

Each party to a Consortium/Joint Venture shall submit separate certificates/statements in the above regard.

2.2.17.3 Tenderers undertake to fully cooperate with the CCT's external service provider appointed to perform a due diligence review and risk assessment upon receipt of such written instruction from the CCT.

2.2.18 Samples, Inspections, tests and analysis

Provide access during working hours to premises for inspections, tests and analysis as provided for in the tender conditions or specifications.

If the **Specification** requires the tenderer to provide samples, these shall be provided strictly in accordance with the instructions set out in the Specification.

If such samples are not submitted as required in the bid documents or within any further time stipulated by the CCT in writing, then the bid concerned may be declared non-responsive.

The samples provided by all successful bidders will be retained by the CCT for the duration of any subsequent

contract. Bidders are to note that samples are requested for testing purposes therefore samples submitted to the CCT may not in all instances be returned in the same state of supply and in other instances may not be returned at all. Unsuccessful bidders will be advised by the Project Manager or dedicated CCT Official to collect their samples, save in the aforementioned instances where the samples would not be returned.

2.2.19 Certificates

The tenderer must provide the CCT with all certificates as stated below:

2.2.19.1 Broad-Based Black Economic Empowerment Status Level Documentation

In order to qualify for preference points, it is the responsibility of the tenderer to submit documentary proof, either as certificates, sworn affidavits or any other requirement prescribed in terms of the B-BBEE Act, of its B-BBEE status level of contribution in accordance with the applicable Codes of good practise as issued by the Department of Trade and Industry, to the CCT at the Supplier Management Unit located within the Supplier Management / Registration Office, 2nd Floor (Concourse Level), Civic Centre, 12 Hertzog Boulevard, Cape Town (Tel 021 400 9242/3/4/5) or included with the tender submission.

Consortiums/Joint Ventures will qualify for preference points, provided that the **entity** submits the relevant certificate/scorecard in accordance with the applicable codes of good practise. Note that, in the case of unincorporated entities, a verified consolidated B-BBEE scorecard must be submitted in the form of a certificate with the tender.

Tenderers are further referred to the content of the **Preference Schedule** for the full terms and conditions applicable to the awarding of preference points.

The applicable code for this tender is the **Amended Codes of Good Practise (Generic Scorecard)** unless in possession of a valid sector certificate.

The tenderer shall indicate in Section 4 of the **Preference Schedule** the Level of Contribution in respect of the enterprise status or structure of the tendering entity (the supplier).

2.2.19.2 Evidence of tax compliance

Tenderers shall be registered with the South African Revenue Service (SARS) and their tax affairs must be in order and they must be tax compliant subject to the requirements of clause 2.2.1.1.2.h. In this regard, it is the responsibility of the Tenderer to submit evidence in the form of a valid Tax Clearance Certificate issued by SARS to the CCT at the Supplier Management Unit located within the Supplier Management / Registration Office, 2nd Floor (Concourse Level), Civic Centre, 12 Hertzog Boulevard, Cape Town (Tel 021 400 9242/3/4/5), or included with this tender. The tenderer must also provide its Tax Compliance Status PIN number on the **Details of Tenderer** pages of the tender submission.

Each party to a Consortium/Joint Venture shall submit a separate Tax Clearance Certificate.

Before making an award the City must verify the bidder's tax compliance status. Where the recommended bidder is not tax compliant, the bidder should be notified of the non-compliant status and be requested to submit to the City, within 7 working days, written proof from SARS that they have made arrangement to meet their outstanding tax obligations. The proof of tax compliance submitted by the bidder must be verified by the City via CSD or e-Filing. The City should reject a bid submitted by the bidder if such bidder fails to provide proof of tax compliance within the timeframe stated herein.

Only foreign suppliers who have answered "NO" to all the questions contained in the Questionnaire to Bidding Foreign Suppliers section on the **Details of Tenderer** pages of the tender submission, are not required to register for a tax compliance status with SARS.

2.2.20 Compliance with Occupational Health and Safety Act, 85 of 1993

Tenderers are to note the requirements of the Occupational Health and Safety Act, 85 of 1993. The Tenderer shall be deemed to have read and fully understood the requirements of the above Act and Regulations and to have allowed for all costs in compliance therewith.

In this regard the Tenderer shall submit **upon written request to do so by the CCT**, a Health and Safety Plan in sufficient detail to demonstrate the necessary competencies and resources to deliver the goods or services all in accordance with the Act, Regulations and Health and Safety Specification.

2.2.21 Claims arising from submission of tender

The tenderer warrants that it has:

- a) inspected the Specifications and read and fully understood the Conditions of Contract.
- b) read and fully understood the whole text of the Specifications and Price Schedule and thoroughly acquainted himself with the nature of the goods or services proposed and generally of all matters which may influence the Contract.
- c) visited the site(s) where delivery of the proposed goods will take place, carefully examined existing conditions, the means of access to the site(s), the conditions under which the delivery is to be made, and acquainted himself with any limitations or restrictions that may be imposed by the Municipal or other Authorities in regard to access and transport of materials, plant and equipment to and from the site(s) and made the necessary provisions for any additional costs involved thereby.
- d) requested the CCT to clarify the actual requirements of anything in the Specifications and Price Schedule, the exact meaning or interpretation of which is not clearly intelligible to the Tenderer.
- e) received any notices to the tender documents which have been issued in accordance with the CCT's Supply Chain Management Policy.

The CCT will therefore not be liable for the payment of any extra costs or claims arising from the submission of the tender.

2.3 The CCT's undertakings

2.3.1 Respond to requests from the tenderer

2.3.1.1 Unless otherwise stated in the Tender Conditions, respond to a request for clarification received up to one week (where possible) before the tender closing time stated on the front page of the tender document.

2.3.1.2 The CCT's representative for the purpose of this tender is stated on the General Tender Information page.

2.3.2 Issue Notices

If necessary, issue addenda in writing that may amend or amplify the tender documents to each tenderer during the period from the date the tender documents are available until one week before the tender closing time stated in the Tender Data. The Employer reserves its rights to issue addenda less than one week before the tender closing time in exceptional circumstances. If, as a result a tenderer applies for an extension to the closing time stated on the front page of the tender document, the CCT may grant such extension and, shall then notify all tenderers who drew documents.

Notwithstanding any requests for confirmation of receipt of notices issued, the tenderer shall be deemed to have received such notices if the CCT can show proof of transmission thereof via electronic mail, facsimile or registered post.

2.3.3 Opening of tender submissions

2.3.3.1 Unless the two-envelope system is to be followed, open tender submissions in the presence of tenderers' agents who choose to attend at the time and place stated in the tender conditions.

Tenders will be opened immediately after the closing time for receipt of tenders as stated on the front page of the tender document, or as stated in any Notice extending the closing date and at the closing venue as stated in the General Tender Information.

2.3.3.2 Announce at the meeting held immediately after the opening of tender submissions, at the closing venue as stated in the General Tender Information, the name of each tenderer whose tender offer is opened and, where possible, the prices and the preferences indicated.

2.3.3.3 Make available a record of the details announced at the tender opening meeting on the CCT's website (<http://www.capetown.gov.za/en/SupplyChainManagement/Pages/default.aspx>.)

2.3.4 Two-envelope system

2.3.4.1 Where stated in the tender conditions that a two-envelope system is to be followed, open only the technical proposal of tenders in the presence of tenderers' agents who choose to attend at the time and place stated in the tender conditions and announce the name of each tenderer whose technical proposal is opened.

2.3.4.2 Evaluate the quality of the technical proposals offered by tenderers, then advise tenderers who have submitted responsive technical proposals of the time and place when the financial proposals will be opened. Open only the financial proposals of tenderers, who have submitted responsive technical proposals in accordance with the requirements as stated in the tender conditions, and announce the total price and any preferences claimed. Return unopened financial proposals to tenderers whose technical proposals were non responsive.

2.3.5 Non-disclosure

Not disclose to tenderers, or to any other person not officially concerned with such processes, information relating to the evaluation and comparison of tender offers and recommendations for the award of a contract, until after the award of the contract to the successful tenderer.

2.3.6 Grounds for rejection and disqualification

Determine whether there has been any effort by a tenderer to influence the processing of tender offers and instantly disqualify a tenderer (and his tender offer) if it is established that he engaged in corrupt or fraudulent practices.

2.3.7 Test for responsiveness

2.3.7.1 Appoint a Bid Evaluation Committee and determine after opening whether each tender offer properly received:

- a) complies with the requirements of these Conditions of Tender,
- b) has been properly and fully completed and signed, and
- c) is responsive to the other requirements of the tender documents.

2.3.7.2 A responsive tender is one that conforms to all the terms, conditions, and specifications of the tender documents without material deviation or qualification. A material deviation or qualification is one which, in the CCT's opinion, would:

- a) detrimentally affect the scope, quality, or performance of the goods, services or supply identified in the Specifications,
- b) significantly change the CCT's or the tenderer's risks and responsibilities under the contract, or
- c) affect the competitive position of other tenderers presenting responsive tenders, if it were to be rectified.

Reject a non-responsive tender offer, and not allow it to be subsequently made responsive by correction or withdrawal of any material deviation or qualification.

The CCT reserves the right to accept a tender offer which does not, in the CCT's opinion, materially and/or substantially deviate from the terms, conditions, and specifications of the tender documents.

2.3.8 Arithmetical errors, omissions and discrepancies

2.3.8.1 Check the responsive tenders for:

- a) the gross misplacement of the decimal point in any unit rate;
- b) omissions made in completing the Price Schedule; or
- c) arithmetic errors in:
 - i) line item totals resulting from the product of a unit rate and a quantity in the Price Schedule; or
 - ii) the summation of the prices; or
 - iii) calculation of individual rates.

2.3.8.2 The CCT must correct the arithmetical errors in the following manner:

- a) Where there is a discrepancy between the amounts in words and amounts in figures, the amount in words shall govern.
- b) If pricing schedules apply and there is an error in the line item total resulting from the product of the unit rate and the quantity, the line item total shall govern and the rate shall be corrected. Where there is an obviously gross misplacement of the decimal point in the unit rate, the line item total as tendered shall govern, and the unit rate shall be corrected.
- c) Where there is an error in the total of the prices either as a result of other corrections required by this checking process or in the tenderer's addition of prices, the total of the prices shall govern and the tenderer will be asked to revise selected item prices (and their rates if Price Schedules apply) to achieve the tendered total of the prices.

Consider the rejection of a tender offer if the tenderer does not correct or accept the correction of the arithmetical error in the manner described above.

2.3.8.3 In the event of tendered rates or lump sums being declared by the CCT to be unacceptable to it because they are not priced, either excessively low or high, or not in proper balance with other rates or lump sums, the tenderer may be required to produce evidence and advance arguments in support of the tendered rates or lump sums objected to. If, after submission of such evidence and any further evidence requested, the CCT is still not satisfied with the tendered rates or lump sums objected to, it may request the tenderer to amend these rates and lump sums along the lines indicated by it.

The tenderer will then have the option to alter and/or amend the rates and lump sums objected to and such other related amounts as are agreed on by the CCT, but this shall be done without altering the tender offer in accordance with this clause.

Should the tenderer fail to amend his tender in a manner acceptable to and within the time stated by the CCT, the CCT may declare the tender as non-responsive.

2.3.9 Clarification of a tender offer

The CCT may, after the closing date, request additional information or clarification from tenderers, in writing on any matter affecting the evaluation of the tender offer or that could give rise to ambiguity in a contract arising from the tender offer, which written request and related response shall not change or affect their competitive position or the substance of their offer. Such request may only be made in writing by the Director: Supply Chain Management using any means as appropriate.

2.3.10 Evaluation of tender offers

2.3.10.1 General

2.3.10.1.1 Reduce each responsive tender offer to a comparative price and evaluate them using the tender evaluation methods and associated evaluation criteria and weightings that are specified in the tender conditions.

2.3.10.1.2 For evaluation purposes only, the effects of the relevant contract price adjustment methods will be considered in the determination of comparative prices as follows:

- a. If the selected method is based on bidders supplying rates or percentages for outer years, comparative prices would be determined over the entire contract period based on such rates or percentages.
- b. If the selected method is based on a formula, indices, coefficients, etc. that is the same for all bidders during the contract period, comparative prices would be the prices as tendered for year one.
- c. If the selected method is based on a formula, indices, coefficients, etc. that varies between bidders, comparative prices would be determined over the entire contract period based on published indices relevant during the 12 months prior to the closing date of tenders.
- d. If the selected method includes an imported content requiring rate of exchange variation, comparative prices would be determined based on the exchange rates tendered for the prices as tendered for year one. The rand equivalent of the applicable currency 14 days prior to the closing date of tender will be used (the CCT will check all quoted rates against those supplied by its own bank).
- e. If the selected method is based on suppliers' price lists, comparative prices would be the prices as tendered for year one.
- f. If the selected method is based on suppliers' price lists and / or rate of exchange, comparative prices would be determined as tendered for year one whilst taking into account the tendered percentage subject to rate of exchange (see sub clause (d) for details on the calculation of the rate of exchange).

2.3.10.1.3 Where the scoring of functionality forms part of a bid process, each member of the Bid Evaluation Committee must individually score functionality. The individual scores must then be interrogated and calibrated if required where there are significant discrepancies. The individual scores must then be added together and averaged to determine the final score.

2.3.10.2 Decimal places

Score financial offers, preferences and functionality, as relevant, to two decimal places.

2.3.10.3 Scoring of tenders (price and preference)

2.3.10.3.1 Points for price will be allocated in accordance with the formula set out in this clause based on the price per item / rates as set out in the **Price Schedule (Part 5)**:

- based on the sum of the prices/rates in relation to a typical project/job.

2.3.10.3.2 Points for preference will be allocated in accordance with the provisions of **Preference Schedule** and the table in this clause.

2.3.10.3.3 The terms and conditions of **Preference Schedule** as it relates to preference shall apply in all respects to the tender evaluation process and any subsequent contract.

2.3.10.3.4 Applicable formula:

The 80/20 preference point system will apply to this tender and the lowest acceptable tender will be used to determine the applicable preference point system

The 80/20 price/preference points system will be applied to the evaluation of responsive tenders up to and

including a Rand value of R50'000'000 (all applicable taxes included), whereby the order(s) will be placed with the tenderer(s) scoring the highest total number of adjudication points.

Price shall be scored as follows:

$$P_s = 80 \times \left(1 - \frac{(P_t - P_{min})}{P_{min}} \right)$$

Where: P_s is the number of points scored for price;
 P_t is the price of the tender under consideration;
 P_{min} is the price of the lowest responsive tender.

Preference points shall be scored as follows:

Points will be awarded to tenderers who are eligible for preferences in respect of the B-BBEE level of contributor attained in terms of **Preference Schedule**.

A maximum of 20 tender adjudication points will be awarded for preference to tenderers with responsive tenders who are eligible for such preference, in accordance with the criteria listed below.

Up to **20** adjudication points (N_P) will be awarded for the level of B-BBEE contribution, in accordance with the tables below:

B-BBEE Status Level of Contributor	Number of Points for Preference
1	20
2	18
3	14
4	12
5	8
6	6
7	4
8	2
Non-compliant contributor*	0

*A non-compliant contributor is one who does not meet the minimum score for a level 8 contributor.

or, in respect of Exempted Micro Enterprises (EMEs):

Black Ownership of EME	Deemed Status Contributor	B-BBEE Level of Contributor	Number of Points for Preference
less than 51%	4		12
at least 51% but less than 100%	2		18
100%	1		20

or, in respect of Qualifying Small Enterprises (QSEs):

Black Ownership of QSE	Deemed Status Contributor	B-BBEE Level of Contributor	Number of Points for Preference
at least 51% but less than 100%	2		18
100%	1		20

The total number of adjudication points (N_T) shall be calculated as follows:

$$N_T = P_s + N_P$$

Where: P_s is the number of points scored for price;
 N_P is the number of points scored for preference.

2.3.10.5 Risk Analysis

Notwithstanding compliance with regard to any requirements of the tender, the CCT will perform a risk analysis in respect of the following:

- a) reasonableness of the financial offer
- b) reasonableness of unit rates and prices
- c) the tenderer's ability to fulfil its obligations in terms of the tender document, that is, that the tenderer can demonstrate that he/she possesses the necessary professional and technical qualifications, professional and technical competence, financial resources, equipment and other physical facilities, managerial capability, reliability, capacity, experience, reputation, personnel to perform the contract, etc.; the CCT reserves the right to consider a tenderer's existing contracts with the CCT in this regard
- d) any other matter relating to the submitted bid, the tendering entity, matters of compliance, verification of submitted information and documents, etc.

The conclusions drawn from this risk analysis will be used by the CCT in determining the acceptability of the tender offer.

No tenderer will be recommended for an award unless the tenderer has demonstrated to the satisfaction of the CCT that he/she has the resources and skills required.

2.3.11 Negotiations with preferred tenderers

The CCT may negotiate the final terms of a contract with tenderers identified through a competitive tendering process as preferred tenderers provided that such negotiation:

- a) does not allow any preferred tenderer a second or unfair opportunity;
- b) is not to the detriment of any other tenderer; and
- c) does not lead to a higher price than the tender as submitted.

If negotiations fail to result in acceptable contract terms, the City Manager (or his delegated authority) may terminate the negotiations and cancel the tender, or invite the next ranked tenderer for negotiations. The original preferred tenderer should be informed of the reasons for termination of the negotiations. If the decision is to invite the next highest ranked tenderer for negotiations, the failed earlier negotiations may not be reopened by the CCT.

Minutes of any such negotiations shall be kept for record purposes.

The provisions of this clause will be equally applicable to any invitation to negotiate with any other tenderers.

In terms of the PPPFA Regulations, 2017, tenders must be cancelled in the event that negotiations fail to achieve a market related price with any of the three highest scoring tenderers.

2.3.12 Acceptance of tender offer

Notwithstanding any other provisions contained in the tender document, the CCT reserves the right to:

2.3.12.1 Accept a tender offer(s) which does not, in the CCT's opinion, materially and/or substantially deviate from the terms, conditions, and specifications of the tender document.

2.3.12.2 Accept the whole tender or part of a tender or any item or part of any item or items from multiple manufacturers, or to accept more than one tender (in the event of a number of items being offered), and the CCT is not obliged to accept the lowest or any tender.

2.3.12.3 Accept the tender offer(s), if in the opinion of the CCT, it does not present any material risk and only if the tenderer(s):

- a) is not under restrictions, has any principals who are under restrictions, or is not currently a supplier to whom notice has been served for abuse of the supply chain management system, preventing participation in the employer's procurement,
- b) can, as necessary and in relation to the proposed contract, demonstrate that he or she possesses the professional and technical qualifications, professional and technical competence, financial resources, equipment and other physical facilities, managerial capability, reliability, experience and reputation, expertise and the personnel, to perform the contract,
- c) has the legal capacity to enter into the contract,
- d) is not insolvent, in receivership, under Business Rescue as provided for in chapter 6 of the Companies Act, 2008, bankrupt or being wound up, has his affairs administered by a court or a judicial officer, has suspended his business activities, or is subject to legal proceedings in respect of any of the foregoing, complies with the legal requirements, if any, stated in the tender data, and

- e) is able, in the opinion of the employer, to perform the contract free of conflicts of interest.

If an award cannot be made in terms of anything contained herein, the Employer reserves the right to consider the next ranked tenderer(s).

2.3.12.4 Not to make an award, or revoke an award already made, where the implementation of the contract may result in reputational risk or harm to the City as a result of (inter alia):

- a) reports of poor governance and/or unethical behaviour;
- b) association with known family of notorious individuals;
- c) poor performance issues, known to the City;
- d) negative social media reports; and
- e) adverse assurance (e.g. due diligence) report outcomes.

2.3.12.5 The CCT reserves the right to nominate an alternative bidder at the time when an award is made and in the event that a contract is terminated during the execution thereof, the CCT may consider the award of the contract, or non-award, to the alternative bidder in terms of the procedures included its SCM Policy.

2.3.13 Prepare contract documents

2.3.13.1 If necessary, revise documents that shall form part of the contract and that were issued by the CCT as part of the tender documents to take account of:

- a) notices issued during the tender period,
- b) inclusion of some of the returnable documents, and
- c) other revisions agreed between the CCT and the successful tenderer.

2.3.13.2 Complete the schedule of deviations attached to the form of offer and acceptance, if any.

2.3.14 Notice to successful and unsuccessful tenderers

2.3.14.1 Before accepting the tender of the successful tenderer the CCT shall notify the successful tenderer in writing of the decision of the CCT's Bid Adjudication Committee to award the tender to the successful tenderer. No rights shall accrue to the successful tenderer in terms of this notice

2.3.14.2 The CCT shall, at the same time as notifying the successful tenderer of the Bid Adjudication Committee's decision to award the tender to the successful tenderer, also give written notice to the other tenderers informing them that they have been unsuccessful.

2.3.15 Provide written reasons for actions taken

Provide upon request written reasons to tenderers for any action that is taken in applying these Conditions of Tender, but withhold information which is not in the public interest to be divulged, which is considered to prejudice the legitimate commercial interests of tenderers or might prejudice fair competition between tenderers.

TENDER DOCUMENT GOODS AND SERVICES		 CITY OF CAPE TOWN ISIXEKO SASEKAPA STAD KAAPSTAD
SUPPLY CHAIN MANAGEMENT		
SCM - 542	Approved by Branch Manager: 03/04/2020	Version: 8 Page 21 of 279

TENDER NO: 60G/2022/23

TENDER DESCRIPTION: PROCUREMENT OF NEW CREMATORS AND ASSOCIATED WORKS

CONTRACT PERIOD: FROM DATE OF COMMENCEMENT OF CONTRACT, NOT EXCEEDING A PERIOD OF 36 MONTHS.

VOLUME 2: RETURNABLE DOCUMENTS

TENDERER	
NAME of Company/Close Corporation or Partnership / Joint Venture/ Consortium or Sole Proprietor /Individual	
TRADING AS (if different from above)	

NATURE OF TENDER OFFER (please indicate below)	
Main Offer (see clause 2.2.11.1)	
Alternative Offer (see clause 2.2.11.1)	

**VOLUME 2: RETURNABLE DOCUMENTS
(3) DETAILS OF TENDERER**

1.1 Type of Entity (Please tick one box)

- Individual / Sole Proprietor
 Close Corporation
 Company
 Partnership or Joint Venture or Consortium
 Trust
 Other:

1.2 Required Details (Please provide applicable details in full):

Name of Company / Close Corporation or Partnership / Joint Venture / Consortium or Individual /Sole Proprietor	
Trading as (if different from above)	
Company / Close Corporation registration number (if applicable)	
Postal address	Postal Code _____
Physical address (Chosen domicilium citandi et executandi)	Postal Code _____
Contact details of the person duly authorised to represent the tenderer	Name: Mr/Ms _____ (Name & Surname) Telephone:(____) _____ Fax:(____) _____ Cellular Telephone: _____ E-mail address: _____
Income tax number	
VAT registration number	
SARS Tax Compliance Status PIN	
City of Cape Town Supplier Database Registration Number (See Conditions of Tender)	
National Treasury Central Supplier Database registration number (See Conditions of Tender)	

<p>Is tenderer the accredited representative in South Africa for the Goods / Services / Works offered?</p>	<p><input type="checkbox"/>Yes <input type="checkbox"/>No</p> <p>If yes, enclose proof</p>
<p>Is tenderer a foreign based supplier for the Goods / Services / Works offered?</p>	<p><input type="checkbox"/>Yes <input type="checkbox"/>No</p> <p>If yes, answer the Questionnaire to Bidding Foreign Suppliers (below)</p>
<p>Questionnaire to Bidding Foreign Suppliers</p>	<p>a) Is the tenderer a resident of the Republic of South Africa or an entity registered in South Africa?</p> <p><input type="checkbox"/>Yes <input type="checkbox"/>No</p>
	<p>b) Does the tenderer have a permanent establishment in the Republic of South Africa?</p> <p><input type="checkbox"/>Yes <input type="checkbox"/>No</p>
	<p>c) Does the tenderer have any source of income in the Republic of South Africa?</p> <p><input type="checkbox"/>Yes <input type="checkbox"/>No</p>
	<p>d) Is the tenderer liable in the Republic of South Africa for any form of taxation?</p> <p><input type="checkbox"/>Yes <input type="checkbox"/>No</p>
<p>Other Required registration numbers</p>	

(4) FORM OF OFFER AND ACCEPTANCE

TENDER 60G/2022/23 : PROCUREMENT OF NEW CREMATORS AND ASSOCIATED WORKS

OFFER: (TO BE FILLED IN BY TENDERER):

Required Details (Please provide applicable details in full):

Name of Tendering Entity* (“the tenderer”)	
Trading as (if different from above)	

AND WHO IS represented herein by: (full names of signatory)

duly authorised to act on behalf of the tenderer in his capacity as: (title/ designation)

HEREBY AGREES THAT by signing the *Form of Offer and Acceptance*, the tenderer:

1. confirms that it has examined the documents listed in the Index (including Schedules and Annexures) and has accepted all the Conditions of Tender;
2. confirms that it has received and incorporated any and all notices issued to tenderers issued by the CCT;
3. confirms that it has satisfied itself as to the correctness and validity of the tender offer; that the price(s) and rate(s) offered cover all the goods and/or services specified in the tender documents; that the price(s) and rate(s) cover all its obligations and accepts that any mistakes regarding price(s), rate(s) and calculations will be at its own risk;
4. offers to supply all or any of the goods and/or render all or any of the services described in the tender document to the CCT in accordance with the:
4.1 terms and conditions stipulated in this tender document;
4.2 specifications stipulated in this tender document; and
4.3 at the prices as set out in the **Price Schedule**.
5. accepts full responsibility for the proper execution and fulfilment of all obligations and conditions devolving on it in terms of the Contract.

Signature(s)

Print name(s):
On behalf of the tenderer (duly authorised)

Date

INITIALS OF CITY OFFICIALS		
1	2	3

FORM OF OFFER AND ACCEPTANCE (continued)

TENDER 60G/2022/23 : PROCUREMENT OF NEW CREMATORS AND ASSOCIATED WORKS]

ACCEPTANCE (TO BE FILLED IN BY THE CITY OF CAPE TOWN)

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

The terms of the contract are contained in:

- (7) & (8): Special and General Conditions of Tender
- (5) Price schedule
- 13: Specifications

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

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

The tenderer shall within two weeks after receiving a completed copy of this agreement, including the schedule of deviations (if any), contact the employer to arrange the delivery of any securities, bonds, guarantees, proof of insurance and any other documents to be provided in terms of the conditions of contract identified in the special contract conditions. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.

Notwithstanding anything contained herein, this agreement comes into effect on the date when the parties have signed the table below and confirms receipt from the employer of one fully completed original copy of this agreement, including the schedule of deviations (if any). The tenderer (now supplier) shall within five working days of the agreement coming into effect notify the employer in writing of any reason why he cannot accept the contents of this agreement as a complete and accurate memorandum thereof, failing which the agreement presented to the contractor shall constitute the binding contract between the parties.

The Parties	Employer	Supplier
Business Name		
Business Registration		
Tax number (VAT)		
Physical Address		
Accepted contract sum including tax		
Accepted contract duration		
Signed – who by signature hereto warrants authority		
Name of signatory		
Signed: Date		
Signed: Location		
Signed: Witness		
Name of Witness		

FORM OF OFFER AND ACCEPTANCE (continued)

(TO BE FILLED IN BY THE CITY OF CAPE TOWN)

Schedule of Deviations

Notes:

1. The extent of deviations from the tender documents issued by the CCT before the tender closing date is limited to those permitted in terms of the conditions of tender.
2. A tenderer's covering letter shall not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid, become the subject of agreements reached during the process of offer and acceptance, the outcome of such agreement shall be recorded here.
3. Any other matter arising from the process of offer and acceptance either as a confirmation, clarification or change to the tender documents and which it is agreed by the Parties becomes an obligation of the contract shall also be recorded here.
4. Any change or addition to the tender documents arising from the above agreements and recorded here, shall also be incorporated into the final draft of the Contract.

1 Subject

 Details

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2 Subject

 Details

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3 Subject

 Details

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4 Subject

 Details

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

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

(5) PRICE SCHEDULE

Bid specifications may not make any reference to any particular trade mark, name, patent, design, type, specific origin or producer, unless there is no other sufficiently precise or intelligible way of describing the characteristics of the work, in which case such reference must be accompanied by the words "or equivalent".

TENDERERS MUST NOTE THAT WHEREVER THIS DOCUMENT REFERS TO ANY PARTICULAR TRADE MARK, NAME, PATENT, DESIGN, TYPE, SPECIFIC ORIGIN OR PRODUCER, SUCH REFERENCE SHALL BE DEEMED TO BE ACCOMPANIED BY THE WORDS 'OR EQUIVALENT'

Pricing Instructions:

- 5.1 State the rates and prices in Rand unless instructed otherwise in the tender conditions.
- 5.2 Include in the rates, prices, and the tendered total of the prices (if any) all duties, taxes (except Value Added Tax (VAT), and other levies payable by the successful tenderer, such duties, taxes and levies being those applicable 14 days before the closing time stated in the General Tender Information.
- 5.3 All prices tendered must include all expenses, disbursements and costs (e.g. transport, accommodation etc.) that may be required for the execution of the tenderer's obligations in terms of the Contract, and shall cover the cost of all general risks, liabilities and obligations set forth or implied in the Contract as well as overhead charges and profit (in the event that the tender is successful). All prices tendered will be final and binding.
- 5.4 All prices shall be tendered in accordance with the units specified in this schedule.
- 5.5 Where a value is given in the Unit column, a Rate is required to be inserted in the relevant columns.
- 5.6 The successful tenderer is required to perform all tasks listed against each item. The tenderer must therefore tender prices/rates on all items as per the section in the Price Schedule. **An item against which no rate is/are entered, or if anything other than a rate or a nil rate (for example, a zero, a dash or the word "included" or abbreviations thereof) is entered against an item, it will also be regarded as a nil rate having been entered against that item, i.e. that there is no charge for that item. The Tenderer may be requested to clarify nil rates, or items regarded as having nil rates; and the Employer may also perform a risk analysis with regard to the reasonableness of such rates.**
- 5.7 Provide fixed rates and prices for the duration of the contract that are not subject to adjustment except as otherwise provided for in clause 17 of the Conditions of Contract and as amplified in the Special Conditions of Contract.
- 5.8 No quantities are set out in the Schedules of Rates and the Contractor will be required to undertake whatever quantities may be directed by the Principal Agent from time to time in the relevant Works Project. The final Contract Price for each completed Works Project shall be computed from the actual quantities of work done, valued at the relevant rates (refer to Clause 10 in these Pricing Assumptions in this regard).
- 5.9 Tenderers shall provide rates (excluding VAT) for each required rate category (if provided) for each item specified in every schedule in the Schedules of Rates. Prime Cost and Provisional Sums will be multiplied by a factor (quantity) to be provided by the Employer at Works Project stage only.
- 5.10 The Employer will only order those quantities of work items, which it actually requires for execution in a Works Project from time to time. The Employer reserves the right not to order any quantities at all depending on circumstances and subject to operational requirements.
- 5.11 Hangers, supports, splices, joining drilling etc. shall form part of unit rate.
- 5.12 The Bills of Quantities form part of and must be read in conjunction with the Specification, which contains the full description of the work to be done and material and equipment to be used, unless otherwise described in the Schedule of Rates. Reference should be made to the Specification for the

full meaning of description of work to be done and materials and equipment to be used in this service.

INITIALS OF CITY OFFICIALS		
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Item			Costing Structure	Spec.	Description	Unit	Rate
1					General Items		
1	.1	.1	1.1.12	--	Site specific H&S risk assessment and method statement.	ea.	
1	.1	.2	1.1.12	--	Setup of site specific H&S file	ea.	
1	.1	.3	1.1.12	--	Providing 1x draft copies of an Installation, Operation and Maintenance Manual prior to commissioning of the Works.	ea.	
1	.1	.4	1.1.12	--	Providing 1x final copies of the Installation, Operation and Maintenance Manual including electronic copies prior to the issue of the Taking-Over Certificate	ea.	

Item			Costing Structure	Spec.	Description	Unit	Rate
2					Cremation equipment supply		
2	.1	.0		2.1.	Cremator		
2	.1	.1	1.1.9		Supply and deliver normal size coffin cremator	ea.	
2	.1	.2	1.1.9		Supply and deliver over-Size coffin cremator	ea.	
2	.1	.3	1.1.8		Install, test and commission	ea.	
2	.2	.0		2.2	Emissions Monitoring Equipment		
2	.2	.1	1.1.9	2.2.1	O2 Measurement Equipment	ea.	
2	.2	.2	1.1.9	2.2.2	Opacity Sensor/ Smoke Detection Sensor	ea.	
2	.2	.3	1.1.8		Install, test and integration into control system per unit	ea.	
2	.3	.0		2.4	Flue Gas Abatement Equipment		
					To serve 1 cremator		
2	.3	.1	1.1.9		Filtration System	ea.	
2	.3	.2	1.1.9		Flue Gas Cooling System	ea.	
2	.3	.3	1.1.9		Reactant System	ea.	
2	.3	.4	1.1.9		Heat recovery system	ea.	
2	.3	.5	1.1.8		Install, test and commission	ea.	
2	.4	.0		2.4	Flue Gas Abatement Equipment		
					To serve 2 cremator		
2	.4	.1	1.1.9		Filtration System	ea.	
2	.4	.2	1.1.9		Flue Gas Cooling System	ea.	
2	.4	.3	1.1.9		Reactant System	ea.	
2	.4	.4	1.1.9		Heat recovery system	ea.	
2	.4	.5	1.1.8		Install, test and commission	ea.	
2	.5	.0		2.4	Flue Gas Abatement Equipment		
					To serve 3 cremator		
2	.5	.1	1.1.9		Filtration System	ea.	
2	.5	.2	1.1.9		Flue Gas Cooling System	ea.	
2	.5	.3	1.1.9		Reactant System	ea.	
2	.5	.4	1.1.9		Heat recovery system	ea.	
2	.5	.5	1.1.8		Install, test and commission	ea.	
2	.6	.0		2.3	Supply and Delivery of Smoke Stack		
					d450, Mild Steel Painted		
2	.6	.1	1.1.10	2.3.2	Refractory Lined, 6mm Wall Thickness	m	
2	.6	.2	1.1.10	2.3.1	Non Refractory Lined, 6mm Wall Thickness	m	
2	.6	.3	1.1.10	2.3.2	Refractory lined, 8mm Wall Thickness	m	
2	.6	.4	1.1.10	2.3.1	Non Refractory Lined, 8mm Wall Thickness	m	
2	.6	.5	1.1.9	2.3.3	Damper, 6mm Wall Thickness	ea.	
2	.6	.6	1.1.9	2.3.3	Damper, 8mm Wall Thickness	ea.	
2	.7	.0		2.3	Supply and Delivery of Smoke Stack		
					d600, Mild Steel Painted		
2	.7	.1	1.1.10	2.3.2	Refractory Lined, 6mm Wall Thickness	m	
2	.7	.2	1.1.10	2.3.1	Non Refractory Lined, 6mm Wall Thickness	m	
2	.7	.3	1.1.10	2.3.2	Refractory lined, 8mm Wall Thickness	m	
2	.7	.4	1.1.10	2.3.1	Non Refractory Lined, 8mm Wall Thickness	m	
2	.7	.5	1.1.9	2.3.3	Damper, 6mm Wall Thickness	ea.	
2	.7	.6	1.1.9	2.3.3	Damper, 8mm Wall Thickness	ea.	

Item			Costing Structure	Spec.	Description	Unit	Rate
2	.8	.0		2.3	Supply and Delivery of Smoke Stack d800, Mild Steel Painted		
2	.8	.1	1.1.10	2.3.2	Refractory Lined, 8mm Wall Thickness	m	
2	.8	.2	1.1.10	2.3.1	Non Refractory Lined, 8mm Wall Thickness	m	
2	.8	.3	1.1.10	2.3.2	Refractory lined, 10mm Wall Thickness	m	
2	.8	.4	1.1.10	2.3.1	Non Refractory Lined, 10mm Wall Thickness	m	
2	.8	.5	1.1.9	2.3.3	Damper, 8mm Wall Thickness	ea.	
2	.8	.6	1.1.9	2.3.3	Damper, 10mm Wall Thickness	ea.	
2	.9	.0		2.3	Supply and Delivery of Smoke Stack d1000, Mild Steel Painted		
2	.9	.1	1.1.10	2.3.2	Refractory Lined, 8mm Wall Thickness	m	
2	.9	.2	1.1.10	2.3.1	Non Refractory Lined, 8mm Wall Thickness	m	
2	.9	.3	1.1.10	2.3.2	Refractory lined, 10mm Wall Thickness	m	
2	.9	.4	1.1.10	2.3.1	Non Refractory Lined, 10mm Wall Thickness	m	
2	.9	.5	1.1.9	2.3.3	Damper, 8mm Wall Thickness	ea.	
2	.9	.6	1.1.9	2.3.3	Damper, 10mm Wall Thickness	ea.	
2	.10	.0			Other Cremation Equipment Supply and Delivery		
2	.10	.1	1.1.9	2.5	Supply of Modern Cremulator as per specification	ea.	
2	.10	.2	1.1.9	2.6	Supply of Stainless Steel Cremator Rake	ea.	
2	.10	.3	1.1.9	2.7	Supply of Stainless Steel Cremator Brush	ea.	
2	.10	.4	1.1.9	2.8	Supply of Stainless Steel ash pan	ea.	
2	.10	.5	1.1.9	2.9	Supply of Ash pan cooling rack for 6 - 8 pans per specification	ea.	
2	.10	.6	1.1.9	2.10.1	Supply of Cremator large coffin lift/charging bier as per specification	ea.	
2	.10	.7	1.1.9	2.10.2	Supply of High lift coffin lift as per specification	ea.	
2	.10	.8	1.1.9	2.10.3	Supply of Normal lift coffin lift as per specification	ea.	

Item			Costing Structure	Spec.	Description	Unit	Rate
3					Flue Gas Ducting		
3	.1	.0		2.11	Refractory Lined Ducting d450mm 3mm Mild Steel, Painted, Castable Refractory Lining as per specification		
3	.1	.1	1.1.10		Straight Section	m	
3	.1	.2	1.1.9		Elbow 90deg	ea.	
3	.1	.3	1.1.9		Tee section	ea.	
3	.1	.4	1.1.7		Installation, supports, fasteners, gaskets and sundries	m	
3	.1	.5	1.1.9		Supports, Install height <4m high	ea.	
3	.2	.0		2.11	Refractory Lined Ducting d600mm 3mm Mild Steel, Painted, Castable Refractory Lining as per specification		
3	.2	.1	1.1.10		Straight Section	m	
3	.2	.2	1.1.9		Elbow 90deg	ea.	
3	.2	.3	1.1.9		Tee section	ea.	
3	.2	.4	1.1.7		Installation, supports, fasteners, gaskets and sundries	m	
3	.2	.5	1.1.9		Supports, Install height <4m high	ea.	
3	.3	.0		2.11	Refractory Lined Ducting d800mm 3mm Mild Steel, Painted, Castable Refractory Lining as per specification		
3	.3	.1	1.1.10		Straight Section	m	
3	.3	.2	1.1.9		Elbow 90deg	ea.	
3	.3	.3	1.1.9		Tee section	ea.	
3	.3	.4	1.1.7		Installation, supports, fasteners, gaskets and sundries	m	
3	.3	.5	1.1.9		Supports, Install height <4m high	ea.	
3	.4	.0		2.11	Refractory Lined Ducting d1000mm 3mm Mild Steel, Painted, Castable Refractory Lining as per specification		
3	.4	.1	1.1.10		Straight Section	m	
3	.4	.2	1.1.9		Elbow 90deg	ea.	
3	.4	.3	1.1.9		Tee section	ea.	
3	.4	.4	1.1.7		Installation, supports, fasteners, gaskets and sundries	m	
3	.4	.5	1.1.9		Supports, Install height <4m high	ea.	
3	.5	.0			Emissions Testing Ports		
3	.5	.1	1.1.12	2.11.1	As per specifications	ea.	

Item			Costing Structure	Spec.	Description	Unit	Rate
4					Fresh Air Supply and Extraction		
4	.1	.0		2.12	Centrifugal roof-mounted extract fan as per specification Roof Mounted, 1 000 m3/hr, Galvanised Sheet Metal Construction		
4	.1	.1	1.1.9		Supply	ea.	
4	.1	.2	1.1.8		Install, test and commission	ea.	
4	.2	.0		2.12	Centrifugal roof-mounted extract fan as per specification Roof Mounted, 2 000 m3/hr, Galvanised Sheet Metal Construction		
4	.2	.1	1.1.9		Supply	ea.	
4	.2	.2	1.1.8		Install, test and commission	ea.	
4	.3	.0		2.12	Centrifugal roof-mounted extract fan as per specification Roof Mounted, 3 000 m3/hr, Galvanised Sheet Metal Construction		
4	.3	.1	1.1.9		Supply	ea.	
4	.3	.2	1.1.8		Install, test and commission	ea.	
4	.4	.0		2.12	Centrifugal roof-mounted extract fan as per specification Roof Mounted, 5 000 m3/hr, Galvanised Sheet Metal Construction		
4	.4	.1	1.1.9		Supply	ea.	
4	.4	.2	1.1.8		Install, test and commission	ea.	
4	.5	.0		2.13	Tubular Axial fan, as per specification Inline duct mounted, Galvanised sheet metal construction <d600mm, Minimum: 12 000 m ³ /hr @ 100 Pa (Static)		
4	.5	.1	1.1.9		Supply	ea.	
4	.5	.2	1.1.8		Install, test and commission	ea.	
4	.6	.0		2.13	Tubular Axial fan, as per specification Inline duct mounted, Galvanised sheet metal construction <d700mm, Minimum: 15 000 m ³ /hr @ 200 Pa (Static)		
4	.6	.1	1.1.9		Supply	ea.	
4	.6	.2	1.1.8		Install, test and commission	ea.	
4	.7	.0		2.13	Tubular Axial fan, as per specification Inline duct mounted, Galvanised sheet metal construction <d750mm, Minimum: 17 500 m ³ /hr @ 200 Pa (Static)		
4	.7	.1	1.1.9		Supply	ea.	
4	.7	.2	1.1.8		Install, test and commission	ea.	
4	.8	.0		2.13	Tubular Axial fan, as per specification Inline duct mounted, Galvanised sheet metal construction		

Item			Costing Structure	Spec.	Description	Unit	Rate
					<d800mm, Minimum: 24 000m ³ /hr @ 200 Pa (Static)		
4	.8	.1	1.1.9		Supply	ea.	
4	.8	.2	1.1.8		Install, test and commission	ea.	
4	.9	.0		2.13	Tubular Axial fan, as per specification Inline duct mounted, Galvanised sheet metal construction <d900mm, Minimum: 30 000m ³ /hr @ 200 Pa (Static)		
4	.9	.1	1.1.9		Supply	ea.	
4	.9	.2	1.1.8		Install, test and commission	ea.	
4	.10	.0		2.13	Tubular Axial fan, as per specification Inline duct mounted, Galvanised sheet metal construction <d900mm, Minimum: 30 000m ³ /hr @ 350 Pa (Static)		
4	.10	.1	1.1.9		Supply	ea.	
4	.10	.2	1.1.8		Install, test and commission	ea.	
4	.11	.0		2.14.1	Spiral Ducting d100mm (Gauge 0.6mm) Galvanized Sheet Metal		
4	.11	.1	1.1.10		Straight length	m	
4	.11	.2	1.1.9		Stop end	ea.	
4	.11	.3	1.1.9		Reducer	ea.	
4	.11	.4	1.1.9		Spigot	ea.	
4	.11	.5	1.1.9		45deg Bend	ea.	
4	.11	.6	1.1.9		90deg Bend	ea.	
4	.11	.7	1.1.9		Sleeve	ea.	
4	.11	.8	1.1.7		Installation of ducting, including sundries	m	
4	.12	.0		2.14.1	Spiral Ducting d125mm (Gauge 0.6mm) Galvanized Sheet Metal		
4	.12	.1	1.1.10		Straight length	m	
4	.12	.2	1.1.9		Stop end	ea.	
4	.12	.3	1.1.9		Reducer	ea.	
4	.12	.4	1.1.9		Spigot	ea.	
4	.12	.5	1.1.9		45deg Bend	ea.	
4	.12	.6	1.1.9		90deg Bend	ea.	
4	.12	.7	1.1.9		Sleeve	ea.	
4	.12	.8	1.1.7		Installation of ducting, including sundries	m	
4	.13	.0		2.14.1	Spiral Ducting d150mm (Gauge 0.6mm) Galvanized Sheet Metal		
4	.13	.1	1.1.10		Straight length	m	
4	.13	.2	1.1.9		Stop end	ea.	
4	.13	.3	1.1.9		Reducer	ea.	
4	.13	.4	1.1.9		Spigot	ea.	
4	.13	.5	1.1.9		45deg Bend	ea.	
4	.13	.6	1.1.9		90deg Bend	ea.	
4	.13	.7	1.1.9		Sleeve	ea.	
4	.13	.8	1.1.7		Installation of ducting, including sundries	m	
4	.14	.0		2.14.1	Spiral Ducting d200mm (Gauge 0.6mm) Galvanized Sheet Metal		

Item			Costing Structure	Spec.	Description	Unit	Rate
4	.14	.1	1.1.10		Straight length	m	
4	.14	.2	1.1.9		Stop end	ea.	
4	.14	.3	1.1.9		Reducer	ea.	
4	.14	.4	1.1.9		Spigot	ea.	
4	.14	.5	1.1.9		45deg Bend	ea.	
4	.14	.6	1.1.9		90deg Bend	ea.	
4	.14	.7	1.1.9		Sleeve	ea.	
4	.14	.8	1.1.7		Installation of ducting, including sundries	m	
4	.15	.0		2.14.1	Spiral Ducting d250mm (Gauge 0.6mm) Galvanized Sheet Metal		
4	.15	.1	1.1.10		Straight length	m	
4	.15	.2	1.1.9		Stop end	ea.	
4	.15	.3	1.1.9		Reducer	ea.	
4	.15	.4	1.1.9		Spigot	ea.	
4	.15	.5	1.1.9		45deg Bend	ea.	
4	.15	.6	1.1.9		90deg Bend	ea.	
4	.15	.7	1.1.9		Sleeve	ea.	
4	.15	.8	1.1.7		Installation of ducting, including sundries	m	
4	.16	.0		2.14.1	Spiral Ducting d300mm (Gauge 0.6mm) Galvanized Sheet Metal		
4	.16	.1	1.1.10		Straight length	m	
4	.16	.2	1.1.9		Stop end	ea.	
4	.16	.3	1.1.9		Reducer	ea.	
4	.16	.4	1.1.9		Spigot	ea.	
4	.16	.5	1.1.9		45deg Bend	ea.	
4	.16	.6	1.1.9		90deg Bend	ea.	
4	.16	.7	1.1.9		Sleeve	ea.	
4	.16	.8	1.1.7		Installation of ducting, including sundries	m	
4	.17	.0		2.14.1	Spiral Ducting d350mm (Gauge 0.6mm) Galvanized Sheet Metal		
4	.17	.1	1.1.10		Straight length	m	
4	.17	.2	1.1.9		Stop end	ea.	
4	.17	.3	1.1.9		Reducer	ea.	
4	.17	.4	1.1.9		Spigot	ea.	
4	.17	.5	1.1.9		45deg Bend	ea.	
4	.17	.6	1.1.9		90deg Bend	ea.	
4	.17	.7	1.1.9		Sleeve	ea.	
4	.17	.8	1.1.7		Installation of ducting, including sundries	m	
4	.18	.0			Spiral Ducting d400mm (Gauge 0.6mm) Galvanized Sheet Metal		
4	.18	.1	1.1.10		Straight length	m	
4	.18	.2	1.1.9		Stop end	ea.	
4	.18	.3	1.1.9		Reducer	ea.	
4	.18	.4	1.1.9		Spigot	ea.	
4	.18	.5	1.1.9		45deg Bend	ea.	
4	.18	.6	1.1.9		90deg Bend	ea.	
4	.18	.7	1.1.9		Sleeve	ea.	
4	.18	.8	1.1.7		Installation of ducting, including sundries	m	
4	.19	.0		2.14.1	Spiral Ducting d450mm (Gauge 0.6mm) Galvanized Sheet Metal		
4	.19	.1	1.1.10		Straight length	m	

Item			Costing Structure	Spec.	Description	Unit	Rate
4	.19	.2	1.1.9		Stop end	ea.	
4	.19	.3	1.1.9		Reducer	ea.	
4	.19	.4	1.1.9		Spigot	ea.	
4	.19	.5	1.1.9		45deg Bend	ea.	
4	.19	.6	1.1.9		90deg Bend	ea.	
4	.19	.7	1.1.9		Sleeve	ea.	
4	.19	.8	1.1.7		Installation of ducting, including sundries	m	
4	.20	.0		2.14.1	Spiral Ducting d500mm (Gauge 0.6mm) Galvanized Sheet Metal		
4	.20	.1	1.1.10		Straight length	m	
4	.20	.2	1.1.9		Stop end	ea.	
4	.20	.3	1.1.9		Reducer	ea.	
4	.20	.4	1.1.9		Spigot	ea.	
4	.20	.5	1.1.9		45deg Bend	ea.	
4	.20	.6	1.1.9		90deg Bend	ea.	
4	.20	.7	1.1.9		Sleeve	ea.	
4	.20	.8	1.1.7		Installation of ducting, including sundries	m	
4	.21	.0		2.14.1	Spiral Ducting d550mm (Gauge 0.6mm) Galvanized Sheet Metal		
4	.21	.1	1.1.10		Straight length	m	
4	.21	.2	1.1.9		Stop end	ea.	
4	.21	.3	1.1.9		Reducer	ea.	
4	.21	.4	1.1.9		Spigot	ea.	
4	.21	.5	1.1.9		45deg Bend	ea.	
4	.21	.6	1.1.9		90deg Bend	ea.	
4	.21	.7	1.1.9		Sleeve	ea.	
4	.21	.8	1.1.7		Installation of ducting, including sundries	m	
4	.22	.0		2.14.1	Spiral Ducting d600mm (Gauge 0.6mm) Galvanized Sheet Metal		
4	.22	.1	1.1.10		Straight length	m	
4	.22	.2	1.1.9		Stop end	ea.	
4	.22	.3	1.1.9		Reducer	ea.	
4	.22	.4	1.1.9		Spigot	ea.	
4	.22	.5	1.1.9		45deg Bend	ea.	
4	.22	.6	1.1.9		90deg Bend	ea.	
4	.22	.7	1.1.9		Sleeve	ea.	
4	.22	.8	1.1.7		Installation of ducting, including sundries	m	
4	.23	.0		2.14.1	Spiral Ducting d650mm (Gauge 0.8mm) Galvanized Sheet Metal		
4	.23	.1	1.1.10		Straight length	m	
4	.23	.2	1.1.9		Stop end	ea.	
4	.23	.3	1.1.9		Reducer	ea.	
4	.23	.4	1.1.9		Spigot	ea.	
4	.23	.5	1.1.9		45deg Bend	ea.	
4	.23	.6	1.1.9		90deg Bend	ea.	
4	.23	.7	1.1.9		Sleeve	ea.	
4	.23	.8	1.1.7		Installation of ducting, including sundries	m	
4	.24	.0		2.14.1	Spiral Ducting d700mm (Gauge 0.8mm) Galvanized Sheet Metal		
4	.24	.1	1.1.10		Straight length	m	
4	.24	.2	1.1.9		Stop end	ea.	

Item			Costing Structure	Spec.	Description	Unit	Rate
4	.24	.3	1.1.9		Reducer	ea.	
4	.24	.4	1.1.9		Spigot	ea.	
4	.24	.5	1.1.9		45deg Bend	ea.	
4	.24	.6	1.1.9		90deg Bend	ea.	
4	.24	.7	1.1.9		Sleeve	ea.	
4	.24	.8	1.1.7		Installation of ducting, including sundries	m	
4	.25	.0		2.14.1	Spiral Ducting d800mm (Gauge 0.8mm) Galvanized Sheet Metal		
4	.25	.1	1.1.10		Straight length	m	
4	.25	.2	1.1.9		Stop end	ea.	
4	.25	.3	1.1.9		Reducer	ea.	
4	.25	.4	1.1.9		Spigot	ea.	
4	.25	.5	1.1.9		45deg Bend	ea.	
4	.25	.6	1.1.9		90deg Bend	ea.	
4	.25	.7	1.1.9		Sleeve	ea.	
4	.25	.8	1.1.7		Installation of ducting, including sundries	m	
4	.26	.0		2.14.1	Spiral Ducting d900mm (Gauge 0.8mm) Galvanized Sheet Metal		
4	.26	.1	1.1.10		Straight length	m	
4	.26	.2	1.1.9		Stop end	ea.	
4	.26	.3	1.1.9		Reducer	ea.	
4	.26	.4	1.1.9		Spigot	ea.	
4	.26	.5	1.1.9		45deg Bend	ea.	
4	.26	.6	1.1.9		90deg Bend	ea.	
4	.26	.7	1.1.9		Sleeve	ea.	
4	.26	.8	1.1.7		Installation of ducting, including sundries	m	
4	.27	.0		2.14.1	Spiral Ducting d1000mm (Gauge 0.8mm) Galvanized Sheet Metal		
4	.27	.1	1.1.10		Straight length	m	
4	.27	.2	1.1.9		Stop end	ea.	
4	.27	.3	1.1.9		Reducer	ea.	
4	.27	.4	1.1.9		Spigot	ea.	
4	.27	.5	1.1.9		45deg Bend	ea.	
4	.27	.6	1.1.9		90deg Bend	ea.	
4	.27	.7	1.1.9		Sleeve	ea.	
4	.27	.8	1.1.7		Installation of ducting, including sundries	m	
4	.28	.0		2.14.2	Sound Attenuator Round d400mm, Galvanized Sheet Metal		
4	.28	.1	1.1.9		Supply	ea.	
4	.28	.2	1.1.8		Installation	ea.	
4	.29	.0		2.14.2	Sound Attenuator Round d500mm, Galvanized Sheet Metal		
4	.29	.1	1.1.9		Supply	ea.	
4	.29	.2	1.1.8		Installation	ea.	
4	.30	.0		2.14.2	Sound Attenuator Round d630mm, Galvanized Sheet Metal		
4	.30	.1	1.1.9		Supply	ea.	
4	.30	.2	1.1.8		Installation	ea.	

Item			Costing Structure	Spec.	Description	Unit	Rate
4	.31	.0		2.14.2	Sound Attenuator Round d700mm, Galvanized Sheet Metal		
4	.31	.1	1.1.9		Supply	ea.	
4	.31	.2	1.1.8		Installation	ea.	
4	.32	.0		2.14.2	Sound Attenuator Round d800mm, Galvanized Sheet Metal		
4	.32	.1	1.1.9		Supply	ea.	
4	.32	.2	1.1.8		Installation	ea.	
4	.33	.0		2.14.2	Sound Attenuator Round d900mm, Galvanized Sheet Metal		
4	.33	.1	1.1.9		Supply	ea.	
4	.33	.2	1.1.8		Installation	ea.	
4	.34	.0		2.14.2	Sound Attenuator Round d1000mm, Galvanized Sheet Metal		
4	.34	.1	1.1.9		Supply	ea.	
4	.34	.2	1.1.8		Installation	ea.	
4	.35	.0		2.14.3	Air Diffuser 150mm x 150mm		
4	.35	.1	1.1.9		Aluminium Air Diffuser Grill	ea.	
4	.35	.2	1.1.9		Galvanized Sheet Metal Plenum with Spigot for Diffuser	ea.	
4	.35	.3	1.1.8		Installation of Air Diffuser with plenum, including sundries	ea.	
4	.36	.0		2.14.3	Air Diffuser 200mm x 200mm		
4	.36	.1	1.1.9		Aluminium Air Diffuser Grill	ea.	
4	.36	.2	1.1.9		Galvanized Sheet Metal Plenum with Spigot for Diffuser	ea.	
4	.36	.3	1.1.8		Installation of Air Diffuser with plenum, including sundries	ea.	
4	.37	.0		2.14.3	Air Diffuser 300mm x 300mm		
4	.37	.1	1.1.9		Aluminium Air Diffuser Grill	ea.	
4	.37	.2	1.1.9		Galvanized Sheet Metal Plenum with Spigot for Diffuser	ea.	
4	.37	.3	1.1.8		Installation of Air Diffuser with plenum, including sundries	ea.	
4	.38	.0		2.14.3	Air Diffuser 400mm x 400mm		
4	.38	.1	1.1.9		Aluminium Air Diffuser Grill	ea.	
4	.38	.2	1.1.9		Galvanized Sheet Metal Plenum with Spigot for Diffuser	ea.	
4	.38	.3	1.1.8		Installation of Air Diffuser with plenum, including sundries	ea.	
4	.39	.0		2.14.3	Air Diffuser 500mm x 500mm		
4	.39	.1	1.1.9		Aluminium Air Diffuser Grill	ea.	
4	.39	.2	1.1.9		Galvanized Sheet Metal Plenum with Spigot for Diffuser	ea.	
4	.39	.3	1.1.8		Installation of Air Diffuser with plenum, including sundries	ea.	
4	.40	.0		2.14.3	Air Diffuser 600mm x 600mm		
4	.40	.1	1.1.9		Aluminium Air Diffuser Grill	ea.	

Item			Costing Structure	Spec.	Description	Unit	Rate
4	.40	.2	1.1.9		Galvanized Sheet Metal Plenum with Spigot for Diffuser	ea.	
4	.40	.3	1.1.8		Installation of Air Diffuser with plenum, including sundries	ea.	
4	.41	.0		2.14.3	Air Diffuser 750mm x 750mm		
4	.41	.1	1.1.9		Aluminium Air Diffuser Grill	ea.	
4	.41	.2	1.1.9		Galvanized Sheet Metal Plenum with Spigot for Diffuser	ea.	
4	.41	.3	1.1.8		Installation of Air Diffuser with plenum, including sundries	ea.	
4	.42	.0		2.14.3	Air Diffuser 850mm x 850mm		
4	.42	.1	1.1.9		Aluminium Air Diffuser Grill	ea.	
4	.42	.2	1.1.9		Galvanized Sheet Metal Plenum with Spigot for Diffuser	ea.	
4	.42	.3	1.1.8		Installation of Air Diffuser with plenum, including sundries	ea.	
4	.43	.0		2.14.3	Air Diffuser 900mm x 900mm		
4	.43	.1	1.1.9		Aluminium Air Diffuser Grill	ea.	
4	.43	.2	1.1.9		Galvanized Sheet Metal Plenum with Spigot for Diffuser	ea.	
4	.43	.3	1.1.8		Installation of Air Diffuser with plenum, including sundries	ea.	
4	.44	.0		2.14.3	Air Diffuser 1000mm x 1000mm		
4	.44	.1	1.1.9		Aluminium Air Diffuser Grill	ea.	
4	.44	.2	1.1.9		Galvanized Sheet Metal Plenum with Spigot for Diffuser	ea.	
4	.44	.3	1.1.8		Installation of Air Diffuser with plenum, including sundries	ea.	
4	.45	.0		2.14.3	Air Diffuser 1200mm x 1200mm		
4	.45	.1	1.1.9		Aluminium Air Diffuser Grill	ea.	
4	.45	.2	1.1.9		Galvanized Sheet Metal Plenum with Spigot for Diffuser	ea.	
4	.45	.3	1.1.8		Installation of Air Diffuser with plenum, including sundries	ea.	
4	.46	.0		2.14.4	Intake Weather Louver 500mm x 500mm		
4	.46	.1	1.1.9		Aluminium Weather Louver with Galvanised wire mesh vermin protection	ea.	
4	.46	.2	1.1.9		Plenum with Spigot for Weather Louver	ea.	
4	.46	.3	1.1.8		Installation of Weather Louvre with Plenum, including sundries	ea.	
4	.47	.0		2.14.4	Intake Weather Louver 600mm x 600mm		
4	.47	.1	1.1.9		Aluminium Weather Louver with Galvanised wire mesh vermin protection	ea.	
4	.47	.2	1.1.9		Plenum with Spigot for Weather Louver	ea.	
4	.47	.3	1.1.8		Installation of Weather Louvre with Plenum, including sundries	ea.	
4	.48	.0		2.14.4	Intake Weather Louver 800mm x 800mm		
4	.48	.1	1.1.9		Aluminium Weather Louver with Galvanised wire mesh vermin protection	ea.	
4	.48	.2	1.1.9		Plenum with Spigot for Weather Louver	ea.	

Item			Costing Structure	Spec.	Description	Unit	Rate
4	.48	.3	1.1.8		Installation of Weather Louvre with Plenum, including sundries	ea.	
4	.49	.0		2.14.4	Intake Weather Louver 900mm x 900mm		
4	.49	.1	1.1.9		Aluminium Weather Louver with Galvanised wire mesh vermin protection	ea.	
4	.49	.2	1.1.9		Plenum with Spigot for Weather Louver	ea.	
4	.49	.3	1.1.8		Installation of Weather Louvre with Plenum, including sundries	ea.	
4	.50	.0		2.14.4	Intake Weather Louver 1000mm x 1000mm		
4	.50	.1	1.1.9		Aluminium Weather Louver with Galvanised wire mesh vermin protection	ea.	
4	.50	.2	1.1.9		Plenum with Spigot for Weather Louver	ea.	
4	.50	.3	1.1.8		Installation of Weather Louvre with Plenum, including sundries	ea.	
4	.51	.0		2.14.4	Intake Weather Louver 1200mm x 1200mm		
4	.51	.1	1.1.9		Aluminium Weather Louver with Galvanised wire mesh vermin protection	ea.	
4	.51	.2	1.1.9		Plenum with Spigot for Weather Louver	ea.	
4	.51	.3	1.1.8		Installation of Weather Louvre with Plenum, including sundries	ea.	
4	.52	.0		2.14.4	Intake Weather Louver 1400mm x 1400mm		
4	.52	.1	1.1.9		Aluminium Weather Louver with Galvanised wire mesh vermin protection	ea.	
4	.52	.2	1.1.9		Plenum with Spigot for Weather Louver	ea.	
4	.52	.3	1.1.8		Installation of Weather Louvre with Plenum, including sundries	ea.	
4	.53	.0		2.14.4	Intake Weather Louver 1600mm x 1600mm		
4	.53	.1	1.1.9		Aluminium Weather Louver with Galvanised wire mesh vermin protection	ea.	
4	.53	.2	1.1.9		Plenum with Spigot for Weather Louver	ea.	
4	.53	.3	1.1.8		Installation of Weather Louvre with Plenum, including sundries	ea.	

Item			Costing Structure	Spec.	Description	Unit	Rate
5					Cold Room Refrigeration and Accessories		
5	.1	.0		2.15	Refrigeration System as per specification Cooling Capacity: 5kw Working Temperature: 2C to 4C		
5	.1	.1	1.1.9		Supply of Refrigeration Equipment	ea.	
5	.1	.2	1.1.8		Install, test and commission of Refrigeration Equipment, Including sundries	ea.	
5	.1	.3	1.1.10		Supply Copper Refrigeration Piping, Sponge Nitrile Insulation	m	
5	.1	.4	1.1.4		Installation of Refrigeration Piping, Including sundries	m	
5	.2	.0		2.15	Refrigeration System as per specification Cooling Capacity: 7.5kw Working Temperature: 2C to 4C		
5	.2	.1	1.1.9		Supply of Refrigeration Equipment	ea.	
5	.2	.2	1.1.8		Install, test and commission of Refrigeration Equipment, Including sundries	ea.	
5	.2	.3	1.1.10		Supply Copper Refrigeration Piping, Sponge Nitrile Insulation	m	
5	.2	.4	1.1.4		Installation of Refrigeration Piping, Including sundries	m	
5	.3	.0		2.15	Refrigeration System as per specification Cooling Capacity: 10kw Working Temperature: 2C to 4C		
5	.3	.1	1.1.9		Supply of Refrigeration Equipment	ea.	
5	.3	.2	1.1.8		Install, test and commission of Refrigeration Equipment, Including sundries	ea.	
5	.3	.3	1.1.10		Supply Copper Refrigeration Piping, Sponge Nitrile Insulation	m	
5	.3	.4	1.1.4		Installation of Refrigeration Piping, Including Sundries	m	
5	.4	.0		2.15	Refrigeration System as per specification Cooling Capacity: 15kw Working Temperature: 2C to 4C		
5	.4	.1	1.1.9		Supply of Refrigeration Equipment	ea.	
5	.4	.2	1.1.8		Install, test and commission of Refrigeration Equipment, Including sundries	ea.	
5	.4	.3	1.1.10		Supply Copper Refrigeration Piping, Sponge Nitrile Insulation	m	
5	.4	.4	1.1.4		Installation of Refrigeration Piping, Including Sundries	m	
5	.5	.0		2.15	Refrigeration System as per specification Cooling Capacity: 20kw Working Temperature: 2C to 4C		
5	.5	.1	1.1.9		Supply of Refrigeration Equipment	ea.	
5	.5	.2	1.1.8		Install, test and commission of Refrigeration Equipment, Including sundries	ea.	
5	.5	.3	1.1.10		Supply Copper Refrigeration Piping, Sponge Nitrile Insulation	m	
5	.5	.4	1.1.4		Installation of Refrigeration Piping, Including Sundries	m	

Item			Costing Structure	Spec.	Description	Unit	Rate
5	.6	.0		2.16	Coffin Storage		
5	.6	.1	1.1.9		Coffin shelving unit as per specification	ea.	

Item			Costing Structure	Spec.	Description	Unit	Rate
6					Rigging		
10 ton crane							
6	.1	.0			10 ton crane		
6	.1	.1	1.1.2		Site establishment & removal	ea.	
6	.1	.2	1.1.15		Delivery to and from site	km	
6	.1	.3	1.1.3		Operate & Maintain Weekday (8am-5pm)	hrs.	
6	.1	.4	1.1.3		Operate & Maintain After Hours	hrs.	
6	.1	.5	1.1.7		Rigging Crew with basic rigging equipment, without crane	hrs.	
20 ton crane							
6	.2	.0			20 ton crane		
6	.2	.1	1.1.2		Site establishment & removal	ea.	
6	.2	.2	1.1.15		Delivery to and from site	km	
6	.2	.3	1.1.3		Operate & Maintain Weekday (8am-5pm)	hrs.	
6	.2	.4	1.1.3		Operate & Maintain After Hours	hrs.	
6	.2	.5	1.1.7		Rigging Crew with basic rigging equipment, without crane	hrs.	
50 ton crane							
6	.3	.0			50 ton crane		
6	.3	.1	1.1.2		Site establishment & removal	ea.	
6	.3	.2	1.1.15		Delivery to and from site	km	
6	.3	.3	1.1.3		Operate & Maintain Weekday (8am-5pm)	hrs.	
6	.3	.4	1.1.3		Operate & Maintain After Hours	hrs.	
6	.3	.5	1.1.7		Rigging Crew with basic rigging equipment, without crane	hrs.	
75 ton crane							
6	.4	.0			75 ton crane		
6	.4	.1	1.1.2		Site establishment & removal	ea.	
6	.4	.2	1.1.15		Delivery to and from site	km	
6	.4	.3	1.1.3		Operate & Maintain Weekday (8am-5pm)	hrs.	
6	.4	.4	1.1.3		Operate & Maintain After Hours	hrs.	
6	.4	.5	1.1.7		Rigging Crew with basic rigging equipment, without crane	hrs.	
100 ton crane							
6	.5	.0			100 ton crane		
6	.5	.1	1.1.2		Site establishment & removal	ea.	
6	.5	.2	1.1.15		Delivery to and from site	km	
6	.5	.3	1.1.3		Operate & Maintain Weekday (8am-5pm)	hrs.	
6	.5	.4	1.1.3		Operate & Maintain After Hours	hrs.	
6	.5	.5	1.1.7		Rigging Crew with basic rigging equipment, without crane	hrs.	
150 ton crane							
6	.6	.0			150 ton crane		
6	.6	.1	1.1.2		Site establishment & removal	ea.	
6	.6	.2	1.1.15		Delivery to and from site	km	
6	.6	.3	1.1.3		Operate & Maintain Weekday (8am-5pm)	hrs.	
6	.6	.4	1.1.3		Operate & Maintain After Hours	hrs.	
6	.6	.5	1.1.7		Rigging Crew with basic rigging equipment, without crane	hrs.	

Item			Costing Structure	Spec.	Description	Unit	Rate
7					LPG		
7	.1	.0		2.17.1	Above ground 9m³ LPG Vessel		
7	.1	.1	1.1.9		Supply, including testing and certification	ea.	
7	.1	.2	1.1.9		Cooling water/Deluge system as per SANS 10087-3:2013	ea.	
7	.1	.3	1.1.8		Installation, test and commission	ea.	
7	.1	.4	1.1.12		Inspection as per pressure equipment regulations	ea.	
7	.2	.0		2.17.1	Above ground 22.5m³ LPG Vessel		
7	.2	.1	1.1.9		Supply, including testing and certification	ea.	
7	.2	.2	1.1.9		Cooling water/Deluge system as per SANS 10087-3:2013	ea.	
7	.2	.3	1.1.8		Install, test and commission	ea.	
7	.2	.4	1.1.12		Inspection as per pressure equipment regulations	ea.	
7	.3	.0		2.17.1	Above ground 45m³ LPG Vessel		
7	.3	.1	1.1.9		Supply, including testing and certification	ea.	
7	.3	.2	1.1.9		Cooling water/Deluge system as per SANS 10087-3:2013	ea.	
7	.3	.3	1.1.8		Install, test and commission	ea.	
7	.3	.4	1.1.12		Inspection as per pressure equipment regulations	ea.	
7	.4	.0			Fire protection		
7	.4	.1	1.1.9		20mm Hose Reel, Supply and install	ea.	
7	.4	.2	1.1.9		9kg dry powder extinguisher, supply and install	ea.	
7	.4	.0			Vaporizer complete	ea.	
					Supply, install test and commission		
7	.4	.1	1.1.13		Vaporizer - 100 kg/hr	ea.	
7	.4	.2	1.1.13		Vaporizer - 250 kg/hr	ea.	
7	.4	.3	1.1.13		Vaporizer - 500 kg/hr	ea.	
7	.5	.0			LPG Shutoff Valves		
					Supply, install test and commission		
7	.5	.1	1.1.13		Shutoff Gate Valve - DN25 Flanged	ea.	
7	.5	.2	1.1.13		Shutoff Gate Valve - DN50 Flanged	ea.	
7	.5	.3	1.1.13		Shutoff Gate Valve - DN65 Flanged	ea.	
7	.5	.4	1.1.13		Shutoff Gate Valve - DN80 Flanged	ea.	
7	.6	.0			LPG Regulating and Safety Valves		
					Supply, install test and commission		
7	.6	.1	1.1.13		Tank Pressure Regulator - DN15 Flanged	ea.	
7	.6	.2	1.1.13		Tank Pressure Regulator - DN25 Flanged	ea.	
7	.6	.3	1.1.13		Tank Pressure Regulator - DN50 Flanged	ea.	
7	.6	.4	1.1.13		Tank Pressure Regulator - DN65 Flanged	ea.	
7	.6	.5	1.1.13		Hydrostatic Relief Valve - DN15 BSP	ea.	
7	.6	.6	1.1.13		Hydrostatic Relief Valve - DN25 BSP	ea.	
7	.6	.7	1.1.13		Hydrostatic Relief Valve - DN50 Flanged	ea.	
7	.6	.8	1.1.13		Hydrostatic Relief Valve - DN65 Flanged	ea.	
7	.6	.9	1.1.13		LPG Outlet Pressure Regulator - DN50 Flanged	ea.	
7	.6	.10	1.1.13		LPG Outlet Pressure Regulator - DN65 Flanged	ea.	
7	.6	.11	1.1.13		LPG Outlet Pressure Regulator - DN80 Flanged	ea.	
7	.6	.12	1.1.13		LPG Outlet Safety Relief Valve - DN15 BSP	ea.	
7	.6	.13	1.1.13		LPG Outlet Safety Relief Valve - DN25 BSP	ea.	

Item			Costing Structure	Spec.	Description	Unit	Rate
7	.6	.14	1.1.13		LPG Outlet Safety Relief Valve - DN50 Flanged	ea.	
7	.6	.15	1.1.13		LPG Outlet Safety Relief Valve - DN65 Flanged	ea.	
7	.6	.16	1.1.13		LPG Outlet Pressure Relief Valve - DN15 BSP	ea.	
7	.6	.17	1.1.13		LPG Outlet Pressure Relief Valve - DN25 BSP	ea.	
7	.6	.18	1.1.13		LPG Outlet Pressure Relief Valve - DN50 Flanged	ea.	
7	.6	.19	1.1.13		LPG Outlet Pressure Relief Valve - DN65 Flanged	ea.	
7	.7	.0			Strainers Supply and install		
7	.7	.1	1.1.13		Y-Type Flanged LPG Strainer - DN25 BSPT	ea.	
7	.7	.2	1.1.13		Y-Type Flanged LPG Strainer - DN50 Flanged	ea.	
7	.7	.3	1.1.13		Y-Type Flanged LPG Strainer - DN65 Flanged	ea.	
7	.7	.4	1.1.13		Y-Type Flanged LPG Strainer - DN80 Flanged	ea.	
7	.8	.0			Piping Sundries		
7	.8	.1	1.1.9		Gaskets - DN15	ea.	
7	.8	.2	1.1.9		Gaskets - DN25	ea.	
7	.8	.3	1.1.9		Gaskets - DN40	ea.	
7	.8	.4	1.1.9		Gaskets - DN50	ea.	
7	.8	.5	1.1.9		Gaskets - DN65	ea.	
7	.8	.6	1.1.9		Gaskets - DN80	ea.	
7	.8	.7	1.1.9		PTFE Thread Tape - DN15	ea.	
7	.8	.8	1.1.9		PTFE Thread Tape - DN25	ea.	
7	.8	.9	1.1.9		PTFE Thread Tape - DN40	ea.	
7	.8	.10	1.1.9		PTFE Thread Tape - DN50	ea.	
7	.8	.11	1.1.9		PTFE Thread Tape - DN65	ea.	
7	.8	.12	1.1.9		PTFE Thread Tape - DN80	ea.	
7	.8	.13	1.1.9		Fasteners cost per flange - DN15	ea.	
7	.8	.14	1.1.9		Fasteners cost per flange - DN25	ea.	
7	.8	.15	1.1.9		Fasteners cost per flange - DN40	ea.	
7	.8	.16	1.1.9		Fasteners cost per flange - DN50	ea.	
7	.8	.17	1.1.9		Fasteners cost per flange - DN65	ea.	
7	.8	.18	1.1.9		Fasteners cost per flange - DN80	ea.	
7	.9	.0			Piping Instruments Supply, install test and commission		
7	.9	.1	1.1.13		Pressure Gauge 1/2 Bottom Entry - 0-2000kPa	ea.	
7	.9	.2	1.1.13		Pressure Gauge 1/2 Bottom Entry - 0-500kPa	ea.	
7	.9	.3	1.1.13		1/2" Pigtail & Gauge Cock Set	ea.	
7	.9	.4	1.1.13		LPG Flow Measurement Device - DN15	ea.	
7	.9	.5	1.1.13		LPG Flow Measurement Device - DN25	ea.	
7	.9	.6	1.1.13		LPG Flow Measurement Device - DN50	ea.	
7	.9	.7	1.1.13		LPG Flow Measurement Device - DN65	ea.	
7	.9	.8	1.1.13		LPG Flow Measurement Device - DN80	ea.	
7	.10	.0			Piping Material		
7	.10	.1	1.1.9		BS 1600/API Spec 5L Seamless Steel Pipe - DN15 - SCH80	m	
7	.10	.2	1.1.9		BS 1600/API Spec 5L Seamless Steel Pipe - DN25 - SCH80	m	
7	.10	.3	1.1.9		BS 1600/API Spec 5L Seamless Steel Pipe - DN50 - SCH40	m	
7	.10	.4	1.1.9		BS 1600/API Spec 5L Seamless Steel Pipe - DN65 - SCH40	m	
7	.10	.5	1.1.9		BS 1600/API Spec 5L Seamless Steel Pipe - DN80 - SCH40	m	

Item			Costing Structure	Spec.	Description	Unit	Rate
7	.11	.0			Pipe Fittings		
					Supply and install		
7	.11	.1	1.1.13		Elbow Long Radius 90° Steel BSPT - DN15 - Class 300	ea.	
7	.11	.2	1.1.13		Elbow Long Radius 90° Steel BSPT - DN25 - Class 300	ea.	
7	.11	.3	1.1.13		Elbow Long Radius 90° Steel Butt-weld - DN50 - SCH40	ea.	
7	.11	.4	1.1.13		Elbow Long Radius 90° Steel Butt-weld - DN65 - SCH40	ea.	
7	.11	.5	1.1.13		Elbow Long Radius 90° Steel Butt-weld - DN80 - SCH40	ea.	
7	.11	.6	1.1.13		Tee Equal Steel BSPT - DN15 - Class 300	ea.	
7	.11	.7	1.1.13		Tee Equal Steel BSPT - DN25 - Class 300	ea.	
7	.11	.8	1.1.13		Tee Equal Steel Butt-weld - DN50 - SCH80	ea.	
7	.11	.9	1.1.13		Tee Equal Steel Butt-weld - DN65 - SCH80	ea.	
7	.11	.10	1.1.13		Tee Equal Steel Butt-weld - DN80 - SCH80	ea.	
7	.11	.11	1.1.13		Reducer Steel Butt-weld - DN80 to DN50 - SCH80	ea.	
7	.11	.12	1.1.13		Reducer Steel Butt-weld - DN65 to DN25 - SCH80	ea.	
7	.11	.13	1.1.13		Reducer Steel Butt-weld - DN80 to DN65 - SCH80	ea.	
7	.11	.14	1.1.13		Reducer Steel BSPT - DN50 to DN25 - Class 300	ea.	
7	.11	.15	1.1.13		Reducer Steel BSPT - DN25 to DN15- Class 300	ea.	
7	.11	.16	1.1.13		Union Taper Seat - DN15 - Class 300	ea.	
7	.11	.17	1.1.13		Union Taper Seat - DN25 - Class 300	ea.	
7	.11	.18	1.1.13		Flange SANS1123 Raised Face x Slip On (T1600/3) - DN15 - PN16	ea.	
7	.11	.19	1.1.13		Flange SANS1123 Raised Face x Slip On (T1600/3) - DN25 - PN16	ea.	
7	.11	.20	1.1.13		Flange SANS1123 Raised Face x Slip On (T1600/3) - DN40 - PN16	ea.	
7	.11	.21	1.1.13		Flange SANS1123 Raised Face x Slip On (T1600/3) - DN50 - PN16	ea.	
7	.11	.22	1.1.13		Flange SANS1123 Raised Face x Slip On (T1600/3) - DN65 - PN16	ea.	
7	.11	.23	1.1.13		Flange SANS1123 Raised Face x Slip On (T1600/3) - DN80 - PN16	ea.	
7	.11	.24	1.1.13		Pipe Hanger/Bracket MS Galvanized - DN15	ea.	
7	.11	.25	1.1.13		Pipe Hanger/Bracket MS Galvanized - DN25	ea.	
7	.11	.26	1.1.13		Pipe Hanger/Bracket MS Galvanized - DN50	ea.	
7	.11	.27	1.1.13		Pipe Hanger/Bracket MS Galvanized - DN65	ea.	
7	.11	.28	1.1.13		Pipe Hanger/Bracket MS Galvanized - DN80	ea.	
7	.11	.29	1.1.13		Threaded Nipple - DN15 - SCH80	ea.	
7	.11	.30	1.1.13		Threaded Nipple - DN25 - SCH80	ea.	
7	.11	.31	1.1.13		Pipe Flexible Braided BSPT Ends - DN15x500mm - PN16	ea.	
7	.11	.32	1.1.13		Pipe Flexible Braided BSPT Ends - DN25x500mm - PN16	ea.	
7	.11	.33	1.1.13		Pipe Flexible Braided Flanged Ends - DN50x500mm - PN16	ea.	
7	.11	.34	1.1.13		Pipe Flexible Braided Flanged Ends - DN65x500mm - PN16	ea.	
7	.11	.35	1.1.13		Pipe Flexible Braided Flanged Ends - DN80x500mm - PN16	ea.	
7	.11	.36	1.1.13		BSP Socket Steam Grade - DN15 - Class 300	ea.	
7	.12	.0			Installation of the LPG Piping:		
7	.12	.1	1.1.4		Installation per meter on ground level < 1.5m	m	

Item			Costing Structure	Spec.	Description	Unit	Rate
7	.12	.2	1.1.4		Installation per meter on heights < 5m	m	
7	.13	.0		2.17.2	Welding per joint:		
7	.13	.1	1.1.12		DN15 Joint	ea.	
7	.13	.2	1.1.12		DN25 Joint	ea.	
7	.13	.3	1.1.12		DN50 Joint	ea.	
7	.13	.4	1.1.12		DN65 Joint	ea.	
7	.14	.0			Painting of piping As per SABS specification per meter including paint and consumables		
7	.14	.1	1.1.15		DN15	m	
7	.14	.2	1.1.15		DN25	m	
7	.14	.3	1.1.15		DN50	m	
7	.14	.4	1.1.15		DN65	m	
7	.15	.1	1.1.12		LPG COC inspection and issue of compliance certificate	ea.	
7	.15	.2	1.1.13		Gas leak detection system according to SANS 10087-3:2013	ea.	
7	.15	.3	1.1.12		Costs associated Major Hazard Installation - Plan, Submission and approval process	ea.	
7	.15	.4	1.1.12		Costs associated with involvement of the local Fire Control Authority per installation	ea.	
7	.15	.5	1.1.12		Leak/Pressure Testing per 30m of Installed Pipe	ea.	

Item			Costing Structure	Spec.	Description	Unit	Rate
8					Compressed Air Supply		
8	.1	.0		2.18.1	Air Compressor FAD: 200 L/min , 90L Air Reservoir		
8	.1	.1	1.1.9		Supply	ea.	
8	.1	.2	1.1.8		Installation, test and commission	ea.	
8	.2	.0		2.18.1	Air Compressor FAD: 400 L/min , 200L Air Reservoir		
8	.2	.1	1.1.9		Supply	ea.	
8	.2	.2	1.1.8		Installation, test and commission	ea.	
8	.3	.0		2.18.1	Air Compressor FAD: 600 L/min , 270L Air Reservoir		
8	.3	.1	1.1.9		Supply	ea.	
8	.3	.2	1.1.8		Installation, test and commission	ea.	
8	.4	.0		2.18.3	Air Filter Regulator Supply, install test and commission		
8	.4	.1	1.1.13		Air Pressure Regulator DN8 Connections 1 200 L/min	ea.	
8	.4	.2	1.1.13		Air Pressure Regulator DN15 Connections 5 600 L/min	ea.	
8	.4	.3	1.1.13		Air Pressure Regulator DN25 Connections 10 000 L/min	ea.	
8	.5	.0			Piping Sundries		
8	.5	.1	1.1.9		PTFE Thread Tape - DN8 per connection	ea.	
8	.5	.2	1.1.9		PTFE Thread Tape - DN15 per connection	ea.	
8	.5	.3	1.1.9		PTFE Thread Tape - DN25 per connection	ea.	
8	.6	.0			Piping Instruments Supply, install test and commission		
8	.6	.1	1.1.13		Pressure Gauge DN15 Bottom Entry - 0-2000kPa 100mm Face	ea.	
8	.6	.2	1.1.13		Pressure Gauge DN15 Bottom Entry - 0-1000kPa 100mm Face	ea.	
8	.7	.0			Piping Material		
8	.7	.1	1.1.9		SANS 62 Medium Wall Thickness Galvanized - DN15	m	
8	.7	.2	1.1.9		SANS 62 Medium Wall Thickness Galvanized - DN25	m	
8	.8	.0			Pipe Fittings Supply and install		
8	.8	.1	1.1.13		BSPT Elbow Long Radius 90° Galvanized - DN15 - SCH10	ea.	
8	.8	.2	1.1.13		BSPT Elbow Long Radius 90° Galvanized - DN25 - SCH10	ea.	
8	.8	.3	1.1.13		BSPT Tee Equal Steel Galvanized - DN15 - SCH10	ea.	
8	.8	.4	1.1.13		BSPT Tee Equal Steel Galvanized - DN25 - SCH10	ea.	
8	.8	.5	1.1.13		BSPT Union Taper Seat Galvanized - DN15 - SCH10	ea.	

Item			Costing Structure	Spec.	Description	Unit	Rate
8	.8	.6	1.1.13		BSPT Union Taper Seat Galvanized - DN25 - SCH10	ea.	
8	.8	.7	1.1.13		Pipe Hanger/Bracket MS Galvanized - DN15	ea.	
8	.8	.8	1.1.13		Pipe Hanger/Bracket MS Galvanized - DN25	ea.	
8	.8	.9	1.1.13		BSPT Threaded Nipple Galvanized - DN15 - SCH10	ea.	
8	.8	.10	1.1.13		BSPT Threaded Nipple Galvanized - DN25 - SCH10	ea.	
8	.8	.11	1.1.13		BSPT Reducing Bush Galvanized - DN25 to DN15 - SCH10	ea.	
8	.8	.12	1.1.13		BSPT Reducing Bush Galvanized - DN15 to DN8 - SCH10	ea.	
8	.8	.13	1.1.13		BSPT Socket Galvanized - DN15 - SCH10	ea.	
8	.8	.14	1.1.13		BSPT Socket Galvanized - DN25 - SCH10	ea.	
8	.9	.0			Installation of the Compressed Air Piping:		
8	.9	.1	1.1.4		Installation per meter on ground level < 1.5m	m	
8	.9	.2	1.1.4		Installation per meter on heights < 5m	m	
8	.10	.0			Flexible Piping		
8	.10	.1	1.1.13		8mm Polyurethane Flexible Tubing	m	
8	.10	.2	1.1.13		6mm Polyurethane Flexible Tubing	m	
8	.10	.3	1.1.13		8mm Flexible Push in to DN15 BSPT Male Fitting	ea.	
8	.10	.4	1.1.13		8mm Flexible Push in to DN8 BSPT Male Fitting	ea.	
8	.10	.5	1.1.13		6mm Flexible Push in to DN8 BSPT Male Fitting	ea.	
8	.11	.0			Painting of piping As per SABS specification per meter including paint and consumables		
8	.11	.1	1.1.15		DN15	m	
8	.11	.2	1.1.15		DN25	m	
8	.12	.1	1.1.13		Hydrostatic Pressure Test	ea.	
9					Maintenance		

Item			Costing Structure	Spec.	Description	Unit	Rate
9	.1	.0			Reclad exterior of cremator		
9	.1	.1	1.1.11		Supply and replace	m^2	
	.2	.0		2.19.1	Cremator Insulation Matrial Cost		
					Supply		
9	.2	.1	1.1.9		50mm Thick Insulation Fibre Block	m^2	
9	.2	.2	1.1.9		75mm Calcium Silicate board	m^2	
9	.3	.0		2.19.1	Cremator Refractory Brick Cost		
					Supply		
9	.3	.1	1.1.9		Super Duty, 60% Alumina quality, Interlocking Refractory Brick	ea.	
9	.4	.0		2.19.1	Cremator Refractory Castable Cost		
					Supply		
9	.4	.1	1.1.9		Hot hearth, 60% Alumina Castable as per spec	m^3	
9	.4	.2	1.1.9		1400 Grade Castable	m^3	
9	.4	.3	1.1.9		1350 Grade Insulating Castable	m^3	
9	.5	.0			Cremator Parts Replacement		
					Removal of existing, install and test commission		
9	.5	.1	1.1.11		Cremator Primary Combustion Chamber Temperature Probe	ea.	
9	.5	.2	1.1.11		Cremator Secondary Combustion Chamber Temperature Probe	ea.	
9	.5	.3	1.1.11		Cremator Primary Combustion Chamber LPG Burner	ea.	
9	.5	.4	1.1.11		Cremator Secondary Combustion Chamber LPG Burner	ea.	
9	.5	.5	1.1.11		Cremator Primary Combustion Chamber Air Supply Fan	ea.	
9	.5	.6	1.1.11		Cremator Secondary Combustion Chamber Air Supply Fan	ea.	
9	.5	.7	1.1.11		Charging Door	ea.	
9	.5	.8	1.1.11		Cremator PLC	ea.	
9	.5	.9	1.1.11		Cremator Scada	ea.	
9	.5	.10	1.1.11		Ash Removal Door	ea.	
9	.5	.11	1.1.11		Ash Removal Bucket	ea.	
9	.5	.12	1.1.11		Flue Gas Monitoring Equipment	ea.	
9	.5	.13	1.1.11		Cremator Door Seal Replacement	ea.	
9	.6	.0		2.19.2	Refractory Lined Ducting Reline		
9	.6	.1	1.1.11		d450mm	m	
9	.6	.2	1.1.11		d600mm	m	
9	.6	.3	1.1.11		d800mm	m	
9	.6	.4	1.1.11		d1000mm	m	
9	.7	.0			Cremator Consumables		
9	.7	.1	1.1.9	2.19.3	Cardboard Rollers	ea.	
9	.7	.2	1.1.9	2.19.4	Metal ID Tags (100 Pack)	ea.	
9	.8	.0			Abatement Equipment Parts Replacement		

Item			Costing Structure	Spec.	Description	Unit	Rate
					Removal of existing & supply, install, test commission replacement		
9	.8	.1	1.1.11		Filter Set	ea.	
9	.8	.2	1.1.11		Cooling System Pump	ea.	
9	.8	.3	1.1.11		Flue Gas Side Heat Exchanger	ea.	
9	.8	.4	1.1.11		Cool Side Heat Exchanger	ea.	
9	.8	.5	1.1.11		Reactant System	ea.	
9	.9	.0			Abatement System Consumables		
9	.9	.1	1.1.9		Consumables for 100 Cremations	ea.	
9	.9	.2	1.1.9		Consumables for 500 Cremations	ea.	
9	.9	.3	1.1.9		Consumables for 1 000 Cremations	ea.	
9	.9	.4	1.1.9		Consumables for 5 000 Cremations	ea.	
9	.10	.0			5kw Refrigeration System		
9	.10	.1	1.1.12		Fee to regas system	ea.	
9	.10	.2	1.1.12		Repair of refrigerant leak	ea.	
9	.10	.3	1.1.11		Compressor Replacement, Supply and Install	ea.	
9	.10	.4	1.1.11		Evaporator Replacement, Supply and Install	ea.	
9	.10	.5	1.1.11		Condenser Replacement, Supply and Install	ea.	
9	.10	.6	1.1.11		Evaporator Fan Replacement, Supply and Install	ea.	
9	.10	.7	1.1.11		Condenser Fan Replacement, Supply and Install	ea.	
9	.10	.8	1.1.11		TX Valve replacement, Supply and Install	ea.	
9	.11	.0			7.5kw Refrigeration System		
9	.11	.1	1.1.12		Fee to regas system	ea.	
9	.11	.2	1.1.12		Repair of refrigerant leak	ea.	
9	.11	.3	1.1.11		Compressor Replacement, Supply and Install	ea.	
9	.11	.4	1.1.11		Evaporator Replacement, Supply and Install	ea.	
9	.11	.5	1.1.11		Condenser Replacement, Supply and Install	ea.	
9	.11	.6	1.1.11		Evaporator Fan Replacement, Supply and Install	ea.	
9	.11	.7	1.1.11		Condenser Fan Replacement, Supply and Install	ea.	
9	.11	.8	1.1.11		TX Valve replacement, Supply and Install	ea.	
9	.12	.0			10kw Refrigeration System		
9	.12	.1	1.1.12		Fee to regas system	ea.	
9	.12	.2	1.1.12		Repair of refrigerant leak	ea.	
9	.12	.3	1.1.11		Compressor Replacement, Supply and Install	ea.	
9	.12	.4	1.1.11		Evaporator Replacement, Supply and Install	ea.	
9	.12	.5	1.1.11		Condenser Replacement, Supply and Install	ea.	
9	.12	.6	1.1.11		Evaporator Fan Replacement, Supply and Install	ea.	
9	.12	.7	1.1.11		Condenser Fan Replacement, Supply and Install	ea.	
9	.12	.8	1.1.11		TX Valve replacement, Supply and Install	ea.	
9	.13	.0			15kw Refrigeration System		
9	.13	.1	1.1.12		Fee to regas system	ea.	
9	.13	.2	1.1.12		Repair of refrigerant leak	ea.	
9	.13	.3	1.1.11		Compressor Replacement, Supply and Install	ea.	
9	.13	.4	1.1.11		Evaporator Replacement, Supply and Install	ea.	
9	.13	.5	1.1.11		Condenser Replacement, Supply and Install	ea.	
9	.13	.6	1.1.11		Evaporator Fan Replacement, Supply and Install	ea.	

Item			Costing Structure	Spec.	Description	Unit	Rate
9	.13	.7	1.1.11		Condenser Fan Replacement, Supply and Install	ea.	
9	.13	.8	1.1.11		TX Valve replacement, Supply and Install	ea.	
9	.14	.0			20kw Refrigeration System		
9	.14	.1	1.1.12		Fee to regas system	ea.	
9	.14	.2	1.1.12		Repair of refrigerant leak	ea.	
9	.14	.3	1.1.11		Compressor Replacement, Supply and Install	ea.	
9	.14	.4	1.1.11		Evaporator Replacement, Supply and Install	ea.	
9	.14	.5	1.1.11		Condenser Replacement, Supply and Install	ea.	
9	.14	.6	1.1.11		Evaporator Fan Replacement, Supply and Install	ea.	
9	.14	.7	1.1.11		Condenser Fan Replacement, Supply and Install	ea.	
9	.14	.8	1.1.11		TX Valve replacement, Supply and Install	ea.	
9	15.	0	2.19.5		Supply of industrial vacuum cleaner as per specification	ea.	
10					Services (Labour, P's & G's, etc.)		

Item			Costing Structure	Spec.	Description	Unit	Rate
10	.1	.0		2.20.1	Semi Skilled Person Labourer, Artisan Assistant, Cleaner, Handyman		
10	.1	.1	1.1.6		Normal working hours (8am - 5pm)	hr	
10	.1	.2	1.1.6		After hours and Saturdays	hr	
10	.1	.3	1.1.6		Sunday and Public Holiday	hr	
10	.2	.0		2.20.2	Artisan/ Technician Mechanical Fitter, Welder, Sheet Metal Worker, Refractory Installer		
10	.2	.1	1.1.6		Normal working hours (8am - 5pm)	hr	
10	.2	.2	1.1.6		After hours and Saturdays	hr	
10	.2	.3	1.1.6		Sunday and Public Holiday	hr	
10	.3	.0		2.20.3	Foreman/Technical supervisor/Site agent		
10	.3	.1	1.1.6		Normal working hours (8am - 5pm)	hr	
10	.3	.2	1.1.6		After hours and Saturdays	hr	
10	.3	.3	1.1.6		Sunday and Public Holiday	hr	
10	.4	.0		2.20.4	Draughtsman		
10	.4	.1	1.1.6		Normal working hours (8am - 5pm)	hr	
10	.4	.2	1.1.6		After hours and Saturdays	hr	
10	.4	.3	1.1.6		Sunday and Public Holiday	hr	
10	.5	.0		2.20.5	Engineer		
10	.5	.1	1.1.6		Normal working hours (8am - 5pm)	hr	
10	.5	.2	1.1.6		After hours and Saturdays	hr	
10	.5	.3	1.1.6		Sunday and Public Holiday	hr	
10	.6	.0		2.20.6	Senior Engineer		
10	.6	.1	1.1.6		Normal working hours (8am - 5pm)	hr	
10	.6	.2	1.1.6		After hours and Saturdays	hr	
10	.6	.3	1.1.6		Sunday and Public Holiday	hr	
10	.7	.0		2.20.7	Contractor's representative		
10	.7	.1	1.1.6		Normal working hours (8am - 5pm)	hr	
10	.7	.2	1.1.6		After hours and Saturdays	hr	
10	.7	.3	1.1.6		Sunday and Public Holiday	hr	
10	.8	.0		2.20.8	Quality Control/ Quality Assurance Officer		
10	.8	.1	1.1.6		Normal working hours (8am - 5pm)	hr	
10	.8	.2	1.1.6		After hours and Saturdays	hr	
10	.8	.3	1.1.6		Sunday and Public Holiday	hr	
10	.9	.0		2.20.9	Health and Safety Officer		
10	.9	.1	1.1.6		Normal working hours (8am - 5pm)	hr	
10	.9	.2	1.1.6		After hours and Saturdays	hr	
10	.9	.3	1.1.6		Sunday and Public Holiday	hr	
10	.10	.0		20.10	Introductory Operator and Maintenance Training (1-5 People)		
10	.10	.1	1.1.6		Normal working hours (8am - 5pm)	hr	
10	.10	.2	1.1.6		After hours and Saturdays	hr	
10	.10	.3	1.1.6		Sunday and Public Holiday	hr	
10	.11	.0	1.1.12	2.20.11	Stack emissions testing		

Item			Costing Structure	Spec.	Description	Unit	Rate
10	.11	.1			Isokinetic sampling	ea.	
10	.11	.2			Stack gas velocity	ea.	
10	.11	.3			Stack gas temperature	ea.	
10	.11	.4			Water vapour content	ea.	
10	.11	.5			Anisokinetic sampling	ea.	
10	.11	.6			Results - Report: Isokinetic Sampling Efficiency	ea.	
10	.11	.7			Quality control and quality assurance	ea.	
10	.11	.8			Upload stack test results in NAEIS	ea.	
10	.12	.1	1.1.12	2.20.12	Generation of inspection reports	ea.	
10	.13	.0	1.1.12		Calibration of emissions monitoring equipment		
					Calibration certificate to be issued		
10	.13	.1			O2 Sensor	ea.	
10	.13	.2			Particulate Matter Sensor	ea.	
10	.14	.0		2.20.13	Site P's & G's		
10	.14	.1	1.1.12		Site Establishment	ea.	
10	.14	.2	1.1.12		Site De-establishment	ea.	
10	.14	.3	1.1.16		Container Rental - Office - 6m	day	
10	.14	.4	1.1.16		Container Rental - Storage - 6m	day	
10	.14	.5	1.1.16		Container Rental - Storage - 12m	day	
10	.14	.6	1.1.12		Portable Toilet Delivery and Collection	km	
10	.14	.7	1.1.16		Portable Toilet Rental	day	
10	.15	.0			General Compliance Items		
10	.15	.1	1.1.9		Covid-19 Equipment per site	ea.	
10	.15	.2	1.1.9		Minimum PPE per person	ea.	
10	.15	.3	1.1.12		Compliance to SHE requirements per site	ea.	
10	.15	.4	1.1.12		Covid-19 Deep Cleaning Call Out Rate	ea.	
10	.15	.5	1.1.12		Covid-19 Deep Cleaning Rate Per Area	m ²	
10	.16	.0			Skip Hire		
					Standard 7m ³ skip, max 8 tons		
10	.16	.1	1.1.2		Delivery to site [Delivery & Offload]	km	
10	.16	.2	1.1.16		Rent	day	
10	.16	.3	1.1.2		Collection [Load & Remove]	km	
10	.17	.0			Scaffold Tower, Working Height: <4m		
10	.17	.1	1.1.12		Erecting, inspection, approval and dismantling	ea.	
10	.17	.2	1.1.16		Operation/Rental	day	
10	.18	.0			Scaffold Tower, Working Height: <6m		
10	.18	.1	1.1.12		Erecting, inspection, approval and dismantling	ea.	
10	.18	.2	1.1.16		Operation/Rental	day	
10	.19	.0			Scaffold Tower, Working Height:<8m		
10	.19	.1	1.1.12		Erecting, inspection, approval and dismantling	ea.	
10	.19	.2	1.1.16		Operation/Rental	day	
10	.20	.0			Scaffold Tower, Working Height: <10m		
10	.20	.1	1.1.12		Erecting, inspection, approval and dismantling	ea.	
10	.20	.2	1.1.16		Operation/Rental	day	
10	.21	.0			Scaffold Tower, Working Height: <12m		

Item			Costing Structure	Spec.	Description	Unit	Rate
10	.21	.1	1.1.12		Erecting, inspection, approval and dismantling	ea.	
10	.21	.2	1.1.16		Operation/Rental	day	
10	.22	.0			Scaffold Tower, Working Height: <14m		
10	.22	.1	1.1.12		Erecting, inspection, approval and dismantling	ea.	
10	.22	.2	1.1.16		Operation/Rental	day	
10	.23	.0			Light Transport and Small Plant		
10	.23	.1	1.1.5		Light Delivery Vehicle (0.5 ton – 1.0 ton LDV)	km	
10	.23	.2	1.1.5		Truck, 3 ton flat bed	km	
10	.23	.3	1.1.2		1.8t Fork Lift, Delivery and Collection	km	
10	.23	.4	1.1.3		1.8t Fork Lift, Rental	day	
10	.23	.5	1.1.2		5t Fork Lift, Delivery and Collection	km	
10	.23	.6	1.1.3		5t Fork Lift, Rental	day	
10	.23	.7	1.1.2		7.5t Fork Lift, Delivery and Collection	km	
10	.23	.8	1.1.3		7.5t Fork Lift, Rental	day	
10	.23	.9	1.1.1		Pallet Jack	day	
10	.23	.10	1.1.2		15m Cherry Picker, Delivery and Collection	km	
10	.23	.11	1.1.3		15m Cherry Picker, Rental	day	
10	.23	.12	1.1.1		Pipe Threading Machine	day	
10	.23	.13	1.1.1		Welding Machine (Tig/ Mig)	day	
10	.23	.14	1.1.1		Pan mixer	day	
10	.23	.15	1.1.1		Hi frequency Vibrator	day	
10	.23	.16	1.1.1		Brick cutter	day	
10	.23	.17	1.1.1		Chipping hammer	day	
10	.24	.0			Waterproofing		
10	.24	.1	1.1.13		4mm RBM, supply and install	m ²	
10	.24	.2	1.1.13		2mm RBM base sheet, supply and install	m ²	
10	.24	.3	1.1.13		Soaker sheet, 0.5mm galvanised sheet metal	p/s	
11					Miscellaneous Items		

Item			Costing Structure	Spec.	Description	Unit	Rate
11	.1	.0			Coatings		
11	.1	.1	--		Two-part Polyurethane Paint	L	
11	.1	.2	--		One-part Enamel Based Paint	L	
11	.1	.3	--		One-part Water Based Paint	L	
11	.1	.4	--		MS Anti Rust Primer Paint, Duram NS4 or equivalent	L	
11	.1	.5	--		Paint Thinners/ Mineral Turpentine	L	
11	.1	.6	--		Floor Coating, Plascon Plascoguard 3000 or equivalent	L	
11	.1	.7	--		High Heat Paint, Duram NS7 or equivalent	L	
12					Extra over for the any component or spare not detailed above		

Item			Costing Structure	Spec.	Description	Unit	Rate
12	.1	.1	--	--	Allow for provisional sum for the selection, supply, delivery to site and installation of any component or spare not detailed above.	Prov-Sum	200 000
12	.1	.2	--	--	Allow for profit on the above provisional sum	%	

(6) SUPPORTING SCHEDULES

Schedule 1: Certificate of Authority for Partnerships/ Joint Ventures/ Consortiums

This schedule is to be completed if the tender is submitted by a partnership/joint venture/ consortium.

1. We, the undersigned, are submitting this tender offer as a partnership/ joint venture/ consortium and hereby authorize Mr/Ms _____, of the authorised entity _____, acting in the capacity of Lead Partner, to sign all documents in connection with the tender offer and any contract resulting from it on the partnership/joint venture/ consortium's behalf.
2. By signing this schedule the partners to the partnership/joint venture/ consortium:
 - 2.1 warrant that the tender submitted is in accordance with the main business and objectives of the partnership/joint venture/ consortium;
 - 2.2 agree that the CCT shall make all payments in terms of this Contract into the following bank account of the Lead Partner:

Account Holder: _____

Financial Institution: _____

Branch Code: _____

Account No.: _____
 - 2.3 agree that in the event that there is a change in the partnership/ joint venture/ consortium and/or should a dispute arise between the partnership/joint venture/ consortium partners, that the CCT shall continue to make any/all payments due and payable in terms of the Contract into the aforesaid bank account until such time as the CCT is presented with a Court Order or an original agreement (signed by each and every partner of the partnership/joint venture/ consortium) notifying the CCT of the details of the new bank account into which it is required to make payment.
 - 2.4 agree that they shall be jointly and severally liable to the CCT for the due and proper fulfilment by the successful tenderer/supplier of its obligations in terms of the Contract as well as any damages suffered by the CCT as a result of breach by the successful tenderer/supplier. The partnership/joint venture/ consortium partners hereby renounce the benefits of excussion and division.

SIGNED BY THE PARTNERS OF THE PARTNERSHIP/ JOINT VENTURE/ CONSORTIUM		
NAME OF FIRM	ADDRESS	DULY AUTHORISED SIGNATORY
Lead partner		Signature..... Name..... Designation.....
		Signature..... Name..... Designation.....
		Signature..... Name..... Designation.....
		Signature..... Name..... Designation.....

Note: A copy of the Joint Venture Agreement shall be appended to List of other documents attached by tenderer schedule.

Schedule 2: Declaration for Procurement above R10 million

If the value of the transaction is expected to exceed R10 million (VAT included) the tenderer shall complete the following questionnaire, attach the necessary documents and sign this schedule:

1. Are you by law required to prepare annual financial statements for auditing? (Please mark with X)

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

1.1 If YES, submit audited annual financial statements:

- (i) for the past three years, or
- (ii) since the date of establishment of the tenderer (if established during the past three years)

By attaching such audited financial statements to **List of other documents attached by tenderer** schedule.

2. Do you have any outstanding undisputed commitments for municipal services towards the CCT or other municipality in respect of which payment is overdue for more than 30 (thirty) days? (Please mark with X)

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

2.1 If NO, this serves to certify that the tenderer has no undisputed commitments for municipal services towards any municipality for more than three (3) (three) months in respect of which payment is overdue for more than 30 (thirty) days.

2.2 If YES, provide particulars:

3. Has any contract been awarded to you by an organ of state during the past five (5) years? (Please mark with X)

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

3.1 If YES, insert particulars in the table below including particulars of any material non-compliance or dispute concerning the execution of such contract. Alternatively attach the particulars to **List of other documents attached by tenderer** schedule in the same format as the table below:

Organ of State	Contract Description	Contract Period	Non-compliance/dispute (if any)

4. Will any portion of the goods or services be sourced from outside the Republic, and if so, what portion and whether any portion of payment from the CCT is expected to be transferred out of the Republic? (Please mark with X)

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

4.1 If YES, furnish particulars below

The tenderer hereby certifies that the information set out in this schedule and/or attached hereto is true and correct, and acknowledges that failure to properly and truthfully complete this schedule may result in steps being taken against the tenderer, the tender being disqualified, and/or (in the event that the tenderer is successful) the cancellation of the contract, restriction of the tenderer or the exercise by the employer of any other remedies available to it.

Signature
Print name:
On behalf of the tenderer (duly authorised)

Date

Schedule 3: Preference Schedule

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

1. GENERAL CONDITIONS

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

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

1.2

- a) The value of this bid is estimated to **NOT to exceed R50 000 000** (all applicable taxes included) and therefore the 80/20 preference point system shall be applicable; or

1.3 Points for this bid shall be awarded for:

- (a) Price; and
- (b) B-BBEE Status Level of Contributor.

1.4 The maximum points for this bid are allocated as follows:

	POINTS
PRICE	80
B-BBEE STATUS LEVEL OF CONTRIBUTOR	20
Total points for Price and B-BBEE must not exceed	100

1.5 Failure on the part of a bidder to submit proof of B-BBEE Status level of contributor together with the bid, will be interpreted to mean that preference points for B-BBEE status level of contribution are not claimed.

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

2. DEFINITIONS

- (a) **“B-BBEE”** means broad-based black economic empowerment as defined in section 1 of the Broad-Based Black Economic Empowerment Act;
- (b) **“B-BBEE status level of contributor”** means the B-BBEE status of an entity in terms of a code of good practice on black economic empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act;
- (c) **“bid”** means a written offer in a prescribed or stipulated form in response to an invitation by an organ of state for the provision of goods or services, through price quotations, advertised competitive bidding processes or proposals;
- (d) **“Broad-Based Black Economic Empowerment Act”** means the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);
- (e) **“EME”** means an Exempted Micro Enterprise in terms of a code of good practice on black economic empowerment issued in terms of section 9 (1) of the Broad-Based Black Economic Empowerment Act;
- (f) **“functionality”** means the ability of a tenderer to provide goods or services in accordance with specifications as set out in the tender documents.
- (g) **“price”** includes all applicable taxes less all unconditional discounts;

(h) “**proof of B-BBEE status level of contributor**” means:

- 1) B-BBEE Status level certificate issued by an authorized body or person;
- 2) A sworn affidavit as prescribed by the B-BBEE Codes of Good Practice;
- 3) Any other requirement prescribed in terms of the B-BBEE Act;

(i) “**QSE**” means a qualifying small business enterprise in terms of a code of good practice on black economic empowerment issued in terms of section 9 (1) of the Broad-Based Black Economic Empowerment Act;

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

3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

4. POINTS AWARDED FOR PRICE

4.1 THE 80/20 PREFERENCE POINT SYSTEMS

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

80/20

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

Where

Ps = Points scored for price of bid under consideration

Pt = Price of bid under consideration

Pmin = Price of lowest acceptable bid

4.2 FORMULAE FOR DISPOSAL OR LEASING OF STATE ASSETS AND INCOME-GENERATING PROCUREMENT

4.3 POINTS AWARDED FOR PRICE

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

80/20

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

Where

Ps = Points scored for price of bid under consideration

Pt = Price of bid under consideration

Pmax = Price of highest acceptable bid

5. POINTS AWARDED FOR B-BBEE STATUS LEVEL OF CONTRIBUTOR

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

B-BBEE Status Level of Contributor	Number of points (90/10 system)	Number of points (80/20 system)
1	10	20
2	9	18
3	6	14

4	5	12
5	4	8
6	3	6
7	2	4
8	1	2
Non-compliant contributor	0	0

6. BID DECLARATION

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

7. B-BBEE STATUS LEVEL OF CONTRIBUTOR CLAIMED IN TERMS OF PARAGRAPHS 1.4 AND 4.1

7.1 B-BBEE Status Level of Contributor: . =(maximum of 20 points)

(Points claimed in respect of paragraph 7.1 must be in accordance with the table reflected in paragraph 4.1 and must be substantiated by relevant proof of B-BBEE status level of contributor.

8. SUB-CONTRACTING

8.1 Will any portion of the contract be sub-contracted?

(Tick applicable box)

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

8.1.1 If yes, indicate:

- i) What percentage of the contract will be subcontracted.....%
- ii) The name of the sub-contractor.....
- iii) The B-BBEE status level of the sub-contractor.....
- iv) Whether the sub-contractor is an EME or QSE

(Tick applicable box)

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

v) Specify, by ticking the appropriate box, if subcontracting with an enterprise in terms of Preferential Procurement Regulations,2017:

Designated Group: An EME or QSE which is at last 51% owned by:	EME	QSE
Black people	√	√
Black people who are youth		
Black people who are women		
Black people with disabilities		
Black people living in rural or underdeveloped areas or townships		
Cooperative owned by black people		
Black people who are military veterans		
OR		
Any EME		
Any QSE		

9. DECLARATION WITH REGARD TO COMPANY/FIRM

9.1 Name of company/firm:.....

9.2 VAT registration number:.....

9.3 Company registration number:.....

9.4 TYPE OF COMPANY/ FIRM

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

[TICK APPLICABLE BOX]

9.5 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES

.....

.....

.....

.....

9.6 COMPANY CLASSIFICATION

- Manufacturer
- Supplier
- Professional service provider
- Other service providers, e.g. transporter, etc.

[TICK APPLICABLE BOX]

9.7 MUNICIPAL INFORMATION

Municipality where business is situated:

Registered Account Number:

Stand Number:.....

9.8 Total number of years the company/firm has been in business:.....

9.9 I/we, the undersigned, who is / are duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the B-BBE status level of contributor indicated in paragraphs 1.4 and 6.1 of the foregoing certificate, qualifies the company/ firm for the preference(s) shown and I / we acknowledge that:

- i) The information furnished is true and correct;
- ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;
- iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 6.1, the contractor may be required to furnish documentary proof to the satisfaction of the purchaser that the claims are correct;
- iv) If the B-BBEE status level of contributor has been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the purchaser may, in addition to any other remedy it may have –
 - (a) disqualify the person from the bidding process;
 - (b) recover costs, losses or damages it has incurred or suffered as a result of that person’s conduct;
 - (c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;
 - (d) recommend that the bidder or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted by the National Treasury from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and

(e) forward the matter for criminal prosecution.

WITNESSES
1.
2.

.....
SIGNATURE(S) OF BIDDERS(S)
DATE:
ADDRESS
.....
.....

For official use.		
SIGNATURE OF CITY OFFICIALS AT TENDER OPENING		
1.	2.	3.

Schedule 4: Declaration of Interest – State Employees (MBD 4 amended)

- 1. No bid will be accepted from:
 - 1.1 persons in the service of the state¹, or
 - 1.2 if the person is not a natural person, of which any director, manager or principal shareholder or stakeholder is in the service of the state, or
 - 1.3 from persons, or entities of which any director, manager or principal shareholder or stakeholder, has been in the service of the City of Cape Town during the twelve months after the City employee has left the employ of the City, or
 - 1.4 from an entity who has employed a former City employee who was at a level of T14 of higher at the time of leaving the City's employ and involved in any of the City's bid committees for the bid submitted, if:
 - 1.4.1 the City employee left the City's employment voluntarily, during a period of 12 months after the City employee has left the employ of the City;
 - 1.4.2 the City employee left the City's employment whilst facing disciplinary action by the City, during a period of 24 months after the City employee has left the employ of the City, or any other period prescribed by applicable legislative provisions, after having left the City's employ.
- 2. Any person, having a kinship with persons in the service of the state, including a blood relationship, may make an offer or offers in terms of this invitation to bid. In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons connected with or related to persons in service of the state, it is required that the tenderer or their authorised representative declare their position in relation to the evaluating/adjudicating authority.
- 3. In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.
 - 3.1 Full Name of tenderer or his or her representative:.....
 - 3.2 Identity Number:.....
 - 3.3 Position occupied in the Company (director, trustee, shareholder²)......
 - 3.4 Company or Close Corporation Registration Number:.....
 - 3.5 Tax Reference Number.....
 - 3.6 VAT Registration Number:.....
 - 3.7 The names of all directors / trustees / shareholders members, their individual identity numbers and state employee numbers must be indicated in paragraph 4 below.
 - 3.8 Are you presently in the service of the state? **YES / NO**
 - 3.8.1 If yes, furnish particulars
 - 3.9 Have you been in the service of the state for the past twelve months? **YES / NO**
 - 3.9.1 If yes, furnish particulars
 - 3.10 Do you have any relationship (family, friend, other) with persons in the service of the state and who may be involved with the evaluation and or adjudication of this bid? **YES / NO**
 - 3.10.1 If yes, furnish particulars
 - 3.11 Are you, aware of any relationship (family, friend, other) between any other tenderer and any persons in the service of the state who may be involved with the evaluation and or adjudication of this bid? **YES / NO**
 - 3.11.1 If yes, furnish particulars.....

- 3.12 Are any of the company's directors, trustees, managers, principle shareholders or stakeholders in service of the state? **YES / NO**
 3.12.1 If yes, furnish particulars
- 3.13 Are any spouse, child or parent of the company's directors, trustees, managers, principle shareholders or stakeholders in service of the state? **YES / NO**
 3.13.1 If yes, furnish particulars
- 3.14 Do you or any of the directors, trustees, managers, principle shareholders, or stakeholders of this company have any interest in any other related companies or business whether or not they are bidding for this contract? **YES / NO**
 3.14.1 If yes, furnish particulars
- 3.15 Have you, or any of the directors, trustees, managers, principle shareholders, or stakeholders of this company been in the service of the City of Cape Town in the past twelve months? **YES / NO**
 3.15.1 If yes, furnish particulars
- 3.16 Do you have any employees who was in the service of the City of Cape Town at a level of T14 or higher at the time they left the employ of the City, and who was involved in any of the City's bid committees for this bid? **YES / NO**
 3.16.1 If yes, furnish particulars

4. Full details of directors / trustees / members / shareholders

Full Name	Identity Number	State Employee Number

If the above table does not sufficient to provide the details of all directors / trustees / shareholders, please append full details to the tender submission.

The tenderer hereby certifies that the information set out in this schedule and/or attached hereto is true and correct, and acknowledges that failure to properly and truthfully complete this schedule may result in steps being taken against the tenderer, the tender being disqualified, and/or (in the event that the tenderer is successful) the cancellation of the contract, restriction of the tenderer or the exercise by the employer of any other remedies available to it.

Signature

Print name:

Date

On behalf of the tenderer (duly authorised)

'MSCM Regulations: "in the service of the state" means to be –

(a) a member of –

- (i) any municipal council;***
- (ii) any provincial legislature; or***
- (iii) the national Assembly or the national Council of provinces;***

(b) a member of the board of directors of any municipal entity;

(c) an official of any municipality or municipal entity;

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

(e) an executive member of the accounting authority of any national or provincial public entity; or

(f) an employee of Parliament or a provincial legislature.

² Shareholder" means a person who owns shares in the company and is actively involved in the management of the company or business and exercises control over the company.

Schedule 5: Conflict of Interest Declaration

1. The tenderer shall declare whether it has any conflict of interest in the transaction for which the tender is submitted. (Please mark with X)

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

- 1.1 If yes, the tenderer is required to set out the particulars in the table below:

2. The tenderer shall declare whether it has directly or through a representative or intermediary promised, offered or granted:

- 2.1 any inducement or reward to the CCT for or in connection with the award of this contract; or
- 2.2 any reward, gift, favour or hospitality to any official or any other role player involved in the implementation of the supply chain management policy. (Please mark with X)

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

If yes, the tenderer is required to set out the particulars in the table below:

Should the tenderer be aware of any corrupt or fraudulent transactions relating to the procurement process of the City of Cape Town, please contact the following:

the City's anti-corruption hotline at 0800 32 31 30 (toll free)

The tenderer hereby certifies that the information set out in this schedule and/or attached hereto is true and correct, and acknowledges that failure to properly and truthfully complete this schedule may result in steps being taken against the tenderer, the tender being disqualified, and/or (in the event that the tenderer is successful) the cancellation of the contract, restriction of the tenderer or the exercise by the employer of any other remedies available to it.

Signature
Print name:
On behalf of the tenderer (duly authorised)

Date

Schedule 6: Declaration of Tenderer's Past Supply Chain Management Practices (MBD 8)

Where the entity tendering is a partnership/joint venture/consortium, each party to the partnership/joint venture/consortium must sign a declaration in terms of the Municipal Finance Management Act, Act 56 of 2003, and attach it to this schedule.

1 The tender offer of any tenderer may be rejected if that tenderer or any of its directors/members have:

- a) abused the municipality's / municipal entity's supply chain management system or committed any fraudulent conduct in relation to such system;
- b) been convicted for fraud or corruption during the past five years;
- c) willfully neglected, reneged on or failed to comply with any government, municipal or other public sector contract during the past five years; or
- d) been listed in the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004) or Database of Restricted Suppliers.

2 In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.

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

2.3.1	If so, furnish particulars:		
Item	Question	Yes	No
2.4	Does the tenderer or any of its directors owe any municipal rates and taxes or municipal charges to the municipality / municipal entity, or to any other municipality / municipal entity, that is in arrears for more than three months?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
2.4.1	If so, furnish particulars:		
2.5	Was any contract between the tenderer and the municipality / municipal entity or any other organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
2.7.1	If so, furnish particulars:		

The tenderer hereby certifies that the information set out in this schedule and/or attached hereto is true and correct, and acknowledges that failure to properly and truthfully complete this schedule may result in steps being taken against the tenderer, the tender being disqualified, and/or (in the event that the tenderer is successful) the cancellation of the contract, , restriction of the tenderer or the exercise by the employer of any other remedies available to it.

Signature
Print name:
On behalf of the tenderer (duly authorised)

Date

Schedule 7: Authorisation for the Deduction of Outstanding Amounts Owed to the City of Cape Town

To: THE CITY MANAGER, CITY OF CAPE TOWN

From: _____
(Name of tenderer)

RE: AUTHORISATION FOR THE DEDUCTION OF OUTSTANDING AMOUNTS OWED TO THE CITY OF CAPE TOWN

The tenderer:

- a) hereby acknowledges that according to SCM Regulation 38(1)(d)(i) the City Manager may reject the tender of the tenderer if any municipal rates and taxes or municipal service charges owed by the tenderer (or any of its directors/members/partners) to the CCT, or to any other municipality or municipal entity, are in arrears for more than 3 (three) months; and
- b) therefore hereby agrees and authorises the CCT to deduct the full amount outstanding by the Tenderer or any of its directors/members/partners from any payment due to the tenderer; and
- c) confirms the information as set out in the tables below for the purpose of giving effect to b) above;
- d) The tenderer hereby certifies that the information set out in this schedule and/or attached hereto is true and correct, and acknowledges that failure to properly and truthfully complete this schedule may result in steps being taken against the tenderer, the tender being disqualified, and/or (in the event that the tenderer is successful) the cancellation of the contract, restriction of the tenderer or the exercise by the employer of any other remedies available to it.

Physical Business address(es) of the tenderer	Municipal Account number(s)

If there is not enough space for all the names, please attach the information to **List of other documents attached by tenderer** schedule in the same format:

Name of Director / Member / Partner	Identity Number	Physical residential address of Director / Member / Partner	Municipal Account number(s)

Signature
Print name:
On behalf of the tenderer (duly authorised)

Date

Schedule 8: Contract Price Adjustment and/or Rate of Exchange Variation

8.1 CONTRACT PRICE ADJUSTMENT

Refer to clause 17 of Volume 3: Draft Contract.

Schedule 9: Certificate of Independent Tender Determination

I, the undersigned, in submitting this tender 60G/2022/23 : PROCUREMENT OF NEW CREMATORS AND ASSOCIATED WORKS] in response to the tender invitation made by THE CITY OF CAPE TOWN, do hereby make the following statements, which I certify to be true and complete in every respect:

I certify, on behalf of : _____ (Name of tenderer)

That:

1. I have read and I understand the contents of this Certificate;
2. I understand that this tender will be disqualified if this Certificate is found not to be true and complete in every respect;
3. I am authorised by the tenderer to sign this Certificate, and to submit this tender, on behalf of the tenderer;
4. Each person whose signature appears on this tender has been authorised by the tenderer to determine the terms of, and to sign, the tender on behalf of the tenderer;
5. For the purposes of this Certificate and this tender, I understand that the word 'competitor' shall include any individual or organisation other than the tenderer, whether or not affiliated with the tenderer, who:
 - (a) has been requested to submit a tender in response to this tender invitation;
 - (b) could potentially submit a tender in response to this tender invitation, based on their qualifications, abilities or experience; and
 - (c) provides the same goods and services as the tenderer and/or is in the same line of business as the tenderer.
6. The tenderer has arrived at this tender independently from and without consultation, communication, agreement or arrangement with any competitor. However, communication between partners in a joint venture or consortium¹ will not be construed as collusive price quoting.
7. In particular, without limiting the generality of paragraphs 5 and 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
 - (a) prices;
 - (b) geographical area where product or service will be rendered (market allocation);
 - (c) methods, factors or formulas used to calculate prices;
 - (d) the intention or decision to submit or not to submit a tender;
 - (e) the submission of a tender which does not meet the specifications and conditions of the tender; or
 - (f) tendering with the intention not to win the contract.
8. In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the products or services to which this tender invitation relates.
9. The terms of this tender have not been and will not be disclosed by the tenderer, directly or indirectly, to any competitor, prior to the date and time of the official tender opening or of the awarding of the contract.
10. I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to tenders and contracts, tenders that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act, Act 89 of 1998, and/or may be reported to the National Prosecuting Authority (NPA) for criminal investigation, and/or may be restricted from conducting business with the public sector for a period not exceeding 10 (ten) years in terms of the Prevention and Combating of Corrupt Activities Act, Act 12 of 2004, or any other applicable legislation.

Signature

Date

Name (PRINT)

(For and on behalf of the Tenderer (duly authorised))

(¹ Consortium: Joint venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.)

Schedule 10A: Local Content Declaration / Annexure C

DECLARATION CERTIFICATE FOR LOCAL PRODUCTION AND CONTENT FOR DESIGNATED SECTORS (a)

Preamble

This declaration is based on and replaces Municipal Bid Document 6.2 (MBD 6.2).

The amendments made to the MBD 6.2 document have been necessary to clarify this standard document as it relates to local production and content in the Electrical and Telecom Cable sector.

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

Documents listed herein are downloadable from the dti's official website, <http://www.thedti.gov.za>.

This schedule must be completed by tenderers and returned with their tender at the closing date and time for this tender.

1. General Conditions

- 1.1 Preferential Procurement Regulations, 2017 (Regulation 8) makes provision for the promotion of local production and content.
- 1.2 Regulation 8(2) prescribes that in the case of designated sectors, organs of state must advertise such bids with the specific bidding condition that only locally produced goods with a stipulated minimum threshold for local production and content will be considered.
- 1.3 Where necessary, for tenders referred to in paragraph 1.2 above, a two stage bidding process may be followed, where the first stage involves a minimum threshold for local production and content and the second stage price and B-BBEE.
- 1.4 A person awarded a contract in relation to a designated sector, may not sub-contract in such a manner that the local production and content of the overall value of the contract is reduced to below the stipulated minimum threshold.
- 1.5 The local content (LC) expressed as a percentage of the bid price must be calculated in accordance with the SABS approved technical specification number SATS 1286: 2011 as follows:

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

Where

x is the imported content in Rand

y is the bid price in Rand excluding value added tax (VAT)

Prices referred to in the determination of x must be converted to Rand (ZAR) by using the exchange rate published by Nedbank at close of business on the date of advertisement of the bid as required in paragraph 4.1 below.

The SABS approved technical specification number SATS 1286:2011 is accessible on http://www.thedti.gov.za/industrial_development/ip.jsp at no cost.

- 1.6 A bid may be disqualified/declared non-responsive if this Declaration Certificate and Annex C (Local Content Declaration: Summary Schedule) are not submitted as part of the bid documentation.

DECLARATION CERTIFICATE FOR LOCAL PRODUCTION AND CONTENT FOR DESIGNATED SECTORS(a)
(Cont'd)

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

<u>Description of services, works or goods</u>	<u>Stipulated minimum threshold</u>
Valve Products and Actuators	70%

3. Does any portion of the services, works or goods offered for Items as detailed in Annexure C have any imported content?

(Tick applicable box)

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

3.1 If yes, the rate(s) of exchange to be used in this bid to calculate the local content as prescribed in paragraph 1.5 of the above General Conditions must be the rate(s) published by Nedbank at close of business on the date of advertisement of the bid.

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

Currency	Rates of exchange
US Dollar	
Pound Sterling	
Euro	
Yen	
Other	

NB: Tenderers must submit proof of the Nedbank rate(s) of exchange used.

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

DECLARATION CERTIFICATE FOR LOCAL PRODUCTION AND CONTENT FOR DESIGNATED SECTORS (a)
(Cont'd)(AS PER ANNEX B OF SATS 1286:2011)

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

IN RESPECT OF BID NO.

ISSUED BY: (Procurement Authority / Name of Municipality / Municipal Entity):

NB

- 1 The obligation to complete, duly sign and submit this declaration cannot be transferred to an external authorized representative, auditor or any other third party acting on behalf of the bidder.
- 2 Guidance on the Calculation of Local Content together with Local Content Declaration Templates (Annex C, D and E) is accessible on http://www.thedti.gov.za/industrial_development/ip.jsp. Bidders should first complete Declaration D. After completing Declaration D, bidders should complete Declaration E and then consolidate the information on Declaration C. **Declaration C should be submitted with the bid documentation at the closing date and time of the bid in order to substantiate the declaration made in paragraph (c) below.** Declarations D and E should be kept by the bidders for verification purposes for a period of at least 5 years. The successful bidder is required to continuously update Declarations C, D and E with the actual values for the duration of the contract.

I, the undersigned, (full names),

do hereby declare, in my capacity as

of(name of bidder entity), the following:

- (a) The facts contained herein are within my own personal knowledge.
- (b) I have satisfied myself that:
 - (i) the goods to be delivered in terms of the above-specified bid comply with the minimum local content requirements as specified in the bid, and as measured in terms of SATS 1286:2011;
- (c) The local content percentages (%) indicated below has been calculated using the formula given in clause 3 of SATS 1286:2011, the rates of exchange indicated in paragraph 4.1 above and the information contained in Declaration D and E which has been consolidated in Declaration C;

Bid price, excluding VAT (y)	R
Imported content (x), as calculated in terms of SATS 1286:2011	R
Stipulated minimum threshold for local content (paragraph 2 above)	
Local content %, as calculated in terms of SATS 1286:2011	

If the bid is for more than one product, the local content percentages for each product contained in Declaration C shall be used instead of the table above. The local content percentages for each product has been calculated using the formula given in clause 3 of SATS 1286:2011, the rates of exchange indicated in paragraph 3.1 above and the information contained in Declaration D and E.

- (d) I accept that the Procurement Authority / Municipality /Municipal Entity has the right to request that the local content be verified in terms of the requirements of SATS 1286:2011.
- (e) I understand that the awarding of the bid is dependent on the accuracy of the information furnished in this application. I also understand that the submission of incorrect data, or data that are not verifiable as described in SATS 1286:2011, may result in the Procurement Authority / Municipal / Municipal Entity imposing any or all of the remedies as provided for in Regulation 14 of the Preferential Procurement Regulations, 2017 promulgated under the Preferential Policy Framework Act (PPPFA), 2000 (Act No. 5 of 2000).

SIGNATURE:

DATE: _____

WITNESS No. 1

DATE: _____

WITNESS No. 2

DATE: _____

Annex C(a) Valve Products and Actuators

Local Content Declaration - Summary Schedule

(C1)	Tender No.	60G/2022/23					
(C2)	Tender description:	Procurement of New Cremators and Associated Works					
(C3)	Designated product(s)	Valve Products and Actuators					
(C4)	Tender Authority:	City of Cape Town					
(C5)	Tenderer Entity name:						
(C6)	Tender Exchange Rate:	Pula		EU		GBP	
(C7)	Specified local content %	70%					

Note: VAT to be excluded from all calculations

		Calculation of local content					
Tender item no's	List of items	Tender price per UoM (excl VAT)	Exempted imported value	Tender value net of exempted imported content	Imported value	Local value	Local content % (per item)
(C8)	(C9)	(C10)	(C11)	(C12)	(C13)	(C14)	(C15)
7.6.5	Hydrostatic Relief Valve - DN15 BSP						
7.6.6	Hydrostatic Relief Valve - DN25 BSP						
7.6.12	LPG Outlet Safety Relief Valve - DN15 BSP						
7.6.13	LPG Outlet Safety Relief Valve						

Tender summary			
Anticipated Annual Tender Qty (m)	Total Tender value	Total exempted imported content	Total Imported content
(C16)	(C17)	(C18)	(C19)

		Calculation of local content						Tender summary			
Tender item no's	List of items	Tender price per UoM (excl VAT)	Exempted imported value	Tender value net of exempted imported content	Imported value	Local value	Local content % (per item)	Anticipated Annual Tender Qty (m)	Total Tender value	Total exempted imported content	Total Imported content
(C8)	(C9)	(C10)	(C11)	(C12)	(C13)	(C14)	(C15)	(C16)	(C17)	(C18)	(C19)
	- DN25 BSP										
7.6.16	LPG Outlet Pressure Relief Valve - DN15 BSP										
7.6.17	LPG Outlet Pressure Relief Valve - DN25 BSP										

(C20) Total tender value	R	
(C21) Total Exempt imported content	R	
(C22) Total tender value net of exempt imported content	R	
(C23) Total Imported content		R
(C24) Total local content		R
(C25) Average local content % of tender		

Signature of tenderer from Annex B

Date: _____

Schedule 10B: Local Content Declaration / Annexure C

DECLARATION CERTIFICATE FOR LOCAL PRODUCTION AND CONTENT FOR DESIGNATED SECTORS (b)

Preamble

This declaration is based on and replaces Municipal Bid Document 6.2 (MBD 6.2).

The amendments made to the MBD 6.2 document have been necessary to clarify this standard document as it relates to local production and content in the Electrical and Telecom Cable sector.

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

Documents listed herein are downloadable from the dti's official website, <http://www.thedti.gov.za>.

This schedule must be completed by tenderers and returned with their tender at the closing date and time for this tender.

2. General Conditions

- 1.7 Preferential Procurement Regulations, 2017 (Regulation 8) makes provision for the promotion of local production and content.
- 1.8 Regulation 8(2) prescribes that in the case of designated sectors, organs of state must advertise such bids with the specific bidding condition that only locally produced goods with a stipulated minimum threshold for local production and content will be considered.
- 1.9 Where necessary, for tenders referred to in paragraph 1.2 above, a two stage bidding process may be followed, where the first stage involves a minimum threshold for local production and content and the second stage price and B-BBEE.
- 1.10A person awarded a contract in relation to a designated sector, may not sub-contract in such a manner that the local production and content of the overall value of the contract is reduced to below the stipulated minimum threshold.
- 1.11 The local content (LC) expressed as a percentage of the bid price must be calculated in accordance with the SABS approved technical specification number SATS 1286: 2011 as follows:

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

Where

x is the imported content in Rand

y is the bid price in Rand excluding value added tax (VAT)

Prices referred to in the determination of x must be converted to Rand (ZAR) by using the exchange rate published by Nedbank at close of business on the date of advertisement of the bid as required in paragraph 4.1 below.

The SABS approved technical specification number SATS 1286:2011 is accessible on http://www.thedti.gov.za/industrial_development/ip.jsp at no cost.

- 1.12A bid may be disqualified/declared non-responsive if this Declaration Certificate and Annex C (Local Content Declaration: Summary Schedule) are not submitted as part of the bid documentation.

DECLARATION CERTIFICATE FOR LOCAL PRODUCTION AND CONTENT FOR DESIGNATED SECTORS (b)
(Cont'd)

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

<u>Description of services, works or goods</u>	<u>Stipulated minimum threshold</u>
Steel Products and Components for Construction	100%

6. Does any portion of the services, works or goods offered for Items as detailed in Annexure C have any imported content?

(Tick applicable box)

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

3.1 If yes, the rate(s) of exchange to be used in this bid to calculate the local content as prescribed in paragraph 1.5 of the above General Conditions must be the rate(s) published by Nedbank at close of business on the date of advertisement of the bid.

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

Currency	Rates of exchange
US Dollar	
Pound Sterling	
Euro	
Yen	
Other	

NB: Tenderers must submit proof of the Nedbank rate(s) of exchange used.

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

DECLARATION CERTIFICATE FOR LOCAL PRODUCTION AND CONTENT FOR DESIGNATED SECTORS (b)
(Cont'd)(AS PER ANNEX B OF SATS 1286:2011)

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

IN RESPECT OF BID NO.

ISSUED BY: (Procurement Authority / Name of Municipality / Municipal Entity):

NB

- 3 The obligation to complete, duly sign and submit this declaration cannot be transferred to an external authorized representative, auditor or any other third party acting on behalf of the bidder.
- 4 Guidance on the Calculation of Local Content together with Local Content Declaration Templates (Annex C, D and E) is accessible on http://www.thedti.gov.za/industrial_development/ip.jsp. Bidders should first complete Declaration D. After completing Declaration D, bidders should complete Declaration E and then consolidate the information on Declaration C. **Declaration C should be submitted with the bid documentation at the closing date and time of the bid in order to substantiate the declaration made in paragraph (c) below.** Declarations D and E should be kept by the bidders for verification purposes for a period of at least 5 years. The successful bidder is required to continuously update Declarations C, D and E with the actual values for the duration of the contract.

I, the undersigned, (full names),

do hereby declare, in my capacity as

of(name of bidder entity), the following:

- (f) The facts contained herein are within my own personal knowledge.
- (g) I have satisfied myself that:
 - (ii) the goods to be delivered in terms of the above-specified bid comply with the minimum local content requirements as specified in the bid, and as measured in terms of SATS 1286:2011;
- (h) The local content percentages (%) indicated below has been calculated using the formula given in clause 3 of SATS 1286:2011, the rates of exchange indicated in paragraph 4.1 above and the information contained in Declaration D and E which has been consolidated in Declaration C;

Bid price, excluding VAT (y)	R
Imported content (x), as calculated in terms of SATS 1286:2011	R
Stipulated minimum threshold for local content (paragraph 2 above)	
Local content %, as calculated in terms of SATS 1286:2011	

If the bid is for more than one product, the local content percentages for each product contained in Declaration C shall be used instead of the table above. The local content percentages for each product has been calculated using the formula given in clause 3 of SATS 1286:2011, the rates of exchange indicated in paragraph 3.1 above and the information contained in Declaration D and E.

- (i) I accept that the Procurement Authority / Municipality /Municipal Entity has the right to request that the local content be verified in terms of the requirements of SATS 1286:2011.
- (j) I understand that the awarding of the bid is dependent on the accuracy of the information furnished in this application. I also understand that the submission of incorrect data, or data that are not verifiable as described in SATS 1286:2011, may result in the Procurement Authority / Municipal / Municipal Entity imposing any or all of the remedies as provided for in Regulation 14 of the Preferential Procurement Regulations, 2017 promulgated under the Preferential Policy Framework Act (PPPFA), 2000 (Act No. 5 of 2000).

SIGNATURE: _____ DATE: _____
 WITNESS No. 1 DATE: _____
 WITNESS No. 2 DATE: _____

Annex C (b): Steel Products and Components for Construction

Local Content Declaration - Summary Schedule

(C1)	Tender No.	60G/2022/23		
(C2)	Tender description:	Procurement of New Cremators and Associated Works		
(C3)	Designated product(s)	Steel Products and Components for Construction		
(C4)	Tender Authority:	City of Cape Town		
(C5)	Tenderer Entity name:			
(C6)	Tender Exchange Rate:	Pula		EU <input type="text"/> GBP <input type="text"/>
(C7)	Specified local content %	100%		

Note: VAT to be excluded from all calculations

Calculation of local content

Tender item no's	List of items	Tender price per UoM (excl VAT)	Exempted imported value	Tender value net of exempted imported content	Imported value	Local value	Local content % (per item)
(C8)	(C9)	(C10)	(C11)	(C12)	(C13)	(C14)	(C15)
	Supply and Delivery of Smoke Stack						
	d450, Mild Steel Painted						
2.6.1	Refractory Lined, 6mm Wall Thickness						
2.6.2	Non Refractory Lined, 6mm Wall Thickness						

Tender summary

Anticipated Annual Tender Qty (m)	Total Tender value	Total exempted imported content	Total Imported content
(C16)	(C17)	(C18)	(C19)

TENDER NO: 60G/2022/23

2.6.3	Refractory lined, 8mm Wall Thickness											
2.6.4	Non Refractory Lined, 8mm Wall Thickness											
2.6.5	Damper, 6mm Wall Thickness											
	Supply and Delivery of Smoke Stack											
	d600, Mild Steel Painted											
2.7.1	Refractory Lined, 6mm Wall Thickness											
2.7.2	Non Refractory Lined, 6mm Wall Thickness											
2.7.3	Refractory lined, 8mm Wall Thickness											
2.7.4	Non Refractory Lined, 8mm Wall Thickness											
2.7.5	Damper, 6mm Wall Thickness											
2.7.6	Damper, 8mm Wall Thickness											
	Supply and Delivery of Smoke Stack											
2.8.1	d800, Mild Steel Painted											
2.8.2	Refractory Lined, 8mm Wall Thickness											
2.8.3	Non Refractory Lined, 8mm Wall Thickness											
2.8.4	Refractory lined, 10mm Wall Thickness											

TENDER NO: 60G/2022/23

2.8.5	Non Refractory Lined, 10mm Wall Thickness								
2.8.6	Damper, 8mm Wall Thickness								
2.8.1	Damper, 10mm Wall Thickness								
	Supply and Delivery of Smoke Stack								
	d1000, Mild Steel Painted								
2.9.1	Refractory Lined, 8mm Wall Thickness								
2.9.2	Non Refractory Lined, 8mm Wall Thickness								
2.9.3	Refractory lined, 10mm Wall Thickness								
2.9.4	Non Refractory Lined, 10mm Wall Thickness								
2.9.5	Damper, 8mm Wall Thickness								
2.9.6	Damper, 10mm Wall Thickness								
3.1.0	Refractory Lined Ducting d450mm								
	3mm Mild Steel, Painted, Castable Refractory								
3.1.1	Straight Section								
3.1.2	Elbow 90deg								
3.1.3	Tee section								
3.1.4	Installation, supports,								

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	fasteners, gaskets and										
3.1.5	Supports, Install height <4m high										
3.2.0	Refractory Lined Ducting d600mm										
	3mm Mild Steel, Painted, Castable Refractory										
3.2.1	Straight Section										
3.2.2	Elbow 90deg										
3.2.3	Tee section										
3.2.4	Installation, supports, fasteners, gaskets and sundries										
3.2.5	Supports, Install height <4m high										
3.3.0	Refractory Lined Ducting d800mm										
	3mm Mild Steel, Painted, Castable Refractory										
3.3.1	Straight Section										
3.3.2	Elbow 90deg										
3.3.3	Tee section										
3.3.4	Installation, supports, fasteners, gaskets and sundries										
3.3.5	Supports, Install height <4m high										
3.4.0	Refractory Lined Ducting d1000mm										

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	3mm Mild Steel, Painted, Castable Refractory										
3.4.1	Straight Section										
3.4.2	Elbow 90deg										
3.4.3	Tee section										
3.4.4	Installation, supports, fasteners, gaskets and sundries										
3.4.5	Supports, Install height <4m high										
4.10.0	Spiral Ducting d100mm (Gauge 0.6mm)										
	Galvanized Sheet Metal										
4.10.1	Straight length										
4.10.2	Stop end										
4.10.3	Reducer										
4.10.4	Spigot										
4.10.5	45deg Bend										
4.10.6	90deg Bend										
4.10.7	Sleeve										
4.11.0	Spiral Ducting d125mm (Gauge 0.6mm)										
	Galvanized Sheet Metal										
4.11.1	Straight length										
4.11.2	Stop end										
4.11.3	Reducer										
4.11.4	Spigot										

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4.11.5	45deg Bend											
4.11.6	90deg Bend											
4.11.7	Sleeve											
4.12.0	Spiral Ducting d150mm (Gauge 0.6mm)											
	Galvanized Sheet Metal											
4.12.1	Straight length											
4.12.2	Stop end											
4.12.3	Reducer											
4.12.4	Spigot											
4.12.5	45deg Bend											
4.12.6	90deg Bend											
4.12.7	Sleeve											
	Spiral Ducting d200mm (Gauge 0.6mm)											
4.13.1	Galvanized Sheet Metal											
4.13.2	Straight length											
4.13.3	Stop end											
4.13.4	Reducer											
4.13.5	Spigot											
4.13.6	45deg Bend											
4.13.7	90deg Bend											
4.13.8	Sleeve											
4.14.0	Spiral Ducting d250mm (Gauge 0.6mm)											

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	Galvanized Sheet Metal										
4.14.1	Straight length										
4.14.2	Stop end										
4.14.3	Reducer										
4.14.4	Spigot										
4.14.5	45deg Bend										
4.14.6	90deg Bend										
4.14.7	Sleeve										
4.15.0	Spiral Ducting d300mm (Gauge 0.6mm)										
	Galvanized Sheet Metal										
4.15.1	Straight length										
4.15.2	Stop end										
4.15.3	Reducer										
4.15.4	Spigot										
4.15.5	45deg Bend										
4.15.6	90deg Bend										
4.15.7	Sleeve										
4.15.8	Installation of ducting, including sundries										
4.16.0	Spiral Ducting d350mm (Gauge 0.6mm)										
	Galvanized Sheet Metal										
4.16.1	Straight length										
4.16.2	Stop end										

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4.16.3	Reducer												
4.16.4	Spigot												
4.16.5	45deg Bend												
4.16.6	90deg Bend												
4.16.7	Sleeve												
4.17.0	Spiral Ducting d400mm (Gauge 0.6mm)												
	Galvanized Sheet Metal												
4.17.1	Straight length												
4.17.2	Stop end												
4.17.3	Reducer												
4.17.4	Spigot												
4.17.5	45deg Bend												
4.17.6	90deg Bend												
4.17.7	Sleeve												
4.18.0	Spiral Ducting d450mm (Gauge 0.6mm)												
	Galvanized Sheet Metal												
4.18.1	Straight length												
4.18.2	Stop end												
4.18.3	Reducer												
4.18.4	Spigot												
4.18.5	45deg Bend												
4.18.6	90deg Bend												
4.18.7	Sleeve												

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4.19.0	Spiral Ducting d500mm (Gauge 0.6mm)											
	Galvanized Sheet Metal											
4.19.1	Straight length											
4.19.2	Stop end											
4.19.3	Reducer											
4.19.4	Spigot											
4.19.5	45deg Bend											
4.19.6	90deg Bend											
4.19.7	Sleeve											
4.20.0	Spiral Ducting d550mm (Gauge 0.6mm)											
	Galvanized Sheet Metal											
4.20.1	Straight length											
4.20.2	Stop end											
4.20.3	Reducer											
4.20.4	Spigot											
4.20.5	45deg Bend											
4.20.6	90deg Bend											
4.20.7	Sleeve											
4.21.0	Spiral Ducting d600mm (Gauge 0.6mm)											
	Galvanized Sheet Metal											
4.21.1	Straight length											
4.21.2	Stop end											

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4.21.3	Reducer												
4.21.4	Spigot												
4.21.5	45deg Bend												
4.21.6	90deg Bend												
4.21.7	Sleeve												
4.22.0	Spiral Ducting d650mm (Gauge 0.8mm)												
	Galvanized Sheet Metal												
4.22.1	Straight length												
4.22.2	Stop end												
4.22.3	Reducer												
4.22.4	Spigot												
4.22.5	45deg Bend												
4.22.6	90deg Bend												
4.22.7	Sleeve												
4.23.0	Spiral Ducting d700mm (Gauge 0.8mm)												
	Galvanized Sheet Metal												
4.23.1	Straight length												
4.23.2	Stop end												
4.23.3	Reducer												
4.23.4	Spigot												
4.23.5	45deg Bend												
4.23.6	90deg Bend												
4.23.7	Sleeve												

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4.24.0	Spiral Ducting d800mm (Gauge 0.8mm)											
	Galvanized Sheet Metal											
4.24.1	Straight length											
4.24.2	Stop end											
4.24.3	Reducer											
4.24.4	Spigot											
4.24.5	45deg Bend											
4.24.6	90deg Bend											
4.24.7	Sleeve											
4.25.0	Spiral Ducting d900mm (Gauge 0.8mm)											
	Galvanized Sheet Metal											
4.25.1	Straight length											
4.25.2	Stop end											
4.25.3	Reducer											
4.25.4	Spigot											
4.25.5	45deg Bend											
4.25.6	90deg Bend											
4.25.7	Sleeve											
4.26.0	Spiral Ducting d1000mm (Gauge 0.8mm)											
	Galvanized Sheet Metal											
4.26.1	Straight length											
4.26.2	Stop end											

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4.26.3	Reducer										
4.26.4	Spigot										
4.26.5	45deg Bend										
4.26.6	90deg Bend										
4.26.7	Sleeve										
7.10.0	Piping Material										
7.10.1	BS 1600/API Spec 5L Seamless Steel Pipe - DN15 - SCH80										
7.10.2	BS 1600/API Spec 5L Seamless Steel Pipe - DN25 - SCH80										
7.10.3	BS 1600/API Spec 5L Seamless Steel Pipe - DN50 - SCH40										
7.10.4	BS 1600/API Spec 5L Seamless Steel Pipe - DN65 - SCH40										
7.10.5	BS 1600/API Spec 5L Seamless Steel										
7.10.0	Pipe - DN80 - SCH40										
7.11.0	Pipe Fittings										
	Supply and install										
7.11.1	Elbow Long Radius 90° Steel BSPT - DN15 - Class 300										
7.11.2	Elbow Long Radius 90° Steel BSPT - DN25 - Class 300										

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7.11.3	Elbow Long Radius 90° Steel Butt-weld - DN50 - SCH40								
7.11.4	Elbow Long Radius 90° Steel Butt-weld - DN65 - SCH40								
7.11.5	Butt-weld - DN80 - SCH40								
7.11.6	Tee Equal Steel BSPT - DN15 - Class 300								
7.11.7	Tee Equal Steel BSPT - DN25 - Class 300								
7.11.8	Tee Equal Steel Butt-weld - DN50 - SCH80								
7.11.9	Tee Equal Steel Butt-weld - DN65 - SCH80								
7.11.10	Tee Equal Steel Butt-weld - DN80 - SCH80								
7.11.11	Reducer Steel Butt-weld - DN80 to DN50 - SCH80								
7.11.12	Reducer Steel Butt-weld - DN65 to DN25 - SCH80								
7.11.13	Reducer Steel Butt-weld - DN80 to DN65 - SCH80								
7.11.14	Reducer Steel BSPT - DN50 to DN25 - Class 300								
7.11.15	Reducer Steel BSPT - DN25 to DN15- Class 300								
7.11.16	Union Taper Seat - DN15 -								

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	Class 300												
7.11.17	Union Taper Seat - DN25 - Class 300												
7.11.18	Flange SANS1123 Raised Face x Slip On (T1600/3) - DN15 - PN16												
7.11.19	Flange SANS1123 Raised Face x Slip On (T1600/3) - DN25 - PN16												
7.11.20	Flange SANS1123 Raised Face x Slip On (T1600/3) - DN40 - PN16												
7.11.21	Flange SANS1123 Raised Face x Slip On (T1600/3) - DN50 - PN16												
7.11.22	Flange SANS1123 Raised Face x Slip On (T1600/3) - DN65 - PN16												
7.11.23	Flange SANS1123 Raised Face x Slip On (T1600/3) - DN80 - PN16												
7.11.24	Pipe Hanger/Bracket MS Galvanized - DN15												
7.11.25	Pipe Hanger/Bracket MS Galvanized - DN25												
7.11.26	Pipe Hanger/Bracket MS Galvanized - DN50												
7.11.27	Pipe Hanger/Bracket MS Galvanized - DN65												
7.11.28	Pipe Hanger/Bracket MS Galvanized - DN80												
7.11.29	Threaded Nipple - DN15 -												

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	SCH80									
7.11.30	Threaded Nipple - DN25 - SCH80									
7.11.31	Pipe Flexible Braided BSPT Ends - DN15x500mm - PN16									
7.11.32	Pipe Flexible Braided BSPT Ends - DN25x500mm - PN16									
7.11.33	Pipe Flexible Braided Flanged Ends - DN50x500mm - PN16									
7.11.34	Pipe Flexible Braided Flanged Ends - DN65x500mm - PN16									
7.11.35	Pipe Flexible Braided Flanged Ends - DN80x500mm - PN16									
7.11.36	BSP Socket Steam Grade - DN15 - Class 300									
8.7.0	Piping Material									
8.7.1	SANS 62 Medium Wall Thickness Galvanized - DN15									
8.7.2	SANS 62 Medium Wall Thickness Galvanized - DN25									
8.8.0	Pipe Fittings									
	Supply and install									
8.8.1	BSPT Elbow Long Radius 90° Galvanized - DN15 - SCH10									

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8.8.2	BSPT Elbow Long Radius 90° Galvanized - DN25 - SCH10											
8.8.3	BSPT Tee Equal Steel Galvanized - DN15 - SCH10											
8.8.4	BSPT Tee Equal Steel Galvanized - DN25 - SCH10											
8.8.5	BSPT Union Taper Seat Galvanized - DN15 - SCH10											
8.8.6	BSPT Union Taper Seat Galvanized - DN25 - SCH10											
8.8.7	Pipe Hanger/Bracket MS Galvanized - DN15											
8.8.8	Pipe Hanger/Bracket MS Galvanized - DN25											
8.8.9	BSPT Threaded Nipple Galvanized - DN15 - SCH10											
8.8.10	BSPT Threaded Nipple Galvanized - DN25 - SCH10											
8.8.11	BSPT Reducing Bush Galvanized - DN25 to DN15 - SCH10											
8.8.12	BSPT Reducing Bush Galvanized - DN15 to DN8 - SCH10											
8.8.13	BSPT Socket Galvanized - DN15 - SCH10											
8.8.14	BSPT Socket Galvanized - DN25 - SCH10											

(C20) Total tender value

R

Signature of tenderer from Annex B

(C21) Total Exempt imported content

R

TENDER NO: 60G/2022/23

(C22) Total tender value net of exempt imported content

R

(C23) Total Imported content

R

(C24) Total local content

R

(C25) Average local content % of tender

Date:

Schedule 12: Schedule of Pre-Qualification Criteria Sub-Contractors

Not applicable.

Schedule 13: List of other documents attached by tenderer

The tenderer has attached to this schedule, the following additional documentation:

	Date of Document	Title of Document or Description (refer to clauses / schedules of this tender document where applicable)
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		
17.		

Attach additional pages if more space is required.

 Signature
 Print name:
 On behalf of the tenderer (duly authorised)

 Date

Schedule 14: Record of Addenda to Tender Documents

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

	Date	Title or Details
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Attach additional pages if more space is required.

SIGNED ON BEHALF OF TENDERER:

Schedule 15: Information to be provided with the tender

The following information shall be provided with the Tender:

- a. The technical details and data required by the Technical Data Sheets:
 - a.15A: Cremator Technical Data Sheet;
 - b.15B: Abatement Equipment Technical Data Sheet.

SIGNED ON BEHALF OF TENDERER:

Schedule 15A: Cremator Technical Data Sheet

To be completed as part of tender submission for technical evaluation, or within 7 days written request thereof.

NO:	ATTRIBUTE	DESCRIPTION	
0	Does cremator fully comply with SANS 329?	Does the cremator meet all the specifications for Industrial thermo processing equipment set out by South African National Standards?	
1	Fuel used	What combustion fuel does the cremator use?	
2	Cremator Type	What cremator type will you propose that meets the requirements set out?	
3	Physical Size	How much space is require for installation and much service space must be available around the machine?	
4	Throughput	How many cremations per 12 hour shift?	
5	Emissions Achievable	Are the proposed cremators able to meet the latest air emission requirements without additional abatement equipment? (specific reference in terms of Particulate Matter, Hg, NOx and CO needs to made in the response)	
6	Emissions Monitoring	What emissions monitoring equipment is included?	
7	SCADA:	What are the monitoring and recording capabilities of the SCADA system?	
8	HMI	Brief description of the HMI unit	
9	Loading/Insertion	Please provide a brief description of the loading procedure as well as where and how the ashes are retrieved.	
10	LPG Fuel consumption per cremation	On average, how much fuel is required for each cremation?	
11	Refractory Quality	What refractory types are used?	
12	Maintenance	How frequently will the equipment need servicing and what is the estimated annual operating cost? [excluding gas and electricity]	

13	Maintenance teams	Can local teams do the maintenance? If so, will they require special training?	
14	Availability of spares	Will spare parts be available in South Africa?	
15	Training	Will sufficient training / training material be available from you as a supplier?	
16	Availability of supplier support	Will you be available to support the operators and maintenance staff in SA if required? Does the cremator have remote support for the control system?	
17	Worldwide offices	Where is your closest supplier office to Cape Town, South Africa?	
18	Installation teams	Who will do the installation on site? Can local teams do the installation? Will you bring a team for commissioning & training on site?	
19	Warranty Information	What is the duration of the warranty and what items are excluded	

Schedule 15B: Abatement Equipment Technical Data Sheet

To be completed as part of tender submission for technical evaluation, or within 7 days written request thereof.

NO:	ATTRIBUTE	DESCRIPTION	
0	Abatement equipment	What abatement equipment will be supplied?	
1	Abatement equipment space needed	How much space is needed for abatement equipment?	
2	Consumable usage	What is the estimated consumable usage and cost?	
3	Emissions Achievable	What emissions specifications would you be able to achieve in abated operation?	
4	Maintenance	How frequently will the equipment need servicing and what is the estimated annual operating cost? [excluding gas and electricity]	
5	Maintenance teams	Can local teams do the maintenance? If so, will they require special training?	
6	Availability of spares	Will spare parts be available in South Africa?	
7	Training	Will sufficient training / training material be available from you as a supplier?	
8	Availability of supplier support	Will you be available to support the operators and maintenance staff in SA if required?	
9	Worldwide offices	Where is your closest supplier office to Cape Town, South Africa?	
10	Installation teams	Who will do the installation on site? Can local teams do the installation? Will you bring a team for commissioning & training on site?	
11	Warranty Information	What is the duration of the warranty and what items are excluded	

Schedule 16A: Tendering Entity Track Record

The following information must be provided by the tenderer at the time of tendering.

Details of the Tenderer's previous proven competency and experience in the execution of work to that described in this document as per **clause 2.2.1.1.1a).**

Failure to provide the relevant requested information below may result in the tenderer being considered non-responsive.

No	Year of Project Completion	Value of Project	Project Name and brief description of work (repairs/maintenance/abatement installation/new installation etc.)	Employer, contact person and contact details (telephone, email address, etc.)	Performance test results from accredited tester OR client reference letter
1					
2					
3					
4					
5					

If further space is required, the details can be provided on a separate sheet.

SIGNED ON BEHALF OF TENDERER:

Schedule 16B: Personnel

The tenderer must have personnel available upon contract phase of the tender as per Schedule 13: Specifications, Clause 2.20: Services.

SIGNED ON BEHALF OF TENDERER:

TENDER DOCUMENT GOODS AND SERVICES		 CITY OF CAPE TOWN ISIXEKO SASEKAPA STAD KAAPSTAD
SUPPLY CHAIN MANAGEMENT		
SCM - 542	Approved by Branch Manager: 03/04/2020	Version: 8 Page 110 of 279

TENDER NO: 60G/2022/23 TENDER DESCRIPTION: PROCUREMENT OF NEW CREMATORS AND ASSOCIATED WORKS CONTRACT PERIOD: FROM DATE OF COMMENCEMENT OF CONTRACT, NOT EXCEEDING A PERIOD OF 36 MONTHS.
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VOLUME 3: DRAFT CONTRACT

TENDERER	
NAME of Company/Close Corporation or Partnership / Joint Venture/ Consortium or Sole Proprietor /Individual	
TRADING AS (if different from above)	

NATURE OF TENDER OFFER (please indicate below)	
Main Offer (see clause 2.2.11.1)	
Alternative Offer (see clause 2.2.11.1)	

VOLUME 3: DRAFT CONTRACT (7) SPECIAL CONDITIONS OF CONTRACT

The following Special Conditions of Contract, referring to the National Treasury – Conditions of Contract (revised July 2010), are applicable to this Contract:

1. Definitions

Delete Clause 1.15 and substitute with the following

- 1.15 The word 'Goods' is to be replaced everywhere it occurs in the GCC with the phrase 'Goods and / or Services' which means all of the equipment, machinery, materials, services, products, consumables, etc. that the supplier is required to deliver to the purchaser under the contract. This definition shall also be applicable, as the context requires, anywhere where the words "supplies" and "services" occurs in the GCC.

Delete Clause 1.19 and substitute with the following

- 1.19 The word 'Order' is to be replaced everywhere it occurs in the GCC with the words 'Purchase Order' which means the official purchase order authorised and released on the purchaser's SAP System

Delete Clause 1.21 and substitute with the following:

- 1.21 'Purchaser' means the **City of Cape Town**. The address of the Purchaser is **12 Hertzog Boulevard, Cape Town, 8001**.

Add the following after Clause 1.25:

- 1.26 'Supplier' means any provider of goods and / or services with whom the contract is concluded
- 1.27 "Intellectual Property" means any and all intellectual property rights of any nature anywhere in the world whether registered, registerable or otherwise, including patents, trademarks, registered designs and domain names, applications for any of the foregoing, trade or business names, copyright and rights in the nature of copyright, design rights, rights in databases, know-how, trade secrets and any other intellectual property rights which subsist in computer software, computer programs, websites, documents, information, techniques, business methods, drawings, logos, instruction manuals, lists and procedures and particulars of customers, marketing methods and procedures and advertising literature, including the "look and feel" of any websites

3. General Obligations

Delete Clause 3.2 in its entirety and replace with the following clauses.

- 3.2 The parties will be liable to each other arising out of or in connection with any breach of the obligations detailed or implied in this contract, subject to clause 28.
- 3.3 All parties in a joint venture or consortium shall be jointly and severally liable to the purchaser in terms of this contract and shall carry individually the minimum levels of insurance stated in the contract, if any.
- 3.4 The parties shall comply with all laws, regulations and bylaws of local or other authorities having jurisdiction regarding the delivery of the goods and give all notices and pay all charges required by such authorities.
- 3.4.1 The parties agree that this contract shall also be subject to the CCT's Supply Chain Management Policy ('SCM Policy') that was applicable on the date the bid was advertised, **save that if the Employer adopts a new SCM Policy which contemplates that any clause therein would apply to the contract emanating from this tender, such clause shall also be applicable to that contract.** Please refer to this document contained on the CCT's website.
- 3.4.2 Abuse of the supply chain management system is not permitted and may result in cancellation of the

contract, restriction of the supplier, and/or the exercise by the City of any other remedies available to it as described in the SCM Policy.

3.5 The **supplier** shall:

3.5.1 Arrange for the documents listed below to be provided to the Purchaser prior to the issuing of the order:

- a) Proof of Insurance (Refer to Clause 11) or Insurance Broker's Warrantee
- b) Letter of good standing from the Compensation Commissioner, or a licensed compensation insurer (Refer to Clause 11)
- c) Initial delivery programme
- d) Other requirements as detailed in the tender documents

3.5.2 Only when notified of the acceptance of the bid by the issuing of the order, the supplier shall commence with and carry out the delivery of the goods in accordance with the contract, to the satisfaction, of the purchaser

3.5.3 Provide all of the necessary materials, labour, plant and equipment required for the delivery of the goods including any temporary services that may be required

3.5.4 Insure his workmen and employees against death or injury arising out of the delivery of the goods

3.5.5 Be continuously represented during the delivery of the goods by a competent representative duly authorised to execute instructions;

3.5.6 In the event of a loss resulting in a claim against the insurance policies stated in clause 11, pay the first amount (excess) as required by the insurance policy

3.5.7 Comply with all written instructions from the purchaser subject to clause 18

3.5.8 Complete and deliver the goods within the period stated in clause 10, or any extensions thereof in terms of clause 21

3.5.9 Make good at his own expense all incomplete and defective goods during the warranty period

3.5.10 Pay to the purchaser any penalty for delay as due on demand by the purchaser. The supplier hereby consents to such amounts being deducted from any payment to the supplier.

3.5.11 Comply with the provisions of the OHAS Act & all relevant regulations.

3.5.12 Comply with all laws relating to wages and conditions generally governing the employment of labour in the Cape Town area and any applicable Bargaining Council agreements.

3.5.13 Deliver the goods in accordance with the contract and with all reasonable care, diligence and skill in accordance with generally accepted professional techniques and standards.

3.6 The **purchaser** shall:

3.6.1 Issue orders for the goods required under this Contract. No liability for payment will ensue for any work done if an official purchase order has not been issued to the supplier.

3.6.2 Make payment to the **supplier** for the goods as set out herein.

3.6.3 Take possession of the goods upon delivery by the supplier.

3.6.4 Regularly inspect the goods to establish that it is being delivered in compliance with the contract.

3.6.5 Give any instructions and/or explanations and/or variations to the supplier including any relevant advice to assist the supplier to understand the contract documents.

3.6.6 Grant or refuse any extension of time requested by the supplier to the period stated in clause 10.

- 3.6.7 Inspect the goods to determine if, in the opinion of the purchaser, it has been delivered in compliance with the contract, alternatively in such a state that it can be properly used for the purpose for which it was intended.
- 3.6.8 Brief the supplier and issue all documents, information, etc. in accordance with the contract.

5. Use of contract documents and information; inspection, copyright, confidentiality, etc.

Add the following after clause 5.4:

- 5.5 Copyright of all documents prepared by the supplier in accordance with the relevant provisions of the copyright Act (Act 98 of 1978) relating to contract shall be vested in the purchaser. Where copyright is vested in the supplier, the purchaser shall be entitled to use the documents or copy them only for the purposes for which they are intended in regard to the contract and need not obtain the supplier's permission to copy for such use. Where copyright is vested in the purchaser, the supplier shall not be liable in any way for the use of any of the information other than as originally intended for the contract and the purchaser hereby indemnifies the supplier against any claim which may be made against him by any party arising from the use of such documentation for other purposes.

The ownership of data and factual information collected by the supplier and paid for by the purchaser shall, after payment, vest with the purchaser

- 5.6 **Publicity and publication**
The supplier shall not release public or media statements or publish material related to the services or contract within two (2) years of completion of the services without the written approval of the purchaser, which approval shall not be unreasonably withheld.
- 5.7 **Confidentiality**
Both parties shall keep all information obtained by them in the context of the contract confidential and shall not divulge it without the written approval of the other party.
- 5.8 **Intellectual Property**
- 5.8.1 The supplier acknowledges that it shall not acquire any right, title or interest in or to the Intellectual Property of the Employer.
- 5.8.2 The supplier hereby assigns to the Employer, all Intellectual Property created, developed or otherwise brought into existence by it for the purposes of the contract, unless the Parties expressly agree otherwise in writing.
- 5.8.3 The supplier shall, and warrants that it shall:
- 5.8.3.1 not be entitled to use the Employer's Intellectual Property for any purpose other than as contemplated in this contract;
- 5.8.3.2 not modify, add to, change or alter the Employer's Intellectual Property, or any information or data related thereto, nor may the supplier produce any product as a result of, including and/or arising from any such information, data and Intellectual Property, and in the event that it does produce any such product, the product shall be, and be deemed in law to be, owned by the Employer;
- 5.8.3.3 not apply for or obtain registration of any domain name, trademark or design which is similar to any Intellectual Property of the Employer;
- 5.8.3.4 comply with all reasonable directions or instructions given to it by the Employer in relation to the form and manner of use of the Employer Intellectual Property, including without limitation, any brand guidelines which the Employer may provide to the supplier from time to time;
- 5.8.3.5 procure that its employees, directors, members and contractors comply strictly with the provisions of clauses 5.8.3.1 to 5.8.3.3 above;

unless the Employer expressly agrees thereto in writing after obtaining due internal authority.

- 5.8.4 The supplier represents and warrants to the Employer that, in providing goods, services or both, as the case may be, for the duration of the contract, it will not infringe or make unauthorised use of the Intellectual Property rights of any third party and hereby indemnifies the Employer from any claims, liability, loss, damages, costs, and expenses arising from the infringement or unauthorised use by the supplier of any third party's Intellectual Property rights.
- 5.8.5 In the event that the contract is cancelled, terminated, ended or is declared void, any and all of the Employer's Intellectual Property, and any and all information and data related thereto, shall be immediately handed over to the Employer by the supplier and no copies thereof shall be retained by the supplier unless the Employer expressly and in writing, after obtaining due internal authority, agrees otherwise.

7. Performance Security

Delete clause 7.1 and replace with the following:

- 7.1 Within 14 (fourteen) days of receipt of the notification of works-package award, the successful bidder shall furnish to the purchaser the performance security of the amount specified herein.

The Guarantee Sum shall be equal to:

- A works projects with a Rand value less than or equal to R200 000: waived (that is, no performance guarantee is required);
- A works projects with a Rand value exceeding R200 000, but less than or equal to R1 000 000: 5% of the bid sum;
- A works projects with a Rand value exceeding R1 000 000: 7% of the bid sum.

Delete clause 7.3 and replace with the following:

- 7.3 The performance security shall be furnished strictly in accordance with the terms and conditions set out in **Form of Guarantee / Performance Security** and can only be issued by any one of the Financial Institutions listed in **Annexure A** (attached to this form).

Delete clause 7.4 and replace with the following:

- 7.4 The performance security will be discharged by the purchaser and returned to the supplier strictly in accordance with the terms and conditions set out in the **Form of Guarantee / Performance Security**.

8. Inspections, tests and analyses

Delete Clause 8.2 and substitute with the following:

- 8.2 If it is a bid condition that supplies to be produced or services to be rendered should at any stage during production or execution or on completion be subject to inspection, the premises of the bidder or contractor shall be open, at all reasonable hours, for inspection by a representative of the purchaser or an organisation acting on behalf of the purchaser.

10. Delivery and documents

Delete clauses 10.1 and 10.2 and replace with the following:

- 10.1 Delivery of the goods shall be made by the supplier in accordance with the terms specified in the contract. The time for delivery of the goods shall be the date as stated on the order. Orders for the supply and delivery of goods may be raised up until the expiry of a framework agreement bid, provided that the goods can be delivered within 30 days of expiry of the framework contract. All orders, other than for the supply and delivery of goods, must be completed prior to the expiry of the contract period.
- 10.2 The purchaser shall determine, in its sole discretion, whether the goods have been delivered in compliance with the contract, alternatively in such a state that it can be properly used for the purpose for which it was intended. When the purchaser determines that the goods have been satisfactorily delivered, the purchaser must issue an appropriate certification, or written approval, to that effect. Invoicing may only occur, and must be dated, on or after the date of acceptance of the goods.

11. Insurance

Add the following after clause 11.1:

11.2 Without limiting the obligations of the supplier in terms of this contract, the supplier shall effect and maintain the following additional insurances:

- a) Public liability insurances, in the name of the supplier, covering the supplier and the purchaser against liability for the death of or injury to any person, or loss of or damage to any property, arising out of or in the course of this Contract, in an amount not less than **R20 million** for any single claim;
- b) Motor Vehicle Liability Insurance, in respect of all vehicles owned and / or leased by the supplier, comprising (as a minimum) "Balance of Third Party" Risks including Passenger Liability Indemnity;
- c) Registration / insurance in terms of the Compensation for Occupational Injuries and Disease Act, Act 130 of 1993. This can either take the form of a certified copy of a valid Letter of Good Standing issued by the Compensation Commissioner, or proof of insurance with a licenced compensation insurer, from either the bidder's broker or the insurance company itself (see **Proof of Insurance / Insurance Broker's Warranty** section in document for a pro forma version).

In the event of under insurance or the insurer's repudiation of any claim for whatever reason, the CCT will retain its right of recourse against the supplier.

11.3 The supplier shall be obliged to furnish the CCT with proof of such insurance as the CCT may require from time to time for the duration of this Contract. Evidence that the insurances have been effected in terms of this clause, shall be either in the form of an insurance broker's warranty worded precisely as per the pro forma version contained in the **Proof of Insurance / Insurance Broker's Warranty** section of the document or copies of the insurance policies.

15. Warranty

Add to Clause 15.2:

15.2 This warranty for this contract shall remain valid for **twelve (12) months** after the goods have been delivered.

16. Payment

Delete Clause 16.1 in its entirety and replace with the following:

16.1 A monthly payment cycle will be the norm. All invoices which are dated on or before the 20th of a particular month will typically be paid between the 23rd and 26th of the following month. The supplier may submit a fully motivated application regarding more frequent payment to the Employer's Director: Expenditure for consideration. Requests for more frequent payments will be considered at the sole discretion of the Employer and is not a right in terms of this contract.

Delete Clause 16.2 in its entirety and replace with the following:

16.2 The supplier shall furnish the purchaser's Accounts Payable Department with an original tax invoice, clearly showing the amount due in respect of each and every claim for payment.

Add the following after clause 16.4

16.5 Notwithstanding any amount stated on the order, the supplier shall only be entitled to payment for goods actually delivered in terms of the Project Specification and Drawings, or any variations in accordance with clause 18. Any contingency sum included shall be for the sole use, and at the discretion, of the purchaser.

The CCT is not liable for payment of any invoice that pre-dates the date of delivery of the goods.

- 16.6 The purchaser will only make advanced payments to the supplier in strict compliance with the terms and details as contained on **Proforma Advanced Payment Guarantee** and only once the authenticity of such guarantee has been verified by the City's Treasury Department.

17. Prices

Add the following after clause 17.1

- 17.2 If as a result of an award of a contract beyond the original tender validity period, the contract execution will be completed beyond a period of twelve (12) months from the expiry of the original tender validity period, then the contract may be subject to contract price adjustment for that period beyond such twelve (12) months. An appropriate contract price adjustment formula will be determined by the Director: Supply Chain Management if such was not included in the bid documents.

- 17.3 If as a result of any extension of time granted the contract execution will be completed beyond a period of twelve (12) months from the expiry of the original tender validity period, then contract price adjustment may apply to that period beyond such twelve (12) months. An appropriate contract price adjustment formula will be determined by the Director: Supply Chain Management if such was not included in the bid documents.

- 17.4 The prices for the goods delivered and services performed shall be subject to contract price adjustment and the following conditions will be applicable:

These rates which are stated on the Price Schedule shall be adjusted on each 6-month anniversary of the date of contract commencement (recalculation date). For the purpose of contract price adjustment, the following general provisions shall apply in all cases:

- (a) The rates submitted will be firm for the first 6 months after commencement of the contract.

CPA for the following 6 months will be calculated in month 6 based on current indices for month 5, and will be applicable for the next 6 months thereafter, with the base month being one month prior to the month in which the tender closed.

CPA for month 13 - 18 will be calculated in month 12 based on current indices for month 11 and will be applicable for the next 6 months thereafter, with the base month being the 5th month from commencement of the contract.

CPA for month 19 - 24 will be calculated in month 18 based on current indices for month 17 and will be applicable for the next 6 months thereafter, with the base month being the 11th month from commencement of the contract.

CPA for month 25 - 30 will be calculated in month 24 based on current indices for month 23 and will be applicable for the next 6 months thereafter, with the base month being the 17th month from commencement of the contract.

CPA for month 31 - 36 will be calculated in month 30 based on current indices for month 29 and will be applicable for the next 6 months thereafter, with the base month being the 22th month from commencement of the contract.

- (b) Adjustments for changes in cost shall be calculated as if the Works are executed within the time for completion and no additional costs due to any work being executed outside the time for completion shall be payable unless the Works Project Manager/Contract Manager/Principal Agent allows an extension of time in accordance with the relevant Clauses.

Labour and Materials

Permissible Adjustments

Adjustment to the Contract Price for the design, manufacture, painting, testing, supply, delivery, offloading and storage of Plant and Materials manufactured in the Republic of South Africa,

shall be allowed **only** for variations in the cost of labour and material based on the indices published by the Steel and Engineering Industries Federation of South Africa (SEIFSA) using the applicable method described below.

For the purpose of this Sub-Clause, Preliminary and General items are included with Labour and material for the sake of convenience, and which otherwise have no relationship with each other. General Items shall comprise General Requirements and Conditions, Health and Safety, Environmental Management, Sundries, and any other items so described or implied in the Schedules of Rates to be adjusted under this Sub-Clause.

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

Table C3 Index of actual labour cost

Table G2 Construction input price index (Materials purchased by type of service), Other structures

Method of Price Adjustment

Labour and Materials

$$A = a + b \frac{L_n}{L_o} + c \frac{M_n}{M_o} - 1$$

where A = Adjustment Factor rounded off to the sixth decimal place
a = 0.10 Fixed coefficient (non-adjustable portion)
b = 0.25)
c = 0.65) Coefficients (sum of these coefficients shall be 0,90)
Ln = Current labour index in Table C3
Lo = Base labour index in Table C3
Mn = Current materials index in Table G2
Mo = Base materials index in Table G2

Labour only

$$A = a + b \frac{L_n}{L_o} - 1$$

where A = Adjustment Factor rounded off to the sixth decimal place
a = 0.10 Fixed coefficient (non-adjustable portion)
b = 0.90
Ln = Current labour index in Table C3
Lo = Base labour index in Table C3

Materials only

$$A = a + c \frac{M_n}{M_o} - 1$$

where A = Adjustment Factor rounded off to the sixth decimal place
a = 0.10 Fixed coefficient (non-adjustable portion)
c = 0.90)
Mn = Current materials index in Table G2
Mo = Base materials index in Table G2

The value of any Plant and Materials imported from outside South Africa inserted on the schedule titled "**Price Basis for Imported Plant and Material** and subject to Sub-Clause 13.8.2.2.2(a) shall be deducted from the total values to be adjusted by the SEIFSA Index adjustment. Any Plant and Materials not inserted in Schedule 20 shall be deemed to be manufactured in South Africa for the purposes of Contract Price Adjustment.

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

17.5.1 Adjustment for variations in rates of exchange:

(a) The value in foreign currency inserted in column (A) shall be subject to clause (h) below when recalculating the Rand value.

(b) The rate of exchange inserted in column (B) shall be the closing spot selling rate quoted by Council's main banker, NEDBANK, on the Base Date, rounded to the second decimal place, subject to sub-paragraph (c) below.

(c) If the rate of exchange inserted by the Tenderer differs from the NEDBANK rate referred to above, then the NEDBANK rate shall apply and the Rand value in columns (C) and (F) shall be recalculated accordingly, without altering the price in the Price Schedule for the relevant items.

(d) If a tender from a supplier or sub-contractor provides for variations in rates of exchange, the Supplier may **only** claim for variations in rates of exchange if he binds the supplier or sub-contractor to the same provision to take out forward cover as described in sub-paragraph (e) below.

(e) The Supplier (or sub-contractor) shall within five working days from the date of placing a firm order on an overseas supplier, cover or recover forward by way of a contract with a bank which is an authorised foreign exchange dealer, the foreign exchange component of the cost of any imported Plant and Materials inserted by the Tenderer on the scheduled titled "**Price Basis for Imported Resources**".

(f) When the Supplier (or sub-contractor) so obtains forward cover, the Supplier shall immediately notify the CCT of the rate obtained and furnish the CCT with a copy of the foreign exchange contract note.

(g) Based on the evidence provided in sub-paragraph (f) above, the value in Rand inserted in column (C) of on the schedule titled "**Price Basis for Imported Resources**" shall be recalculated using the forward cover rate obtained, and any increase or decrease in the Rand value defined in this clause shall be adjusted accordingly, subject to sub-paragraph (h) below.

(h) The adjustments shall be calculated upon the value in foreign currency in the Supplier's (or sub-contractor's) **forward cover contract**, provided that, should this value exceed the value in foreign currency inserted in column (A) of on the schedule titled "**Price Basis for Imported Resources**", then the value in column (A) shall be used.

17.5.2 Adjustment for variations in customs surcharge and customs duty

(a) Any increase or decrease in the Rand value between the amounts of Customs Surcharge and Customs Duty inserted in on the schedule titled "**Price Basis for Imported Resources**" and those amounts actually paid to the Customs and Excise Authorities, which are due to changes in the percentage rates applicable or to the foreign exchange rate used by the authorities, shall be adjusted accordingly.

(b) The Tenderer shall state the Customs Duty Tariff Reference applicable to each item and the Supplier shall advise the CCT's Agent of any changes which occur.

17.5.3 Adjustment for variation in labour and material Costs

If the prices for imported Plant and Materials are not fixed, the Supplier shall in his Tender specify the formula for calculating Contract Price Adjustments normally used in the country of manufacture and the indices and relative proportions of labour and material on which his Tender prices are based. Evidence of the indices applicable shall be provided with each claim. The indices applicable 42 days before contractual dispatch date from the factory will be used for the purposes of Contract Price Adjustment.

Failure to specify a formula in the Tender shall mean that the prices are fixed or shall be deemed to be fixed.

18. Contract Amendments

Delete the heading of clause 18 and replace with the following:

18. Contract Amendments and Variations

Add the following to clause 18.1:

Variations means changes to the goods, extension of the duration or expansion of the value of the contract that the purchaser issues to the supplier as instructions in writing, subject to prior approval by the purchaser's delegated authority. Should the supplier deliver any goods not described in a written instruction from the purchaser, such work will not become due and payable until amended order has been issued by the purchaser.

20. Subcontracts

Add the following after clause 20.1:

- 20.2 The supplier shall be liable for the acts, defaults and negligence of any subcontractor, his agents or employees as fully as if they were the acts, defaults or negligence of the supplier.
- 20.3 Any appointment of a subcontractor shall not amount to a contract between the CCT and the subcontractor, or a responsibility or liability on the part of the CCT to the subcontractor and shall not relieve the supplier from any liability or obligation under the contract.

21. Delays in the supplier's performance

Delete Clause 21.2 in its entirety and replace with the following:

- 21.2 If at any time during the performance of the contract the supplier or its sub-contractors should encounter conditions beyond their reasonable control which impede the timely delivery of the goods, the supplier shall notify the purchaser in writing, within 7 Days of first having become aware of these conditions, of the facts of the delay, its cause(s) and its probable duration. As soon as practicable after receipt of the supplier's notice, the purchaser shall evaluate the situation, and may at his discretion extend the time for delivery.

Where additional time is granted, the purchaser shall also determine whether or not the supplier is entitled to payment for additional costs in respect thereof. The principle to be applied in this regard is that where the purchaser or any of its agents are responsible for the delay, reasonable costs shall be paid. In respect of delays that were beyond the reasonable control of both the supplier and the purchaser, additional time only (no costs) will be granted.

The purchaser shall notify the supplier in writing of his decision(s) in the above regard.

- 21.3 No provision in a contract shall be deemed to prohibit the obtaining of goods from a national department, provincial department, or a local authority.

22. Penalties

Delete clause 22.1 and replace with the following:

- 22.1 Subject to GCC Clause 25, if the supplier fails to deliver any or all of the goods within the period(s) specified in the contract, the purchaser shall, without prejudice to its other remedies under the contract, deduct from the contract price, as a penalty, a sum as stated herein for each day of the delay until actual delivery or performance.

In the event that the actual delivery period for goods and / or services ordered in terms of this tender exceeds the purchase order delivery period by a week, a penalty of 5% of the value of the

purchase order will be imposed per week. No such penalties shall exceed four weeks or more than 20% of the value of the purchase order concerned.

22.2 The purchaser shall, without prejudice to its other remedies under the contract, deduct from the contract price, financial penalties as contained on the **Preference Schedule** relating to breaches of the conditions upon which preference points were awarded.

23. Termination for default

Delete the heading of clause 23 and replace with the following:

23. Termination

Add the following to the end of clause 23.1:

if the supplier fails to remedy the breach in terms of such notice

Add the following after clause 23.7:

23.8 In addition to the grounds for termination due to default by the supplier, the contract may also be terminated:

23.8.1 Upon the death of the supplier who was a Sole Proprietor, or a sole member of a Close Corporation, in which case the contract will terminate forthwith.

23.8.2 The parties by mutual agreement terminate the contract.

23.8.3 If an Order has been issued incorrectly, or to the incorrect recipient, the resulting contract may be terminated by the purchaser by written notice

23.8.4 If a material irregularity vitiates the procurement process leading to the conclusion of the contract, rendering the procurement process and the conclusion of the resulting contract unfair, inequitable, non-transparent, uncompetitive or not cost-effective, provided the City Manager follows the processes as described in the purchasers SCM Policy.

23.8.5 After providing notice to the supplier, if the implementation of the contract may result in reputational risk or harm to the City as a result of (inter alia):

- 23.8.5.1 reports of poor governance and/or unethical behaviour;
- 23.8.5.2 association with known family of notorious individuals;
- 23.8.5.3 poor performance issues, known to the Employer;
- 23.8.5.4 negative social media reports; or
- 23.8.5.5 adverse assurance (e.g. due diligence) report outcomes..

23.9 If the contract is terminated in terms of clause 23.8, all obligations that were due and enforceable prior to the date of the termination must be performed by the relevant party.

26. Termination for insolvency

Delete clause 26.1 and replace with the following:

26.1 The purchaser may make either of the following elections to ensure its rights are protected and any negative impact on service delivery is mitigated:

26.1.1 accept a supplier proposal (via the liquidator) to render delivery utilising the appropriate contractual mechanisms; or

26.1.2 terminate the contract, as the liquidator proposed supplier is deemed unacceptable to the purchaser, at any time by giving written notice to the supplier (via the liquidator).

26.2 Termination will be without compensation to the supplier, provided that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to the purchaser.

27. Settlement of Disputes

Amend clause 27.1 as follows:

- 27.1 If any dispute or difference of any kind whatsoever, with the exception of termination in terms of clause 23.1(c), arises between the purchaser and the supplier in connection with or arising out of the contract, the parties shall make every effort to resolve such dispute or difference amicably, by mutual consultation.

Delete Clause 27.2 in its entirety and replace with the following:

- 27.2 Should the parties fail to resolve any dispute by way of mutual consultation, either party shall be entitled to refer the matter for mediation before an independent and impartial person appointed by the City Manager in accordance with Regulation 50(1) of the Local Government: Municipal Finance Management Act, 56 of 2003 – Municipal Supply Chain Management Regulations (Notice 868 of 2005). Such referral shall be done by either party giving written notice to the other of its intention to commence with mediation. No mediation may be commenced unless such notice is given to the other party.

Irrespective whether the mediation resolves the dispute, the parties shall bear their own costs concerning the mediation and share the costs of the mediator and related costs equally.

The mediator shall agree the procedures, representation and dates for the mediation process with the parties. The mediator may meet the parties together or individually to enable a settlement.

Where the parties reach settlement of the dispute or any part thereof, the mediator shall record such agreement and on signing thereof by the parties the agreement shall be final and binding.

Save for reference to any portion of any settlement or decision which has been agreed to be final and binding on the parties, no reference shall be made by or on behalf of either party in any subsequent court proceedings, to any outcome of an amicable settlement by mutual consultation, or the fact that any particular evidence was given, or to any submission, statement or admission made in the course of amicable settlement by mutual consultation or mediation.

28. Limitation of Liability

Delete clause 28.1 (b) and replace with the following:

- (b) the aggregate liability of the supplier to the purchaser, whether under the contract, in tort or otherwise, shall not exceed the sums insured in terms of clause 11 in respect of insurable events, or where no such amounts are stated, to an amount equal to twice the contract price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment.

Add the following after clause 28.1:

- 28.2 Without detracting from, and in addition to, any of the other indemnities in this contract, the supplier shall be solely liable for and hereby indemnifies and holds harmless the purchaser against all claims, charges, damages, costs, actions, liability, demands and/or proceedings and expense in connection with:

- a) personal injury or loss of life to any individual;
b) loss of or damage to property;

arising from, out of, or in connection with the performance by the supplier in terms of this Contract, save to the extent caused by the gross negligence or wilful misconduct of the purchaser.

- 28.3 The supplier and/or its employees, agents, concessionaires, suppliers, sub-contractors or customers shall not have any claim of any nature against the purchaser for any loss, damage, injury or death which any of them may directly or indirectly suffer, whether or not such loss, damages, injury or death is caused through negligence of the purchaser or its agents or employees.

- 28.4 Notwithstanding anything to the contrary contained in this Contract, under no circumstances whatsoever, including as a result of its negligent (including grossly negligent) acts or omissions or those of its servants, agents or contractors or other persons for whom in law it may be liable, shall any party or its servants (in whose favour this constitutes a *stipulatio alteri*) be liable for any indirect, extrinsic, special, penal, punitive, exemplary or consequential loss or damage of any kind whatsoever, whether or not the loss was actually foreseen or reasonably foreseeable), sustained by the other party, its directors and/or servants, including but not limited to any loss of profits, loss of operation time, corruption or loss of information and/or loss of contracts.
- 28.5 Each party agrees to waive all claims against the other insofar as the aggregate of compensation which might otherwise be payable exceeds the aforesaid maximum amounts payable.

31. Notices

Delete clauses 31.1 and 31.2 and replace with the following:

- 31.1 Any notice, request, consent, approvals or other communications made between the Parties pursuant to the Contract shall be in writing and forwarded to the addresses specified in the contract and may be given as set out hereunder and shall be deemed to have been received when:
- a) hand delivered – on the working day of delivery
 - b) sent by registered mail – five (5) working days after mailing
 - c) sent by email or telefax – one (1) working day after transmission

32. Taxes and Duties

Delete the final sentence of 32.3 and replace with the following:

In this regard, it is the responsibility of the supplier to submit documentary evidence in the form of a valid Tax Clearance Certificate issued by SARS to the CCT at the Supplier Management Unit located within the Supplier Management / Registration Office, 2nd Floor (Concourse Level), Civic Centre, 12 Hertzog Boulevard, Cape Town (Tel 021 400 9242/3/4/5).

Add the following after clause 32.3:

32.4 The **VAT registration** number of the City of Cape Town is **4500193497**.

ADDITIONAL CONDITIONS OF CONTRACT

Add the following Clause after Clause 34:

35. Reporting Obligations.

35.1 The supplier shall complete, sign and submit with each delivery note, all the documents as required in the Specifications. Any failure in this regard may result in a delay in the processing of any payments.

36. Protection of personal information

- a. The Contractor acknowledges that, for the purposes of the service level agreement, they may come into contact with or have access to personal information and other information that may be classified or deemed as private or confidential and for which CCT is responsible in terms of POPIA. Such personal information may also be deemed or considered as private and confidential as it relates to POPIA.
- b. The Contractor agrees that they will at all times comply with POPIA and CCT's Privacy Notice, and that it shall only collect, use and process personal information it comes into contact with pursuant to this agreement in a lawful manner, and only to the extent required to execute the services, or to provide the goods and to perform their obligations in terms of the service level agreement.
- c. The Contractor agrees that it shall put in place, and at all times maintain, appropriate physical, technological and contractual security measures to ensure the protection and confidentiality of the personal information that it, or its employees, its contractors or other authorised individuals comes into contact in relation to the service level agreement.
- d. The Contractor agrees that it shall notify CCT immediately where there are reasonable grounds to believe that the personal information of a data subject has been accessed or acquired by any unauthorised person.

- e. Unless so required by law, the Contractor agrees that it shall treat the personal information as confidential and further not disclose any personal information as defined in POPIA to any third party without the prior written consent of CCT.
- f. The Contractor hereby indemnifies and holds the CCT harmless against all claims, losses, damages and costs of whatsoever nature suffered by CCT arising from or in relation to the Contractor's (and/or its employees', agents' and sub-contractors') non-compliance with applicable data protection laws and/or other legislation.

The Contractor agrees that CCT may conduct regular data protection audits on the Contractor and undertakes to give its full co-operation in this regard

(8) GENERAL CONDITIONS OF CONTRACT

(National Treasury - General Conditions of Contract (revised July 2010))

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1. Definitions

1. The following terms shall be interpreted as indicated:

- 1.1 'Closing time' means the date and hour specified in the bidding documents for the receipt of bids.
- 1.2 'Contract' means the written agreement entered into between the purchaser and the supplier, as recorded in the contract form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.
- 1.3 'Contract price' means the price payable to the supplier under the contract for the full and proper performance of his or her contractual obligations.
- 1.4 'Corrupt practice' means the offering, giving, receiving, or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution.
- 1.5 'Countervailing duties' are imposed in cases in which an enterprise abroad is subsidised by its government and encouraged to market its products internationally.

- 1.6 'Country of origin' means the place where the goods were mined, grown or produced or from which the services are supplied. Goods are produced when, through manufacturing, processing or substantial and major assembly of components, a commercially recognised new product results that is substantially different in basic characteristics or in purpose or utility from its components.
- 1.7 'Day' means calendar day.
- 1.8 'Delivery' means delivery in compliance with the conditions of the contract or order.
- 1.9 'Delivery ex stock' means immediate delivery directly from stock actually on hand.
- 1.10 'Delivery into consignee's store or to his site' means delivered and unloaded in the specified store or depot or on the specified site in compliance with the conditions of the contract or order, the supplier bearing all risks and charges involved until the supplies are so delivered and a valid receipt is obtained.
- 1.11 'Dumping' occurs when a private enterprise abroad markets its goods on its own initiative in the RSA at lower prices than that of the country of origin, and which action has the potential to harm the local industries in the RSA.
- 1.12 'Force majeure' means an event beyond the control of the supplier, not involving the supplier's fault or negligence, and not foreseeable. Such events may include, but are not restricted to, acts of the purchaser in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes.
- 1.13 'Fraudulent practice' means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of any bidder, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial, non-competitive levels and to deprive the bidder of the benefits of free and open competition.
- 1.14 'GCC' means the General Conditions of Contract.
- 1.15 'Goods' means all of the equipment, machinery, and/or other materials that the supplier is required to supply to the purchaser under the contract.
- 1.16 'Imported content' means that portion of the bidding price represented by the cost of components, parts or materials which have been or are still to be imported (whether by the supplier or his subcontractors) and which costs are inclusive of the costs abroad, plus freight and other direct importation costs such as landing costs, dock dues, import duty, sales duty or other similar tax or duty at the South African place of entry as well as transportation and handling charges to the factory in the Republic where the supplies covered by the bid will be manufactured.
- 1.17 'Local content' means that portion of the bidding price which is not included in the imported content, provided that local manufacture does take place.
- 1.18 'Manufacture' means the production of products in a factory using labour, materials, components and machinery, and includes other, related value-adding activities.
- 1.19 'Order' means an official written order issued for the supply of goods or works or the rendering of a service.
- 1.20 'Project site', where applicable, means the place indicated in bidding documents.
- 1.21 'Purchaser' means the organisation purchasing the goods.
- 1.22 'Republic' means the Republic of South Africa.
- 1.23 'SCC' means the Special Conditions of Contract.

1.24 'Services' means those functional services ancillary to the supply of the goods, such as transportation and any other incidental services, such as installation, commissioning, provision of technical assistance, training, catering, gardening, security, maintenance, and other such obligations of the supplier covered under the contract.

1.25 'Written' or 'in writing' means handwritten in ink or any form of electronic or mechanical writing.

2. Application

2.1 These general conditions are applicable to all bids, contracts and orders, including bids for functional and professional services, sales, hiring, letting and the granting or acquiring of rights, but excluding immovable property, unless otherwise indicated in the bidding documents.

2.2 Where applicable, special conditions of contract are also laid down to cover specific supplies, services or works.

2.3 Where such special conditions of contract are in conflict with these general conditions, the special conditions shall apply.

3. General

3.1 Unless otherwise indicated in the bidding documents, the purchaser shall not be liable for any expense incurred in the preparation and submission of a bid. Where applicable, a non-refundable fee for documents may be charged.

3.2 With certain exceptions, invitations to bid are only published in the Government Tender Bulletin. The Government Tender Bulletin may be obtained directly from the Government Printer, Private Bag X85, Pretoria 0001, or accessed electronically from www.treasury.gov.za.

4. Standards

4.1 The goods supplied shall conform to the standards mentioned in the bidding documents and specifications.

5. Use of contract documents and information; inspection.

5.1 The supplier shall not, without the purchaser's prior written consent, disclose the contract, or any provision thereof, or any specification, plan, drawing, pattern, sample, or information furnished by or on behalf of the purchaser in connection therewith, to any person other than a person employed by the supplier in the performance of the contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far as may be necessary for the purposes of such performance.

5.2 The supplier shall not, without the purchaser's prior written consent, make use of any document or information mentioned in GCC clause 5.1, except for purposes of performing the contract.

5.3 Any document, other than the contract itself, mentioned in GCC clause 5.1 shall remain the property of the purchaser and shall be returned (all copies) to the purchaser on completion of the supplier's performance under the contract if so required by the purchaser.

5.4 The supplier shall permit the purchaser to inspect the supplier's records relating to the performance of the supplier and to have them audited by auditors appointed by the purchaser, if so required by the purchaser.

6. Patent rights

6.1 The supplier shall indemnify the purchaser against all third-party claims of infringement of patent, trademark, or industrial design rights arising from the use of the goods or any part thereof by the purchaser.

7. Performance Security

- 7.1 Within 30 (thirty) days of receipt of the notification of contract award, the successful bidder shall furnish to the purchaser the performance security of the amount specified in the SCC.
- 7.2 The proceeds of the performance security shall be payable to the purchaser as compensation for any loss resulting from the supplier's failure to complete his obligations under the contract.
- 7.2 The performance security shall be denominated in the currency of the contract or in a freely convertible currency acceptable to the purchaser, and shall be in one of the following forms:
 - a) a bank guarantee or an irrevocable letter of credit issued by a reputable bank located in the purchaser's country or abroad, acceptable to the purchaser, in the form provided in the bidding documents or another form acceptable to the purchaser; or
 - b) a cashier's or certified cheque.
- 7.4 The performance security will be discharged by the purchaser and returned to the supplier not later than 30 (thirty) days following the date of completion of the supplier's performance obligations under the contract, including any warranty obligations, unless otherwise specified in the SCC.

8. Inspections, tests and analyses

- 8.1 All pre-bidding testing will be for the account of the bidder.
- 8.2 If it is a bid condition that supplies to be produced or services to be rendered should at any stage during production or execution or on completion be subject to inspection, the premises of the bidder or contractor shall be open, at all reasonable hours, for inspection by a representative of the Department or an organisation acting on behalf of the Department.
- 8.3 If there are no inspection requirements indicated in the bidding documents and no mention of such is made in the contract, but during the contract period it is decided that inspections shall be carried out, the purchaser shall itself make the necessary arrangements, including payment arrangements with the testing authority concerned.
- 8.4 If the inspections, tests and analyses referred to in clauses 8.2 and 8.3 show the supplies to be in accordance with the contract requirements, the cost of the inspections, tests and analyses shall be defrayed by the purchaser.
- 8.5 Where the supplies or services referred to in clauses 8.2 and 8.3 do not comply with the contract requirements, irrespective of whether such supplies or services are accepted or not, the cost in connection with these inspections, tests or analyses shall be defrayed by the supplier.
- 8.6 Supplies and services which are referred to in clauses 8.2 and 8.3 and which do not comply with the contract requirements may be rejected.
- 8.7 Any contract supplies may on or after delivery be inspected, tested or analysed and may be rejected if found not to comply with the requirements of the contract. Such rejected supplies shall be held at the cost and risk of the supplier, who shall, when called upon, remove them immediately at his own cost and forthwith substitute them with supplies which do comply with the requirements of the contract. Failing such removal, the rejected supplies shall be returned at the suppliers cost and risk. Should the supplier fail to provide the substitute supplies forthwith, the purchaser may, without giving the supplier further opportunity to substitute the rejected supplies, purchase such supplies as may be necessary at the expense of the supplier.
- 8.8 The provisions of clauses 8.4 to 8.7 shall not prejudice the right of the purchaser to cancel the contract on account of a breach of the conditions thereof, or to act in terms of Clause 23 of the GCC.

9. Packing

- 9.1 The supplier shall provide such packing of the goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit, and open storage. Packing, case size and weights shall take into consideration, where appropriate, the remoteness of the goods' final destination and the absence of heavy handling facilities at all points in transit.
- 9.2 The packing, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the contract, including additional requirements, if any, specified in the SCC, and in any subsequent instructions ordered by the purchaser.

10. Delivery and documents

- 10.1 Delivery of the goods shall be made by the supplier in accordance with the terms specified in the contract. The details of shipping and/or other documents to be furnished by the supplier are specified in the SCC.
- 10.2 Documents to be submitted by the supplier are specified in the SCC.

11. Insurance

- 11.1 The goods supplied under the contract shall be fully insured, in a freely convertible currency, against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in the manner specified in the SCC.

12. Transportation

- 12.1 Should a price other than an all-inclusive delivered price be required, this shall be specified in the SCC.

13. Incidental Services

- 13.1 The supplier may be required to provide any or all of the following services, including additional services (if any) specified in the SCC:
- (a) performance or supervision of on-site assembly, and/or commissioning of the supplied goods;
 - (b) furnishing of tools required for the assembly and/or maintenance of the supplied goods;
 - (c) furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied goods;
 - (d) performance or supervision or maintenance and/or repair of the supplied goods, for a period of time agreed by the parties, provided that this service shall not relieve the supplier of any warranty obligations under this contract; and
 - (e) training of the purchaser's personnel, at the supplier's plant and/or on-site, in assembly, start-up, operation, maintenance, and/or repair of the supplied goods.
- 13.2 Prices charged by the supplier for incidental services, if not included in the contract price for the goods, shall be agreed upon in advance by the parties and shall not exceed the prevailing rates charged to other parties by the supplier for similar services.

14. Spare parts

- 14.1 As specified in the SCC, the supplier may be required to provide any or all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the supplier:
- (a) such spare parts as the purchaser may elect to purchase from the supplier, provided that this election shall not relieve the supplier of any warranty obligations under the contract; and
 - (b) in the event of termination of production of the spare parts:
 - (i) Advance notification to the purchaser of the pending termination, in sufficient time to permit the purchaser to procure needed requirements; and
 - (ii) following such termination, furnishing at no cost to the purchaser, the blueprints, drawings, and specifications of the spare parts, if requested.

15. Warranty

- 15.1 The supplier warrants that the goods supplied under the contract are new, unused, of the most recent or current models, and that they incorporate all recent improvements in design and materials unless provided otherwise in the contract. The supplier further warrants that all goods supplied under this contract shall have no defect arising from design, materials, or workmanship (except when the design and/or material is required by the purchaser's specifications), or from any act or omission of the supplier, that may develop under normal use of the supplied goods in the conditions prevailing in the country of final destination.
- 15.2 This warranty shall remain valid for 12 (twelve) months after the goods, or any portion thereof, as the case may be, have been delivered to and accepted at the final destination indicated in the contract, or for 18 (eighteen) months after the date of shipment from the port or place of loading in the source country, whichever period concludes earlier, unless specified otherwise in the SCC.
- 15.3 The purchaser shall notify the supplier promptly, in writing, of any claims arising under this warranty.
- 15.4 Upon receipt of such notice, the supplier shall, within the period specified in the SCC and with all reasonable speed, repair or replace the defective goods or parts thereof, without costs to the purchaser.
- 15.5 If the supplier, having been notified, fails to remedy the defect(s) within the period specified in the SCC, the purchaser may proceed to take such remedial action as may be necessary, at the supplier's risk and expense and without prejudice to any other rights which the purchaser may have against the supplier under the contract.

16. Payment

- 16.1 The method and conditions of payment to be made to the supplier under this contract shall be specified in the SCC.
- 16.2 The supplier shall furnish the purchaser with an invoice accompanied by a copy of the delivery note and upon fulfillment of any other obligations stipulated in the contract.
- 16.3 Payments shall be made promptly by the purchaser, but in no case later than 30 (thirty) days after submission of an invoice or claim by the supplier.
- 16.4 Payment will be made in Rand unless otherwise stipulated in the SCC.

17. Prices

- 17.1 Prices charged by the supplier for goods delivered and services performed under the contract shall not vary from the prices tendered by the supplier in his bid, with the exception of any price adjustments authorized in the SCC or in the purchaser's request for bid validity extension, as the case may be.

18. Contract Amendments

- 18.1 No variation in or modification of the terms of the contract shall be made except by written amendment signed by the parties concerned.

19. Assignment

- 19.1 The supplier shall not assign, in whole or in part, its obligations to perform under the contract, except with the purchaser's prior written consent.

20. Subcontracts

- 20.1 The supplier shall notify the purchaser in writing of all subcontracts awarded under this contract if not already specified in the bid. Such notification, in the original bid or later, shall not relieve the supplier from any liability or obligation under the contract.

21. Delays in the supplier's performance

- 21.1 Delivery of the goods and performance of services shall be made by the supplier in accordance with the time schedule prescribed by the purchaser in the contract.
- 21.2 If at any time during the performance of the contract, the supplier or its subcontractor(s) should encounter conditions impeding timely delivery of the goods and performance of services, the supplier shall promptly notify the purchaser in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the supplier's notice, the purchaser shall evaluate the situation and may at his or her discretion extend the supplier's time for performance, with or without the imposition of penalties, in which case the extension shall be ratified by the parties by amendment of contract.
- 21.3 No provision in a contract shall be deemed to prohibit the obtaining of supplies or services from a national department, provincial department, or a local authority.
- 21.4 The right is reserved to procure, outside of the contract, small quantities of supplies; or to have minor essential services executed if an emergency arises, or the supplier's point of supply is not situated at or near the place where the supplies are required, or the supplier's services are not readily available.
- 21.5 Except as provided under GCC Clause 25, a delay by the supplier in the performance of its delivery obligations shall render the supplier liable to the imposition of penalties, pursuant to GCC Clause 22, unless an extension of time is agreed upon pursuant to GCC Clause 21.2 without the application of penalties.
- 21.6 Upon any delay beyond the delivery period in the case of a supplies contract, the purchaser shall, without cancelling the contract, be entitled to purchase supplies of a similar quality and up to the same quantity in substitution of the goods not supplied in conformity with the contract and to return any goods delivered later at the supplier's expense and risk, or to cancel the contract and buy such goods as may be required to complete the contract and, without prejudice to his other rights, be entitled to claim damages from the supplier.

22. Penalties

- 22.1 Subject to GCC Clause 25, if the supplier fails to deliver any or all of the goods or to perform the services within the period(s) specified in the contract, the purchaser shall, without prejudice to its other remedies under the contract, deduct from the contract price, as a penalty, a sum calculated on the delivered price of the delayed goods or unperformed services, using the current prime interest rate, calculated for each day of the delay until actual delivery or performance. The purchaser may also consider termination of the contract pursuant to GCC Clause 23.

23. Termination for default

- 23.1 The purchaser, without prejudice to any other remedy for breach of contract, by written notice of default sent to the supplier, may terminate this contract in whole or in part:
- (a) if the supplier fails to deliver any or all of the goods within the period(s) specified in the contract, or within any extension thereof granted by the purchaser pursuant to GCC Clause 21.2;
 - (b) if the supplier fails to perform any other obligation(s) under the contract; or
 - (c) if the supplier, in the judgment of the purchaser, has engaged in corrupt or fraudulent practices in competing for or in executing the contract.
- 23.2 In the event the purchaser terminates the contract in whole or in part, the purchaser may procure, upon such terms and in such manner as it deems appropriate, goods, works or services similar to those undelivered, and the supplier shall be liable to the purchaser for any excess costs for such similar goods, works or services. However, the supplier shall continue performance of the contract to the extent not terminated.
- 23.3 Where the purchaser terminates the contract in whole or in part, the purchaser may decide to impose a restriction penalty on the supplier by prohibiting such supplier from doing business with the public sector for a period not exceeding 10 years.

- 23.4 If a purchaser intends imposing a restriction on a supplier or any person associated with the supplier, the supplier will be allowed a time period of not more than 14 (fourteen) days to provide reasons why the envisaged restriction should not be imposed. Should the supplier fail to respond within the stipulated 14 (fourteen) days the purchaser may regard the intended penalty as not objected against and may impose it on the supplier.
- 23.5 Any restriction imposed on any person by the Accounting Officer/Authority will, at the discretion of the Accounting Officer/Authority, also be applicable to any other enterprise or any partner, manager, director or other person who wholly or partly exercises or exercised or may exercise control over the enterprise of the first-mentioned person, and with which enterprise or person the first-mentioned person is or was, in the opinion of the Accounting Officer/Authority, actively associated.
- 23.6 If a restriction is imposed, the purchaser must, within 5 (five) working days of such imposition, furnish the National Treasury with the following information:
- (i) the name and address of the supplier and/or person restricted by the purchaser;
 - (ii) the date of commencement of the restriction;
 - (iii) the period of restriction; and
 - (iv) the reasons for the restriction.

These details will be loaded in the National Treasury's central database of suppliers or persons prohibited from doing business with the public sector.

- 23.7 If a court of law convicts a person of an offence as contemplated in sections 12 or 13 of the Prevention and Combating of Corrupt Activities Act, Act 12 of 2004, the court may also rule that such person's name be endorsed on the Register for Tender Defaulters. When a person's name has been endorsed on the Register, the person will be prohibited from doing business with the public sector for a period of not less than five years and not more than 10 years. The National Treasury is empowered to determine the period of restriction, and each case will be dealt with on its own merits. According to section 32 of the Act the Register must be open to the public. The Register can be perused on the National Treasury website.

24. Anti-dumping and countervailing duties and rights

- 24.1 When, after the date of bid, provisional payments are required, or anti-dumping or countervailing duties are imposed, or the amount of a provisional payment or anti-dumping or countervailing right is increased in respect of any dumped or subsidised import, the State is not liable for any amount so required or imposed, or for the amount of any such increase. When, after the said date, such a provisional payment is no longer required or any such anti-dumping or countervailing right is abolished, or where the amount of such provisional payment or any such right is reduced, any such favourable difference shall, on demand, be paid forthwith by the contractor to the State, or the State may deduct such amounts from moneys (if any) which may otherwise be due to the contractor in regard to supplies or services which he or she delivered or rendered, or is to deliver or render in terms of the contract or any other contract or any other amount which may be due to him or her.

25. Force majeure

- 25.1 Notwithstanding the provisions of GCC Clauses 22 and 23, the supplier shall not be liable for forfeiture of its performance security, damages, or termination for default if, and to the extent that, his delay in performance or other failure to perform his obligations under the contract is the result of an event of force majeure.
- 25.2 If a force majeure situation arises, the supplier shall notify the purchaser promptly, in writing, of such condition and the cause thereof. Unless otherwise directed by the purchaser in writing, the supplier shall continue to perform its obligations under the contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the force majeure event.

26. Termination for insolvency

- 26.1 The purchaser may at any time terminate the contract by giving written notice to the supplier if the supplier becomes bankrupt or otherwise insolvent. In this event, termination will be without

compensation to the supplier, provided that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to the purchaser.

27. Settlement of Disputes

- 27.1 If any dispute or difference of any kind whatsoever arises between the purchaser and the supplier in connection with or arising out of the contract, the parties shall make every effort to resolve such dispute or difference amicably, by mutual consultation.
- 27.2 If, after 30 (thirty) days, the parties have failed to resolve their dispute or difference by such mutual consultation, then either the purchaser or the supplier may give notice to the other party of his intention to commence with mediation. No mediation in respect of this matter may be commenced unless such notice is given to the other party.
- 27.3 Should it not be possible to settle a dispute by means of mediation, it may be settled in a South African court of law.
- 27.4 Mediation proceedings shall be conducted in accordance with the rules of procedure specified in the SCC.
- 27.5 Notwithstanding any reference to mediation and/or court proceedings herein,
- (a) the parties shall continue to perform their respective obligations under the contract unless they otherwise agree; and
 - (b) the purchaser shall pay the supplier any monies due to the supplier.

28. Limitation of Liability

- 28.1 Except in cases of criminal negligence or wilful misconduct, and in the case of infringement pursuant to Clause 6:
- (a) the supplier shall not be liable to the purchaser, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the supplier to pay penalties and/or damages to the purchaser; and
 - (b) the aggregate liability of the supplier to the purchaser, whether under the contract, in tort or otherwise, shall not exceed the total contract price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment.

29. Governing language

- 29.1 The contract shall be written in English. All correspondence and other documents pertaining to the contract that is exchanged by the parties shall also be written in English.

30. Applicable Law

- 30.1 The contract shall be interpreted in accordance with South African laws, unless otherwise specified in the SCC.

31. Notices

- 31.1 Every written acceptance of a bid shall be posted to the supplier concerned by registered or certified mail, and any other notice to him shall be posted by ordinary mail, to the address furnished in his bid or to the address notified later by him in writing; and such posting shall be deemed to be proper service of such notice.
- 31.2 The time mentioned in the contract documents for performing any act after such aforesaid notice has been given, shall be reckoned from the date of posting of such notice.

32. Taxes and Duties

- 32.1 A foreign supplier shall be entirely responsible for all taxes, stamp duties, licence fees, and other such levies imposed outside the purchaser's country.

32.2 A local supplier shall be entirely responsible for all taxes, duties, licence fees, etc., incurred until delivery of the contracted goods to the purchaser.

32.3 No contract shall be concluded with any bidder whose tax matters are not in order. Prior to the award of a bid the Department must be in possession of a tax clearance certificate submitted by the bidder. This certificate must be an original issued by the South African Revenue Services.

33. National Industrial Participation (NIP) Programme

33.1 The NIP Programme administered by the Department of Trade and Industry shall be applicable to all contracts that are subject to the NIP obligation.

34 Prohibition of Restrictive practices

34.1 In terms of section 4 (1) (b) (iii) of the Competition Act, Act 89 of 1998, as amended, an agreement between or concerted practice by firms, or a decision by an association of firms, is prohibited if it is between parties in a horizontal relationship and if a bidder(s) is/are or a contractor(s) was/were involved in collusive bidding (or bid rigging).

34.2 If a bidder(s) or contractor(s), based on reasonable grounds or evidence obtained by the purchaser, has/have engaged in the restrictive practice referred to above, the purchaser may refer the matter to the Competition Commission for investigation and possible imposition of administrative penalties as contemplated in the Competition Act, Act 89 of 1998.

34.3 If a bidder(s) or contractor(s) has/have been found guilty by the Competition Commission of the restrictive practice referred to above, the purchaser may, in addition and without prejudice to any other remedy provided for, invalidate the bid(s) for such item(s) offered, and/or terminate the contract in whole or part, and/or restrict the bidder(s) or contractor(s) from conducting business with the public sector for a period not exceeding 10 (ten) years and/or claim damages from the bidder(s) or contractor(s) concerned.

(9) FORM OF GUARANTEE / PERFORMANCE SECURITY

FORM OF GUARANTEE / PERFORMANCE SECURITY

GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means:

Physical address of Guarantor:

"Supplier" means:

"Contract Sum" means: The accepted tender amount (INCLUSIVE OF VAT) of R

Amount in words:

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

Amount in words:

"Contract" means: The agreement made in terms of the Form of Offer and Acceptance for tender no _____: _____ and such amendments or additions to the contract as may be agreed in writing between the parties.

PERFORMANCE GUARANTEE

1. The Guarantor's liability shall be limited to the amount of the Guaranteed Sum.
2. The Guarantor's period of liability shall be from and including the date of issue of this Guarantee/Performance Security up to and including the termination of the Contract or the date of payment in full of the Guaranteed Sum, whichever occurs first.
3. The Guarantor hereby acknowledges that:
 - 3.1 any reference in this Guarantee/Performance to "Contract" is made for the purpose of convenience and shall not be construed as any intention whatsoever to create an accessory obligation or any intention whatsoever to create a suretyship;
 - 3.2 its obligation under this Guarantee/Performance Security is restricted to the payment of money.
4. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor hereby undertakes to pay the City of Cape Town the sum due and payable upon receipt of the documents identified in 4.1 to 4.2:
 - 4.1 A copy of a first written demand issued by the City of Cape Town to the Supplier stating that payment of a sum which is due and payable has not been made by the Supplier in terms of the Contract and failing such payment within seven (7) calendar days, the City of Cape Town intends to call upon the Guarantor to make payment in terms of 4.2;
 - 4.2 A first written demand issued by the City of Cape Town to the Guarantor at the Guarantor's physical address with a copy to the Supplier stating that a period of seven (7) days has elapsed since the first written demand in terms of 4.1 and the sum has still not been paid.
5. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor undertakes to pay to the City of Cape Town the Guaranteed Sum or the full outstanding balance upon receipt of a first written demand from the City of Cape Town to the Guarantor at the Guarantor's physical address calling up this Guarantee / Performance Security, such demand stating that:
 - 5.1 the Contract has been terminated due to the Supplier's default and that this Guarantee/Performance Security is called up in terms of 5; or

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

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

6. It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 4 and 5 shall not exceed the Guarantor's maximum liability in terms of 1.
7. Where the Guarantor has made payment in terms of 5, the City of Cape Town shall upon the termination date of the Contract, submit an expense account to the Guarantor showing how all monies received in terms of this Guarantee/Performance Security have been expended and shall refund to the Guarantor any resulting surplus. All monies refunded to the Guarantor in terms of this Guarantee/Performance Security shall bear interest at the prime overdraft rate of the City of Cape Town's bank compounded monthly and calculated from the date payment was made by the Guarantor to the City of Cape Town until the date of refund.
8. Payment by the Guarantor in terms of 4 or 5 shall be made within seven (7) calendar days upon receipt of the first written demand to the Guarantor.
9. The City of Cape Town shall have the absolute right to arrange its affairs with the Supplier in any manner which the City of Cape Town may deem fit and the Guarantor shall not have the right to claim his release from this Guarantee /Performance Security on account of any conduct alleged to be prejudicial to the Guarantor.
10. The Guarantor chooses the physical address as stated above for the service of all notices for all purposes in connection herewith.
11. This Guarantee/Performance Security is neither negotiable nor transferable and shall expire in terms of 2, where after no claims will be considered by the Guarantor. The original of this Guarantee / Performance Security shall be returned to the Guarantor after it has expired.
12. This Guarantee/Performance Security, with the required demand notices in terms of 4 or 5, shall be regarded as a liquid document for the purposes of obtaining a court order.
13. Where this Guarantee/Performance Security is issued in the Republic of South Africa the Guarantor hereby consents in terms of Section 45 of the Magistrate's Courts Act No 32 of 1944, as amended, to the jurisdiction of the Magistrate's Court of any district having jurisdiction in terms of Section 28 of the said Act, notwithstanding that the amount of the claim may exceed the jurisdiction of the Magistrate's Court.

Signed at

Date

Guarantor's signatory (1)

Capacity

Guarantor's signatory (2)

Capacity

Witness signatory (1)

Witness signatory (2)

ANNEXURE

LIST OF APPROVED FINANCIAL INSTITUTIONS

The following financial institutions are currently (as at 12 October 2021) approved for issue of contract guarantees to the City:

National Banks:

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

International Banks (with branches in SA):

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

Insurance companies:

American International Group Inc (AIG)
Bryte Insurance Company Limited
Coface SA
Compass Insurance Company Limited
Credit Guarantee Insurance Corporation of Africa
Limited Guardrisk Insurance Company Limited
Hollard Insurance Company Limited
Infiniti Insurance Limited
Lombard Insurance Company Limited
New National Assurance Company Limited
PSG Konsult Ltd (previously Absa Insurance)
Regent Insurance Company Limited
Renasia Insurance Company Limited
Santam Limited

(10) FORM OF ADVANCE PAYMENT GUARANTEE – NOT USED

ADVANCE PAYMENT GUARANTEE

GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means:

Physical address of guarantor:

"Supplier" means:

"Contract Sum" means: The accepted tender amount (INCLUSIVE of VAT) of R

Amount in words:

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

"Plant and materials" means: The Plant and materials in respect of which an advance payment prior to manufacture is required, which the City of Cape Town has agreed may be subject to advance payment, such Plant and materials being listed in the Schedule of Plant and materials.

"Schedule of Plant and materials" means: A list of Plant and materials which shows the value thereof to be included in the Guaranteed Advance Payment Sum.

"Guaranteed Advance Payment Sum" means: The maximum amount of R

Amount in words:

1. The Guarantor's liability shall be limited to the amount of the Guaranteed Advance Payment Sum.
2. The Guarantor's period of liability shall be from and including the date of issue of this Advance Payment Guarantee and up to and including the termination of the Contract or the date of payment in full of the Guaranteed Advance Payment Sum, whichever occurs first.
3. The Guarantor hereby acknowledges that:
 - 3.1 any reference in this Advance Payment Guarantee to the Contract is made for the purpose of convenience and shall not be construed as any intention whatsoever to create an accessory obligation or any intention whatsoever to create a suretyship;
 - 3.2 its obligation under this Advance Payment Guarantee is restricted to the payment of money.
4. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor hereby undertakes to pay the City of Cape Town the sum advanced to the Supplier upon receipt of the documents identified in 4.1 to 4.2:
 - 4.1 A copy of a first written demand issued by the City of Cape Town to the Supplier stating that payment of a sum advanced by the City of Cape Town has not been repaid by the Supplier in terms of the Contract ("default") and failing such payment within seven (7) calendar days, the City of Cape Town intends to call upon the Guarantor to make payment in terms of 4.2;
 - 4.2 A first written demand issued by the City of Cape Town to the Guarantor at the Guarantor's physical address with a copy to the Supplier stating that a period of seven (7) calendar days has elapsed since the first written demand in terms of 4.1 and the sum advanced has still not been repaid by the Supplier.
5. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor undertakes to pay to the City of Cape Town the Guaranteed Advance Payment Sum or the full outstanding balance not repaid upon receipt of a first written demand from the City of Cape Town to the Guarantor at the Guarantor's physical address calling up this Advance Payment Guarantee, such demand stating that:
 - 5.1 the Contract has been terminated due to the Supplier's default and that this Advance Payment Guarantee is called up in terms of 5; or
 - 5.2 a provisional or final sequestration or liquidation court order has been granted against the Supplier and that the Advance Payment Guarantee is called up in terms of 5; and
 - 5.3 the aforesaid written demand is accompanied by a copy of the notice of termination and/or the provisional/final

sequestration and/or the provisional liquidation court order.

6. It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 4 and 5 shall not exceed the Guarantor's maximum liability in terms of 1.
7. Payment by the Guarantor in terms of 4 or 5 shall be made within seven (7) calendar days upon receipt of the first written demand to the Guarantor.
9. The City of Cape Town shall have the absolute right to arrange its affairs with the Supplier in any manner which the City of Cape Town may deem fit and the Guarantor shall not have the right to claim his release from this Advance Payment Guarantee on account of any conduct alleged to be prejudicial to the Guarantor.
10. The Guarantor chooses the physical address as stated above for the service of all notices for all purposes in connection herewith.
11. This Advance Payment Guarantee is neither negotiable nor transferable and shall expire in terms of 2, whereafter no claims will be considered by the Guarantor. The original of this Guarantee shall be returned to the Guarantor after it has expired.
12. This Advance Payment Guarantee, with the required demand notices in terms of 4 or 5, shall be regarded as a liquid document for the purposes of obtaining a court order.
13. Where this Guarantee/Performance Security is issued in the Republic of South Africa the Guarantor hereby consents in terms of Section 45 of the Magistrate's Courts Act No 32 of 1944, as amended, to the jurisdiction of the Magistrate's Court of any district having jurisdiction in terms of Section 28 of the said Act, notwithstanding that the amount of the claim may exceed the jurisdiction of the Magistrate's Court.

Signed at

Date

Guarantor's signatory (1)

Capacity

Guarantor's signatory (2)

Capacity

Witness signatory (1)

Witness signatory (2)

(10.1) ADVANCE PAYMENT SCHEDULE – NOT USED

This Advance Payment Schedule is to be read in conjunction with clause 16.6 in the SCC. The purpose of this schedule is to itemise specific plant and materials for which the CCT is prepared to make advance payment to the supplier, subject to the conditions below.

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

Plant and materials which have been manufactured and are stored by the supplier (only allowed for cremators and abatement equipment, if applicable):	Plant and materials yet to be manufactured and for which a deposit with order is required from the supplier by a third party manufacturer/supplier, and which may be stored by the supplier (only allowed for cremators and abatement equipment, if applicable):

Conditions:

- 1) The supplier can only rely on advance payment being permitted by the CCT in respect of the plant and materials listed in the table above. The CCT may, however, permit advance payment for other plant and materials in exceptional circumstances and at its sole discretion, during the course of the Contract, and upon reasonable request from the supplier.
- 2) Advance payment for the purposes of deposits will only be provided up to a limit of 50% of the value of any one item being claimed.
- 3) The supplier shall provide the CCT with documentary evidence of the terms and conditions for which a deposit with order is required by a third party manufacturer/supplier, together with the advance payment guarantee.
- 4) The supplier will also be permitted to obtain advance payment for the balance of the value of the plant and materials in respect of which he has paid a deposit, for an item which after manufacture is stored by the supplier. The supplier shall, in respect of such payment, provide an advance payment guarantee, either for such balance or, if the advance payment guarantee in respect of the deposit is to be returned by the CCT upon request, for the whole value of the item.

(11) OCCUPATIONAL HEALTH AND SAFETY AGREEMENT

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

..... ,
(Supplier/Mandatory/Company/CC Name)

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

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

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

COID ACT Registration Number:

OR Compensation Insurer: Policy No.:

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

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

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

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

Signed at on the..... day of.....20....

Witness

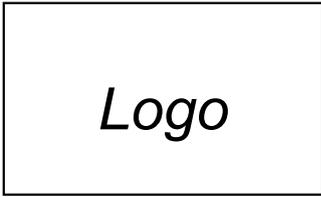
Mandatory

Signed at on the..... day of.....20

Witness

for and on behalf of
City of Cape Town

(12) INSURANCE BROKER'S WARRANTY (PRO FORMA)



Letterhead of supplier's Insurance Broker

Date _____

CITY OF CAPE TOWN
City Manager
Civic Centre
12 Hertzog Boulevard
Cape Town
8000

Dear Sir

TENDER NO.: 60G/2022/23

TENDER DESCRIPTION: PROCUREMENT OF NEW CREMATORS AND ASSOCIATED WORKS

NAME OF SUPPLIER: _____

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

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

Yours faithfully

Signed: _____

For: _____ (Supplier's Insurance Broker)

(13) SPECIFICATION(S)

13.1 TRADE NAMES OR PROPRIETARY PRODUCTS

Bid specifications may not make any reference to any particular trade mark, name, patent, design, type, specific origin or producer, unless there is no other sufficiently precise or intelligible way of describing the characteristics of the work, in which case such reference must be accompanied by the words “or equivalent”.

TENDERERS MUST NOTE THAT WHEREVER THIS DOCUMENT REFERS TO ANY PARTICULAR TRADE MARK, NAME, PATENT, DESIGN, TYPE, SPECIFIC ORIGIN OR PRODUCER, SUCH REFERENCE SHALL BE DEEMED TO BE ACCOMPANIED BY THE WORDS ‘OR EQUIVALENT’

13.2. EMPLOYMENT OF SECURITY PERSONNEL

All security staff employed by the supplier on behalf of the CCT or at any CCT property must be registered with Private Security Industry Regulatory Authority (PSiRA). Proof of such registration must be made available to the CCT’s agent upon request.

13.3 FORMS FOR CONTRACT ADMINISTRATION

The supplier shall complete, sign and submit with each invoice, the following:

- a) Monthly Project Labour Report (**Annex 3**).
- b) B-BBEE Sub-Contract Expenditure Report (**Annex 4**).
- c) Joint Venture Expenditure Report (**Annex 5**).

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

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

The Monthly Project Labour Reports shall be completed and submitted in accordance with the instructions therein.

13.4 PERFORMANCE MANAGEMENT TO BE ADHERED TO

Contractor will be measured against the following:

Business Process for Tender no: 7119G/2022/23

The contractor shall be measured against his performance in adhering to the specifications and timelines undersigned per works project.

Attend Site Meeting/ Complete Works Project Document

- The contractor shall make available a Contractor's Representative for each works project scope meeting;
- The Contractor's Representative must be available at short notice and after hours for emergency work as and when required;
- Following the scope meeting, the City's Works Project Manager shall make available the works project document for the Contractor's completion by the due date specified;
- A scope of works document shall be completed for each works project, signed by the Works Project Manager and contractor's representative.

Request Start and Finish Dates or Works Programme

- Upon receiving the purchase order from the City, a Start and Finish will be supplied by the Contractor via e-mail;
- Contractor to supply a realistic Start and Finish date within five (5) working days for when work will commence and be completed.

Work scheduled and in progress:

- Contractor performs the work according to tender and scope specifications;
- Safety Files must be available on site with the Contractor from start until finish date of the project;
- Deviation from start/finish dates will only be allowed if the project is stopped or delayed by City of Cape Town;
- Contractor to communicate all issues with regards to the project directly with the Works Project Manager and/or Contract Manager.

Sign off work as complete

- Contractor to attend sign off meeting arranged by Works Project Manager;
- Works Project Manager and Contractor must complete and sign documentation or complete Snag list;
- Works Project Manager and Contractor must sign Snag list, if applicable, and Contractor to supply a new completion date.

Contractor to supply Invoice

- Contractor to supply Project Manager with invoice once signoff has been completed.

Safety Audits

- As and when required work sites will be audited by a Safety Audit Contractor;
- All sites that have been audited must achieve a minimum score of 80%.

Note: where reference to Works Project Manager is made above, the term is interchangeable with Contract Manager and/or Principal Agent.

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General Scope of Works

This specification lays down the performance, quality, and overall system requirements of the works. Deviation from the Specification will only be considered if the Engineer considers such deviation an improvement. The work shall meet with the approval of the Engineers in all its parts and details

The Contractor shall carry out any other incidental works or supply and install accessories, not specifically mentioned but considered necessary to bring the whole installation to proper and satisfactory working order. All such works and items not included in the scope should be included in price schedule Section 13. All other accessories required to comply fully with Local Authority Regulation/Requirements shall also be supplied and installed. No additional claims will be allowed if the Contractor fails to include these items in the tender, or price schedule.

From an electrical point of view, the contractor will be responsible for the installation of his electrical control equipment and panels. This includes all the equipment, sensors, cable trays and wiring between his panels and his field equipment. The client will be responsible for the supply of electrical power to 1x main electrical incoming connection into the contractor's panel/equipment. All other electrical power and signal reticulation will form part of the contractor's scope of supply.

Drawings and descriptive technical brochures for all equipment will be submitted for review to the Engineers prior to fabrication and installation of works.

Contractor will provide all other information and equipment needed to complete related works by other subcontractors.

a) *Table 1: Applicable Standards*

APPLICABLE STANDARDS		
No	Standard	Description
1	Government Gazette, Vol. 581 No. 37054 – Subcategory 8.2	The Emissions Standards for Crematoria and Veterinary Waste Incineration
2	The Occupational Health and Safety Act 85 of 1993	The Occupational Health and Safety
3	SANS 329:	Thermo processing equipment
4	SANS 347:	Categorization and conformity assessment criteria for all pressure equipment
5	SANS 10087-3	The handling, storage, distribution and maintenance of liquefied petroleum gas in domestic, commercial, and industrial installations.
6	SANS 10147	Refrigerating systems, including plants associated with air-conditioning systems
7	SANS 1238:2005(SABS 1238)	Material, constructional and dimensional requirements for steel and aluminium ductwork (together with fittings and dampers)
8	Western Cape Provincial Government Standard Specification.	
9	City of Cape Town General or Standard Specifications	

Supply of Labour, Equipment and Materials

Only competent personnel that have been adequately trained by the Contractor shall execute all the required work. All tools, equipment and consumables that are required for undertaking work shall be provided by the Contractor at his cost. All material, spare parts, components, equipment and accessories necessary for the repairs of each installation shall be supplied and installed by the Contractor. All workmanship, materials and components used for replacements shall be guaranteed for a minimum of twelve (12) months.

Communication

The Contractor shall ensure that he is reachable by telephone, email and a cellular telephone connection to ensure that he can be reached at any time. CCT shall furnish the Contractor with a list of contact details of all his operating personnel at the various installations. Should CCT or operating personnel determine or suspect that preventative, corrective or breakdown maintenance is required, a call shall be logged through the call centre to reach the Contractor as soon as possible.

1. Payment Structure

1.1.1 Small Plant charges

Unit: Hour (hr)/ Day (day)/ Week (wk.) As specified.

The unit of measurement shall be a rate to establish and operate plant and equipment.

The rates for plant shall, in addition, cover the cost of insurances, transport, hiring where required, consumable stores, fuel and maintenance.

1.1.2 Large Plant Site Establishment & Removal charges

Unit: Number

The unit of measurement shall be the amount of times the plant was established and removed from site.

The rate shall include charges for overheads, fuel, maintenance, charges and profit for the supply, delivery, offloading, loading and/or removal etc. of a large plant including the delivery of all woven slings, steel rope, steel chains, shackles etc. as required for rigging and lifting. The requirements for rigging and lifting equipment shall be the responsibility of the Contractor. The rates shall include full compensation for all costs related to travelling, inspecting and assessing the site.

1.1.3 Large Plant Operate & Maintain charges

Unit: Hour (hr) / Day (day) As specified.

The unit of measurement shall be an hourly/daily rate to operate a large plant.

The rate shall include charges for overheads, fuel, maintenance, charges and profit including woven slings, steel rope, steel chains, shackles etc. as required for rigging and lifting. The requirements for rigging and lifting equipment shall be the responsibility of the Contractor.

In the case of rigging equipment, insurance must cover the value of the items being lifted and this must be included in the rate.

1.1.4 Piping Install Charge

Unit: Meter (m)

The unit of measurement shall be the length of piping installed

The tendered rates shall include full compensation for the installation, testing, and commissioning of piping/ducting and actions necessitated to obtain a complete and efficiently working system.

Separate items will be listed in the Bill of Rates for different types and sizes of equipment.

1.1.5 Transport Charge

Unit: Kilometre (km)

The unit of measurement shall be a kilometre rate for the transport and delivery of materials, equipment or labour into storage or on the site (excluding large or mobile plant measured elsewhere).

The rate shall include all charges including overheads, fuel, maintenance, charges, profit etc. Rate must also include insurance for all the goods in transit.

1.1.6 Labour Charge

Unit: Hour (hr)

The unit of measurement shall be an hourly rate to supply the required labour. The unit rates for labour and plant, or the percentage allowances for addition to the net cost of labour and materials shall cover overhead charges and profit, site supervision and site staff, insurances, holidays with pay, and use and maintenance of tools and equipment. The rates or allowances shall also cover travelling allowances or travelling costs, lodging allowances and any other emoluments and allowances payable to the workmen.

Separate items will be listed in the Bill of Rates for different labour types and working hours.

1.1.7 Ducting Install Charge

Unit: Meter (m)

The unit of measurement shall be the length of ducting installed

The tendered rates shall include full compensation for the installation of ducting and for all other costs and actions necessitated to obtain a complete and efficiently working system including mounting accessories and sundries.

Separate items will be listed in the Bill of Rates for different types and sizes of equipment and materials.

1.1.8 Installation Testing and Commissioning of Equipment

Unit: Number

The unit of measurement shall be the number of unit installed and commissioned.

The tendered rates shall include full compensation for the installation, testing, and commissioning of equipment and for all other costs and actions necessitated to obtain a complete and efficiently working system.

1.1.9 Supply of Equipment

Unit: Number

The unit of measurement shall be the number of unit supplied.

The tendered rates shall include full compensation for the supply, manufacture, and transport to site. Separate items will be listed in the Bill of Rates for different types and sizes of equipment.

1.1.10 Supply of Equipment per Meter

Unit: Meter (m)

The unit of measurement shall be the length of hardware to be supplied

The tendered rates shall include full compensation for the supply, manufacture, and transport to site. Separate items will be listed in the Bill of Rates for different types and sizes of equipment.

1.1.11 Removal of Existing & Supply, Install, Test commission Replacement

Unit: Number

The unit of measurement shall be the number of units of equipment replaced.

The tendered rate shall include full compensation for removal of the existing equipment as well as the supply, installation, testing and recommissioning of replacement equipment. The tendered amount shall include all other costs and actions necessitated to obtain a complete and efficiently working system.

1.1.12 Supply of Service

Unit: Number

The unit of measurement shall be the number of unit supplied.

The tendered rates shall include full compensation for the labour, hardware and associated costs to complete the tasks need to supply the mentioned deliverable. Travel to be included in this rate.

1.1.13 Supply and Installation of Equipment

Unit: Number

The unit of measurement shall be the number of units of equipment supplied and installed.

The tendered rate shall include full compensation for supply and installation of equipment. This includes hardware and labour for fixing to walls or floor if needed and any needed hardware and sundries. The tendered rate shall include all other costs and actions necessitated to obtain a complete and efficiently working system.

1.1.14 Installation of Equipment per Meter

Unit: Meter (m)

The unit of measurement shall be the length of hardware to be installed

The tendered rates shall include full compensation for the labour, sundries and incidental work necessitated to obtain a complete and efficiently working system. This includes hardware and labour for fixing.

1.1.15 Supply of Service per Meter

Unit: Meter (m)

The unit of measurement shall be the length of hardware what work is to be completed on.

The tendered rates shall include full compensation the labour rates and associated costs to complete the tasks need to supply the mentioned deliverable.

1.1.16 Rent of Equipment

Unit: Hour (hr)/ Day (day)

The unit of measurement shall be an hourly/daily rate to rent and operation of equipment.

The rates for equipment rental shall, in addition, cover the cost of insurances, consumables, fuel, maintenance and labour for operator.

1.1.17 Rigging Crew

Unit: Hour (hr)

This rate is for the use of a rigging crew for the applicable crane size for preparation work for the lift as well as final positioning and crawling of hardware. The contractor to decide the suitable crew size and needed skill level of members. This rate shall include basic rigging equipment.

2. Specifications

2.1 Requirements for Cremators

Cremators shall conform to SANS 329 in its entirety. It's a complete specification for any industrial thermo processing equipment detailing all minimum equipment and safety requirements.

Supplied cremators shall also conform to the following specific specifications:

- a) *Fuel Supply*: New cremators should operate using LP Gas for burners.
- b) *Electricity Supply*: The supplied cremators are to be able to operate with 380 VAC 50Hz three phase and 220 VAC 50 Hz single phase electricity.
- c) *Throughput*: 8 cremations per 12 hours per cremator. With the ability to operate continuously for 24 hours (if required). All electrical systems to comply with SANS 60204-1.
- d) *Door Opening/Closing*: Cremator loading door is to be mechanised and have manual override in case of power failure or breakdown.
- e) *Interface*: Cremators must incorporate a touch-screen HMI for controlling all relevant operational and maintenance tasks. HMI to be lockable with password.
- f) *Emissions Monitoring*: The cremators shall be able to incorporate continuous emissions monitoring systems to continuously monitor air opacity, combustion temperature and flue gas O₂ content, this data should be used by the PLC to adapt combustion parameters to insure complete combustion. Emissions testing will be executed yearly to acquire an atmospheric emissions licence. Supply of O₂ and opacity measurement devices shall be listed as a separate items in the price schedule.
- g) *Secondary Combustion*: Cremators to insure adequate secondary combustion chamber retention time and temperature. Retention time to be more than 2 seconds and combustion temperature above 800 °C.
- h) *Monitoring and Data Recording*: Cremators to feature SCADA system for monitoring and recording operational data.

The following minimum data to be monitored and stored for 6 month with a recording interval of 1min:

- a. Primary combustion temperature
- b. Secondary combustion temperature
- c. Flue gas opacity or flue gas particulate monitor
- d. Flue gas O₂ content
- e. Primary and secondary burners status
- f. Fan status
- g. Cremator cycle start stop, e.g. Warm Up, Cremation, Shutdown.

The following data is to be recorded and reported per cremation. Each data point shall include the time and date of data point as well as time from start of cremation. This data is to be stored for 2 year:

- i. Primary combustion chamber temperature at the start of cremation.
- ii. Maximum combustion temperature of cremation.
- iii. Minimum secondary combustion chamber temperature during cremation.
- iv. Start and end time of cremation.
- v. Average flue gas opacity/particulate over cremation time.

The following data is to be recorded and reported for overall operation each data point shall include the event time and date. This data is to be stored for 2 year:

- i. Error logging
 - ii. Change of combustion parameters
 - iii. High temperature events
 - iv. High emissions events
 - v. Low secondary combustion temperature events
 - vi. Cremator start up and shut down
- i) *Control:* Cremators shall be PLC controlled with all combustion parameters controlled automatically. PLC will ensure adequate control of combustion temperatures and air flow as to ensure emission levels are maintained as per specification. PLC systems shall comply with the minimum SIL (safety integrity level) requirements of EN 50156-1 and software for safety functions shall be designed in accordance with the requirements of IEC 61508-3 or comparable requirements for functional safety. Safety functions shall be separate from other functions (e.g. control functions.) All safety functions shall be tested at least once during commissioning. Testing shall be documented and the records shall be maintained on site.
- Automatic burner control systems shall comply with EN 298 or SANS 50125, if technically applicable. If necessary for process reasons, the characteristics of the system may differ from the requirements specified in EN 298 or SANS 50125, providing the levels of safety and reliability are not reduced.
- j) *Safety interlocks:* Minimum safety interlocks include:
- a. Minimum temperatures to be achieved before the chamber can be loaded.
 - b. Main burner to shut down if the door is opened.
 - c. Gas shut-off in case of flame out
 - d. System shall be fitted with a safety device to effect a safety shutdown of the burner(s) in the event of a failure in the flue venting.
 - e. System shall be fitted with a safety device to effect a safety shutdown of the burner(s) in the event of case of a critical fault

f. Gas shut-off in case of combustion air supply failure. Construction air supply will be confirmed by either a differential pressure sensor or flow sensor. Pressure detectors shall comply with SANS 51854. The air proving device shall be checked in the 'no flow' state before start-up (e.g. by stopping the combustion air supply or by interrupting the air signal to the device(s) in such a way as to simulate stopping the flow of air

k) *Loading/Unloading Layout:* Cremators should preferably be of the front load and unload layout.

Duty Cycle: Cremators are to be able to operate 24/7 when necessary.

Coffin Size:

Normal size cremator should be able to accommodate a coffin of maximum size:

450mm x 650mm x 1950mm (H x W x L)

Over size cremator should be able to accommodate a coffin of maximum size:

650mm x 900mm x 2350mm (H x W x L)

l) *Technical Support:*

Cremator shall include remote support via internet connection. Supplier shall be able to log into SCADA and control system to troubleshoot and address faults remotely

m) *Refractory Quality:*

The supplier must state the useful life of the hearth and other parts of the refractory. The hearth of a cremator must be able to operate for a minimum of 2000 cremations.

The refractory for the cremators shall consist of the following:

Brick lining:

- A minimum of 50mm thick Fibre Insulation Block against the steel casing rated for 1200° Celsius.
- The lower level and the working face lining to consist of Super Duty Interlocking refractory brick of 60% Alumina quality.
- The upper hot face lining to be of a minimum 1427° Celsius insulation brickwork.
- Method statement for the construction must be detailed.

Castable Lining

- The side wall lining is comprised of minimum 75mm of calcium silicate board and at least 114mm of 1400 grade castable
- The main material used for the hot face of the primary and secondary walls and roof is to be a standard 1400 grade castable.

The hot hearth to be constructed from abrasion resistant 60% Alumina, 1550 grade castable with 316 Stainless steel needles added. The castable shall have a Phosphoric Acid Bonding System.

n) *Peep Hole:* A primary chamber peep hole must be provided

2.2 Requirements for Emissions Monitoring Equipment

2.2.1 O₂ Measurement Equipment

Flue gas oxygen content measurement system should conform to the following minimum specifications.

- a) *Measured gas temperature:* up to 600°C
- b) *Measured gas pressure:* -3 to +3kPa

- c) *Measuring range:* 0 to 50 vol% O₂
- d) *Accuracy:* -1 to 1 %
- e) *Resolution:* 1%
- f) *Response time:* Within 10 sec
- g) *Ingress protection:* IP65 for higher
- h) *Analog output:* 4 to 20mA
- i) *Power Supply:* 240V AC

2.2.2 Opacity Sensor/ Smoke Detection Sensor

Flue gas opacity measurement system should conform to the following minimum specifications:

- a) *Type:* Double pass
- b) *Measured gas temperature:* up to 600°C
- c) *Measured gas pressure:* -3 to +3kPa
- d) *Measuring range:* 0 to 100 %
- e) *Accuracy:* -2 to 2 %
- f) *Resolution:* 1%
- g) *Damping, selectable:* 1 to 60s
- h) *Ingress protection:* IP65 for higher
- i) *Analog output:* 4 to 20mA
- j) *Power Supply:* 240V AC

2.3 Requirements for Smoke Stack

2.3.1 Non- Refractory Lined

Stacks to be constructed with wall thickness and outer diameter as specified in the Bill of Rates. The stack is to be a welded mild steel construction with flanges every 2000mm, Flanged connections to be designed so that they are sturdier than the straight section itself. Rate per meter of stack section should include compensation for all flanges, fasteners and sealing material for connections.

2.3.2 Refractory lined

Refractory lined smoke stack sections are to have the same steel structure as that of the non-refractory lined stack section while including an internal refractory lining with a thickness of 50mm. Lining to be of the 1350 grade insulating castable. Stack sections to be sufficiently strengthened to support the additional refractory weight without deformation.

2.3.3 Dampers

Damper to be designed for use in non-refractory smoke stack to allow ingress of fresh cool air in to the bottom of the stack as to cool the flue gas through mixing. Thus, dampers should be designed such that they throttle the amount of fresh air allowed to enter the stack. The diameter of the damper should match that of the smoke stack. The damper should be flanged on both sides. The dampers to be constructed with wall thickness and outer diameter as specified in the Schedule of Rates. The dampers to be of mild steel construction.

2.4 Requirements for Flue Gas and Abatement equipment

The contractor is to specify, supply, install and commission the necessary abatement equipment to meet the emissions standards. The abatement equipment is to meet die following specifications:

- a) Flue Gas / Exhaust air quality: The unit must be able to meet the minimum emission standards as stated

Table 2: Emissions standards as per Government Gazette, Vol. 581 No. 37054 - Subcategory 8.2: Crematoria and Veterinary Waste Incineration

SUBSTANCE OR MIXTURE OF SUBSTANCES		mg/Nm ³
Common name	Chemical symbol	
Particulate matter		40
Carbon monoxide	CO	75
Oxides of nitrogen	NO _x expressed as NO ₂	500
Mercury	Hg	0.05 (i.e. 50µg)

**Under normalized conditions of 11% O₂, 273 Kelvin and 101.3 kPa

- a) The supplied abatement equipment is to be able to operate with this 380 VAC 50Hz three phase and 220 VAC 50 Hz single phase electricity supply.
- b) If needed the contractor is to supply necessary compressor and compressed air piping.
- c) All replaceable and serviceable equipment is to have comfortable access.
- d) The supplier of cremators is to supply test data from similar installations to prove emissions standards can be met with the proposed equipment.
- e) Flue gas is to be cooled as necessary not to damage filter equipment. (If necessary)
- f) Abatement equipment to feature flow gas bypass in case of emergency or system failure. Flue glue gas is to be bypassed to stacks. In this case an alarm is to be sent to the PLC and SCADA system of the cremators so that the event can be logged and cremators shut down until their problem is addressed.
- g) The contractor to be responsible for water piping between abatement equipment and cooling equipment.
- h) As listed in price schedule, the contractor is to list the rates for three sizes of abatement equipment. Each set of abatement equipment is to be sized to serve the listed number of cremators operating under full capacity.
- i) Abatement equipment shall be suitable to use for the cremators supplied by the tenderer and the exiting cremators on site. Emissions testing results of exiting cremators and data sheets can be found in Appendix A and B

2.5 Modern Cremulator

The contractor is to supply a modern cremulator with dust free operation.

- a) Cremulator to operate without the generation of dust
- b) Cremulator to be of sanitary design and constructed out of 304 Stainless Steel
- c) Cremulator to be free standing without the need for a workbench to bring it to working height
- d) To use 220V 50Hz electricity supply.
- e) The cremulator to have replaceable blades

2.6 Cremator Rake

Cremator rake shall be constructed out of Stainless Steel 304 with a 3m long shaft and 300mm wide head. Shaft to be of diameter 30mm or larger.

2.7 Cremator Brush

Cremator brush shall be constructed out of Stainless Steel 304 with a 3m long shaft and 300mm wide head. Bristles shall be Stainless Steel. Shaft to be of diameter 30mm or larger.

2.8 Ash Pan

Stainless Steel ash pan to be constructed out of 2mm thick Stainless Steel 304 sheet metal. Ash dimensions to be 600mm (L)x 250mm(W) x 200mm (H) or equivalent volume.

2.9 Supply of Ash pan cooling rack for 6 - 8 pans per specification

Ash cooling rack to be 1000mm high and have space for 6 to 8 ash pans. Cooling rack to be constructed out of Stainless Steel 304 and be of sturdy design.

2.10 Coffin Lifting equipment

2.10.1 Cremator Charging Lift/Bier

The charging lift supplied should make it possible for a single operator to load a cremator and load and unload shelving units. Thus the lift should incorporate a driving mechanism to drive coffins along the length of the lift.

The charging lift should meet the following specifications:

- a) Lifting operation to be driven, allowing push button operation of lifting and lowering
- b) Max lift height at least 2.0m
- c) Min lift height at lower than 0.6m
- d) Lift to be electrically driven with a 12V battery to allow wireless operation.
- e) Lift to be able to lift and charge 350 kg.
- f) Incorporate locking brake to lock lift to floor
- g) Lift should be able to be used to change cremator by mechanising the changing proses.

The same mechanism should be able to be used to load and unload coffins storage shelves.

- h) Lift to be supplied with charger for battery.

2.10.2 High Lift Coffin Lift

- a) Lifting operation to be driven, allowing push button operation of lifting and lowering
- b) Max lift height at least 2.5m
- c) Min lift height at lower than 0.8m
- d) Lift to be electrically driven with a 12V battery to allow wireless operation.
- e) Lift to be able to lift 350 kg.
- f) Incorporate locking brake to lock lift to floor
- g) Lift to be supplied with charger for battery.

2.10.3 Normal Coffin Lift

- a) Lifting operation to be driven, allowing push button operation of lifting and lowering
- b) Max lift height at least 2m.
- c) Min lift height at lower than 0.6m.
- d) Lift to be electrically driven with a battery to allow wireless operation.
- e) Lift to be able to lift 350kg.
- f) Lift to be supplied with charger for battery.

2.11 Requirements for Refractory Lined Ducting

Flue gas ducting to be installed from cremators to abatement equipment and from abatement equipment to stacks. Flue Gas ducting to be round and be of painted 3mm mild steel construction with internal refractory lining with a thickness of 50mm. Lining to be of the 1350 grade insulating castable.

Paint to be heat resistant paint rated for temperatures up to 600C..

- a) Flue gas ducting to feature flanged connections at least every 2m to ease installation and servicing.
- b) Ducting to be supplied with inspection hatches on each straight line between bends where possible to enable inspection of refractory. Rate for supply should make provision for this.
- a) Contractor to design and supply supports for refractory lined ducting, supports are to be constructed out of hot dipped galvanized mild steel. Rate for installation of flue gas ducting should make allowance for the manufacturing and installation of supports every 2m of ducting. Ducting would be mounted up to a maximum height of 3m above floor level.

2.11.1 Emissions Testing Ports

The contractor is to supply ports for emissions testing, the ports are to be 4" NB (DN100) sockets The sockets are to be supplied with blanking plugs and be of the same material specifications as the flue gas ducting. Rate for ports should include the cost of supplying sockets, addition of sockets to ducting, Rate to include changes that need to be made to ducting and refractory, e.g. holes.

2.12 Requirements for Roof-Mounted Extract Fans

- a) Galvanized steel sheet construction
- b) Impeller made of aluminium sheet of galvanised sheet metal.
- c) Galvanized bird protection grid should be included
- d) Power supply should be Single-phase 220V 50 Hz single phase or 380 VAC 50 Hz three-phase.
- e) Fan motors are to have ingress protection of at least IP64.

Rates are to be given for the supply of the fan as well as the installation, testing and commissioning. Rate for installation should include all sundries and costs associated with mounting the fan to the roof. Waterproofing will be costed separately in section 10.24.0 of the BOQ.

Rates to be given for each fan size listed in the price schedule.

Flow rate specified can be accepted as flow rate at “free delivery” i.e. without restriction.

Normal temperature and pressure can be assumed.

2.13 Requirements for Tubular Axial Fan

- a) Hot dip galvanised tubular sheet steel casing
- b) Impeller made of aluminium or galvanised mild steel.
- c) Power supply should be single-phase 220V 50 Hz single phase or 380 VAC three-phase.
- d) Fan motors are to have ingress protection of at least IP64.
- e) Fan to be an in-line duct mounted fan.

Rates are to be given for the supply of the fan as well as the installation, testing and commissioning. Rate for installation should include all sundries and costs associated with mounting the fan to ducting or wall.

Rates for fans to be given for each operating point listed in the price schedule.

Normal temperature and pressure can be assumed.

Operation point to should always be selected right side of peak fan pressure as per common practice

2.14 Requirements for Extraction and Supply Ducting

2.14.1 Ducting

- a) All ductwork including straight sections, tapers, elbows, branches, shoe pieces, collars, terminal diffuse boxes and other transformation pieces must be factory – fabricated according to all applicable SARACCA standards including SANS 1238:2005.
- b) All ducts, transverse duct connectors (flanges/cleats) and accessories or related hardware such as support systems will be zinc coated (galvanized).
- c) The fabricated duct dimensions should be as per approved drawings and all connecting sections are dimensionally matched to avoid any gaps.
- d) Ducts shall be straight and smooth on the inside.
- e) Changes in dimensions and shape of ducts shall be gradual (between 1:4 and 1:7).
- f) Supports for round ducts should be a completely galvanized system consisting of fully threaded rods, double L bottom brackets (made from minimum 3.0 mm thick M.S. sheet), nuts, washers and suspension bolts

should be used to anchor all ducting to their respective support structures as specified in SANS 0173. Rates for supports should be included in the installation of ducting

2.14.2 Sound Attenuators

Sound attenuators are to be of the straight through design without pod. Length of attenuators are to be 1.5D where the length is one and a half times the diameter. Sound attenuators are to be constructed out of galvanised sheet metal. Installation rate is to make accommodation for fitting to ducting and/or fan, this includes any hardware and sundries necessary to make a neat fitment. Additional supports if needed for attenuator should be covered by the installation rate.

2.14.3 Air Diffusers/Air Supply Grilles

Air diffusers are to have a throw pattern with equal throw in all directions. Diffusers to be manufactured out of aluminium with a minimum of 50mm boarder frame. Diffusers to have adjustable blades. Rates for the supply of different sizes of diffuser as per price schedule. A rate for the supply of a plenum box for each diffuser is also requested. Diffuser plenum box should be manufactured out of aluminium or galvanised sheet metal and should feature a spigot of appropriate size for connection to ducting. Rate for installation should include all sundries for mounting air diffuser to plenum box and plenum box to ducting as well as allowance for galvanised metal supports of the diffuser and plenum to hang from roof/ceiling with a maximum distance of 2m. All aluminium hardware supplied should be natural anodised finish.

2.14.4 Intake Weather Louvers

Weather louvers are to have blades spaced 50mm apart. Weather louvers to be manufactured out of aluminium with a minimum of 50mm boarder frame. Weather louvers to feature galvanised metal bird/rodent mesh. Rates for the supply of different sizes of weather louver as per price schedule. A rate for the supply of a plenum box for each weather louvers is also requested. Plenum box should be manufactured out of aluminium or galvanised sheet metal and should feature a spigot of appropriate size for connection to ducting/ attenuators. Rate for installation shall include all hardware and sundries for mounting weather louver to plenum box and plenum box to ducting/attenuator as well as allowance for galvanised metal supports for the weather louver and plenum to a wall or floor with a maximum distance of 0.7m. All aluminium hardware supplied should be natural anodised finish.

2.15 Requirements for Refrigeration System

Refrigeration systems are needed for the coffin storage cold rooms, all refrigeration equipment to be sized for a set point of 2°C. Rates are required for cooling systems with different cooling capacities ranging from 5kW to 20kW. Rated cooling capacities should be achievable in typical Cape Town climate conditions as listed below:

Barometric Pressure	101,3kPa
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Summer Conditions:

Maximum dry bulb temp.	36 °C
Relative Humidity	20-30%
Wet Bulb Temp.	20°C

Maximum dry bulb temp.	24 Hour average	22°C
Maximum wet bulb temp.		23°C

Winter Conditions

Minimum dry bulb temp.		0°C
Relative Humidity		100%
Wet bulb Temp.		0°C

The supply of refrigeration equipment includes but is not limited to the evaporator, compressor, condenser, expansion valves, fans, temperature probes and controls, all necessary hardware to complete a fully working refrigeration system.

The refrigeration units are to conform to the following specifications:

- b) System to be equipped with temperature probe to keep room is specified temperature range.
- c) Evaporators are to have corrosion protective coating.
- d) Refrigeration equipment to be installed for an expected lifetime of 10 year.
- e) Installation to conform to SANS: 10147.

The contractor is to supply a rate for the installation of the refrigeration equipment as well as a supply rate for piping and installation rate for piping. Refrigeration installation and commissioning rate should cover costs associated with leak testing refrigerating lines and filling of refrigerant lines.

The piping rates are to correspond to the adequate piping size for the rated cooling capacity of the refrigeration system.

All copper piping to be supplied with nitrile insulation, pipe brackets and sundries. Installation cost of piping should include associated cost for example waterproof penetrations.

2.16 Coffin Storage Shelving

Shelving units are needed for the storage of coffins, the contractor is to supply a rate for the supply of coffin shelf units meeting the following specifications:

- a) Shelving unit should be able to support three normal sized coffins individually shelved vertically with space for a fourth coffin on the floor under the shelving unit.
- b) Units to be constructed out of Stainless Steel 304 or equivalent.
- c) Shelving units to be of sanitary design with neat welding, cleanable surface finish and no open cavities.
- d) Units to be self-supporting with mounting only to the floor.
- e) Each shelf should be rated to support 350kg.
- f) Shelves should be designed to be loaded in the length.
- g) Shelves should make accommodation for rollers or low friction strips to ease loading and unloading.
- h) Units should be designed so that coffins overhang to ease loading and unloading.

- i) Coffins should be supported by at least four supports spaced equally along the length of the coffin, each support covering full width of the coffin.
- j) Shelving unit dimensions should roughly be: H: 1700mm x W: 800mm x L: 1800 mm.

2.17 Requirements for LPG piping and equipment

Contractor to supply rates for piping and gas handling equipment. All equipment listed in the LPG section of the price schedule should conform to SANS 10087-3, SANS 329 and SANS 347. All LPG equipment supplied to be registered with South African Gas Association and obtain a registration certificate for each item. Where the equipment has a threaded connection, such threads shall comply with SANS 1306-1 or SANS 1109-1. All flanged fittings shall use full face solid gaskets that are compatible with the product to be used in the pipeline.

After assembly, the gas reticulation system shall be tested for leak-tightness and the ability to withstand the internal test pressure. The test pressure shall be not less than 1,5 times the maximum working pressure. The system shall be leak-free. However, allowance shall be made for ambient condition fluctuations.

2.17.1 Vessel

Rates for designing, manufacturing and installation of several sizes of above ground LPG storage vessel are requested. The rate for the vessel is to include any walkways or inspection ladders as needed. The contractor is also requested to supply a rate for the supply and installation of a cooling water/deluge system normally applicable to the size tank listed in the price schedule.

Storage vessels shall be designed and constructed in accordance with an approved standard (for example, PD 5500 and ASME BPVC Section VIII Division 1).

All bulk tank installations shall be commissioned in accordance with the requirements of the Vessels Under Pressure Regulations. All installations shall be carried out by a registered installer in accordance with the requirements of the Vessels Under Pressure Regulations and a certificate of compliance shall be issued by a competent person.

All costs for civil work for example, plinths, fencing and perimeter walls are excluded from rate of the vessels.

All cost to meet regulatory requirements shall be included in the rates mentioned.

2.17.2 LPG Pipe Welding

Only competent persons, who can provide proof of competency in welding, shall carry out welding on LPG piping.

The Contractor shall appoint a welding inspector from a certified institution at their own cost. Quality control of welds are to be included in the rate per weld and are to be completed as required by the approved inspection authority. The contractor shall be responsible for any welds that do not meet the specifications set out by the approved inspection authority.

Rate for welding shall include all sundries associated with completing the welds to satisfactory quality including weld preparation. Plant charge for welding machine only applicable for on-site welding.

2.17.3 Manual Isolation Valves

Manually operated isolation valves up to 50 mm (flanged or threaded) shall comply with the requirements of SANS 50331

2.17.4 Gas Pressure regulators

A gas pressure regulator shall be incorporated where this is necessary for control of the pressure and the flow rate. Gas pressure regulators, when fitted, shall comply with EN 334, ISO 23551-2 or ISO 23550. Pressure adjustment on the gas pressure regulator shall only be possible with the appropriate tool.

2.18 Compressed Air

2.18.1 Compressors

Air compressors supplied under this tender are to meet the following specifications.

- a) Compressor to be belt driven, reciprocating type
- b) Powered by 380 VAC 50Hz three phase
- c) Include anti-vibration feet for floor mounting
- d) Feature adjustable pressure regulator.
- e) Include after cooler for moisture separation.
- f) Be rated for 10bar output

Rates for various sizes are to be included in the price schedule. See minimum free air delivery and reservoir size for each compressor listed.

2.18.2 Piping

All compressed air piping is to be screwed and sealed with PTFE tape. All threads to be BSP or BSPT. Various rates for associated hardware to be provided as listed in the price schedule.

Installation costs to cover all associated works including the installation of pipe hangers/ brackets and sealing of threaded connections. Contractor shall be responsible for the repair of connections that fail the hydrostatic pressure test.

2.18.3 Pressure regulator

Pressure regulators for compressed air supplied under this tender are to meet the following specifications.

- a) Include knob for output pressure adjustment, lockable.
- b) Include 40 µm filter
- c) Include output pressure gauge.
- d) Regulating pressure range wider than 1bar to 10bar
- e) Rated pressure >15bar
- f) Rated temperature -10C to 60C
- g) Housing material: Die-cast aluminium

2.19 Maintenance

The contractor is to supply rates for various equipment supply, completing the replacement of equipment or complementing a specific service. Where a specific rate is requested for a task all necessary hardware, labour and sundries should be included in the rate to complete the task.

Where replacing is requested costs accosted with removing the existing hardware should be included in the rate.

2.19.1 Cremator Refractory

The refractory for cremators shall consist of the following:

- 50mm Thick insulation fibre block used against the steel casing, rated for 1200° Celsius.
- The lower level and the working face lining to consist of Super Duty Interlocking refractory brick of 60% Alumina quality.
- The upper hot face lining to be of a minimum 1427° Celsius insulation brickwork.
- The side wall lining is comprised of minimum 75mm of calcium silicate board and at least 114mm of 1400 grade castable
- The main material used for the hot face of the primary and secondary walls and roof is to be a standard 1400 grade castable.
- The hot hearth to be constructed from abrasion resistant 60% Alumina, 1550 grade castable with 316 Stainless steel needles added. The castable shall have a Phosphoric Acid Bonding System. The hearth of a cremator must be good for a minimum of 2000 cremations.

2.19.2 Refractory Lined Ducting Reline

Refractory lined smoke stack sections are to be relined with 50mm 1350 grade insulating castable.

2.19.3 Cardboard Rollers

350mm wide combustible cardboard rollers able to support the full weight of a 350kg coffin.

2.19.4 Metal ID Tags

30mm Diameter Stainless Steel uniquely numbered disk with a thickness of 1mm. Pack of 100.

2.19.5 Industrial Vacuum Cleaner

- a) Power rating of at least 1600W
- b) To operate on 230V, 50 Hz power
- c) Stainless Steel Canister with a volume of 60L or more
- d) Required Suction Pressure: 200mbar
- e) Required Flow Rate: 2.5 m³/min
- f) Wet and Dry Type

2.20 Services

The contractor is to supply various labour rates as required in the price schedule. Afterhours rates are also to be submitted.

Note: Labour cannot be charged for attending scope meetings. Labour may however be claimed for emergency work requiring attendance, pending the works project manager/principle agent's approval.

The following eligibility criteria are to be applied to each labour rate.

2.20.1 Semi-Skilled Person

A semi-skilled person is not required to have any specific competencies, however is to be thoroughly trained for work they are assigned to. Semi-skilled workers are to be made fully aware all safety procedures on site and general housekeeping rules of the site.

2.20.2 Artisan/ Technician

An artisan is to be a skilled tradesman in the specific trade they are assigned to work on. Artisans are to have a level N3 certificate or higher in their receptive fields. Or have at least (five) 5 years relevant experience in the trade they are practicing.

2.20.2 A Specialized Artisan/Technician

A specialized artisan is a highly skilled tradesman with a specific qualification in the trade they are assigned to work on. Specialized artisans are expected have passed a trade test in the relevant field at an institute accredited by the SAQA.

2.20.3 Foreman/Technical supervisor/Site agent

A foreman is the responsible person site. A foreman is to have a diploma in building management or a minimum of 3-year site management experience.

2.20.4 Draughtsman

Draughtsman to have at least a NQF 4 computer aided drawing certificate with two years post graduate experience.

2.20.5 Engineer

An engineer is to have a Bachelor's degree in Engineer (BEng) or Bachelor of Technology(BTech) with at least 2 (two) years verifiable postgraduate experience. In the case of a National Diploma in Engineering, 5 (years) of verifiable postgraduate experience is needed.

2.20.6 Senior Engineer

BSc / BEng degree with at least 5 (five) years verifiable postgraduate experience.

2.20.7 Contractor's representative

The contractors shall be a person appointed by the contractor to represent the contractor in meetings and be the general contact person to the contractor. The Contractor's Representative shall be easily reachable and shall, on behalf of the Contractor, receive instructions. The Contractor's Representative shall be a competent person for the duty of communicating tasks and information to and from the contractor. If the Contractor's Representative is to be temporarily absent during the execution of the Works a suitable replacement person shall be appointed, subject to the Engineer's prior consent, and the Engineer shall be notified accordingly.

2.20.8 Quality Control/ Quality Assurance Officer

The quality control officer to have at least a SAQI Certificate in Quality Control (Level 2) and two years' experience in the relevant field that they will practice in. A quality control officer can also have no formal training in quality control however should then have at least 5 (five) years verifiable experience in the relevant field that they will be practicing in

2.20.9 Health and Safety Officer

Must be a registered Construction Health and Safety Officer (CHSO).

2.20.10 Introductory Operator and Maintenance Training (1-5 People)

The contractor shall provide a service for training staff in the operation and maintenance of supplied hardware. The training shall be billed per hour per 5 people.

2.20.11 Stack emissions testing

Stack emissions test to be performed by a competent emissions testing provider that is registered with the National Laboratory Association of South Africa.

Testing will be billed per hour of tests ran. Rate per session also to be given, rate per session to cover the costs of completing a technical report on the findings.

Stack tests are to be done for: Particulate matter, Carbon monoxide, Oxides of Nitrogen and Mercury.

Calibration certificates are to be provide with technical report.

Method of measurements

The contractor will be required to provide the services of a Refractory specialist for in-stack Testing for the Crematorium chimney stacks as and when required;

The contractor will be required to provide the services of a Stack Testing specialist to upload results of Stack Testing of NAEIS report.

All isokinetic and anisokinetic sampling and reporting is to be carried out according to internationally accepted reference methods, which comply with the National Environmental Management: Air Quality Act of 2004 (Act 39 of 2004) as detailed and scheduled in the Government Notice 893 of 22 November 2013: List of Activities Which Result in Atmospheric Emissions Which Have or May Have a Significant Detrimental Effect on the Environment, Including Health, Social Conditions, Economic Conditions, Ecological Conditions or Cultural Heritage Amended by Government Notice 1207, dated 31 July 2018, Schedule A

(2) Subcategory 8.2: Crematoria and Veterinary Waste Incineration

Description:	Cremation of human remains, companion animals(pets) and the incineration of veterinary waste		
Application:	All installations		
Substance or mixture of substances	Chemical System	Plant status	Mg/Nm³ under normal conditions of 11% O₂, 273 Kelvin and 101.3 kPa.
Common name			
Particular matter	N/A	New	40
		Existing	250
Carbon monoxide	CO	New	75
		Existing	150
Oxides of nitrogen	NO _x expressed as NO ₂	New	500
		Existing	1000
Mercury (applicable to human cremations only)	Hg	New	0.05
		Existing	0.05

All measurements of the prescribed pollutants shall be compared to the New Plant Standards, which came into effect on 1 April 2020, as detailed in Listing Notice 893.

- Particulate Matter (TPM)

- Mercury (Hg)
- Combustion Gas Components (O₂, NO, NO₂, NO_x, CO,)

In addition to the above, the following parameters are to be measured:

- Gas velocity
- Gas volumetric flow rate
- Gas temperature as well as absolute and static pressure
- Water vapour content of the stack gas

A minimum of three (3) tests are to be conducted with a minimum duration of sixty (60) minutes each (and a maximum of 8 hrs), per component measured, per point source as is prescribed in Government No. 37054. Document and report the start and finish times of each sample run. For Mercury (Hg) five (5) test samples are required.

Isokinetic sampling

Isokinetic sampling techniques are to be applied to measure the concentration of:

- Particulate Matter (PM)
- Heavy Metal Components

The sampling methods for the abovementioned components comply with the specifications of the following internationally accepted methods:

- DMP Page 9 of 27 December 2014 Eq 282/14;
- USEPA Method 17: "Determination of Particulate Matter Emissions from Stationary Sources";
- Or equivalent ISO or British Standard as specified in Annexure A of Notice 1207.

Stack gas velocity

The gas velocities are to be calculated from data obtained from a minimum of 12 point velocity pressure measurements. The location of the sampling points is based on the assumption that the distribution of gas velocity in a section of a duct/stack adjacent to the wall approximates a 1/7th power law curve. This procedure complies with the specifications of the following internationally accepted method:

- USEPA Method 1: "Sample and Velocity Traverses for Stationary Sources".

Velocity pressure measurements are taken by means of an S-type pitot tube and digital manometer. Volumetric flow rates are to be calculated from the individual point velocities and internal dimensions of the stack. This procedure complies with the specifications of the following internationally accepted method:

- USEPA Method 2: "Determination of Stack Gas Velocity and Volumetric Flow Rate;
- (Type S Pitot Tube);
- DMP Page 10 of 27 December 2014 Eq 282/14.

Stack gas temperature

The gas temperatures are to be measured by means of a Type-K thermocouple connected to a digital thermometer.

Water vapour content

The water vapour content of the gas stream is to be calculated from the temperature of the gas leaving the condenser unit and the mass of water condensed during each test. This procedure complies with the specifications of the following internationally accepted method:

- USEPA Method 4: "Determination of Moisture Content in Stack Gases".

Anisokinetic sampling:

Combustion Gas Components:

A portable emissions analyser is to be used to measure the concentrations of O₂, NO, NO₂, NO_x, CO, CO₂ present in the stack gas streams on a volume/volume basis, in accordance with

- EN 50379-2:2004, Specification for portable electrical apparatus designed to measure combustion gas parameters of heating appliances.
- DMP Page 11 of 27 December 2014, Eq 282/14

Results

USEPA Method 17 indicates that isokinetic results will be acceptable if the isokinetic sampling efficiency is found to be: $-10\% \leq \text{Sampling Efficiency} \leq 10\%$

Where concentrations are reported at NTP or mg/Nm³ it refers to the conversion of concentrations to normal conditions of 0 °C (273 K) and 101.325 kPa.

Normal temperature and pressure: This condition is also referred to as NTP and implies concentrations are recalculated from actual conditions to gas volumes at 0°C (273.15 K) and 101.325 kPa.

As these conditions imply a reduction in the sampled gas volume due to the effect of reduced temperature and increased pressure, the resulting calculated concentration is higher than at actual stack gas conditions.

NTP, dry: Current emission limits imposed by the Department of Environmental Affairs require results to be reported at NTP on a dry basis, i.e. based on the gas volume with water vapour removed. The removal of the water vapour content from the stack gas implies a further reduction in gas volume, resulting in even higher calculated concentrations.

NTP, dry, corrected to 11% O₂: This reporting condition was introduced to ensure that everybody report results at the same conditions. If the measured concentration of O₂ is higher than the reference level of 11% the resulting calculated concentration will be higher. If the measured concentration of O₂ is less than 11% the calculated concentration will be less.

Isokinetic Sampling Efficiency

The parameter which must be controlled to establish isokinetic sampling is the gas velocity as it enters the nozzle of the sample probe, which must be equal to the actual gas velocity at the specific sample point in the duct/stack.

The isokinetic sampling efficiencies are to be calculated to be within the specified limit of the prescribed method for all isokinetic measurements.

2.20.12 Inspection reports

The contractor can be requested to complete an inspection report for the purpose of identification of a fault or to document work that was done. Electronic inspection report must be completed and handed in on a memory stick at the office of the Employer. The inspection report shall include:

- a) Name of the hardware
- b) Location of the hardware
- c) Detail the work that was done/fault inspected.
- d) Photograph of the equipment and name plate.
- e) Photograph of the works being carried out.
- f) Indication of further works to complete /Equipment to fix fault.
- g) In addition a testing and commissioning sheet to be supplied if new equipment was installed or existing equipment repaired.

2.20.13 Site P's & G's

Various preliminary and general rates are to be supplied relating to the initiation of works, conclusion of works and general services needed on site. Site establishment fee to include all costs associated to initiate a site, this includes planning, signage, and preparation of grounds e.g. partitioning off of construction area.

Site de-establishment cost to include all costs to restore site to condition prior to commencing of works. This includes removing of rubble and removing all equipment and partitioning.

2.20.14 Scaffold

Scaffold towers must be independent/free standing single bay towers. with platform consist of solid hook-on-boards leaving no openings plus safety netting and toe board to prevent tools and appliance from falling through or off, trap door and hook-on-ladder. All scaffold towers must comply with circumstances for outside or inside use and must comply with SANS 10085.

2.20.15 Waterproofing

Rates for waterproofing material supply and installation shall be supplied in the BOQ.

Water proofing shall be done using flexible polyester and/or fiberglass reinforced APP polymer modified bitumen membrane (RBM) with a base sheet where needed. Apply waterproofing system according to manufacturer's instructions, including priming procedures. Bonding shall be heat-fused on primed surfaces. All waterproofing to meet the specification set out in SANS 10021.

Testing:

Perform test(s) prior to application of surface finishes

Horizontal surfaces: a flood test of 48 hours or a spark, vacuum or air pressure test, using suitable testing apparatus

Vertical surfaces: a spark or vacuum test, whichever is easier.

3. Technical Data Sheet Returnable Schedule

The following technical data sheets should be submitted with the tender documents as part of the evaluation. Each technical data should include the **manufacturers name and details** and minimum the information listed per section.

Cremators

- a) Physical Size: How much space is required for installation and much service space must be available around the machine? Include Drawings
- b) Throughput : How many cremations per 12-hour shift?
- c) Method statement indicating the refractory layout and quality.
- d) Emissions Achievable emissions in unabated configuration.
- e) HMI: HMI mimics to be supplied including list of basic features
- f) SCADA: What are the monitoring and recording capabilities of the SCADA system?
- g) Loading/Insertion: Please provide a brief description of the loading procedure as well as where and how the ashes are retrieved.
- h) LPG Fuel consumption per cremation: On average, how much fuel is required for each cremation? 12 Hour shift can be assumed.
- i) Refractory Quality: What refractory types are used? Please provide data sheet
- j) Maintenance: How frequently will the equipment need servicing? What are common replacement parts and their cost?
- k) Maintenance teams: Can local teams do the maintenance? If so, will they require special training? Availability of spares: Will spare parts be available in South Africa?
- l) Warranty Information Please also fill in the Technical Data Sheet Template for Cremators

Emissions monitoring equipment.

- a) Basic data sheet showing all parameters listed in specifications
- b) Proses connection
- c) Warranty Information

Abatement Equipment

- a) Physical Size: How much space is required for installation and much service space must be available around the machine? Include Drawings.
- b) Abatement system subsystems and brief description of their workings.
- c) Consumable usage estimate per cremation based on a 12hr shift. Including cost estimate.
- d) Expected emissions during abated operation. Third party test data of previous installations to be provided as proof.
- e) Drawing of physical dimensions of abatement equipment.
- f) Maintenance: How frequently will the equipment need servicing what are common replacement parts and their cost?
- g) Maintenance teams: Can local teams do the maintenance? If so, will they require special training?
- h) List of spares not included in maintenance section of price schedule with rates for replacement should be listed in price schedule Section 13
- i) Warranty Information

Please also fill in the Technical Data Sheet Template for Abatement equipment.

Cremulator

- a) Basic data sheet showing all parameters listed in specifications
- b) Warranty Information

Coffin Lifting equipment

- a) Basic data sheet showing all parameters listed in specifications
- b) Warranty Information

Extraction Fans

- a) Basic data sheet showing all parameters listed in specifications.
- b) Fan curves with operation point highlighted.
- c) Warranty Information

Supply Fans

- a) Basic data sheet showing all parameters listed in specifications.
- b) Fan curves with operation point highlighted.
- c) Warranty Information

Refrigeration Systems

- a) Basic data sheet showing all parameters listed in specifications.
- b) Fan curves with operation point highlighted.
- c) Warranty Information

Coffin Storage Shelf

- a) Basic data sheet showing all parameters listed in specifications.
- b) Technical drawings of shelf unit with indication of materials and finishes used.

Air Compressors

- a) Basic data sheet showing all parameters listed in specifications.
- b) Warranty Information

Refractory for maintenance

- a) Data sheet showing basic chemical composition and temperature and rating
- b) Expected lifetime
- c) Warranty Information

4. Technical Data Sheet Templates

4.1 Technical Data Sheet Template for Cremators.

NO:	ATTRIBUTE	DESCRIPTION	
0	Does cremator fully comply with SANS 329?	Does the cremator meet all the specifications for Industrial thermo processing equipment set out by South African National Standards?	
1	Fuel used	What combustion fuel does the cremator use?	
2	Cremator Type	What cremator type will you propose that meets the requirements set out?	
3	Physical Size	How much space is require for installation and much service space must be available around the machine?	
4	Throughput	How many cremations per 12 hour shift?	
5	Emissions Achievable	Are the proposed cremators able to meet the latest air emission requirements without additional abatement equipment ? (specific reference in terms of Particulate Matter, Hg, NOx and CO needs to made in the response)	
6	Emissions Monitoring	What emissions monitoring equipment is included?	
7	SCADA:	What are the monitoring and recording capabilities of the SCADA system?	
8	HMI	Brief description of the HMI unit	
9	Loading/Insertion	Please provide a brief description of the loading procedure as well as where and how the ashes are retrieved.	
10	LPG Fuel consumption per cremation	On average, how much fuel is required for each cremation?	
11	Refractory Quality	What refractory types are used?	
12	Maintenance	How frequently will the equipment need servicing and what is the estimated annual operating cost? [excluding gas and electricity]	
13	Maintenance teams	Can local teams do the maintenance? If so, will they require special training?	
14	Availability of spares	Will spare parts be available in South Africa?	
15	Training	Will sufficient training / training material be available from you as a supplier?	
16	Availability of supplier support	Will you be available to support the operators and maintenance staff in SA if required? Does the cremator have remote support for the control system?	
17	Worldwide offices	Where is your closest supplier office to Cape Town, South Africa?	
18	Installation teams	Who will do the installation on site? Can local teams do the installation? Will you bring a team for commissioning & training on site?	
19	Warranty Information	What is the duration of the warranty and what items are excluded	

4.2 Technical Data Sheet Template for Abatement Equipment

NO:	ATTRIBUTE	DESCRIPTION	
0	Abatement equipment	What abatement equipment will be supplied?	
1	Abatement equipment space needed	How much space is needed for abatement equipment?	
2	Consumable usage	What is the estimated consumable usage and cost?	
3	Emissions Achievable	What emissions specifications would you be able to achieve in abated operation?	
4	Maintenance	How frequently will the equipment need servicing and what is the estimated annual operating cost? [excluding gas and electricity]	
5	Maintenance teams	Can local teams do the maintenance? If so, will they require special training?	
6	Availability of spares	Will spare parts be available in South Africa?	
7	Training	Will sufficient training / training material be available from you as a supplier?	
8	Availability of supplier support	Will you be available to support the operators and maintenance staff in SA if required?	
9	Worldwide offices	Where is your closest supplier office to Cape Town, South Africa?	
10	Installation teams	Who will do the installation on site? Can local teams do the installation? Will you bring a team for commissioning & training on site?	
11	Warranty Information	What is the duration of the warranty and what items are excluded	

APPENDIX A: EXISTING CREMATOR DATA SHEET.



HUMAN CREMATION CHAMBER SPECIFICATION Model US 200 "Classic X-CEL"

EQUIPMENT:

U.S. Cremation Equipment, a division of American Incinerators Corporation - Multiple Chambered Human Cremator; Natural Gas, Propane (LP) or Oil fired.

MANUFACTURER:

U.S. Cremation Equipment a division of American Incinerators Corporation.

CONSTRUCTION STANDARDS:

The cremator shall be constructed of U.L./CSA listed components and will meet or exceed nationally accepted incinerator construction standards as originally established per the Incinerator Institute of America (IIA) publication guidelines; i.e.:

- A. Primary chamber will not exceed 60% of total furnace volumes. Flue connection shall not be considered part of furnace volume.
- B. Flame supervision through continuous ultraviolet scanning flame detectors on all burners.
- C. High temperature refractory construction with air-cooled walls to prevent excessive heat radiation.
- D. Exhaust gas temperature reduction.

SAFETY CERTIFICATIONS

Underwriters Laboratories (UL) listed appliance File number MH47704.

CREMATOR DIMENSIONS:

Chamber volumes:	Primary - 114 CF (3.23 CM) Secondary - 101 CF (2.86 CM)
Primary Chamber:	101" L x 52" W x 39" H (2565 mm x 1321 mm x 991 mm)
Structural footprint:	169" L x 76" W (4293 mm x 1930 mm)
Over-all dimensions:	169" L x 87" W (W/ Control Panel) x 128" H (4293 mm L x 2210 mm W x 3251 mm H)

POWER CHARGING DOOR:

Door Height: 42" (1067 mm)
Door Width: 55 1/4" (1403 mm)

PRIMARY CHAMBER OPENING:

Width: 52" (1321 mm)
Roof Arch Height: 39" (984 mm) @ High Point – 35" @ Low Point

OPERATING TEMPERATURE:

Temperatures are determined as a result of federal, state or local permitting authority operating standards.

Typical primary chamber setting: 1,000°F-1,200°F (538°C - 648°C)
Typical secondary chamber setting: 1,400°F-1,800°F (760°C - 982°C)

RETENTION TIME:

In excess of 2 seconds.

CAPACITY:

Single load capacity of 1200 lbs (544 kg) per cremation cycle. Burn Rate of 150-400 lbs/hr (68 - 181 kg)

DRAFT:

Induced via refractory lined draft inducer.

SHIPPING WEIGHT:

34,000 lbs. (15,422 kg)

EMISSIONS:

The U.S. Cremation Equipment cremator shall meet or exceed federal, state/province and local environmental regulations.

EMISSION CONTROL:

Secondary chamber equipped with one 2,500,000 BTU/HR burner. Also equipped with an electronic exhaust gas scanner system which temporarily suspends operation of the primary chamber burner if the opacity of the exhaust gases reaches the maximum locally authorized level.

STEEL CONSTRUCTION SPECIFICATIONS:

- A. The structure to be heavy 3" steel angle, square tube; 3/8" steel plate, seal welded construction.
- B. Subfloor to be 3/16" steel plate, seal welded construction.
- C. The exterior shell to be 12 gauge steel removable panels.
- D. Interior shell to be 10 gauge steel, seal welded construction.

INSULATION & REFRACTORY SPECIFICATIONS:

- A. Hot Hearth: 3000°F (1650°C) abrasion resistant cast refractory monolithic cast 7"-13" thick, 1 1/2" recessed top and rounded, stressed arched bottom.

- B. Chamber Floors: 3000°F (1650°C) abrasion resistant cast refractory, 5" thick on top of 2" 2400°F (1316°C) light weight insulating castable.
- C. Chamber Ceilings: 3000°F (1650°C) cast refractory, monolithic cast, rounded, stressed arched, 5"-9" thick, topped by 2", 2400°F (1316°C) light weight insulating castable.
- D. Interior Walls: 2800°F (1538°C) alumina-silicate firebrick, 2 1/2" x 4 1/2" x 9", all chambers are backed by 4" (102 mm) of 1900°F (1038°C) ceramic fiber insulation.
- E. Stack: Lined with 2-3" (51 to 76 mm) of 2200°F (1205°C) insulating refractory.

SKIN TEMPERATURE CONTROL:

Integral dual casing, completely air-cooled design to prevent excessive heat radiation.

COMBUSTION EQUIPMENT:

- A. Combustion Air - One (1) single or 3 phase, 220/460V, 17-15.5/7.6 amp, 7.5 hp air blower motor 1,700 CFM (158 CMM)
- B. Primary Chamber - One 1,500,000 BTU/hr nozzle mix, gas-fired burner; Eclipse, North American, or equal.
- C. Secondary Chamber - One, 2,500,000 BTU/hr modulating, nozzle mix, gas-fired burner. Eclipse, North American, or equal.
- D. Burner Flame Safeguard - Control supervision on each burner via a flame safeguard relay and ultra-violet light detector.
- E. Low Air Pressure Safety Switch - Interlocked to all burners.

EXHAUST GAS TEMPERATURE REDUCTION:

Hot air duct operating exit temperature: 900°F (482°C)

HOT AIR DUCT:

10 gauge carbon steel, high temperature 2-3" (50 – 75 mm)refractory lining, pre-drilled flanges, 24" (610 mm) Outside Diameter, 28" (710 mm) at flanges.

UTILITY REQUIREMENTS:

A. GAS:

- 1. Pressure:
 - a) Natural Gas: 7-9" W.C. (178-228 mm)
 - b) LP Gas (Propane): 11-14" W.C. (288-355 mm)
- 2. Flow Rate: 4,000,000 BTU/hr

B. ELECTRICAL:

Voltage: 208/230/360 Volts
 Phase: Single or 3 Phase

Frequency: 50/60Hz

Amperage: 40 Amp for 3; 70 Amp for single Phase

CREMATION CHAMBER LOADING/CLEAN-OUT DOOR:

Hydraulically operated, refractory lined, upward movement guillotine style door w/view port. It is a front loading-front cleanout design with cremated remains collection/ cooling hopper and removal system. The hydraulic system pump is a 1 HP with a capacity of 15 liters per minute or equivalent system.

CREMATION PROCESS CONTROL:

The cremation cycle is controlled by a programmable logic control (PLC) system. Visual confirmation of the system status is provided through a Colour Touch Screen Panel which displays temperatures, elapsed time, burner operation and other functions. Continuous fuel and air modulation is automatically controlled by a time/temperature actuated system. Operator interface performed through the Colour Touch Screen. A Temperature Chart Recorder (if applicable) is provided.

EXTERIOR FINISH:

The top and rear compartments are finished with two coats of high-temperature, textured, black polyurethane. The front and side panels are powder coated in a claret colour. The cremator is trimmed in stainless steel.

TOOLS:

The tools consist of a steel wire brush and rake with long handles, and a short handle rake. A trigger Hand Magnet for removal of metal is also included.

APPENDIX B: EXISTING CREMATOR STACK TESTS.

The following data represents a typical stack emission test result for existing cremators:

Pollutant	Concentration (mg/Nm ³) ^a				Emission Standard (mg/Nm ³)	Compliance
	Test 1	Test 2	Test 3	Average		
Particulate Matter	56	67	38	54	40	No
Hg	0.33	0.04	0.01	0.13	0.05	No
NO _x	200	289	332	274	500	Yes
CO	94	4	33	44	75	Yes
At 273 K, 101.3kPa, and 11% O ₂ .						

2. AMENDED GENERAL (STANDARD) SPECIFICATION FOR MECHANICAL WORKS

D1 GENERAL

The City of Cape Town's Standard Specification for Mechanical Works (including General Works) shall apply to this contract. Technical Details are in places superseded by or elaborated upon, in the Detailed Mechanical Specification. Amendments to the General Specifications (appropriate for the Crematorium project only) are indicated in italics in this section.

D2 ENVIRONMENT

D2.1 Crematorium Site

This environment is very corrosive to ferrous metals and, where the use of such metals cannot be avoided, the metals must be adequately protected, such protection systems being designed for a life of at least 15 years.

*Gas may also be present throughout the site at slightly elevated levels with respect to ambient conditions, and this may contain hydrogen sulphide which, in addition to being corrosive to ferrous metal, is also corrosive to most non-ferrous metals. **The effect on copper alloys can be particularly severe, often with disastrous effects on the reliability and life of switchgear, control systems, slip-rings, etc. Such equipment must therefore be adequately sealed and protected.***

D3 CLIMATIC CONDITIONS (CAPE PENINSULA)

Barometric Pressure	-	101,3kPa
<u>Summer Conditions:</u>		
Max. dry bulb temp.	-	36°C
Relative Humidity	-	20-30%
Wet Bulb Temp.	-	20°C
Max. dry bulb temp.	- 24 Hour average	22°C
Max. wet bulb temp.	-	23°C
Wind	-	Predominantly South To South East
Max. hourly average	-	36 knots (67 km/h)
Gusts up to	-	-74 knots (137 km/h) and maximum expected gusts of 195 km/h.
<u>Winter Conditions</u>		
Minimum dry bulb temp.	-	0°C
Relative Humidity	-	100%
Wet bulb Temp.	-	0°C
Wind - Predominantly North to North West	-	
Max. hourly average	-	40 knots (74 km/h)
Gusts up to	-	68 knots (126 km/h)

D4 DESIGN

D4.1 General

This Specification lays down the performance, quality and overall system requirements of the Works. Deviation from the Specification will only be considered if the Engineer considers such deviation an

improvement.

D4.2 Safety

Safety shall be an all-important and overriding consideration and proper attention shall be paid to this aspect at the design stage. The regulations of the Occupational Health and Safety Act, Act 85 of 1993, as amended, shall be strictly observed.

Equipment which is potentially dangerous shall be designed in accordance with a relevant South African or international Standard.

The following must be noted:

- (a) Hazards must be avoided or guarded. Nip points shall be guarded; sharp corners shall be rounded off; operating handles, supports and protrusions shall be kept clear of access ways; and so forth.
- (b) The Contractor's Drawings and specifications shall clearly specify the structural requirements of the Works and the Contractor shall be responsible for covering all unsafe gaps and openings left in structures after the equipment installation, *requiring re-measurable building works for a permanent safe installation*.
- (c) Moving parts shall be properly guarded to the satisfaction of the Engineer.
- (d) An emergency stop button shall be installed in a convenient position next to each machine. The installation shall be designed to provide immediate access without the danger of accidental operation.

Installations considered unsafe by the Engineer shall be corrected by the Contractor at no cost to the City of Cape Town.

D4.3 Design Aspects

A high quality standard is required and reliability, long life, trouble free operation, efficiency, ease of maintenance and operation, and neatness are essential.

All plant and equipment shall be of robust construction and the design shall, as applicable, be based on:

- (a) the full range of duties which can be reasonably anticipated;
- (b) the power and torque transmitted by the driver system under full load and stalled conditions;
- (c) the maximum pressure or vacuum which can be produced by pumps, fans and compressors under all conditions including blocked or closed inlet and outlet circuits;
- (d) conservative service and safety factors based on approved standards or laid down in the printed specifications of reputable and approved manufacturers;
- (e) a safety margin of at least 20 % in addition to any service or safety factors which apply;
- (f) twenty four hour per day operation;
- (g) a minimum life of 100 000 hours before repair or major part replacement (*or as elaborated upon in the Detailed Specification for the Cremators*);
- (h) prevention of serious damage from normal operational problems such as blockages, blinding, jamming, seizure, malfunction and, as far as is practical, maloperation; if these occurrences cannot be avoided by good design.

Machines with non-overloading characteristics shall be selected wherever possible; e.g.: motors shall be sized so that they cannot be overloaded by the driven machine.

D4.4 Fail-Safe Operation and Protections

Where damage can occur from normal operational or other foreseeable problems, plant, equipment and systems must be designed to be fail safe; i.e. must have built-in redundant elements, or be fail-to-safe; i.e. must return to a safe condition where no further damage can be done in the event of a failure, malfunction, maloperation, overload and, as far as practical, misuse. All reasonable and economically

justifiable protections to prevent or limit damage to plant and equipment, particularly in high risk situations, must be incorporated. Protections shall:

- (a) be directed at the source of the problem, limit forces to safe levels and act quickly enough to prevent damage (electrical thermal type overloads are inadequate);
- (b) stop or prevent from starting all equipment at risk;
- (c) activate an alarm with a labelled indicator on the control panel whenever a protection operates;
- (d) not permit unauthorised tampering;
- (e) operate reliably after long inactive periods exposed to corrosive and dirty conditions.

Tenderers shall highlight equipment limitations which can be exceeded during operation and cannot be guarded against.

D4.5 Moving Parts

The following general requirements apply not only to machines but to all equipment with moving parts such as headstocks, extension spindles, swivelling davits, heavy duty hinges, pivots and the like:

- (a) All rotating or swivelling shafts, pins and the like, shall be adequately supported, guided and restrained by lubricated or self-lubricating bearings, collars and/or bushes.
- (b) Swivelling joints on linkages and the like shall be of the "universal" or fork and rod type with bearings or bushes fitted to the eyes or forks.
- (c) On abrasive applications abrasion resistant materials and slow speed operation shall be utilised.
- (d) Susceptibility to fatigue failure shall be minimised by proper design and manufacturing procedures. In particular, changes in section shall be radiused and care must be taken to avoid the use of welded components in areas of fluctuating stress.
- (e) The locking of nuts and pins in position shall be done to the approval of the Engineer.
- (f) Wearing parts shall be designed for interchangeability and ease of removal and replacement.

D4.6 Arrangement and Mounting

The arrangement and general design shall take the following requirements into consideration:

- (a) Lifting eyes, lugs, hooks, etc., shall be provided on heavy or large items to facilitate handling.
- (b) Castings or fabrications shall have machined pads for seating and be mounted on either soleplates or baseplates as appropriate.
- (c) Where accurate alignment is required, positioning pins and/or jacking screws shall be provided.
- (d) The needs of operation and maintenance including neatness, access, working space, safety, cleaning, adjustment, handling, assembly, alignment, disassembly, removal, etc.
- (e) With plant and equipment to be mounted on or against concrete or brick structures built by others, provision shall be made for adjustment in the mechanical design. Any special accuracy requirements must be specified on the Contractor's Drawings.

D4.7 Prevention of Corrosion

The Contractor shall review all designs from a corrosion protection point of view prior to commencing work. Any details which might have a negative effect on the corrosion protection and the future application of coatings are to be brought to the Engineer's attention for a ruling prior to commencement of work.

All items shall be designed to minimise corrosion in the environment in which they shall be exposed. Particular emphasis shall be placed on accessibility for surface preparation and the application of coatings. The general requirements of SANS 10120 – 3 HC shall apply.

Mastics, sealants, insertion rubber or suitable gasket material shall be used to seal unavoidable crevices such as bolted connections; e.g. under guardrail feet.

The design of articles shall ensure that surfaces of corrodible materials, such as carbon steel, shall be

accessible for initial coating and for maintenance. The use of back-to-back angles, partially open box sections or inaccessible stiffeners shall be avoided. Fabrication openings shall be of sufficient size to enable fettling, blast cleaning and painting.

D5 INSTALLATION

D5.1 General

The Works shall comply with the following:

- (a) When erected and installed, the plant and equipment shall be of neat and workmanlike appearance, solidly and evenly supported, true to line, level, plumb and in proper working order.
- (b) The requirements of Sub-clause "Arrangement and Mounting" (see Clause "Design") must be noted.
- (c) The Contractor shall provide all foundation bolts, supports, hangers, brackets, etc. required for the support and fixing of equipment. *Note: the Contractor shall include in the tendered rates for these items.*
- (d) *The Contractor shall be responsible for all grouting necessary for all plant and equipment, and for making good all pipe penetrations and other interim or permanent building works.*
- (e) The use of more than three shims in the alignment of equipment will not be permitted. Machined spacers shall be prepared where necessary. Shims and spacers shall be of a corrosion resistant material such as stainless steel.
- (f) Corrosion protection requirements shall be carefully attended to and the relevant paragraphs of Sub-clause "Paint Application" (see Clause "Corrosion Protection : Paint Coatings) must be noted. All mating faces must be coated before and sealed after assembly.
- (g) A small amount of a nickel-based, anti-seize compound shall be applied along the full length of fastener threads before the nut is applied.
- (h) Crevices which are formed between two metal surfaces shall, prior to final fastening, be filled with a suitable formable packing, Denso tape or equivalent, or with a suitable mastic or sealant.

D5.2 Alignment of Shafts

Not applicable

D6 MATERIALS

D6.1 Materials – Generally

All materials used in the manufacture and construction of plant and equipment shall be new, unused and shall be the best of their respective kinds. The Contractor shall ensure that the materials are selected in accordance with the best engineering practice to suit the working conditions and the extremely corrosive environment.

D6.2 Steel

All structural steel shall comply with the requirements of SANS 1431 grade 300W and shall be legibly marked with the maker's name or trade mark and identification marks.

D6.3 Stainless steel

The AISI grade of stainless steel to be used will normally be specified in the Detailed Mechanical Specification. Unless otherwise specified, rolled material shall be supplied with a matt, annealed and pickled or otherwise de-scaled surface finish. For wrought steels, the equivalent BS 970 grade may in each case be used. The common applications are as follows:

APPLICATION	AISI	BS 970
Low Corrosion Interior		
Welded	304L	304S12
Not Welded	304	304S15
Exterior and Corrosive Interior		

Welded	316L	316S12
Not Welded	316	316S16

A manufacturer's test certificate shall be provided for each batch of stainless steel giving details of the material analysis and any mechanical tests carried out on the material. Each stainless steel item supplied shall be clearly and permanently marked with the grade of stainless steel and cross-referenced to the applicable test certificate.

Where grades 316 and 304 are mentioned in the Tender Documents, these shall be taken synonymously with grades 316L and grade 304L, respectively. Contractors may offer grade EN 1.4162 in place of grades 316 and 304.

D6.4 3CR12

This is the titanium stabilised, 12 % chrome steel as produced by Columbus Stainless, South Africa.

3CR12 shall always be supplied with an annealed and pickled finish. 3CR12, in cases where it is to be coated, shall be suitably abrasive blasted to ensure adherence of the prime coat.

D6.5 Plastics

Thermoplastics and fibre reinforced polymers shall be UV resistant, have adequate tensile strength and high impact strength and generally suit the application.

PVC is regarded as too brittle and shall not be used unless called for in this Specification or approved in writing by the Engineer before supply.

D7 CASTINGS

Castings shall comply with the relevant South African or British Standard for the material used, including the following:

Grey Cast Iron	SANS 1034	BS 1452
S. G. Iron	SANS 936/7	BS 2789
Steel (General Purpose)	SANS 1465	BS 3100
Aluminium	SANS 989/992	BS 1490
Copper and Copper Alloy	SANS 200	BS 1400

Particular attention shall be paid to cleanliness, soundness and neat fettling and dressing of castings. Surfaces shall be smooth and irregularities caused by mould washaways, and the presence of porosity and sand and slag inclusions will not be tolerated. Areas under bolt heads, nuts and washers, shall be machined or spot faced to ensure a flat and smooth pressure bearing area, and sufficient space shall be provided for the use of ring or socket spanners.

All pressure retaining castings shall be hydrostatically tested to not less than 1,5 times the maximum working pressure after machining and shall be pressure tight.

No repairs shall be undertaken to castings without the written permission of the Engineer and **welding will not be permitted on cast iron castings.**

Castings shall be heat treated to provide optimum corrosion resistance and toughness combined with reasonable machinability. In particular stainless steel castings shall be heat treated so as to ensure that all carbides are in solution, to ensure optimum grain size, and to provide maximum corrosion resistance.

The Contractor shall provide a test certificate for each casting or batch of castings, except for those made of grey cast iron, giving details of the material analysis, the heat treatment and any mechanical tests carried out.

D8 FABRICATION OF CARBON STEELS

D8.1 Standards

Steelwork shall be constructed, fabricated and erected in accordance with SABS Standard Building Regulations, Chapter 6, "Structural Steelwork", and with SANS 1200 H where applicable.

D8.2 Finish

Edges shall be rounded to a radius of at least 2 mm. Weld spatter and other protrusions shall be removed.

D8.3 Requirements for Corrosion Protection

In addition to finishing requirements, the requirements of corrosion protection application shall be taken into consideration. Surfaces must be accessible for surface preparation and coating. Inaccessible pockets and open hollow sections and similar hidden surfaces shall not be permitted unless the corrosion protection system specified for the fabrication is hot-dip galvanizing without painting.

Pits, undercuts, indentations, etc. which would prevent access to blast material are unacceptable.

D8.4 Drawings

General and detailed fabrication drawings shall be submitted by the Contractor for approval by the Engineer. Full details of the welding procedures and standards which he proposes to use shall be shown on these drawings.

D8.5 Inspections

The Contractor shall arrange for the Engineer to inspect fabrications, including fabricated pipework, in the fabrication workshop and prior to corrosion protection.

D9 FABRICATION OF STAINLESS STEELS

The requirements regarding the fabrication of carbon steels apply to the fabrication of stainless steels as well. In addition, the following requirements apply to the fabrication of stainless steels:

- (a) Fabrication of stainless steels and 3CR12 shall follow the recommendations in "The Stainless Steel User Manual" and "The 3CR12 Fabrication Guide" issued by Columbus Stainless. Only fabricators experienced with stainless steel will be considered acceptable. Such fabricators shall use permanently dedicated storage and fabrication areas and shall use machines, tools and handling equipment suited and permanently dedicated to this type of material.
- (b) Surfaces which become contaminated with steel or otherwise stained or otherwise marked so as to be of uneven colour, shall be cleaned by pickling or electro-cleaning rather than by grinding.
- (c) The Contractor shall arrange for the Engineer to inspect fabrications, including fabricated pipework, in the fabrication workshop

D10 WELDING

D10.1 General Welding Requirements

D10.1.1 Standards

- i) Standards complying with good modern practice, and acceptable to the Engineer, shall be adopted. These include the following:
 - ii) BS EN 1011 - Arc welding carbon and carbon manganese steelwork.
 - iii) BS 4677 - Arc welding austenitic stainless steel pipework.
 - iv) BS 2633 - Class 1 Arc welding of steel pipework.
 - v) BS 2971 - Class II Arc welding of steel pipework.
 - vi) BS 806 - Design and construction of ferrous piping in connection with land boilers (used for arc welding specification of all pipe flanges).

Welders shall be experienced competent artisans approved in accordance with BS 4872.

D10.1.2 Continuous Welding and Elimination of Crevices

Welding shall be continuous on all sides of any joint. All crevices, including those arising from welding on one side only, shall be eliminated. This requirement applies to the welding of all metals and, in this respect, it should be noted that welding deformation results from incorrect welding procedure rather than from continuous welding.

In special cases only, non-continuous welding might be approved in writing by the Engineer. The resulting crevices shall be sealed with a two part solvent free epoxy which can be applied at thicknesses of up to 600 µm and above such as Sigmaline 523 or Sigmacover 1000 or equivalent. If overcoating is not required, a coal tar product which can be applied at thicknesses of up to 1 000 µm such as Carboline Bitumastic 50 or equivalent; is acceptable.

D10.1.3 Weld Appearance

Welding shall be free of blowholes, projections, pinholes, splatter and undercuts and all welding flux shall be removed. All weld spatter and other sharp imperfections shall be removed prior to abrasive blasting. Prior to painting, weld beads with a surface irregularity exceeding 3 mm or with sharp crests having a radius under 2 mm shall be ground. Weld grinding must not be performed on 304L or 316L stainless steel, however, unless unavoidable.

D10.1.4 Site Welding

Site welding shall be kept to a minimum and shall only be undertaken with the approval of the Engineer.

D10.2 Welding of Stainless Steel and 3CR12

The following apply in addition to all of the above.

D10.2.1 Stainless Steel Welding

Stainless steels shall be welded strictly as recommended in "The Stainless Steel User Manual" issued by Columbus Stainless.

D10.2.2 3CR12 Welding

3CR12 shall be welded strictly as recommended in "The 3CR12 Fabrication Guide" issued by Columbus Stainless.

D10.2.3 Stainless Steel Type

Austenitic stainless steels to be welded shall be of the low carbon grade (i.e.: 304L, 316L, etc).

D10.2.4 Welding Rods

The welding rods used shall be the most suitable for the metal and purpose. Type 309 stainless steel welding rods shall be used for welding 3CR12 unless otherwise approved in writing.

D10.2.5 Welders

Only welders experienced with welding stainless materials shall be used.

D10.2.6 General

All possible steps shall be taken to ensure maximum corrosion resistance and strength of the welds and welded material. Special care shall be taken to avoid prolonged heating. Welds shall be passivated. Discolouration and steel contamination must be removed by pickling or electro-cleaning as approved by the Engineer but should rather be avoided by taking the appropriate measures.

D11 CORROSION PROTECTION : APPLICATION AND CONTROL

D11.1 Painting Contractor

Surface preparation and coating application shall be carried out by suitably trained and experienced

industrial painting contractors who are fully equipped and staffed to do such work in their own covered premises strictly in accordance with the paint manufacturer's recommendations. Before proceeding with the corrosion protection coatings, the Contractor shall submit the name of the painting sub-contractor and the proposed works supervisor for approval by the Engineer.

D11.2 Site Work

Surface preparation and coating application shall not be done on Site except for minor repairs, for application of the final aesthetic coat, where specifically called for in the Detailed Mechanical Specification or where permitted by the Engineer in writing.

D11.3 Systems to be used

D11.3.1 Systems

The corrosion protection systems to be used on the plant and equipment will usually be specified in the Detailed Mechanical Specification, but if not, the Contractor shall recommend a suitable system for approval by the Engineer. If doubt exists as to the system or colour to be used, the Engineer's requirements must be ascertained.

D11.3.2 Alternative Systems

Alternative systems superior to those specified may be used if approved in writing by the Engineer

D11.3.3 All Items to be Painted

Except where otherwise specified, all metal surfaces shall be painted. This includes hot-dip galvanized items and metal-sprayed coatings. In the latter case the paint shall be in the form of a sealer. Details of approved painting systems to be used are given below.

D11.3.4 Coating Appearance

After installation on Site the finished paintwork must be neat, smooth, of uniform colour and to the approval of the Engineer.

D11.3.5 Grade 316 Stainless Steel

It is not usually necessary to paint 316 stainless steel. If corrosion of 316 stainless steel does occur, and depending on the appearance or extent of the problem, the Engineer may call for pickling, electrocleaning, painting or replacement of the item at no additional cost to the City of Cape Town. Painting may however be required if contaminated or stained surfaces cannot be properly cleaned or where stitch welding has been approved.

D11.4 Quality Control of Coating Application

D11.4.1 Quality Plan and Records

The Contractor shall provide a Quality Plan which shall include all steps in the surface preparation and corrosion protection process plus technical data sheets for all products proposed.

Records of compliance with the Quality Plan shall be maintained.

D11.4.2 Responsibility and Rectification

The Contractor is responsible for the quality of the work and materials used, irrespective of any quality surveillance that may be carried out by the Engineer.

If unacceptable work is found on Site, the full area associated by the engineer with that unacceptable area shall be redone after the Contractor has submitted a method proposal.

D11.4.3 Inspections

The Contractor shall arrange for the coating application on fabricated steelwork to be inspected throughout by the Engineer. The Engineer may approve inspections by an independent competent person (hereinafter called the Inspector) appointed by and at the cost of the Contractor. Inspections shall be adequate to ensure compliance with the Specification and shall be done at the following stages as a minimum:

Coating (Hot-Metal Spray, Paint, etc.)

After fabrication but before surface preparation.

After surface preparation but before application of the first coat.

After application of the final hot-metal sprayed coating or after application of the paint primer or first coat (as applicable).

After the final factory applied paint or sealing coat.

Hot-dip Galvanizing

After fabrication but before hot-dip galvanizing.

After hot-dip galvanizing.

Duplex Protection (Hot-dip Galvanizing and Coating)

After fabrication but before hot-dip galvanizing.

After hot-dip galvanizing but before application of the first coat.

After application of the primer.

After the final Site-applied paint coat.

D11.4.4 Witnessing of Inspection

If the coating is to be done in the Cape Peninsula by an inspector other than the Engineer, the Contractor shall, nevertheless, arrange for the Engineer to witness the inspections at the latter's discretion.

D11.4.5 Dry Film Thickness

The dry film thickness of any coat or coating system shall be determined in accordance with SANS 2808. The test method defines that the instrument is to be calibrated on a substrate that represents the surface to be coated.

D11.4.6 Inspection Report

A written report of the inspections, prepared by the Inspector and signed by both the Inspector and the Contractor, shall be submitted for appraisal by the Engineer before delivery of the equipment to Site.

D11.4.7 Inspector Qualifications

Inspectors appointed by the Contractor shall hold an appropriate qualification from one of the following:

- (a) Corrosion Institute of Southern Africa.
- (b) South African Institute of Welding.
- (c) South African Institute for Non-Destructive Testing.
- (d) South African Qualification and Certification Committee.

D11.4.8 Identification of Items

Every item to be coated shall be identified by a welded or hard-stamped code. Records shall be maintained for each item.

D12 CORROSION PROTECTION : SURFACE PREPARATION

D12.1 Imperfections

Welding shall be free of blowholes and all welding flux removed. All weld spatter, sharp edges and other imperfections shall be removed prior to abrasive blasting. Prior to painting, weld beads with a surface irregularity exceeding 3 mm or with sharp crests having a radius under 2 mm shall be ground. (Weld grinding must not, however, be performed on stainless steel). Areas to be painted shall be free of crevices. If the Engineer has permitted stitch welding in terms of Clause "Welding", crevices shall be filled with a compatible sealing compound after the priming coat has been applied.

D12.2 Edges

Edges shall be rounded to a radius of at least 2 mm.

D12.3 Cleanliness

The provision of acceptable cleanliness entails not only the removal of existing mill scale, coatings and/or corrosion product, but also the removal of surface contaminants such as oil, grease and soluble salts.

Water soluble salts present on the steel before application of the primer shall not exceed 10 µg/cm².

D12.4 Abrasive Blasting

Before coating, all new steel surfaces shall be abrasive blast cleaned in accordance with Section 4.3 of SANS 10064 to a preparation grade of ISO-Sa3 in accordance with ISO 8501. The blast profile, measured in accordance with SANS 5772 (dial gauge), shall be in the range of 50 to 75 µm. The abrasive shall comply with SANS 10064 and shall be free from all traces of oil, grease, foreign matter and corrosive contaminants such as chlorides, etc. The blasted surface shall be cleaned and degreased as required. The prepared surface shall be given the first coat of the painting system within 4 hours after blasting.

In instances where stainless steel and 3CR12 are to be painted, the surface shall be suitably abrasive blasted prior to primer application.

D12.5 Between Coats

Between coats or with previously painted surfaces in good condition, all traces of oils, greases, soluble salts and corrosive air borne contaminants shall be thoroughly washed from the surface to be painted using a detergent type cleaning agent, rinsed and dried. The previous coat shall then immediately be lightly sanded or otherwise prepared as recommended by the paint manufacturer, wiped clean, dried and painted. Solvents are not acceptable as a surface cleaning agent.

D12.6 Hot-Dip Galvanized Surfaces

Hot-dip galvanized surfaces to be painted shall not be passivated and shall be free from white rust and shall be cleaned with an approved water based galvanizing cleaner using non-metallic abrasive pads until a "water break free" surface is obtained. The surface shall then be thoroughly rinsed with clean potable water to remove all residues and dried immediately prior to painting. Where necessary to obtain adhesion a sweep blast of the surface shall be done after cleaning.

D13 CORROSION PROTECTION : METAL COATINGS AND DUPLEX COATINGS

D13.1 General

Fabrication of items to be protected by metal coatings shall be in accordance with SANS 14713.

D13.2 Hot-Dip Galvanizing

D13.2.1 General

Hot-dip galvanizing shall be done in accordance with SANS 121 and the following shall apply:

- (a) Coatings shall be to the thicknesses detailed in the Standard.
- (b) Hot-dip galvanized material which is to remain unpainted shall be passivated as specified in SANS 121. Items to be painted after hot-dip galvanizing shall be air dried and not passivated.
- (c) Hot-dip galvanized material shall be substantially free from white rust when it is erected on site. Stacking and storing shall at all times be done in a manner to prevent white rust forming.
- (d) Damage to hot-dip galvanizing caused by welding, grinding, etc. is not acceptable. Repair to hot-dip galvanizing damaged by handling or transport shall be done by cleaning the area and applying 3 coats of a zinc rich primer giving a dry film thickness of at least 100 µm and containing at least 94 % zinc in the dried film. If the Engineer considers that damage is excessive, such items shall be replaced by the Contractor without cost to the City of Cape Town.
- (e) Welding after hot-dip galvanizing is not acceptable.
- (f) The Contractor shall supply a galvanizer's guarantee or test certificate prior to installation.

D13.2.2 Duplex Systems

Preparation and application of organic coatings on hot-dip galvanizing shall be done in accordance with the Hot Dip Galvanizers Association Southern Africa's Code of Practice for Surface Preparation and Application of Organic Coatings.

The duplex system shall be as follows:

- (a) Hot-dip galvanizing; without passivation of the zinc coating.
- (b) Application of one coat of an epoxy primer (two part; for hot-dip galvanised surfaces) with a dft of 75 µm.
- (c) Polyurethane enamel top coat (two part) with a dft of 50 µm; done on Site after suitable repair to the primer.

Acceptable coating products are specified elsewhere.

D13.3 Hot-Metal Sprayed Coatings

D13.3.1 General

Fabrication and surface preparation of items to be protected by hot-metal spray shall comply with the requirements specified in this Standard Specification for Mechanical Works (including General Works).

Hot-metal sprayed coatings shall be in accordance with SANS 2063 and shall comply with the following:

- (a) The minimum coating thickness for both aluminium and zinc shall be 150 µm. Greater thicknesses may be specified in the Detailed Mechanical Specification.
- (b) The thickness shall be checked on every surface plane at points not more than 300 mm apart for small articles and 500 mm for large articles. Angles shall be checked along all 4 surfaces, channels along all 6 surfaces, pipes in 4 planes. The minus tolerance on thickness in isolated areas shall also not exceed -10 % and such low areas shall not be larger than 50 mm in diameter.
- (c) The time between surface preparation and coating shall be shortened from 4 hours to 2 hours at any application area closer than 10 km from the coast.
- (d) Unless otherwise specified, all hot-metal coatings shall be sealed and coated immediately after hot-metal spraying. The system shall consist of a low viscosity sealant, which is applied until absorption is complete, followed by a suitable coating system.

The sealant systems outlined below are acceptable (where appropriate for the particular application).

D13.3.2 System 1 (for immersion applications)

Application of an epoxy zinc sealer to a dft of 60 µm (Sigmacover 522, or equivalent).

Application of two coats of epoxy pipe coating to a dft (per coat) of 125 µm; (Sigmaguard 720, or equivalent).

D13.3.3 System 2 (for non-immersion applications)

Application of a two part epoxy primer to a dry film thickness of 40 µm; (Intergard 269, Carboline Rustbond Penetrating Sealer, or equivalent).

Application of one intermediate coat chemical resistant vinyl copolymer to a minimum dry film thickness of 70 µm (Carboline Polyclad 938 HB, or equivalent).

Application of one coat of vinyl copolymer chemical resistant enamel to a minimum dry film thickness of 40 µm (Carboline Polyclad 938-2, or equivalent).

D13.3.4 System 3 (suitable for crane beams, gantries, etc.)

Application of one coat of a two-part epoxy primer to a dry film thickness of 40 µm; (Carboline Rustbond Penetrating Sealer, Intergard 269, or equivalent).

Application of two coats of a two-part polyurethane enamel (two part) to a minimum combined dry film thickness of 70 µm.

D13.3.5 System 4

Application of micaceous oxide pigmented polyamide cured epoxy to achieve a dry film thickness of 60-80 µm; (Sigmacover 522, or equivalent).

One coat of solvent borne modified acrylic coating to achieve a dry film thickness of 70 µm; (Sigma Topacryl coating, or equivalent).

One coat of solvent borne modified acrylic finish to a dry film thickness of 30-45 µm; (Sigma Topacryl finish, or equivalent).

D14 CORROSION PROTECTION : PAINT COATINGS

D14.1 Paint

D14.1.1 Paint Quality

Paint shall be of best quality, of approved manufacture and brand and comply with the requirements of the relevant SANS (Standards South Africa) or BS specifications.

D14.1.2 Compatibility

All materials in a paint system shall be purchased from one paint manufacturer.

D14.1.3 Packaging

All coating materials shall be delivered in the manufacturer's original, sealed containers of maximum 25 litre capacity, clearly marked with the following:

- (a) Manufacturer's name.
- (b) Product Brand and Reference Number.
- (c) Batch Number, which may incorporate the date of manufacture.
- (d) Date of manufacture, unless already incorporated in the batch number.
- (e) Abbreviated instructions for storage and use of the material, which shall include mixing ratios of components for multi-component materials, minimum temperature of application, method of application, and minimum and maximum overcoating times where applicable.

D14.1.4 Confirmation of Suitability

Contractors shall obtain confirmation from their paint suppliers that, when using their paints, the systems specified are technically correct and suitable for the application and the material being coated.

D14.2 Paint Application

D14.2.1 Surface Preparation

All surfaces shall be properly prepared as specified in Clause "Corrosion Protection : Surface Preparation".

Coats shall be clean and free from dust, oil and moisture before overcoating. The primary method for determination of oil and grease contamination of surfaces shall be visual inspection. Any surface that exhibits obvious signs of oil and grease, as well as variations in surface rusting and flash rusting, shall be regarded as having oil or grease contamination. All surfaces which have been machined or have had holes drilled shall be regarded as having oil and grease contamination.

D14.2.2 Environmental Conditions

Paint shall not be applied if:

- (a) the conditions are windy or dusty.
- (b) the surface temperature is less than 10 °C.
- (c) the surface temperature is less than 3 °C above dewpoint.
- (d) the surface temperature is above 35 °C.
- (e) the conditions are contrary to the manufacturer's recommendations.

- (f) the relative humidity is 85% or above (the determination of humidity may be made using moisture sensitive hair-type gauges, electronic gauges or sling psychrometers (whirling hygrometers) having a resolution of at least 1% humidity. Electronic gauges shall have calibration certification not more than 6 months old. Moisture sensitive hair-type and analogue gauges shall have a calibration certificate not more than 1 month old. The accuracy of thermometer used in sling psychrometers shall be tested by placing at least 4 thermometers displaying temperatures within half a degree Centigrade of a mean shall be used).

D14.2.3 Mixing

Coating materials shall be mixed thoroughly by a power stirrer.

In the case of two-pack materials, each component shall be thoroughly stirred separately. The two components shall then be mixed together in the proportions supplied by the manufacturer until the mixture is completely homogeneous. The use of part of the contents is not acceptable.

In the case of solvent-based epoxy materials, the mixed material shall be allowed to stand for the induction period recommended by the material manufacturer.

D14.2.4 Painting

Paints shall be applied strictly in accordance with the manufacturer's instructions by tradesmen skilled in this class of work. Thinning of paint shall only be allowed for spray application and the manufacturer's recommended thinners shall be used.

D14.2.5 Stripe Coats

All edges and welds shall be provided with at least one stripe coat. This coat shall, preferably, be the same as the primer but can be the same as the intermediate coat.

D14.2.6 Coating of Hidden Areas

Areas which will be inaccessible after erection and surfaces resting on floors shall receive the full paint system prior to erection.

D14.2.7 Surfaces in Contact

Mating or contact surfaces shall be treated with one of the following systems, the system being chosen to suit the application:

- (a) Surfaces shall be prepared and primed and brought together while the paint is still wet; or,
- (b) Each surface shall be provided with one coat of inorganic zinc silicate; or,
- (c) Surfaces shall be provided with a mastic or sealant; or,
- (d) Surfaces shall be provided with insertion rubber or other gasket material.

D14.2.8 Crevices

Crevices will not be permitted. Where unavoidable crevices are accepted by the Engineer, such crevices shall be sealed with a two part solvent free epoxy which can be applied at thicknesses of up to 600 µm and above such as Sigmaline 523 or Sigmacover 1000 or equivalent. If overcoating is not required, a coal tar product which can be applied at thicknesses of up to 1 000 µm such as Carboline Bitumastic 50 or equivalent; may be applied.

D14.2.9 Items Encased in Concrete

Metal to be encased in concrete shall be painted externally up to 30 mm inside the concrete section, leaving the remainder bare so as to facilitate bonding with the concrete.

D14.2.10 Protection of Machined Surfaces

Where painting of machined surfaces is not possible or advisable, these surfaces shall be coated with an approved proprietary anti-corrosion compound giving 12 months protection under operating conditions. Shaft ends and machined mating or mounting surfaces or pads shall be so coated and shall not be painted.

D14.2.11 Coating Thickness

The dry film thickness shall be measured using a non-destructive thickness testing machine and shall

comply with the Specification. 90 % of all thicknesses measured shall comply with the minimum requirements of the Specification. Up to 10 % of all readings may be below the specified minimum thickness, but may not be less than 80 % of the specified minimum thickness.

D14.2.12 Repair

Painted areas damaged during transportation, erection or any means whatever shall be repaired as follows - Rusted spots shall be removed and cleaned by means of a wire brush or emery paper to a bright metal finish and the surrounding paint which is still intact shall be feathered for a distance of 50 mm beyond the damaged area. Spot priming and repair shall consist of all the coats previously applied and shall overlap the undamaged area.

D14.2.13 Protection on Site

Proper and adequate use of cover sheets and other means shall be made to protect the existing paintwork from damage and from metal dust and sparks when welding, grinding, and wire brushing on site. Similarly effective steps shall be taken to prevent spillage or splashing or other damage to floors, walls and equipment when painting on site and any damage or mess caused shall be corrected at the Contractor's cost.

D14.2.14 Final Coat

A continuous, smooth finish with a uniform colour is required. The final external coat/s shall, where applicable, be applied on Site after installation.

D14.3 Final Colour Code – General

Colours shall comply with the National Colour Standard, SANS 1091.

The final colour marking shall be in accordance with SANS 10140.

Where SANS 10140 does not specify a requirement, the colour marking shall comply with the following (please note that wastewater treatment works are dealt with separately below):

PIPEWORK				
CONTENTS OF PIPE	BASIC COLOUR	COLOUR OF INDICATOR		
		1 BAND	2 BANDS	3 BANDS
AIR				
Compressed, Power	Arctic Blue (F28)		-	-
Aeration	Arctic Blue (F28)	Canary Yellow (C61)	-	-
Instrument	Arctic Blue (F28)	Salmon Pink (A40)	-	-
Vacuum	Arctic Blue (F28)	Primrose (C67)	-	-
Lime Transfer	Arctic Blue (F28)	Crimson (A03)	-	-
Backwash	Arctic Blue (F28)	Verdigris Green (E22)	-	-
CHEMICALS				
Aluminium Sulphate	Jacaranda (F18)	Verdigris Green (E22)	-	-
Sodium Aluminate	Jacaranda (F18)	Crimson (A03)	-	-
Ferric Sulphate	Jacaranda (F18)	Canary Yellow (C61)	-	-

Lime (dry powder)	Jacaranda (F18)	Salmon Pink (A40)	-	-
Activated Carbon	Jacaranda (F18)	Light Stone (C37)	-	-
Polyelectrolyte	Jacaranda (F18)	Cloud White (G80)	-	-
GASES (other than air); liquefied or gaseous				
Butane, Propane	Light Stone (C37)	-	-	-
Ammonia	Light Stone (C37)	Ultramarine (F09)	-	-
Blast furnace	Light Stone (C37)	Crimson (A03)	-	-
Carbon Dioxide	Light Stone (C37)	Light Brunswick Green (H07)	-	-
Coke Oven	Light Stone (C37)	Light Grey (G29)	-	-
Producer	Light Stone (C37)	Verdigris Green (E22)	-	-
Chlorine, Hypochlorite	Light Stone (C37)	Canary Yellow (C61)	-	-
WATER				
Cold Drinkable	Brilliant Green (H10)	Cornflower (F29)	-	-
Hot Drinkable	Brilliant Green (H10)	Crimson (A03)	Cornflower (F29)	-
Boiler Feed (Distilled)	Brilliant Green (H10)	Crimson (A03)	Cloud White (G80)	Crimson (A03)
Boiler Feed (De-mineralised)	Brilliant Green (H10)	Cloud White (G80)	-	-
Industrial, Raw	Brilliant Green (H10)	Golden Yellow (B49)	-	-
Reclaimed	Brilliant Green (H10)	Jacaranda (F18)	-	-
Backwash	Brilliant Green (H10)	Light Stone (C37)	-	-
De-sludge	Brilliant Green (H10)	Canary Yellow (C61)	-	-
Stove Circulating	Brilliant Green (H10)	Salmon Pink (A40)	-	-
Hydraulic Power	Brilliant Green (H10)	Terra Cotta (A10)	-	-
Final Treated Effluent	Aquamarine (E67)	-	-	-
Interchange, Stage	Drakensberg Green (H36)	-	-	-
Raw Sewage	Olive Green (H05)	-	-	-
Sea Water	Light Brunswick Green (H07)	-	-	-
Primary Sludge	Dark Brown (B03)	-	-	-

Waste Activated Sludge	Light Brown (B15)	-	-	-
Digested Sludge	Light Brown (B15)	Light Olive Green (H21)	-	-
Pasteurised Sludge	Light Brown (B15)	Cloud White (G80)	-	-
OIL				
Diesel Fuel	Golden Brown (B13)	Cloud White (G80)	-	-
Hydraulic Power	Golden Brown (B13)	Salmon Pink (A40)	-	-
Lubricating	Golden Brown (B13)	Verdigris Green (E22)	-	-
Transformer	Golden Brown (B13)	Crimson (A03)	-	-
Paraffin	Golden Brown (B13)	Arctic Blue (F28)	-	-
PLANT AND EQUIPMENT				
EQUIPMENT		COLOUR CODE		
FIRE FIGHTING				
Equipment and Pipework		Signal Red (A11)		
ELECTRICAL				
Distribution Boards, Switch-Gear, Terminal Boxes and Conduits		Light Orange (B26)		
Emergency Stop		Signal Red (A11)		
MACHINE GUARDS				
Inside		Light Orange (B26)		
Outside		Colour of Machine		
Protruding Shafts, Exposed Gear Wheels and Rotating Parts		Light Orange (B26)		
HANDRAILS				
Horizontal Rails and Chains		Golden Yellow (B49)		
Stanchions		Black		
Protrusion, Sides of Ramps		Black and Yellow Diagonal Stripes		
GENERAL				
Scour Pipes		Deep Buff (B24)		
Valves		Basic colour of pipeline		
WORKSHOP FLOOR DEMARCATION				
Demarcation Lines		Golden Yellow (B49)		
Working Areas		Pastel Grey (G54)		
No Parking, No Storage		Golden Yellow (B49)		

Aisles and Walkways	Brilliant Green (H10)
Storage Area	Terracotta (A10)
<i>Urethane based paint is to be used for concrete surfaces</i> <i>Traffic paint is to be used for tarred surfaces</i>	

Items made of 316 or 316L stainless steel may be left unpainted provided the surface is of uniform self-colour without blemishes, rust, marks or stains. If blemished, the surfaces must either be painted or cleaned by pickling and/or electro-cleaning (not grinding or other mechanical means).

D14.5 Painting Systems

D14.5.1 Definition of Terms

The abbreviation "dft." used in this Specification shall mean dry film thickness given in microns and, except where otherwise specified, is the minimum (not average) thickness permissible.

D14.5.2 System for Large Immersed Steel Fabrications

This system is suitable for steel items subject to immersion, semi-immersion and non-immersion such as tanks, pipes, etc.

STEP	PREPARATION/COATING METHOD	Minimum dft (µm)
1	Blast steel surface to ISO-Sa3 in accordance with ISO 8501	
2	Apply three coats of a low solvent, high solids, polyamine/amide cured, epoxy (two part).	350
		Total = 350 µm
<p>The coating shall undergo EID detection over the full surface in accordance with SANS 1217. This test shall be done by an inspector holding an appropriate qualification from either the CISA, the SAIW or the SAQCC.</p> <p>When applied to hot-dip galvanized surfaces, a suitable epoxy primer shall be used after careful surface preparation before applying this system.</p> <p>This system shall be applied by a specialist applicator prior to delivery to site with particular attention to the required interval between coats.</p> <p>The first and third coats shall be a different colour to the second coat.</p>		

D14.5.3 System for Large Immersed Steel Fabrications (non-chalking surface)

Not applicable

D14.5.4 System for Large Immersed Steel Fabrications (not requiring decorative finish)

Not applicable

D14.5.5 System for non-immersed Steel in Coastal Atmosphere

STEP	PREPARATION/COATING METHOD	Minimum dft (µm)
1	Blast steel surface to ISO-Sa3 in accordance with ISO 8501	
2	Coat of two component zinc epoxy primer.	100
3	Coat of two component epoxy intermediate.	150
4	Coat of polyurethane enamel (two part).	50
		Total = 300 µm

D14.5.6 System for non-Immersed Steel in Moderate Atmosphere

This system is suitable for heavy fabricated steel items requiring a hard, high gloss colour finish; e.g. bridges, structural steel, mobile equipment, etc.

STEP	PREPARATION/COATING METHOD	Minimum dft (µm)
1	Blast steel surface to ISO-Sa3 in accordance with ISO 8501	
2	Coat of inorganic zinc silicate	75
3	Coat of epoxy intermediate coat	75
4	Coat of polyurethane enamel (two part)	40
		Total = 190 µm
The complete system must be factory applied and touch ups will be required on Site. The primer shall be tested for full cure before applying the subsequent coats. This system shall not be used for items subject to immersion.		

D14.5.7 System for Hot-Dip Galvanized Steel (Duplex)

STEP	PREPARATION/COATING METHOD	Minimum dft (µm)
1	After hot-dip galvanizing, do not passivate.	
2	Coat epoxy primer (two part for HDG surfaces)	75
3	Coat polyurethane enamel (two part)	50
		Total = 125 µm

D14.5.8 System for Repair to Coating on Steel and Cast Iron (“Maintenance Coating”)

This system is suitable as a maintenance coat over weathered coatings and partially failed coatings.

STEP	PREPARATION/COATING METHOD	Minimum dft (µm)
1	Surface preparation shall include, as a minimum, removal of all loose mill scale, non-adherent rust and loose paint prior to wire brushing and de-greasing and shall comply with ISO-St3 (ISO 8501) or with SSPC-SP3 (Steel Structures Painting Council of the USA).	
2	Coat of aluminium filled epoxy (two part).	100
3	Coat of epoxy intermediate.	150
4	Coat of polyurethane enamel (two part).	40
		Total = 165 µm

D14.5.9 System for Cast Iron Components

This system is suitable for motors, gearboxes and other cast iron components.

STEP	PREPARATION/COATING METHOD	Minimum dft (µm)
1	Blast steel surface to ISO-Sa2 ^{1/2} in accordance with ISO 8501	
2	Coat high build epoxy primer	100
3	Coat polyurethane enamel (two part)	60
		Total = 160 µm

D14.5.10 System for Steel in Dry Applications up to 200 °C

STEP	PREPARATION/COATING METHOD	Minimum dft (µm)
1	Blast steel surface to ISO-Sa3 in accordance with ISO 8501	
2	Coat of a two part micaceous iron oxide pigmented polyamine/amide cured epoxy sealer/coating (Sigmacover 522 or equivalent).	60
3	Coat of a two part micaceous iron oxide pigmented polyamine/amide cured epoxy sealer/coating	60

	(Sigmacover 522 or equivalent).	
		Total = 120 µm

D14.5.11 System for Steel in Dry Applications up to 200 °C

STEP	PREPARATION/COATING METHOD	Minimum dft (µm)
1	Blast steel surface to ISO-Sa3 in accordance with ISO 8501.	
2	Coat of inorganic zinc silicate.	75
3	Coat of modified silicon heat resisting coating for 200 °C.	75
		Total = 150 µm
<p>Particular care shall be taken to obtain the recommended anchor pattern during abrasive blasting and to achieve the required primer thickness on all surfaces in one coat. The primer must be factory applied. The primer shall be tested for full cure before applying the subsequent coat. An intermediate coat suitable for 200 °C shall be included between the primer and top coat if so recommended by the paint manufacturer. The top coat must cure at ambient temperatures.</p>		

D14.5.12 System for Steel in Potable Water up to 100 °C

STEP	PREPARATION/COATING METHOD	Minimum dft (µm)
1	Blast steel surface to ISO-Sa3 in accordance with ISO 8501	
2	Coat of a two part micaceous iron oxide pigmented polyamine/amide cured epoxy sealer/coating (Sigmacover 522 or equivalent).	80
3	Coat of a two part micaceous iron oxide pigmented polyamine/amide cured epoxy sealer/coating (Sigmacover 522 or equivalent).	80
4	Coat of a two part micaceous iron oxide pigmented polyamine/amide cured epoxy sealer/coating (Sigmacover 522 or equivalent).	80
		Total = 240 µm

D14.5.13 System for Steel and Cast Iron in Dry Applications up to 540 °C

STEP	PREPARATION/COATING METHOD	Minimum dft (µm)
1	Blast steel surface to ISO-Sa3 in accordance with ISO 8501	
2	Coat modified silicon	40
3	Coat modified silicon	40
4	Coat modified silicon	40
		Total = 120 µm

D14.5.14 System for Steel Grid Flooring (where HDG is not suitable)

STEP	PREPARATION/COATING METHOD	Minimum dft (µm)
1	Blast steel surface to ISO-Sa2 ¹ / ₂ in accordance with ISO 8501.	
2	Apply a glass flake resin by dipping in catalysed resin.	

D14.5.15 System: Fusion Bonded Epoxy

This system is suitable for immersed objects, cast iron valve bodies, pipework, etc.

STEP	PREPARATION/COATING METHOD	Minimum dft (µm)
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1	Blast steel surface to ISO-Sa3 in accordance with ISO 8501	
2	Apply fusion bonded epoxy in accordance with the manufacturer's instructions for the item to be coated.	300
		Total = 300 µm
<p>This is a water resistant, non-toxic and non-tainting, fusion bonded epoxy pipe coating in accordance with SANS 1217.</p> <p>The material used shall be of Type 2; i.e. a thermosetting powder-coating material.</p> <p>Pre-heating is needed to achieve the required coating thickness.</p> <p>No reading shall be less than 200 µm.</p> <p>The Contractor shall execute EID detection over the full surface in accordance with SANS 1217.</p> <p>The items to be coated shall be prepared in accordance with the relevant clauses of this Specification and, in particular, shall have edges ground to a radius of curvature of at least 3 mm.</p>		

D14.5.16 System: Hot-Applied Thermoplastic

This system is suitable for immersed objects, cast iron valve bodies, pipework, etc.

STEP	PREPARATION/COATING METHOD	Minimum dft (µm)
1	Blast steel surface to ISO-Sa3 in accordance with ISO 8501	
2	Apply one coat of a synthetic thermoplastic polyamide.	300
		Total = 300 µm
<p>No reading shall be less than 200 µm.</p> <p>The coating shall be applied by dipping into a fluidised bed of the polymer after the object has been suitably heated.</p> <p>The coating shall be executed strictly in accordance with the recommendations of the polymer supplier and the applicator shall be certified by the supplier for application of the coating.</p> <p>The Contractor shall execute EID detection over the full surface in accordance with SANS 1217.</p> <p>Objects to be coated shall be prepared in accordance with the relevant clauses of this Specification and, in particular, shall have edges ground to a radius of curvature of at least 3 mm.</p>		

D14.5.16 System for Repair of Coatings on Submerged Steelwork

This is a two part, solvent free epoxy which is suitable for application to wet steel.

STEP	PREPARATION/COATING METHOD	Minimum dft (µm)
1	Abrade corroded areas to St 2 in accordance with ISO 8501.	
2	Feather existing coating and lightly abrade existing coating.	
3	Clean and degrease surfaces to be coated and allow to dry.	
4	Apply coat(s) of a two part, solvent free epoxy which is suitable for application to wet steel.	800
		Total = 800 µm
Coating shall be done in accordance with the manufacturer's instructions.		

D14.5.17 System to Provide Thick Coating for Complex Surfaces

These systems are thick coatings for covering complex surfaces normally including crevices which are formed by fasteners, seams, edges and corners and are generally applied either before or after the parent surfaces have already been suitably coated. Suitable for immersed and non-immersed applications.

STEP	PREPARATION/COATING METHOD	Minimum dft (µm)
1	Clean and degrease surfaces to be coated and allow to dry.	
2a	Two coats of a solvent free, two part epoxy which can be	

	applied at thicknesses of up to 600 µm and above such as Sigmaline 523 or Sigmacover 1000 or equivalent.	600
	OR	
2b	Single part, cold applied coal tar coating which can be applied up to a dry film thickness not less than 1 000 µm; Carboline Bitumastic 50 or equivalent.	1 000
		Total > 1 000

D14.6 Acceptable Materials and Suppliers

The table below lists acceptable materials and suppliers. In all cases, other equivalent materials and suppliers are acceptable.

GENERIC	MATERIAL/SUPPLIER
Hot-Dip Galvanizing	Hot-dip galvanisers shall hold the certification mark for SANS 121.
Powder Coating	Plascon epoxy/polyester powder : CEP series, Sigmalining FBE 27.
Universal Undercoat	Sigmarine 40, Carboline GP-64 Undercoat, Plascon Plasconamel 189 Undercoat.
High-Gloss Alkyd Enamel	Carboline AD-51 Finish, Plasconamel 1000 Finish, Sigmarine 49.
HB Epoxy Primer : Two Part	Plascon Plascotuff HB Epoxy MLE series, Sigmazinc 109HS, Carboline 193 Primer.
Epoxy Primer : Two Part (for hot-dip galvanized surfaces)	International Interguard 269, Sigmacover 280.
Polyamine/Amide Cured Epoxy Sealer/Coating : Two Part	Carboline Rustbond Penetrating Sealer, Plascon Plascoguard Copon EA3 Primer, Sigmacover 522.
Epoxy Intermediate Coat	Sigmacover 456, Carboline 190 HB, Plascon Plascosafe 18 Primer, Sigmacover 435.
Low Solvent, High Solids, Polyamine/Amide Cured Epoxy : Two Part	Plascon Plascoguard Copon KSIR88, Sigmaguard 720 Ameron Amercoat 385, Carboline 891.
Polyamine/amide Cured Coal Tar Epoxy : Two Part	Sigmacover 300, Carbomastic 200, Ameron Amercoat 78HBB.
Solvent Free Epoxy repair coating	Plascon Plascoguard Copon Hycote 151, Sigmaguard 575.
Aluminium Filled Epoxy : Two Part	Ameron Amerlock 400 AL, Carbomastic 15, Sigmacover 630.
Two Part Solvent Free Epoxy For Submerged Applications	Sigmarite Submarine Coating, Carboline 1208, InterZone 954, Jotamastic 87.
Zinc Phosphate Primer	Carboline GP-18 Primer, Plascon Plascoprime 183 HB, Bildphos M10 Primer.
Inorganic Zinc Silicate	Plascon Plascozinc 233, Sigmazinc 160, Carboline Carbozinc 11, Ameron Dimetcote 11.
Modified Silicon	Carboline 4631, Plascon Plascotherm Silicone 540 – Aluminium, Sigmatherm 520.
Silicone Acrylic	Plascon Plascotherm Silicon – Acrylic 200 T, Carboline 1248.
Polyurethane Enamel : Two Part	Sigmadur 550, Carboline 134 over polyamine/mide coatings, Carboline 133 HB over zinc coatings, International Interthane 990, Plascon Plascothane Recoatable Enamel CPC Series, for two-coat systems, Plascon

		Plascothane Recoatable Enamel CPQ Series, for single coat systems.
	Glass Flake Resin	Power Blast Vitaglass.
	Hot-applied Thermoplastic	Rilsan.
	Thick Coating for Complex Surfaces	Sigmaline 523, Sigmacover 1000 or Carboline Bitumastic 50.

D15 FASTENERS

D15.1 Standards

Bolts and nuts shall be hexagon head type complying with SANS 1700 with threads of the coarse pitch series. Allen head screws of any type shall not be used without the Engineer's written consent.

D15.2 Fasteners M12 and Smaller

All fasteners M12 and smaller shall be of EN Grade 1.4401 (316), or better.

D15.3 Fasteners Larger than M12 - in Corrosive Areas

All fasteners in corrosive areas shall be of EN Grade 1.4401 (316), or better. Corrosive areas shall be taken to include any moist or wet area such as in and above settling tanks, in or in the vicinity of open channels, where a continuous spray can be expected and all internal and external areas in the vicinity of the inlet works of a wastewater treatment works. All fasteners embedded in brick, concrete or soil shall also be of EN Grade 1.4401 (316), or better.

D15.4 Fasteners Larger than M12 - Non-Corrosive Areas

Fasteners larger than M12 which are in non-corrosive areas shall, except when specified otherwise, be hot-dip galvanized.

D15.5 High Tensile Bolts

Where high tensile bolts are required by the design, they shall be hot-dip galvanized and painted. The bolt holes and crevices shall be filled and sealed prior to painting.

D15.6 Material Compatibility

Fastener material shall always be of equal or better corrosion resistance than the items being fastened, e.g. EN Grade 1.4401 (316) bolts must be used to fasten together EN Grade 1.4401 (316) stainless steel fabrications or flanges.

D15.7 Washers

Washers of similar material to the bolts shall be provided under each nut and setscrew head. Multiple washers or shims shall not be used. Spring washers or other approved locking arrangement shall be used on all fasteners subject to vibration.

D15.8 Anti-Seize Compound

Before assembly, threads shall be treated with a nickel based, anti-seize/corrosion protection compound; Chesterton 725 : Nickel Anti-Seize Compound, or equivalent. The Contractor shall note:

- (a) Copper-based compounds are not acceptable and, if used, shall be cleaned off before the correct compound is applied.
- (b) If it is found during inspection that compound has not been applied, the Contractor shall disassemble all fasteners and comply with this requirement.
- (c) A small amount of compound shall be applied along the full length of the thread before the nut is applied. Excessive compound visible on the thread after the nut has been applied shall be cleaned off.

D15.9 Thread Projection

Bolt threads shall project between 1 and 6 mm from the head of the nuts when fixed. Longer projections will only be allowed if the Contractor can show that bolts of a more suitable length are not manufactured.

D15.10 Corrosion Protection

After installation the exposed surfaces of bolts not made of EN Grade 1.4401 (316) or of EN 1.4162 shall be coated as for the items being fastened. If the use of Allen head or similar fasteners has been approved by the Engineer, the recessed heads shall be filled with a suitable non-hardening sealing compound.

D16 ANCHOR FASTENERS

D16.1 Type and Material

All anchor fasteners shall be of EN Grade 1.4401 (316), or better.

Anchor fasteners for water retaining structures and for brickwork shall be of the chemical anchor fastening type. Anchor fasteners for other applications may be of the expanding type or chemical anchor type.

D16.2 Hook Bolts

EN Grade 1.4401 (316), or better, hook bolts shall be supplied and grouted by the Contractor into pockets which will be provided in the concrete structure in accordance with the information to be supplied by the Contractor. The grouting products shall be used strictly in accordance with the manufacturer's instructions.

D16.3 Alternative Anchor Bolts

The use of EN Grade 1.4401 (316) stainless steel "Hilti Kwik Bolt" stud bolts or equivalent may be used as an alternative where approved by the Engineer. If steel reinforcing bars are encountered while the holes are being drilled, the Contractor shall knock a hole in the concrete around the steel and grout in a stainless steel hook bolt as described above.

D16.4 Through-Bolt Anchors

Where machinery is anchored by studs or bolts which extend through the supporting structure and is therefore fastened down with the use of nuts from both sides, these, together with associated washers and brackets, shall also be of EN Grade 1.4401 (316), or better.

D16.5 Anti-Seize Compound

A small amount of a nickel-based, anti-seize compound shall be applied along the full length of fastener threads before the nut is applied.

D17 GRID FLOORING

The depth of bearer bars in steel grid flooring shall not be less than 30 mm with a bearer bar pitch of not greater than 40 mm. The bearer bars shall be across the shorter span.

Panels shall be set level and fixed to angle frames to prevent rocking.

Cut-outs in grid flooring for pipes, valve spindles, etc. are to be made and banded before any corrosion protection is done. The edges of removable grid access covers must also be banded.

Grid flooring and frames shall be hot-dip galvanized after fabrication. Alternatively, a glass flake resin which is applied by dipping the flooring in catalysed resin, is acceptable; such as Power Blast's Vitaglass or equivalent. Painted coatings will not be acceptable.

Where grid flooring rests on painted surfaces, strips of rubber insertion material shall be secured under the grid to protect the paint.

The fixing clip set (saddle clamp and locking plate) shall be of hot-dip galvanised steel or stainless steel. All fasteners shall be of EN Grade 1.4401 (316), or better.

D18 **GUARD RAILING**

D18.1 **General**

Guard railing shall be provided in accordance with legislated requirements and shall be provided generally in positions where the vertical change in level is 1 000 mm or greater.

Guard railing shall comply with SANS 10104.

Fabrication and installation requirements are specified elsewhere in this Standard Specification for Mechanical Works (including General Works).

D18.2 **Guard Railing for Equipment Installations**

Guard railing for equipment installations shall comply with the following specific requirements:

- (a) Guard railing shall be of EN Grade 1.4401 (316) stainless steel and shall comprise hand and knee rails not less than 32 mm diameter and stanchions spaced at not more than 1,8 m except where specifically directed otherwise in writing by the Engineer.
- (b) On platforms, walkways, landings or around dangerous areas the vertical height, measured from the top of the hand rail to the floor or surface, shall be **at least 1 000 mm**.
- (c) On stairways and fixed ladders the rails shall be parallel to the strings, and the vertical height, measured from the top of the hand rail to the nosing of the tread, shall be at least 900 mm.
- (d) For applications covered by this Specification, the rails and stanchion shall withstand, without permanent deflection, a proof force of 890 N and 1780 N respectively, applied at any point and in any direction. This requirement is in addition any strength requirement specified in SANS 10104. Contractors shall provide proof that their guard railing has been tested and withstands these loads.
- (e) No opening between rails shall allow the passage of a ball of diameter 600 mm.
- (f) Stanchions and rails shall be smoothly finished and free from sharp corners, edges and projections which may injure persons or damage clothing. Stanchion bases shall have the corners rounded or sheared off.
- (g) Welded guard rail installations are preferred. Installations which incorporate jointed sections shall be secure and without relative movement of the components under loading. "Pop" riveted installations will not be acceptable. Joints shall be smoothly finished, without corners.
- (h) Railings shall be ended off with positively fixed closure bends. At corners, short radius bends with stanchions on both ends shall be employed or, alternatively, stanchions specifically designed for such a position shall be employed. No sharp endings will be permitted.
- (i) Stanchions shall generally be base-mounted to suit the arrangement requirements and shall be of solid or welded construction. Welding shall be continuous and shall be smoothly finished and then passivated.
- (j) Stanchions which are hollow shall be self-draining.
- (k) Stanchion feet which are attached to metallic surfaces shall have minimum dimensions of 150 mm X 60 mm X 8 mm. Two fasteners, of minimum size M16, shall be used to secure each foot. Neatly fitting packing, Denso tape or equivalent, shall be fitted under stanchion feet to prevent the formation of crevices.
- (l) Stanchion feet which are attached to non-metallic surfaces shall have minimum dimensions of 150 mm X 150 mm X 10 mm. In instances where the horizontal surface to which the foot is to be fastened is less than 150 mm wide, the foot shall be designed to be seated on at least two surfaces. Four fasteners, of minimum size M16, shall be used to anchor the foot. Non-shrink, cementitious grout shall be applied under the foot just prior to final tightening of nuts.
- (m) A small amount of a nickel-based, anti-seize compound shall be applied along the full length of fastener threads before the nut is applied.

- (n) All components shall be supplied in the pickled and passivated condition which may also be polished. All surfaces must be uncontaminated and unmarked to ensure maximum corrosion resistance. A manufacturer's test certificate shall be provided for each batch of stainless steel giving the chemical analysis of the material.
- (o) Where kickplates are required by legislation, these shall extend to 150 mm above the walkway level.

D18.3 Guard Railing in Public Places

The requirements for guard railing at equipment installations shall also apply for guard railing for public places. The following specific requirements must also be complied with:

- (a) The structural design shall be done in accordance with the requirements of SANS 10104.
- (b) No opening in guard railing installed in public places shall allow the passage of a ball of 100 mm diameter.

D19 PERMANENT LADDERS AND STAIRS

D19.1 General

Permanent ladders shall comply, primarily, with the requirements of the OSH Act and, secondarily, with BS 5395. Stairs shall comply with BS 5395, Part 3.

Unless other materials are specified, ladders and stairs shall be of carbon steel and hot-dip galvanized after all fabrication has been completed.

Unless other materials are specified, bolts shall be hot-dip galvanized but anchor bolts in concrete and brickwork shall be of EN Grade 1.4401 (316), or better, and shall be no smaller than M16.

D19.2 Permanent Ladders

Ladders shall comply with the following detail design aspects:

- (a) Access points to the head of ladders from platforms and walkways shall be protected by self-closing gates or by chains.
- (b) No part of the ladders shall project into the passageway.
- (c) The width between strings shall be between 380 mm and 450 mm.
- (d) A minimum clear space of 230 mm must be allowed behind the rungs.
- (e) The diameter of the rungs shall be approximately 25 mm and these shall be formed from HT steel reinforcing bar.
- (f) Additional rungs shall be provided in the same horizontal plane as the top rung in order to close the gap between the platform and the ladder. Sufficient rungs shall be provided to ensure a maximum gap of 75 mm. These top rungs shall be at the same level as the floor or platform to which access is being provided.
- (g) Strings shall be formed from flat bar.
- (h) The vertical distance between the ladder support brackets shall not exceed 1 800 mm.
- (i) The strings shall extend to 1 100 mm above the floor or platform and shall be matched with any guard rail protections at this level. Connections between hot-dip galvanized steel ladders and stainless steel guard railing shall be bolted. Unless laterally supported by the guard rails, these strings shall be supported by vertical structural sections (not flat bar) whose footings shall comply with this Specification for guard rail stanchion feet.
- (j) All rises in a flight shall be uniform and the surface of the top rung shall be level with the top platform or landing. The height chosen for the rise shall be between 225 mm and 255 mm.
- (k) Except on chimneys, the height of a ladder should not exceed 6 000 mm. Greater heights shall be provided with intermediate landings between each 6 000 mm ladder section.
- (l) If the height between start and end levels is over 4 000 mm, the ladder shall be fitted with a safety cage. The safety cage shall extend at least 1 000 mm above the higher landing. The cage "shall afford firm support along its whole length for the back of the person climbing the ladder, and for which purpose no part of the cage shall be more than 700 mm away from the level of the rungs."

(as per OHS General Safety Regulations). The cage shall comprise no fewer than seven vertical elements.

- (m) Strings, rungs and support members shall be of solid structural sections (e.g. flat bar, round bar, square bar, angles, etc.) and no hollow sections will be accepted for any part of the ladder.

D19.3 Stairs

Stairs shall comply with BS 5395.

D20 PIPEWORK

D20.1 Pipes and Fittings

D20.1.1 Steel Pipe – General Duties

Steel pipes for general non-corrosive, non-abrasive duties for liquid, air and gas shall be as follows:

Up to DN 150 - SANS 62 medium class.

Over DN 150 - SANS 719.

Unless otherwise specified, steel pipework and fittings shall be hot-dip galvanised and painted.

D20.1.2 Steel Pipework – Design

Pipework up to DN 600 shall be in accordance with SANS 1476. Pipework for the conveyance of water shall, in addition, comply with CCT-WS 11 Standard Specification for Steel Pipe, Fittings and Specials.

D20.1.3 Stainless Steel Pipework

Stainless steel pipework shall be to ASTM 312. Schedule 10 pipes and fittings shall be used except where otherwise specified.

D20.1.4 Steam Pipework

Steam pipework smaller than DN 50 shall be of EN Grade 1.4401 (316) stainless steel to ASTM A-312 Schedule 40 or approved equal. Steam pipework DN 50 and larger shall be manufactured to SANS 62 heavy class, ANSI B36.10 STD/Schedule 40 or to BS 1600 Schedule 40. Steel pipework shall be supplied with a suitable temporary corrosion protection both internally and externally in order to prevent corrosion during the storage, installation and pre-commissioning period. A primer similar to Plascon SNK 2, phenolic modified polyvinyl butyral self-etch primer, would be suitable.

D20.1.5 Hydraulic and Oil Pipework

Hydraulic pipework shall be to BS 778 or equal. All hydraulic and oil pipes and fittings shall be thoroughly degreased, descaled and cleaned internally and externally after fabrication by abrasive blasting or pickling, thoroughly cleaned and rinsed, dipped in a hot iron phosphate solution and coated internally with a corrosion inhibiting, oil soluble preservative. After treatment and drying all openings shall be sealed until the pipes are installed.

D20.1.6 Butt Weld Fittings

Steel butt welding pipe fittings shall be to ANSI B 16.9, BS 1965 or BS 1640 of the same schedule as the pipework or heavier. Butt weld fittings in stainless steel shall be to ASA B 36.19 for schedule 5S and 10S and ASA B 16.9 for schedule 40S and 80S. Alternatively, fittings may be to BS 1640.

D20.1.7 Malleable Cast Iron

Malleable cast iron fittings shall be to SANS 14.

D20.1.8 Cast Iron

Cast iron pipes and fittings shall comply with BS 2035 (Class D) and shall be pressure tested in accordance with Clause 12 of that Standard. The requirements of the Standard's Clause 6 regarding freedom from defects and casting appearance and Clauses 8, 9 and 10 regarding casting accuracy will be strictly applied. The requirements of the Standard with regard to protection and flanges shall be modified to comply with this Specification. Also refer to Clause "Castings" of this Specification.

D20.1.9 Copper

Copper pipes shall be to BS 2871 or approved equal.

D20.1.10 Plastic Pipework

Polyethylene or Polypropylene pipes shall comply with SANS 533 and SANS 1315 respectively and shall carry the SABS mark. The contractor manufacturing and installing the pipework shall satisfy the requirements of SANS 9001. PVC pipework is not acceptable except where specified.

An operating life of 50 years shall be designed for and appropriate derating factors shall be applied to suit the application. The rated maximum working pressure at operating conditions of the class of pipe selected shall be not less than 1,5 times the actual maximum operating pressure. If the material used has insufficient resistance to solar radiation (U.V. light) for the application, suitable protection must be provided to achieve the required life.

Note that nominal bores and pipe diameters specified must be regarded as the minimum inside diameter.

D20.2 Pipework Design

D20.2.1 Pipe Type and Material

The type and material of pipe to be used will be given in the Detailed Mechanical Specification.

D20.2.2 Pipe Diameters

Unless otherwise specified in the Detailed Mechanical Specification, pipe diameters shall be based on the following velocities. The velocities shall be based on the compressed volume at the operating pressure in the case of steam, air and other gases. Valves and other ancillaries shall generally be of the same nominal diameter as the pipe. Non-standard sizes shall not be used.

FLUID	FLUID FLOW [ℓ/s]			
	0-2,5	2,5-15	15-100	100-500
ALLOWABLE FLOW VELOCITY [m/s]				
<u>LIQUID</u>				
GRIT FREE:	0.75 max	1,25 max	1,5 max	2 max
HIGH SOLIDS OR GRIT:		0,8 min	1 min	1 min
		1,5 max	1,75 max	2 max
<u>STEAM</u>	10 max	15 max	20 max	25 max
<u>AIR AND GAS</u>				
above 10 kPa	5 max	8 max	10 max	12 max
below 10 kPa	2,5 max	3 max	4 max	5 max

Grit free liquids include potable water, final effluent, centrate, supernatant, etc. Liquids considered to have high solids content will include raw sewage, sludge and grit slurry.

If anomalies occur within the same system using the above table, the larger pipe diameter shall generally be used.

D20.2.3 Coupling Arrangement

Screwed fittings may be used on DN 50 and smaller provided that sufficient unions or flanges are provided for disassembly and removal of equipment. Reducing sockets and not reducing bushes shall be used where required.

All steel pipes larger than DN 50 shall be flanged or fitted with mechanical pipe couplings as applicable.

Suitable pipe couplings shall be incorporated wherever necessary to facilitate maintenance or isolate vibration. A coupling shall be provided on each pump suction. Couplings shall be adequately restrained by harnesses as specified in the Clause "Pipe Couplings".

D20.2.4 Draining, Venting and Purging

On liquid lines provision shall be made for draining and venting where necessary. Vents shall be provided at all vertical down bends on gravity lines. On gas lines provision shall be made for purging.

D20.2.5 Condensate Drains for Air Lines

Automatic condensate traps with isolating valves and valved by-passes shall be provided at all necessary points including ahead of any globe type valve, orifice plate or concentric reducer in a horizontal line, at each change of level and immediately ahead of the user equipment.

A suitable well of a diameter equal to the pipe diameter with a bottom drain shall be provided at each condensate removal point. Condensate traps and valves shall be accessible and condensate shall be piped to the nearest drain. Pipework shall be sloped in the direction of flow towards a drain point with a slope of 1 in 150 and care shall be taken to avoid sagging at any point.

D20.2.6 By-Passes

Isolating valves and valved by-passes shall be provided around condensate traps, pressure reducing valves and valves with solenoid or other actuation which do not have provision for manual operation.

D20.2.7 Encased Pipes

Pipework to be permanently encased in concrete, cement or similar shall be of cast iron or EN Grade 1.4401 (316), or better, for steel and stainless steel pipework respectively. The encased portion shall be a short, straight length of pipe, flanged both ends with adequate clearance between the wall surface and the flanges for inserting flange bolts. Victaulic type couplings may in some instances be permitted instead of flanges.

Pipe sections through walls below ground or water level shall be provided with a puddle flange the same diameter as a standard flange. The encased area shall in such cases be uncoated up to 30 mm inside the wall surface and coated to Specification from there on.

D20.2.8 Isolation

The layout design shall make provision for isolation and easy removal of mechanical equipment.

D20.2.9 Nozzles for Fittings, Gauges, etc.

Nozzles on pipework (for installation of gauges, transmitters, drain pipes, cooling water take-offs, air release valves, etc.) shall be designed so that the pipework corrosion prevention system is not affected.

Nozzles shall consist of a flanged, welded tee-off of at least 100 mm diameter, painted or cement-lined internally and provided with a non-corrosive blank flange, e.g. EN Grade 1.4401 (316) stainless steel. The blank flange shall be provided with tapped holes suitable for the equipment installation.

Internally painted, small diameter carbon steel nozzles and screwed carbon steel tee-offs are not acceptable. Carbon steel pipework may be provided with small diameter, EN Grade 1.4401 (316) stainless steel nozzles which are welded into the pipework if the Engineer considers this acceptable in the application.

D20.2.10 Flow Straighteners

If a flow straightener is specified in the Detailed Mechanical Specification, this shall be provided in accordance with drawing number ME-A4/1520 : Pump Suction Flow Straightener – Plain Ended Pipe. This design is for plain ended pipes on the suction side of pumps but the blade configuration shall apply where applicable to other applications.

D20.3 Pipework Installation

D20.3.1 Appearance

Pipes and fittings shall be conservatively selected to suit the application, neatly installed, straight to line and level, adequately supported and shall operate without vibration.

D20.3.2 Valve Orientation

On sludge or raw sewage pipelines, check valves shall, wherever possible, be mounted horizontally and isolating valves with spindles vertical. Valve handwheels shall be arranged so that they are accessible to the operators.

D20.3.3 Supports

Proposed designs of pipe supports shall be submitted to the Engineer for acceptance prior to manufacture. Specific requirements are:

- (a) Steel supports shall be fabricated from heavy duty hot-rolled steel sections. The complete assembly shall be hot-dip galvanised after all fabrication is completed.
- (b) Welds shall be "all-round".
- (c) Each foot shall feature at least four anchor fasteners.
- (d) For cantilevered pipe supports, the spacing between anchor fasteners shall be not less than one quarter of the cantilevered length

The spacing between pipe supports shall be as follows:

APPROXIMATE DISTANCE BETWEEN SUPPORTS FOR STEEL PIPE	
Pipe Diameter (DN)	Distance Between Supports (mm)
0 – 15	500
20 – 50	1 200
65 – 100	2 000
125 – 200	3 000
250 – 500	4 000
> 500	5 000
Distance between supports must be halved for pipe materials other than carbon steels and stainless steels.	

Pipe supports shall be so located that when an item of mechanical equipment is removed, the associated valves and pipework are still adequately supported. Supports shall be provided close to heavy items such as valves. No external loads shall be placed on items of mechanical equipment such as pumps, compressors, etc. Adequate provision shall be made for expansion and contraction due to variations in temperature or pressure.

3 mm thick neoprene strips shall be placed between pipes and supports or clamps to protect the paintwork and limit corrosion. Where roller or sliding supports are used to accommodate movement, suitable wear blocks shall be fixed to the pipe to prevent damage.

Floor pipe supports shall be aligned using a nut above and below the foot. A space of at least 20 mm shall be left between the foot and the floor and this space shall be filled using non-shrink grout in accordance with the manufacturer's recommendations once alignment has been completed. Alternative designs and installations may be submitted by the Contractor. Wall pipe supports shall be similar.

Where the Engineer approves the use of concrete pipe supports to be built by a civil contractor under a separate contract, these will be constructed after installation of the pipework and temporary supports shall be provided by the Contractor in positions which will not interfere with the construction of the concrete supports.

D20.3.4 Pressure Testing

All pipelines shall be pressure tested to 1,5 times maximum working pressure. This shall be done before covering up the pipeline in any way where applicable and shall be witnessed by the Engineer.

D21 PIPEWORK FOR PUMP SUCTION

Not applicable

D22 FLUID STRAINERS FOR PIPEWORK

Not applicable

D23 FLANGES

D23.1 Standards

All standard flanges shall comply with SANS 1123. For flange sizes not included in the SANS, BS 4504 shall be used. Cast iron flanges and their mating flanges shall have flat faces. The flange table shall be as specified or, if not specified, selected to suit the maximum possible operating pressure but not less than Table 1000. Drilling and installation of flanges shall be "off-centre".

D23.2 Flange Fixing

Flanges DN 50 and smaller may be of the screwed on type. Metal flanges above DN 50 shall be welded on in accordance with BS 806 Type 6 unless otherwise agreed or specified.

D23.3 Machining of Flanges

All flanges shall be machined on the sealing face. Flanges cut from plate shall also be machined on the bore and outside diameter. Cast iron flanges shall also be machined or spot faced on the back of the flange to ensure a flat bearing surface for the fastener's head or nut and washer. All edges, including bolt-holes, shall be chamfered or rounded to a 2 mm radius.

D23.4 Butt Flanges

If the use of a loose hot-dip galvanized butt flange arrangement with stainless steel pipework is specified or approved by the Engineer, such arrangement and design shall comply with BS 4504 Table 6/6 or 10/6 as appropriate. The butt welded shouldered end for the pipe may be rolled from hot rolled stainless steel angle section. The hot-dip galvanized butt flange must be electrically insulated from the stainless steel pipework.

D23.5 Gaskets

The jointing material used on flange joints shall be of rubber or compressed asbestos fibre at least 3 mm thick complying respectively with BS 2494 or BS 1832, as applicable. Full face gaskets shall be used for full face flanges. Inner bolt circle gaskets shall be used on raised face flanges and when clamping items such as wafer type valves between flanges inside the bolt circle. Properly designed O-ring seals are also acceptable.

D24 PIPE COUPLINGS

D24.1 General

Where pipework movement, misalignment or dismantling must be allowed for, or if necessary for any other reason, pipe couplings may be used if approved by the Engineer. Pipe couplings shall be of the mechanical type, stainless steel bellows type or rubber bellows type.

D24.2 Supports and Anchors

Pipework using couplings shall be supported and anchored strictly in accordance with the coupling manufacturer's recommendations.

If the pipework configuration does not provide axial restraint, harnesses against separating forces shall be provided. Systems incorporating additional flanges or lugs and connected by tie bars or positively fixed to anchors will be acceptable. Systems relying purely on friction will not be acceptable. Tie bar harnesses shall incorporate three tie bars or more.

D24.3 Mechanical Pipe Couplings

Mechanical pipe couplings shall:

- (a) be of rolled steel, forgings or of high grade castings;
- (b) be coated;
- (c) have rubber seals of a suitable grade;
- (d) shall have stainless steel fasteners, and,
- (e) be supplied without centre register unless otherwise specified.

Pipe ends shall be in accordance with the coupling manufacturer's recommendations. Where machining is required, as in the case of cast iron pipes, the length of machining on each pipe shall be approximately equal to the total length of the coupling to ensure that the coupling can be separated for pipe removal.

Couplings for air applications below 60 °C shall be hot-dip galvanized for air applications above 60 °C shall be of stainless steel. Couplings for liquid applications shall be coated in accordance with System – "Hot-Applied Thermoplastic" or System – "Fusion Bonded Epoxy". Couplings for stainless steel pipework shall be stainless steel.

Fasteners, including coupling studs, **stub studs** (i.e. studs welded to the flanges of flange adaptors), washers and nuts shall be of EN Grade 1.4401 (316), or better.

When couplings are part of a buried pipeline, the metallic surfaces shall be coated as specified above and then covered and wrapped. Couplings shall be covered with mastic to a smooth finish, wrapped with tape and then wrapped with a polythene sheet which is strapped in place. "Denso mastic" and "Denso tape", or equivalent products, are suitable. If the operating temperature is likely to exceed 70 °C, the mastic and tape shall be replaced with a suitable grease or a suitable sealer.

D24.4 Stainless Steel Bellows Pipe Couplings

Stainless steel bellows shall incorporate stainless steel flanges and fasteners.

D24.5 Rubber Bellows Pipe Couplings

Rubber bellows couplings are acceptable for machinery which is flexibly mounted and also in applications which require isolation of driven machinery from the surrounding pipework and/or structures.

The flexible material used for rubber expansion joints shall be chosen specifically for maximum resistance to bursting.

Metal backing flanges for rubber expansion joints shall be of stainless steel or hot-dip galvanized steel.

D25 CONDENSATE TRAPS FOR SEWAGE GAS

Condensate traps shall be of the automatic float operated type which shall not permit the escape of gas. For pipeline condensate removal a valve with 1-inch BSP pipe connections shall be used.

Sewage gas is generally at a very low pressure and often contains sticky solids. The valve of the condensate trap shall therefore be provided with an orifice and a seat of large area using a soft sealing element. The valve shall not be subject to sticking and shall preferably be of a ball type.

The body and all other parts shall be of EN Grade 1.4401 (316) stainless steel.

Condensate traps shall be provided with an isolating valve and valved bypass.

D26 FLAME ARRESTERS

Flame arresters shall have EN Grade 1.4401 (316) stainless steel bodies and EN Grade 1.4401 (316) stainless steel elements. For all normal duties flame arresters shall be of a type which incorporates a fusible plug controlling an automatic shut off valve. Alternatively a separate thermally operated valve may be incorporated. Flame arresters used to protect relief valves shall however not incorporate a shut off valve.

Provision shall be made in the arrangement for access to the flame barrier element for maintenance. Valves shall be incorporated to isolate the flame arrester.

The gas has a very high moisture content and the flame trap design shall minimise the entrapment of water and suitable drainage petcocks shall be provided.

Suitably valved pressure tapings shall be provided upstream and downstream of the flame arresters.

D27 PRESSURE RELIEF AND VACUUM BREAKER VALVE WITH FLAME ARRESTER UNIT

The valve is generally used to protect anaerobic digesters and shall suit this duty.

The valve shall be of a type using removable lead weights on the pressure pallet. Each lead weight shall represent a pressure of 25 mm W.G. and the valve shall be supplied with sufficient weights for the pressure given in the Detailed Mechanical Specification. Below this pressure setting the valve shall not leak. The vacuum pallet shall be set to 50 mm W.G.

The valve shall be of stainless steel construction with EN Grade 1.4401 (316) stainless steel wire mesh screens over the intake and exhaust ports. Pallets shall be centre and side guided and provided with seat inserts of a suitable material which is not subject to distortion. Seat rings and pallets shall be removable.

A flame arrester (of a type not incorporating a shut off valve) shall be installed between the digester and the relief valve.

The complete relief valve/flame arrester unit shall be sized to permit a pressure relief gas capacity of 5 m³/min with a pressure increase not exceeding 25 mm W.G. and a vacuum relief air flow of 10 m³/min at a vacuum of approximately 150 mm W.G.

D28 VALVES FOR LIQUIDS OR GASES

D28.1 General

The valves to be used on the more common applications are specified below.

Where special valves are necessary for special applications, these will be specified in the Detailed Mechanical Specification but, if not, tenderers must select suitable valves and provide details in the tender.

The handwheel, lever, etc. on valves, valve actuators and valve gearboxes to be supplied and installed for the Wastewater Branch of the City of Cape Town shall be configured to be clockwise closing. All valves supplied and installed for the Bulk Water Branch in the City of Cape Town shall be anti-clockwise closing.

D28.2 Requirements for All Valves

All valves shall comply with the following (unless inapplicable):

- (a) Valves shall be designed and constructed to ensure reliable operation after long periods of non-operation.
- (b) Valves shall be double-flanged unless unavailable or otherwise specified.
- (c) Valves and their method of actuation shall be designed to operate under the full pressure rating of the valve.
- (d) If not obvious from the configuration, all valves, including valves with gearboxes and valves with actuators, shall be provided with an indication of the current position as well as an indication of the closing and/or the opening direction.
- (e) Spindle covers shall be provided for valves with rising spindles.
- (f) The specific application shall be taken into account in the corrosion protection of valves.
- (g) Cast iron valve components, including valve bodies, shall be protected with System – “Fusion Bonded Epoxy” or System – “Hot-Applied Thermoplastic”.
- (h) Metal plating of ferrous materials is not an adequate corrosion protection system.
- (i) Lever handles on small bore valves and position indicator plates shall be of stainless steel.
- (j) Fasteners shall be of EN Grade 1.4401 (316), or better. This applies to all fasteners on the body of the valve and its gearbox. Pipework flange bolts are specified elsewhere.

D29 CHECK VALVES

D29.1 General

Where special valves are necessary for special applications, these will be specified in the Detailed Mechanical Specification but, if not, tenderers must select suitable valves and provide details in the tender. Check valves to be used on the more common applications are specified below.

Single-door and double-door check valves shall comply with SANS 1551-1 unless overridden by the requirements of this Clause.

Bronze swing type check valves may be used for pipework up to DN 50.

D29.2 Requirements for All Check Valves

Check valve installations shall comply with the following:

- (d) Valves shall be designed and constructed to ensure reliable operation after long periods of non-operation.
- (e) Valves shall be double-flanged unless unavailable or otherwise specified.
- (f) Valves shall be designed to function correctly under the full pressure rating of the valve.
- (g) The specific application shall be taken into account in the corrosion protection of valves. Steel and cast iron valve components, including valve bodies, shall be protected with System – “Fusion Bonded Epoxy” or System – “Hot-Applied Thermoplastic”.
- (h) Fasteners shall be of EN Grade 1.4401 (316), or better. Flange fasteners are specified elsewhere.
- (i) Check valves shall be sized to open fully at the system’s design flow rate.
- (j) The check valve installation shall ensure that the valve is able to operate without interference from a physical obstruction such as a shut-off valve, bend, mortar lining, etc. Where a check valve is located close to another valve, a straight pipe shall be provided and this shall have a flange-to-flange length of not less than 1,5 times the valve diameter.
- (k) Indelible body markings, as per SANS 1551-1, shall include the manufacturer’s name, pressure rating (PN), nominal size (DN) and the direction of flow.
- (l) A shut-off valve shall be installed downstream of each check valve.

D30 AIR RELEASE VALVES

Not applicable

D31 PENSTOCKS / SLUICE GATES

Not applicable

D32 VALVE ACTUATORS

D32.1 General

Manual operation, by lever, handwheel, etc., shall be provided on all actuators.

The direction of operation of handwheels be indicated

Metal plating of ferrous materials, (e.g. zinc or cadmium plating) is not an adequate corrosion protection system for items such as actuator shafts and such items shall be provided with an additional coating of a semi-setting, thick protective layer, such as a suitable Tectyl product, or equivalent.

D32.2 Electric Actuators

Not applicable

D32.3 Pneumatic Actuators

Not applicable

D33 BASEPLATES

D33.1 Baseplate Configuration

Both direct-coupled and belt-driven machines shall be mounted with their drivers on common cast iron or fabricated steel baseplates of rigid construction.

In applications where baseplates are not practical, machined soleplates, suitably fixed and grouted to the concrete plinths, shall be provided. No machine may be mounted directly onto a concrete base without the use of either a baseplate or soleplate.

D33.2 Corrosion Protection

Steel baseplates shall be hot-dip galvanized unless specified otherwise in the Detailed Mechanical Specification.

D33.3 Drainage

Baseplates shall be configured to prevent pooling of water. Baseplates shall be either fully grout filled or provided with drain holes in all side members.

D33.4 Machined Mounting Pads

The baseplate shall incorporate machined mounting pads at the support and fixing positions of each item of plant and equipment to be mounted on the baseplate. On fabricated baseplates this machining shall be done after fabrication, stress relieving (if applicable) and hot-dip galvanizing are complete. The thickness of the mounting pads shall be not less than 1,25 times the diameter of the holding down bolts. The pads shall not be provided with threaded holes for machine screws but shall be drilled for inserting through-bolts and adequate provision shall be made for reaching the nut with a suitable spanner. In the period between machining and installation of the equipment, the machined surface shall be protected against corrosion by a removable coating. After installation, a non-hardening compound, Tectyl or equivalent, shall be applied to exposed machined surfaces and to the crevice formed at the foot of the equipment.

The above design may be suitably modified if the Contractor uses a pourable resin based chocking system. Such chocks shall be at least 15 mm thick.

D33.5 Shimming

Not more than three shims may be used at any point and these must be made of a corrosion resistant material.

D33.6 Jacking Arrangement

At least two diagonally opposed jacking screws shall be provided for belt tensioning in the case of belt-driven units. Direct-coupled motors above 10 kW shall be provided with jacking screws for horizontal alignment and direct-coupled motors above 150 kW shall be provided with jacking screws for vertical alignment as well. Jacking screws shall be of EN Grade 1.4401 (316), or better.

Drilled and tapped flat plate is not acceptable for jacking points. A jacking point shall consist of a suitable hot-rolled steel section welded to the baseplate and with a captured machine nut to accept the jacking screw.

D33.7 Grouting

Baseplates shall be designed and grouted to eliminate collection points for water or dirt. Except where otherwise approved in writing by the Engineer, all baseplates on concrete plinths shall be fully grouted in. Grouting holes must be provided on baseplates having a continuous top plate. Tapped holes and fixing setscrew protrusions shall be suitably protected.

The material used for grouting shall be a non-shrink, cementitious grout (ABE Duragrout 1000, or equivalent). ABE Epidermix 324, or equivalent, is acceptable if the Contractor's design requires an epoxy grout to be used.

The initial grouting shall be overseen by the grout supplier's technical representative.

D33.8 Fasteners

Anchor fasteners shall be of EN Grade 1.4401 (316), or better.

A small amount of a nickel-based, anti-seize compound shall be applied along the full length of fastener threads before the nut is applied.

D33.9 Alignment

Preliminary alignment of equipment mounted on baseplates shall be done at the factory to ensure that the baseplate has been correctly manufactured, but final alignment shall always be done on Site after installation and grouting has been completed. Alignment shall be accurate and to the approval of the Engineer and a final alignment check witnessed by the Engineer must be carried out by the Contractor prior to start up.

D34 GUARDS

Guards shall comply in all respects with the Occupational Health and Safety Act of 1993 as amended and the following points shall also be noted:-

- (a) Guards are required to cover all moving or revolving components of machinery.
Guards which do not adequately cover moving protrusions such as keys, lock-nuts, lockwashers, setscrews, etc., or irregularities such as keyways, will under no circumstances be accepted.
- (b) Guards shall be neatly and rigidly constructed and fixed and shall not vibrate or cause noise during operation.
- (c) Where expanded metal or similar mesh is used, the mesh opening shall not permit a circular object 10 mm or larger to penetrate.
- (d) Mesh shall not be used for chain guards but on belt drives the side of the guard most conveniently sited for inspection shall be constructed of expanded metal or similar. Mesh should similarly be used in other situations where inspection or ventilation is required.
- (e) Guards shall completely enclose drives and shall entirely prevent a person from touching any moving protrusion.
- (f) Allowance must be made for adjustment on belt guards or where adjustment will be required.
- (g) It shall be possible to remove the guard easily for maintenance purposes.
- (h) Guards shall preferably be fabricated of EN Grade 1.4401 (316) stainless steel (uncoated) but may also be hot-dip galvanized, hot-metal zinc-sprayed or hot-metal aluminium-sprayed carbon steel, coated to Specification in all these cases. Fasteners shall be M10 or larger and shall be of EN Grade 1.4401 (316) stainless steel.

D35 ELECTRIC MOTORS

D35.1 Rating

All electric motors shall be rated for operation on a 3-phase, 4-wire, 400/230 volt, 50 Hz, AC supply at sea level, with an ambient temperature of up to 40 °C.

The rated power of the motor shall be selected to be not less than 20 % in excess of the designed power requirement of the associated plant unless the motor forms part of a packaged unit and/or where the size of the motor is specified and/or as otherwise approved by the Engineer.

A motor shall be selected so that it shall reach full operating speed within 10 seconds for the method of starting and drive arrangement used.

D35.2 Specifications

Except as otherwise specified, motors shall be standard squirrel cage or slip-ring motors complying with SANS 1804 as amended, with IP55 enclosure and IC 0141 cooling, and suitable for a damp environment. Motors shall be suitable for both "continuous running duty", Duty Class S1, and "intermittent periodic duty", Duty Class S3. Windings shall be copper conductors insulated with Class F material (100 °C rise capability) with Class B temperature rise (80 °C). The motors shall be suitable for 6 starts per hour, two of which shall be consecutive.

D35.3 Type

The type of motor (and starter if applicable) to be supplied is determined by the requirements of the application

specified in the Detailed Mechanical Specification and by the starting limitations specified in the Electrical Specification. In the absence of such specifications, a standard squirrel cage motor complying with this Clause shall be offered.

D35.4 Construction

Motor frames shall be of the totally enclosed fan cooled type with cast iron yoke frames and cast iron end covers. Sheet steel is not acceptable for fan cowls and these shall be of cast iron, tough plastic or stainless steel. The end covers and yoke shall be properly machined and each cover shall locate on a spigot register to ensure concentricity and parallelism. Bearings shall be of grease lubricated roller and/or ball type, provided with grease nipples (with extension tubes where access is restricted) and sealed to suit external use. Motors required for external use shall be fully weatherproofed.

D35.5 Terminal Boxes

Terminal boxes shall be top mounted wherever possible and arranged for cable entry from either side. The two ends of each stator winding shall be "brought out" to the terminal box. Squirrel cage motors shall be wired to permit both direct-on-line and star-delta starting.

D35.6 Thermistors

Motors of 55 kW and up to (but not including) 150 kW, as well as motors for variable speed drives shall be provided with thermistors embedded in the windings of each phase. The thermistor tails shall be "brought out" to separate terminals mounted near the motor winding terminal block.

D35.7 RTDs

Motors rated at 150 kW and above, both fixed and variable speed, shall be provided with PT 100 type RTDs. Two RTDs shall be provided per phase winding. All six shall be incorporated into the control system; three to provide monitoring and three to provide high temperature trip functions.

D35.8 Heaters

Motors of size 75 kW and above shall be fitted with "pocket" heaters. The heater shall be mounted at the bottom of the motor frame and shall be replaceable without dismantling the motor. These shall be arranged to switch on when the motor stops operating and switch off when it starts operating.

D35.9 Slip-Ring Motors

Slip-ring (wound rotor) motors shall be of the totally enclosed fan cooled type with stainless steel slip-rings. The slip-rings shall be mounted inboard of the non-drive end bearing and shall be fitted and keyed to the shaft as a single unit. The terminal box shall be common to both stator and rotor connections.

The brush holders shall be manufactured from fibreglass and shall be removable from the terminal box as a complete unit. Where the current density in a single brush at the full operating load approaches or is above 80 % of the capability of the brush, then an additional brush shall be provided in a separate brush box.

D35.10 Motor Speed

Motor speeds shall be selected as follows:

- (a) motors with ratings below 30 kW can have nominal speeds up to 3 000 rpm.
- (b) preference shall be given to motors with nominal speeds up to 1 500 rpm for ratings between 30 kW and 132 kW, both inclusive.
- (c) motors with ratings above 132 kW shall have a nominal speed of 1 500 rpm or below.

D35.11 Variable Speed Applications

In applications where the motor speed is controlled by variable frequency drive, the motors shall be cooled by a separate, 50 Hz motor driven "piggy-back" fan. This requirement will be waived if the Contractor can provide documentation to confirm that the drive and motor design can operate in the application, with shaft-mounted fan, without overheating. This requirement does not apply to submerged motor applications.

D35.12 Hazardous Locations

When required to suit a hazardous location in terms of SANS 10108 or in terms of this Specification, suitable motors complying with SANS 60034-5 or SANS 61241, as appropriate, shall be supplied. The relevant SANS certificates, clearly indicating the location classification in which the machine may be operated, shall be submitted to the Engineer before delivery of the motors. Each motor shall be clearly and permanently marked with the applicable certificate number.

D35.13 Special Motors

Should the Tenderer wish to offer a different type of motor to those specified so as to obtain special starting characteristics and/or variable speed, a full technical specification of the motor must be supplied and such specification shall be for equipment to a standard at least equal to that of the motors specified above. In particular, no item of electrical protection shall be omitted.

D35.14 Warning

Motor manufacturers must be warned that the motors are to be installed in an extremely corrosive and often damp environment. All motors shall therefore be adequately protected against corrosion.

D36 POWER TRANSMISSION

D36.1 Shaft Couplings

Shaft couplings shall be selected to reduce transmission of misalignment forces and of torsional oscillations between the driving and driven machine. Couplings shall, wherever practical, be of the rubber-tyre or rubber compression type, keyed to the shafts.

Elastomeric elements shall be urethane based. Flexible metallic elements shall be of stainless steel. Couplings shall not require lubrication.

Spacer couplings shall be used in all cases where this will assist maintenance.

Coupling guards shall comply with the requirements of the OHS Act and shall be to the approval of the Engineer.

After installation, the alignment of all couplings shall be checked by the Contractor in the presence of the Engineer or a person delegated by him. Alignment shall be accurate and to the approval of the Engineer.

D36.2 Vee Belt Drives

Vee drives shall be designed to suit the power rating of the motor using service factors appropriate to the driving and driven machinery. Drives shall be designed, manufactured and installed in accordance with BS 3790 and ISO 4184, utilizing taperlock pulleys with taperlocks keyed to the shaft.

Where alternative pulley diameters can be selected, preference must be given to the larger pulley diameters to minimize the belt loading on bearings.

Tenderers shall ensure that the bearing arrangements of driving and driven machinery are designed to cope with the loads imposed by vee-belt drives and shall incorporate lay shafts where necessary. Lay shafts shall be supported by bearings mounted in bearing housings which are adequately sealed and fitted with grease nipples. Bearing units incorporating open, shielded bearings are not acceptable. Tenderers shall submit their design calculations and drawings for lay shaft arrangements for acceptance by the Engineer. Bearings shall be designed for an L_{10} life exceeding 100 000 hours.

D36.3 Motor Driven Gearboxes

Gearboxes shall, unless otherwise specified, be supplied with environmental protection to IP 55.

Gearboxes shall be selected using a service factor of 1,75 based on the drive rating and shall have an efficiency

of not less than 96 % on two stage reduction and 95 % on three stage reduction.

Gears shall be case hardened, profile ground and lapped, helical and spiral bevel gears.

Roller bearings shall be used throughout. Bearings shall be designed for an L₁₀ life in excess of 100 000 hours.

The gearbox housing shall be of rigid cast iron construction preferably split in the horizontal plane.

A breather designed to prevent moisture from entering shall be fitted.

Oil-bath gearboxes shall have suitable oil level indicators or dipsticks. Unless otherwise decided by the Engineer, the drain from the gearbox shall be extended beyond the base so that the oil can be easily collected. The drain line shall be of EN Grade 1.4401 (316) stainless steel and shall be fitted with a ball valve and square-head plug.

Each gearbox shall be mounted on machined sole plates fitted with jacking screws to assist with alignment.

D37 MACHINE VIBRATION

The mechanical vibration of machines measured at all important points such as bearings shall be lower than that specified as "good" for that class of machine in BS 7854 (ISO 10816).

Reciprocating machines shall be designed and installed so that the machine vibrations are isolated from the floor structure. Vibration isolation mountings which will eliminate not less than 90 % of the vibrations transmitted by the equipment shall be provided between the baseplate and the concrete plinth. When mounted on the vibration isolators, distortion of the baseplate shall be negligible in comparison with the permissible and acceptable misalignment of the equipment mounted thereon.

Shafts shall be designed so that the critical speed is outside the operating speed range.

D38 NOISE CONTROL

D38.1 General

Noise emitted by equipment shall be kept to a minimum and shall not exceed the noise levels specified in these documents.

D38.2 Noise Levels

The sound power of any equipment shall not exceed 89 dB(A) (referred to 10⁻¹² Watts) unless specifically approved by the Engineer. This is approximately equivalent to a sound pressure level of 81 dB(A) at a radius of one metre from the acoustical centre assuming uniform hemispherical propagation in a free field on a hard floor. In certain instances, a lower noise level may be called for in the Detailed Mechanical Specification.

Where the Contractor is unable to restrict the noise level of the machines to the maximum specified by the appropriate selection of suitable equipment; e.g. by selecting slow speed or silent type machines, quiet type cooling fans, suitable silencers, etc.; this shall be clearly pointed out by the tenderer so that appropriate steps can be taken at the design stage to counteract the effects of noise.

D38.3 Acoustic Treatment

Acoustic enclosures are not acceptable unless specifically called for. Acoustic treatment of high noise sources must, however, be included where applicable where this can be done without greatly interfering with operation or maintenance.

When acoustic lagging is called for in the Detailed Mechanical Specification this shall consist of a 100 mm thick layer of rockwool having a density of 60 kg/m³, suitably fixed in place and reinforced to prevent collapse, and

covered with 25 mm thick asbestos free plaster having a density of 1 000 kg/m³ (I.P. Insultex AF720, or equivalent). The outer surface shall be finished off with scrim cloth before being painted.

It is not necessary to lag flow meters and cast iron valves on acoustically lagged pipelines.

Components which can move, such as those associated with expansion bellows or mechanical couplings, shall be enclosed by an effective acoustic enclosure designed to prevent sound transmission but able to cope with movement without damage.

D38.4 Measurement

Noise levels will be verified by taking impulse weighted L_{eq} readings in dBA over ten minutes at the specified positions. Readings so achieved shall not exceed the specified level by more than 2 dBA. Should the noise exceed the specified level or should the level be in dispute, the Contractor will be responsible for obtaining certified sound pressure levels across the full octave band mid-frequency range in order to establish the precise A-weighted level.

D39 THERMAL LAGGING

Thermal insulation shall only be carried out after successful pressure testing of the equipment.

The efficiency of the insulation system shall exceed 90 % and the insulation cold face temperature shall not exceed 40 °C.

Pipe insulation shall consist of pre-formed insulation material having a thermal conductivity of approximately 0,040 W/mK at 60 °C. The insulation material shall not have any corrosive effect on the pipework and, in particular, it must be noted that fibreglass may not be used on stainless steel.

Inside buildings, or in other protected areas, pipe insulation shall be supplied with a canvas covering having a 50 mm lap at one end and along the longitudinal seam. The laps shall be sealed using a suitable lagging adhesive. On bends the insulation material shall be neatly mitred and covered with canvas. At all flanges the insulation shall be closed off. Flanges, couplings, tees and valves shall be insulated using a removable canvas blanket or jacket fastened in place with brass hooks and eyes.

All insulation shall be coated with a suitable sealer and then painted in accordance with the colour code. The manufacturer shall advise regarding the paint types and system to be used.

Outside buildings or in other exposed areas pipe insulation shall be fixed in position using three bands per section or a suitable adhesive and then clad with aluminium. All longitudinal and circumferential joints shall incorporate a 50 mm lap with each edge grooved. The longitudinal joints shall be positioned in the "twenty past" position with the lap and groove downwards. All ends next to couplings or flanges shall be closed off and sealed before fitting muff type insulation and cladding over the couplings and flanges. All bends, tees and other fittings shall also be insulated and clad but valves need not be insulated. All joints shall be primed and sealed using a silicone or other appropriate sealer and the contractor shall generally ensure that the lagging is weatherproof with particular attention being paid to all joints and pipework support or anchor points.

With large exposed items such as vessels mounted outside, the Tenderer shall recommend a suitable system incorporating a 20 mm thick, smooth layer of weatherproof, reinforced plaster covered with a scrim cloth and overcoated with at least two coats of fibre reinforced resin sealer.

D40 BEARINGS

D40.1 General

Bearing systems shall be designed to provide safe start-up and shut-down, under normal stoppages as well as electrical supply failure, without damage.

Bearings used in variable speed applications shall be designed to operate continuously over the full design speed range.

Unless prevented from running in a particular direction, rotational bearings shall be designed to support shaft rotation in both directions.

D40.2 Bearing Choice

vii) Bearings shall be chosen primarily to suit the equipment manufacturer's requirements and the plant's design conditions but the following guidelines shall be considered:

- (a) Greased lubricated bearings are generally acceptable for units with power ratings up to 100 kW.
- (b) Units with power ratings between 100 kW and 1 000 kW shall preferably be provided with rolling element bearings.
- (c) Units with power ratings above 1 000 kW and with high speed shafts shall preferably be provided with plain bearings (oil-film type). Plain bearings shall be provided with oil ring lubrication or positively fed lubrication.

D40.3 Design Life for Rolling Element Bearings

Ball and roller bearings shall generally be selected for a design life of 100 000 – 200 000 hours; i.e. the bearing manufacturer's category for machines required to work with a high degree of reliability 24 hours per day.

D40.4 Thermal Alarms

Thermal alarms on bearing systems shall be set in accordance with the specific instructions of the equipment manufacturer or, if it necessary for these to be set on Site, such alarms shall be set after no less than 24 hours of operation have occurred.

D41 LUBRICATION

D41.1 Grease Lubrication

Grease lubrication is generally acceptable where design parameters are not severe.

Where greasing points are not easily accessible, grease lines shall be piped to an easily accessible position for manual greasing. Each grease point shall be provided with completely separate pipework.

A distributor shall be provided where motorised lubrication is provided to more than one destination. The distributor shall be a positive displacement device which ensures equal, successive lubrication to all destinations.

Pipework for grease distribution shall be of stainless steel or non-ferrous metal.

D41.2 Oil Lubrication

Oil lubrication shall be provided where the design parameters are more severe.

Where oil lubrication is provided, the Contractor is responsible for the initial oil fill and the first oil change, including flushing, draining and filling, after an initial run-in period not exceeding 3 months.

Oil level indicators shall be fitted for visual checking. Drain cocks, including EN Grade 1.4401 (316) fittings where necessary to permit convenient draining, and plugged at the end, shall be provided for oil reservoirs exceeding 1,5 litre capacity. Drains shall be from the lowest point and syphon type drains are unacceptable.

Lubrication systems shall be designed to exclude dirt and moisture. Air vents on the oil reservoir shall incorporate filters. Drain facilities shall always be provided.

D42 SCREW PUMPS

Not used

D43 CENTRIFUGAL PUMPS

Not applicable

D44 SUBMERSIBLE AND IMMERSIBLE PUMPS

Please refer to the DETAILED Specification.

D45 DRAINAGE PUMPS

Not applicable

D46 POSITIVE DISPLACEMENT PUMPS

Please refer to the DETAILED Specification

D47 METERING PUMPS

Please refer to the DETAILED Specification

D48 VERTICAL SHAFT MIXERS

Not applicable

D50 SUBMERSIBLE MIXERS

Not applicable

D51 COMMINUTORS

Not applicable

D52 SCREW CONVEYORS

Not applicable

D53 BELT CONVEYORS

Not applicable

D54 COMPRESSORS

Not applicable

D55 AIR RECEIVERS

Not applicable

D56 PRESSURE VESSELS

Not applicable

D57 POSITIVE DISPLACEMENT FANS AND VACUUM PUMPS

D57.1 General

Each fan shall be provided with the following:

- (a) Isolating valve.
- (b) Pressure relief valve sized for full flow.
- (c) Check valve.
- (d) Inlet filtration with paper element.
- (e) Inlet and outlet silencing.
- (f) Discharge pressure gauge.
- (g) Inlet pressure gauge (if not atmospheric).
- (h) Anti-vibration mounts.

Roots type rotary lobe fans shall be installed and configured so that the suction and discharge pulsing is minimised and shall not cause undue noise or damage to equipment.

The Detailed Mechanical Specification describes the requirements for the sealing water supply arrangement for liquid-ring units.

D57.2 Pressure Relief Valve

A lockable pressure relief valve shall be fitted to **each** unit, regardless of whether any electronic protection system has been provided.

The pressure relief valve shall be sized for full flow at blow-off pressure. It shall be mounted immediately downstream of the fan but upstream of any valve. Unless provided as part of a proprietary package, the valve shall be mounted on a flanged nozzle on the discharge pipe. A padlock, or equivalent locking mechanism, shall be provided.

The valve shall be provided with a test certificate indicating the blow-off pressure setting.

D57.3 Liquid-Ring Units for Wastewater Applications

Liquid-Ring Units for wastewater installations shall incorporate stainless steel impellers and bodies.

D58 COOLING TOWERS

Not used.

D59 LIFTING EQUIPMENT

D59.1 General Requirements

Lifting equipment shall comply with the following general requirements:

- (a) The design, fabrication and installation of lifting equipment shall be fully in accordance with the relevant aspects of the Occupational Health and Safety Act and Regulations.
- (b) Lifting equipment shall be designed, constructed and installed in accordance with an internationally accepted technical design standard.
The guidelines given in the Southern African Steel Construction Handbook may be used where applicable and where these do not conflict with the technical design standard.
- (c) Test certificates shall be provided for all items of lifting equipment.
- (d) The safe working load (SWL) shall be permanently marked on all components.
- (e) Lifting equipment and installations shall be inspected and shall be tested over the complete lifting range using a test load.
Unless otherwise specified in the technical design standard, the test load shall be:
 - ⊕ at least 125 % of the SWL for equipment with a SWL of up to 10 tonne SWL;
 - ⊕ at least 110 % of the SWL for equipment with a SWL of 10 tonne and above.
- (f) High-tensile and alloy steel chains shall have a factor of safety of at least four. Other chains shall have a factor of safety of at least five.
- (g) Steel-wire ropes shall have a factor of safety of at least six. Man-made fibre ropes or woven webbing shall have a factor of safety of at least six.
- (h) Anchor fasteners for securing steel structures to concrete shall have a diameter of not less than M16 and shall be of EN Grade 1.4401 (316), or better.
- (i) Foot-plates for columns which form part of lifting gantries shall be secured with a minimum of four anchor bolts.
- (j) Hollow steel sections such as pipes and tubing are not acceptable as structural members unless the section is fully closed by welding.
- (k) Tenderers shall note that many aspects, such as fabrication, welding, corrosion protection and fasteners, shall be in accordance with the requirements of other clauses in this Standard Specification for Mechanical Works (including General Works).

D59.2 Steel Gantries

Not used

D59.3 Overhead Travelling Cranes

Not used

D59.4 Hoists

Not used

D59.7 Davits

Not used

D59.8 Hand Cranked Winches

In addition to the general requirements for lifting equipment, hand cranked winches shall comply with the following:

- (a) Hand cranked winches shall be rated for a SWL of at least 50 % in excess of the expected working load. All gears, clutches, etc., shall be enclosed in a robust cast iron, cast steel or fabricated stainless steel casing which shall be grease filled and sealed against ingress of dirt and moisture. The winch shall be designed to hold the load stationary when the hand crank is released during raising and lowering. In addition, a locking arrangement to lock the position of the load at any point shall be provided.
- (b) The force required to operate the winch at its maximum rated load shall not exceed 130 Newtons.
- (c) The wire rope shall be of stainless steel. The wire rope shall be long enough to reach the lowest required position and still have at least 3 turns remaining on the drum. The drum size shall easily store the full rope length. The drum shall have a diameter of at least 25 times the diameter of the wire rope.
- (d) The support brackets, all exposed fasteners, shafts, handles, pins, etc., shall be of EN Grade 1.4401 (316), or better, and the casing shall be hot-dip galvanized or hot-metal zinc-sprayed (to a thickness of 150 µm) and then painted.

D60 LINEAR SCREENS/BELT PRESSES

Not used

D61 CENTRIFUGES

Not used

D62 AUTOMATIC POLYELECTROLYTE PREPARATION SYSTEM

Not used

D63 ENGINE DRIVEN ELECTRICITY GENERATING SETS - FREE ISSUE BY CLIENT

The items in this clause are to enable the Tenderer (later, the Contractor) to familiarize themselves with the equipment provided by the City of Cape Town, to in turn allow for pricing for the installation, commissioning and testing stages.

D63.1 Equipment

This Clause deals chiefly with the overall requirements and the mechanical aspects of the equipment. The detail electrical requirements are specified in the Electrical Specification.

Engine-driven electricity generating set installations shall include an engine-driven alternator, shaft coupling, engine and alternator cooling system, starting system, anti-vibration mounting system, skid frame, lifting lugs, exhaust system, fuel tank, electrical control panel and specified spares.

D63.2 Arrangement

The engine and alternator shall be provided with an anti-vibration mounting system within a completely rigid baseframe.

The baseframe shall be hot-dip galvanised after fabrication.

The baseframe shall incorporate skids and shall be provided with four jacking points to facilitate levelling. Where a high level of noise abatement is required, suitably designed vibration pads (Tico, or equivalent) shall be placed between the skids and the concrete floor.

D63.3 Performance

The complete genset installation shall be capable of the kW and kVA output and any other performance requirement specified in the Detailed Mechanical Specification for continuous as well as for high current (motor starting) requirements. The genset rating shall provide for these performance requirements whilst maintaining the frequency and voltage within the ranges specified in the Electrical Specification.

D63.4 Engine

Unless otherwise specified in the Detailed Mechanical Specification, the engine shall be a multi-cylinder, diesel-fuelled compression ignition unit. It shall run at 1 500 rpm which shall not be greater than 85 % of its rated full speed. The power rating shall be in accordance with an approved British Standard or other approved by the Engineer. Tenderers shall provide full details with their tender documents.

The net power output rating of the engine at 1 500 rpm with all driven accessories as installed and for continuous operation shall be at least 15 % greater than the alternator's shaft input power (kilowatt) required.

The engine shall be capable of delivering the specified required output continuously under the site conditions without overheating or other failure.

D63.5 Engine Environment

The engine cooling and ventilation system shall cater for all air needs such as combustion air, ventilation air and the cooling air requirements for the engine cooling system and the alternator. Air for combustion, engine cooling and ambient cooling shall be drawn from an area free of the heated discharge(s) and the exhaust emission.

If the engine is of the water-cooled type, the engine coolant shall be treated with the engine manufacturer's recommended anti-corrosive, water soluble coolant.

If the genset is to be installed in an enclosure or room, the allowable temperature rise to be used for the design of plant room ventilation shall be 5 °C. Adequate ventilation shall be provided to remove from the enclosure the radiation and convection heat losses from the generating set (to be taken as a minimum of 33 % of the maximum engine shaft power plus the heat emitted by the alternator).

Filtration shall be provided on the inlet and outlet duct to prevent the ingress of wind blown dirt

D63.6 Engine Lubrication

Engine oil filters shall be mounted in an accessible position.

An extension pipe with square headed plug (i.e. not a cock or handpump) shall be provided to facilitate draining oil from the sump.

Certain control functions are specified for the monitoring and control of engine lubrication.

D63.7 Combustion Air Intake

A two-stage cyclonic dry type air cleaner shall be fitted and shall have water and dust evacuators. The air cleaner shall be amply rated for the application. The complete air induction system shall have the approval of the engine manufacturer.

The air filter shall be designed to reduce intake noise breakout.

D63.8 Exhaust and Silencing System

All piping for the exhaust system shall be of grade 409 stainless steel. The silencers and all pipe support brackets shall also be of stainless steel.

Where required to satisfy the OHS Act requirements, the exhaust system, including silencers, shall be thermally insulated with a preformed mineral wool inner layer sealed with asbestos free finishing plaster.

Exhaust outlets shall be arranged so that it is not possible for wind-driven rain to enter.

The silencing system for engines above 25 kW shall include a reactive silencer and an absorptive type silencer and all support brackets. A flexible connection of the bellows type shall be installed as close to the manifold(s) as possible to limit vibration transfer and to allow expansion under heating. The standard reactive (i.e. pulsation damper type) silencer shall be installed downstream of the flexible connection. The distance between the engine and the reactive silencer shall be designed to avoid resonance. An additional absorptive silencer, Burgess or equivalent, shall be installed downstream of the reactive silencer. The tail pipe shall have a length of at least 15 times the pipe diameter, measured downstream of the absorptive silencer.

Where the genset is installed inside an enclosure or room, both silencers shall be installed inside the enclosure. The exhaust outlet shall be led outside the genset enclosure to discharge at least three metres above ground level.

D63.9 Engine Fuel System

A primary and a secondary fuel filter of the replacement element type shall be provided. In addition, a water trap ("Otomatik" type, or equivalent) shall be provided. All three shall be installed between the fuel tank and the injector pump.

Piping between the fuel tank and the engine shall be of stainless steel and a flexible section for absorbing vibration shall be fitted, at the engine, to meet the requirements and approval of the engine manufacturer.

The flow velocity in the suction piping shall not exceed 0,8 metres per second (based on 3 times the fuel consumption at the rated load). The tank suction connection shall be at least 50 mm above the tank bottom.

A fuel return line from the engine shall be connected to the tank at the same level as the suction line and its diameter shall be the same as that of the suction line.

A fusible-link controlled, shut-off valve shall be mounted in the fuel supply line above the engine and this shall close in the event of fire. A manual shut-off valve shall be installed upstream of this valve.

D63.10 Starting

Refer to the Detailed Electrical Specification for the required starting details.

D63.11 Acoustically Enclosed Applications

Gensets which are installed in rooms in order to control noise shall have their air supply and discharge openings fitted with acoustic attenuators adequately designed to ensure a noise level at 1 metre from the openings outside the plant room of no more than 60 dBa impulse rating level. The attenuators shall incorporate sound absorbent elements (Donkin, Trox or equivalent).

Each opening shall be provided with a weather louvre and an internal mesh screen.

Silenced units shall be as specified in the Detailed Mechanical Specification.

D63.12 Operation and Control

The required method of starting and stopping shall be via an Automatic Mains Fail Panel, designed, supplied, installed and commissioned by the Tenderer. This Panel shall interface with the Standby Generator Control equipment, which shall be part of the package supplied free-issue by the Client. The Generator's control panel shall provide the following items as listed below.

All monitored items shall be displayed. Monitored and displayed items shall include the following:

- (a) alternator output power (kW).
- (b) alternator apparent power (kVA).
- (c) alternator power factor.
- (d) alternator voltage.
- (e) alternator current.
- (f) alternator speed.
- (g) engine coolant inlet temperature.
- (h) engine coolant outlet temperature.
- (i) engine oil pressure.
- (j) fuel tank level.

The following alarms shall cause a system trip:

- (a) high engine coolant temperature (if applicable).
- (b) engine coolant low flow (if applicable).
- (c) low engine oil pressure.
- (d) high ambient temperature in enclosure (if applicable).

D63.13 Acceptance Tests

The tests which shall be carried out by the Contractor to certify that the equipment is operating in accordance with the performance requirements in this Specification shall include the following:

- (a) fuel lines shall be tested for airtightness prior to filling.
- (b) a test shall be done to verify the guaranteed power output. The Contractor shall do preliminary tests and make adjustments as necessary. Once all adjustments have been carried out, the generating set shall operate for a period of not less than 15 minutes to permit conditions to settle down before proceeding with the acceptance test. The acceptance test shall be run for not less than 30 minutes at full specified continuous power output with electrical power output readings being taken every 5 minutes. The arithmetic average of these results will be taken as the official test result. All monitored parameters shall also be recorded.
- (c) test that the genset is able to start the largest motor as specified.
- (d) tests to show that each protection circuit is operational.
- (e) pressure tests of all pipework.
- (f) operation of all components of the system individually and as a system.
- (g) where the genset is installed in an enclosure or room, the allowable temperature rise for plant room ambient is 5 °C and this shall be confirmed during continuous operation for a period of at least two hours.

The Contractor shall make all arrangements and shall provide all equipment required to perform the above tests, including the provision of load resistor banks or equivalent.

D63.14 Spares, Manual, etc.

The following spares shall be provided if stated as a requirement in the Detailed Mechanical Specification:

- (a) complete set of diesel injectors (1 off per genset).
- (b) complete diesel injector pump (1 off per genset).
- (c) complete engine gasket set (1 off per genset).
- (d) complete engine fanbelt set (1 off per genset).
- (e) complete air filter set (2 off per genset).
- (f) complete fuel filter set (2 off per genset).
- (g) complete oil filter set (2 off per genset).

Technical information to be provided for the operating staff shall be comprehensive and tailored to be specifically applicable to the installation. The detailed requirements for the Operation and Maintenance Manual are specified elsewhere in this Standard Specification for Mechanical Works (including General Works).

Two fire extinguishers of a suitable size and type shall be provided and shall be mounted suitably for the application.

D64 (DIESEL) FUEL TANKS

This shall be integrated within the Standby Generator supplied by the Client.

D65 INSTRUMENTATION

- (a) Environmental protection of electronic instrumentation shall be as follows:
- (b) Instrumentation and associated displays and transmitters which are either located inside or located outside and above ground level shall have IP 55, or higher, rating.
- (c) Instrumentation and associated displays and transmitters which are located in underground chambers shall have IP 68 environmental protection. The instrument shall be mounted in an enclosure which shall provide physical protection and shall be self-draining.
- (d) Instruments and associated displays and transmitters which are located outside buildings shall be mounted in enclosures. Enclosures shall be of polycarbonate construction with transparent front, Fibox EK or equivalent. The complete enclosure installation shall have an IP 55 rating or higher. The enclosure size shall be chosen to provide a clearance of at least 100 mm all-round the instrument.

Instruments and their cabling shall be protected so that electromagnetic interference does not affect their operation and signal transmission.

Calibration certificates shall be included in the Manual.

D66 FLOW METERS

D66.1 Electromagnetic Flow Meters

D66.1.1 Meters

Electromagnetic flow meter sensors shall be full-bore, in-line, double-flanged units with remotely mounted transmitters. The transmitters shall provide local flow indication and 4-20 mA output. Sensors shall, unless otherwise specified, have IP 68 protection and transmitters shall have IP 67 protection.

Electromagnetic flow meters shall have polyurethane lined stainless steel tubes with either Titanium or Hastelloy C electrodes. Accuracy shall be $\pm 1\%$ of flow or better. Rubber linings are acceptable for treated water applications.

Calibration shall be in litres per second unless otherwise specified.

For applications other than for treated water, flow meters shall be provided with an electronically

operated electrode cleaning device. Automatic, timed cleaning shall be provided.

D66.1.2 Installation

The equipment shall be correctly installed, connected, adjusted and calibrated by competent persons. Calibration shall be done in the presence of the Engineer. The operation and signal transmission of meters against electromagnetic interference shall be provided.

The meter shall be installed with a straight pipe length of at least 10 pipe diameters upstream of the sensor and a straight pipe length of at least 5 pipe diameters downstream of the meter. If this is not possible, specific measures shall be taken to provide flow straightening. The complete meter installation shall comply with the manufacturer's instructions.

Grounding rings shall be supplied and installed if the application requires these.

D66.1.3 Testing

A factory test calibration certificate shall be provided for each flow meter.

The flow meter shall be provided with a simulation test unit for field verification of the measuring system without removal of the sensor. If more than one identical model flow meter is installed, two simulation test units shall be provided.

D66.2 Visual Flow Meters and Indicators

D66.2.1 General

Visual flow meters or flow indicators shall be provided if specified in the Detailed Mechanical Specification. These are normally used for auxiliary circuits such as cooling and lubrication circuits and for flushing of mechanical seals.

D66.2.2 Design and Materials

The units shall be of the double window type with a graduated indicating flap. Flow indicators which utilise a moving spinner or ball will be acceptable in some applications.

The body shall be double flanged and shall incorporate easy dismantling to allow cleaning of the windows.

Bodies shall be of stainless steel.

D67 GAUGES

D67.1 Gauges – General

Gauges shall comply with the following:

- (a) Gauges shall be of durable, industrial construction. Case and bezel shall be of stainless steel unless this material is unsuitable.
- (b) Scale markings shall be radial, plain, straight, black lines on a white background and shall be spaced so that one scale division represents approximately 1 % - 1,5 % of the maximum scale value in values of 1, 2 or 5 multiplied by any power of 10 to suit the maximum operating rating.
- (c) On circular gauges the scale shall be concentric and the maximum and minimum scale values shall be near the bottom of the gauge, with the scale symmetrically disposed about the vertical centre line of the gauge.

- (d) The tip of the pointer shall be of the knife edge type extending across the scale divisions and shall be as close as practical to the dial.
- (e) Wherever applicable, **gauges shall be clearly strip marked in green to indicate the normal operating range and in red to indicate the non-permissible range of values.** Such markings shall always be on the inner scale face and not on the glass face.
- (f) The units of measurement shall be clearly marked on the dial. A printed label of approved non-corrosive material indicating the duty of the gauge shall be neatly fixed on or near the gauge.

D67.2 Gauge Installation and Mounting

Gauges shall be installed and mounted in accordance with the following:

- (a) Gauges shall be mounted vertically and in such a position that they can be easily read from floor level.
- (b) Flanged nozzles for gauge tapings shall be provided on the parent pipework. Nozzles shall comply with the requirements of the Clause "Pipework".
- (c) Gauges for permanent equipment installations, such as for centrifugal and reciprocating pumps, shall not be mounted directly on pipework but shall be mounted on a wall or on a pedestal stand so as to minimise vibration. Gauge cocks shall be provided at each end of the connecting pipework.
- (d) Pressure gauges shall be fitted with an isolating and air bleed cock.
- (e) Pressure gauges used on sewage, sludge, powder, chemical or other applications where blockage or corrosion of the gauge is possible shall be fitted with a diaphragm type chemical seal, both being liquid filled. The portion of the seal in contact with the process liquid shall be of a suitable non-corroding material and, when solids are handled, shall have a large threaded socket connection not smaller than 1" BSP.
- (f) Gauges for liquids containing solids shall have the nozzle on the side of the parent pipe and the configuration shall allow easy cleaning of the passageways.

D67.3 Pressure Gauges

Pressure gauges shall comply with the following:

- (a) Pressure, vacuum or compound gauges shall comply with SANS 1062. Gauges shall be of Accuracy class 1.6 and Durability grade A unless otherwise specified. The gauges shall bear the Standards South Africa mark.
- (b) Gauges shall have a scale diameter of not less than 100 mm.
- (c) Calibration shall be in kiloPascals with the full scale reading between 1,5 and 2 times maximum actual operating pressure except where otherwise specified. The full scale reading for a gauge on the discharge leg of a centrifugal pump shall be higher than the pump shut-off head.
- (d) All gauges shall be suitable for continuous operation and shall be liquid filled on all pump applications and where fluctuations in pressure may cause damage.
- (e) Gauges shall not be mounted directly on equipment subject to vibration. Gauges in pump stations shall not be mounted directly on the pipework and shall be connected to the pressure tapping point by small diameter stainless steel pipework.

- (f) For dry locations indoors, the casing may be reinforced plastic or epoxy coated aluminium and the elastic element and shank of stainless steel. For damp indoor locations, particularly in any location where sewage is flowing, and for all locations outdoors, the gauges shall be weatherproof and have the cases and other metal components of EN Grade 1.4401 (316) stainless steel.
- (g) When used on steam lines a siphon shall be fitted between the steam line and the gauge which shall be filled with water before putting the gauge into service.

D67.4 Temperature Gauges

Temperature gauges shall comply with the following:

- (a) Temperature gauges shall have dials not less than 120 mm diameter. Accuracy shall be $\pm 1\%$ of reading or better.
- (b) The gauges shall be fitted vertically into removable EN Grade 1.4401 (316) stainless steel wells and the gauges shall be removable without leakage from the pipe or vessel. Protrusion into a pipeline shall be kept to a minimum. When handling sludge, sewage or other abrasive liquids the protrusion shall not exceed 15 mm and in this case the wells shall also be of a heavy duty abrasion resistant type.

D68 THERMOMETERS

Thermometers shall be of the liquid column type and the complete tube shall be protected by a sturdy pocket of stainless steel or brass.

D69 VENTILATION SYSTEMS

D69.1 Design

Performance requirements to be achieved by the Contractor's design are specified in the Detailed Mechanical Specification.

Resistance to flow for all ductwork, pipework and associated equipment shall be calculated by the Contractor prior to equipment selection. At least 250 Pa shall be allowed for resistance losses in filters unless the Contractor can confirm a lower figure. Reasonable modification to ductwork and pipework during installation shall be provided for in the design; i.e. a suitable safety factor shall be incorporated in the design.

D69.2 Fans

Direct-drive, axial-flow fans shall incorporate manually adjustable pitch, cast aluminium, aerofoil section blades, clamped in split, metallic hubs. Terminal boxes shall be mounted on the fan unit. Fan casings shall cover the overall length of the fan and motor assembly or shall feature a plate mount which incorporates a bell mouth inlet. Suspended fans shall be restrained to prevent excessive torsional and axial movement during start-up. Fan casings shall be of hot-dip galvanized steel unless overridden by the Detailed Specification. Axial flow fans installed in corrosive flows shall be either belt-driven or shall have their motors protected by bifurcated airstreams.

Centrifugal fans shall be constructed of galvanized sheet steel with spun steel inlet cones and machined shafting supported on rolling bearings mounted in sealed bearing housings provided with grease nipples. The open type bearing units with exposed "lubricated for life" bearings will not be acceptable. Fans shall be mounted on steel channel base frames sized to accommodate drive motors.

Fan motors shall be protected to IP 55 or higher. Fans and motors shall preferably have a nominal

speed of 1 500 rpm or lower and motors shall have a nominal voltage of 400 Volts. Fans shall be dynamically balanced to ISO 1940, grade G6,3. Fans shall be flexibly connected to ducting.

Fan/motor housings shall, as a minimum, be provided with rubber mountings. Where flexible mounting is specified, fans shall be flexibly supported off the structure using spring or rubber-in-shear mountings having a minimum static deflection of 20 mm. Suction and discharge areas shall be effectively guarded with hot-dip galvanized (or better) wire screens of 12 mm maximum mesh and 1,6 mm minimum gauge. Belt drives shall be accurately aligned axially and angularly and shall be to the Engineer's approval. Guarding shall totally enclose drives, shall be rigidly mounted off base plates and shall be to the Engineer's approval.

Drive motors shall comply generally with the clause "Electric Motors".

D69.3 Ducting and Sheet Metalwork

All ducting for air conditioning and ventilation purposes shall be manufactured in accordance with SANS 1238.

Volume control dampers shall be installed where required or where called for in the Detailed Mechanical Specification and shall be of the opposed blade type.

Unless otherwise specified in the Detailed Specification, materials used in the fabrication of air conditioning and ventilation ductwork shall be of hot-dip galvanized, low carbon steel and sheet steel material thicknesses shall be in accordance with SANS 1238.

Flexible connections between ducting and moving equipment shall be by means of approved coated fabric collars with sewn and cemented seams. Flexible collars shall have sufficient free movement to take up the deflection of the connected moving equipment and shall not be used as a means of accommodating misalignment. When installed, collars shall not restrict the free area of the ducting and particular care shall be taken to avoid mounting flexible collars at fan intakes and discharges.

Take-off sockets shall be provided where grilles or louvres are mounted in distribution ducting. Sockets shall be long enough to ensure that no part of the grille or its associated control mechanism projects into the duct cross-section. All such duct-mounted grilles shall be provided with opposed-blade, volume control dampers or flap-type volume controls with straightening blades.

Rectangular ducting shall be supported on trapeze type hangers constructed from hot-dip galvanized, low carbon steel angle with $\varnothing 10$ stainless steel hanger rods. Rod diameter shall be not less than 10 mm and support spacing shall be less than 2 000 mm.

Circular ducting shall be supported in hoops constructed from 40 mm X 5 mm hot-dip galvanized low carbon steel flat bar suspended from $\varnothing 10$ mm stainless steel rod at 3 000 mm maximum centres.

Where ductwork penetrates brickwork, a wrot timber frame shall be built in to locate and mount the ductwork or air terminal as the case may be.

Where ductwork penetrates concrete slabs or walls, flanges shall be provided on one side to stabilize the duct and weak grout or fire stopping shall be applied to the spaces between the ducting and the structure to effectively seal the clearance. Where ducting penetrates between areas having differing fire risk or mandatory fire separation, fire dampers to the latest amendment of SANS 193 shall be installed to the Engineer's approval.

D69.4 Filters

Filter cells shall be mounted in proprietary frames and clip-fixed to achieve zero discernible by-pass.

Slide frame mounted filters shall have wing nut fixed airtight cover plates.

Filter banks shall have a differential manometer connected across them. Manometers shall be correctly set up and levelled and shall be provided with red gauge oil of the correct specific gravity.

The filter frame shall be fabricated from hot-dip galvanised steel (minimum thickness of 0,5 mm) unless otherwise specified in the Detailed Mechanical Specification.

Flow speed through the filter opening shall be not greater than 2 m/s.

D69.5 Sound Attenuators

Circular attenuators shall be directly connected to axial flow fan flanges. Where diameters differ by more than 20 mm, hot-dip galvanized low carbon steel connecting cones shall be bolted between the fan and the attenuator to adapt the respective diameters. Attenuators containing an acoustic pod shall have leading and trailing fairings in moulded grp or spun hot-dip galvanized steel. Pods shall be securely and concentrically fitted in the casings to the Engineer's approval.

Splitter attenuators shall be fabricated of galvanized sheet steel with mating flanges. Splitters shall comprise acoustic lining material mounted on galvanized sheet steel and shall be securely supported within the attenuator casing. Leading and trailing ends of splitters shall have fairings in moulded grp or hot-dip galvanized steel sheet.

Attenuators shall be constructed to achieve the overall acoustic performance specified. Acoustic infill material shall be "Eurolon" by Donkin or equivalent. Where air passageway velocities exceed 20 m/s, the infill material shall be supported by pre-galvanised perforated sheet steel having a thickness of at least 0,8 mm.

Where attenuators are to be used in grease or oil-laden atmospheres or where called for in the Detailed Mechanical Specification, a polyester membrane shall be interposed between the infill material and the perforated sheet.

Attenuators shall not impose a resistance of more than 50 Pa at rated air-flow.

External surfaces of the attenuators shall be painted as for the general ductwork.

D69.5 Equipment Bases for Equipment in Acoustically Sensitive Areas

The Detailed Mechanical Specification specifies whether the ventilation equipment system design must comply with the requirements of this Clause.

Inertia bases for centrifugal fans, chillers, refrigerant compressors, air cooled condensers, air compressors, pumpsets, motors and the like shall consist of reinforced concrete cast into sheet metal formers and shall be at least 150 mm deep.

Bases shall be reinforced with, at least, $\varnothing 13$ mm reinforcing bars located at 150 mm centres each way.

The mass ratio between bases and equipment shall be at least 1:1 for fans and 1,5:1 for pumps. Concrete bases for pumpsets shall be large enough to support pipes and fittings between the pumps and flexible connections and shall also be generally large enough to accommodate the motors and driven equipment. Equipment shall be bolted onto concrete inertia bases.

Structural steel bases shall be provided for cooling towers and evaporative condensers.

Spring isolators shall be installed between concrete inertia bases and floor plinths and between cooling towers or evaporative condensers and floor plinths. Either free standing stable spring units or caged

spring units with snubbers may be used. Spring isolators shall be installed with levelling bolts and shall incorporate 6 mm thick ribbed neoprene acoustic pads bonded to the base. Spring diameters shall be large enough to prevent excessive rocking of equipment during start-up as well as normal operation.

Isolators shall be chosen to give a static deflection corresponding to a ratio of 3:1 of the lowest disturbing frequency to the natural frequency of the mounting.

Bases and spring isolators shall be arranged to give a clearance of approximately 25 mm between the underside of the bases and floor plinths.

Floor plinths shall be provided for all equipment bases. Plinths shall be large enough to accommodate the concrete inertia bases and spring isolators. Floor plinths shall also be provided under items of equipment, such as cooling towers, air plena etc., which do not require concrete inertia bases. Plinths under air plena shall be at least 100 mm higher than finished floor level.

D69.6 Equipment Noise Control

Refer to clause "Noise Control".

D69.7 Machine Vibration

Refer to clause "Machine Vibration Levels".

D70 CHLORINATION SYSTEMS

Not used

D71 CONTROL SYSTEMS

D71.1 General

Control systems shall comply with the following:

- (a) Control shall function as an integrated, coherent system.
- (b) Protection systems shall be designed to prevent damage to equipment. Failing to start, tripping or stopping of any item of equipment shall prevent the start-up or shall initiate the appropriate shut-down procedure of related equipment in cases where damage could occur.
- (c) Emergency stop stations shall be provided near to each motor driven unit.
- (d) Digital indicators shall provide no fewer than three significant places (and, preferably, no more than three).

D71.2 Design

The design of the control system, including drawings, functional specification, control panel layout, circuit diagrams and protection systems, shall be submitted to the Engineer for acceptance.

D71.3 Testing and Commissioning of Control Systems

Setpoints for equipment and process parameters which are required for the operation of control systems shall be obtained once the equipment is operational.

The Contractor shall submit a schedule of all control functions to be checked on Site during testing and commissioning. This shall be submitted for acceptance by the Engineer. The format shall be as follows, or similar:

COMMISSIONING - CONTROL SYSTEM TESTS				
Date	Test Function	Test Method	Result (e.g. SCADA message, etc.)	Proposed Corrective Action

D71.4 Technical Details

D71.4.1 Control Panels

Where the details of motor starter panels have not been specified in the electrical specifications, every 400 V starter panel shall include the following standard equipment:

- (a) Circuit breaker (complete with auxiliary contacts for control circuits).
- (b) Contactor.
- (c) Overload relay with manual reset
- (d) Ammeter (CT based, if above 40A).
- (e) Starter alive indicating light (Red).
- (f) Motor running indicating light (Green).
- (g) Running hour meter.
- (h) Selector switch.
- (i) Stop push button.
- (j) Start push button.

D71.4.2 PLC/SCADA Systems

Control systems utilising PLC/SCADA systems shall incorporate the following:

- (a) The PLC/SCADA system shall be configured for equipment to be PLC controlled such that the installation will be able to operate following a failure of the SCADA system.
- (b) Mimic screens provided for SCADA systems shall include the following (unless inapplicable):
 - ⊕ Overview of scheme; including the process flow diagram and indicating all electronically monitored parameters which are not included in a sub-system.
 - ⊕ Overview of each plant grouping.
 - ⊕ Individual unit (Centrifuge, compressor, pumpset, etc.).
 - ⊕ Equipment sequence selection.
 - ⊕ Equipment start interlocks.
 - ⊕ For each motor larger than 55 kW, motor status and, where applicable, motor protection relay diagnostic.
 - ⊕ Electrical reticulation schematic.
 - ⊕ Hardware diagnostic.
 - ⊕ Alarms.
 - ⊕ Set-points for alarm, trip and control loop functions (including password protected alteration facility).
 - ⊕ Record of equipment and process parameters at instant of equipment trip and station trip (see also below).
 - ⊕ Event log.
 - ⊕ Trending of monitored system parameters (see also below).
 - ⊕ Communication status of control system hardware.
 - ⊕ SCADA security system current settings, including personnel names.

- ⊕ Ancillary equipment status; e.g. security, fire detection, UPS.
 - ⊕ Printing.
- (c) Trend screens shall be as follows:
- ⊕ Screens may include logical operational groupings.
 - ⊕ Points of inflection of measured parameters shall be recorded.
 - ⊕ Trend screens shall be provided for 3 hours, for 7 days and for 3 months (unless the nature of the parameter demands different scales).
- (d) At least one colour printer (for graphs, mimics, etc.) and one line printer (for alarms) shall be provided in accordance with the detailed specifications.
- (e) The control system shall provide an alarm on the SCADA screen if an instruction to an item of equipment to start or stop does not cause that item to start or stop.
- (f) Alarm conditions which lead to the control system executing an equipment trip shall be logged. Subsequent alarms which occur as a result of the tripping action shall be logged as subordinate alarms. The condition **which caused the trip** shall be described with respect to the:
- ⊕ Item of equipment.
 - ⊕ Trip setpoint reached.
 - ⊕ Description of parameter; i.e. flow, temperature, etc.
 - ⊕ Time of event.
- (g) A time delay following an alarm condition leading to a control system trip shall be incorporated in order to prevent tripping actions caused by electrical disturbances or similar occurrences. The time delay chosen shall match the functional needs and shall be decided in conjunction with the Engineer.
- (h) Three significant places shall be used for representation of values on SCADA systems.

D72 CONTRACTOR'S DRAWINGS

The Contractor's drawings shall comply with the following:

- (a) Drawings shall be prepared in accordance with the latest issue of SANS 10111. The equivalent BS code of engineering drawing practice will also be acceptable.
- (b) Drawings shall be to A1 or A0 size.
- (c) Drawings shall be to scale, with both the scale and the drawing being large enough to clearly show all relevant components of the plant and equipment without misunderstanding.
- (d) In addition to the usual plan and two side elevations, sufficient additional sections shall be included to clearly show the arrangement of all plant and equipment.
- (e) General arrangement and detail drawings shall be cross-referenced.
- (f) Item lists shall be provided on the drawing or on a separate parts list.
- (g) Item descriptions shall include the material of construction, quantity and full identification information, including, as applicable, brand name, manufacturer's reference number, model number, size, rating, source, duty, quantity, etc.

The contractor shall prepare and correct drawings to satisfy the requirements of the Conditions of Contract and of this Specification to the satisfaction of the Engineer and shall incorporate reasonable changes required by the Engineer.

D73 CONTRACTOR'S RESPONSIBILITY WITH REGARD TO CIVIL WORKS

The Contractor shall be responsible for all interim and permanent building works under this contract.

D74 TUITION

D74.1 General

During the Trial Operation Period, the City of Cape Town's staff (OR those of the operations' License Holder) will observe and then assist the Contractor in operating the plant. The Contractor shall train these staff in the starting, operating and stopping of the plant and shall train the City of Cape Town's maintenance staff on the maintenance requirements and procedures. Unless otherwise called for in the Detailed Mechanical Specification, the Tenderer shall price for the on-Site personal tuition of 8 operational staff members and 4 engineering staff members.

The Contractor shall also provide the trainees with printed copies of the Operating and Training Manual which forms part of the Installation, Operation and Maintenance Manual.

D74.2 Operational Staff Tuition

The Contractor shall provide the following tuition as applicable to the Contract:

- (a) Start-up, shut-down and operating instruction for all operational modes for the Works shall be provided. This shall be comprehensive and shall include actions to be taken in the case of all alarm conditions and basic fault finding.
- (b) A layout drawing of the installation, a process flow diagram, and a P&ID shall be provided for each Operator. The instructions described in (a) above shall also be provided in printed form for each Operator.
- (c) If the specified control system is SCADA based, the tuition shall include instruction on the SCADA system.

D74.3 Electrical Engineering Staff Tuition

The Contractor shall provide the following tuition as applicable to the Contract:

- (a) Control system software instruction.
- (b) Detailed overview of 11 kV protection and settings (if applicable).
- (c) Tuition on setting of 11 kV protection (if applicable).
- (d) Motor protection relay and settings.
- (e) Overview of PLC programming for the purposes of making settings' changes and re-loading software and programs if PLCs are replaced.
- (f) Overview of SCADA system.

D75 SPARES

Spares which are specified in the Detailed Mechanical Specification shall be packed individually in wooden boxes with the lids unattached. Each box shall be labelled with the Contract number, manufacturer, contents, relevant part/model numbers and the supplier's address. The boxes shall be brought to Site and the lids shall be secured to the boxes immediately after the Engineer has approved the spares and the packaging.

D76 OPERATING INSTRUCTIONS AND SIGNAGE

Operating instructions and signage, if specified in the Detailed Mechanical Specification, shall comply with the requirements below.

D76.1 Operating Instructions

Wall mounted operating instructions shall comply with the following:

- (a) Start-up, Shut-down and Operating instructions shall be provided. These shall be comprehensive and shall indicate actions to be taken in the case of all alarm conditions. These shall be written from the point of view of the plant operator.

- (b) A layout drawing of the equipment installation, a process flow diagram, and a P&ID shall be provided.
- (c) Instructions shall be framed (wooden frame. glass front, hardboard backing) and shall be attached to the wall in the control room using brass screws.

D76.2 Signage

Signs, suitably framed or encapsulated, which shall be provided by the Contractor in appropriate places on the walls of the plant room shall include the following:

- (a) All statutory and special safety warning instructions.
- (b) Course of action during/after electrical shock.
- (c) Any operating restrictions for equipment.
- (d) Operating instructions in cases of plant trip and electrical supply failure.
- (e) Spares list.

D76.3 Symbolic signs shall comply with SANS 1186.

The wording of the signs shall be approved by the Engineer prior to final printing. All signs shall cross refer, where applicable, to the relevant portion of the Manual.

All signs shall be installed prior to commissioning.

D77 INSTALLATION, OPERATION AND MAINTENANCE MANUAL

D77.1 Submission of Manual

Two draft copies of the Manual shall be submitted to the Engineer prior to commissioning the Works. One copy will be returned to the Contractor with comments. The second copy will be used by the operational staff on Site.

Six copies of the final version of the Manual, as accepted by the Engineer, shall be provided prior to the start of the Defects Notification Period.

D77.2 General Requirements

The Manual shall comply with the following:

- (a) The Manual shall be for the complete Works and shall be of a standard acceptable to the Engineer. It shall be in English and shall be practically and neatly presented.
- (b) One Manual shall contain original documents and this set shall be marked "Original". The other 5 Manuals shall contain all the information in the original and shall be marked "Copy 2" to "Copy 6".
- (c) Binders shall have hard, plastic protected covers utilising four-ring, spring-clip holders. Binders shall not be overloaded. One spare, empty binder shall be provided for every three used. A title label shall be affixed to the spine of all binders. This shall indicate Contract number, title, Contractor's name, Site/Plant name, volume number and contents.
- (d) Sections and sub-sections shall be titled, uniquely numbered and provided with separator sheets.
- (e) Printed matter which is inserted in the Manual shall be arrowed (indelibly) to indicate the equipment installed.
- (f) Drawings shall be to a scale which makes details clear. Large drawings shall be held in plastic envelopes in the Manual. A4 and A3 drawings may be bound as normal pages. Drawings shall also be provided on electronic data storage in Autocad, or equivalent, format.
- (g) Cross-referencing within the Manual is acceptable where duplication occurs.

D77.3 Format and Contents

The Manual shall be in accordance with the following (the Contractor shall modify, elaborate and repeat this format as required):

No.	HEADING	CONTENT
1	GENERAL	
1.1	Contents List	Contents List for complete Manual.
1.2	Description of the Works	The description of the Works shall include a description of; firstly, the process; secondly, the design parameters and; thirdly, a detailed description of the equipment installation supported by drawings and process flow diagrams.
1.3	Equipment List	Equipment list containing each item of mechanical, electrical, instrumentation and control equipment. The equipment list shall include the make, model, serial number, description, size, range, performance data, motor and drive details, supplier's name, address and phone numbers, all as applicable. The design duty, the position of each unit's installation and its purpose in the system shall be given. Additional information which shall be provided for instruments includes the normal operating reading, maximum or minimum permissible readings, set-points (activation, warning and trip), etc. A separate list of all spares provided in terms of this Contract shall also be provided.
1.4	Drawing List	Drawing list of all the Contractor's drawings and the Tender drawings.
1.5	Cable Schedule	Cable schedule for power, data, control and instrumentation cables. This shall include the cable construction, conductor material, insulation, protection, voltage rating, start and finish points, route length, duty, load, voltage drop, core area, no. of cores, no. of cores used and gland size. For cable voltages above 400 Volts, the schedule shall also include the purchase details, specification and date of manufacture.
1.6	Documents	As-built system, layout and GA drawings. Plant circuit, flow diagrams and/or P&IDs. Control panel layouts. I/O list, program listing, loop and logic diagrams for each PLC. Colour prints of SCADA mimic screens, control faceplates and sequences. System control diagram and logic sequence chart. Copy of certificate of electrical compliance.
2	OPERATION	
2.1	Control System	Description of control system; including all manual and automatic controls. This shall include controls, instruments, protection list, settings, indications, alarms, trips, etc.
2.2	Commissioning	Commissioning Instructions. Commissioning report.
2.3	Operating and Training Manual	Operating and training manual. This shall include normal start-up, adjustment, operating and shut-down procedures and any emergency operating procedures. All specific safety aspects as well as settings, adjustments, observation, etc. shall be provided.
3	MAINTENANCE SCHEDULES	
	Maintenance and Lubrication	Schedule of routine maintenance, by time period, for all mechanical, electrical, instrumentation and control equipment. This shall be all-inclusive but reference to manufacturer's standard manuals in other parts of the Manual is acceptable. The schedule shall incorporate a lubrication schedule of recommended lubricants, capacity, lubrication periods, etc.
4	MECHANICAL EQUIPMENT <i>(This section shall be repeated for each item of equipment)</i>	

4.1	Identifying Information	Identifying information for the item; copied from the Equipment List.
4.2	Nameplate	A photograph of the nameplate or a table containing the unit's nameplate information.
4.3	Design and Operation	Details of operating principles, construction and operating instructions.
4.4	Maintenance Information	Technical and maintenance information including instructions for installation, assembly, disassembly, lubrication, adjustment, calibration, reconditioning, repair, etc.
4.5	Spares	A spares list giving the item number, part number, description, quantity and materials. A list of spares recommended to be held on Site.
4.6	Test Results	Factory and Site test results.
4.7	Corrosion Protection	Corrosion protection systems used, coating supplier's data sheets and coating repair procedures.
4.8	Documents	Performance curves. Large scale, dimensioned, cross sectional and arrangement drawings of the item for assembly and spares recognition purposes, cross-referenced to the spares list. Dimensioned drawings of fabricated equipment. Circuit layout of any auxiliary systems
5	ELECTRICAL EQUIPMENT <i>(This section shall be repeated for each item of equipment)</i>	
5.1 to 5.6	As for 4.1 to 4.6 for Mechanical Equipment (see above).	
5.7	Control Details	Control and electrical details, including logic sequence, circuit diagrams and software, as applicable.
5.8	Documents	Electrical reticulation drawings. Equipment overall dimensions. Wiring diagrams. Switchboard layout drawings and SLDs. Electrical panel construction drawings.
6	INSTRUMENTATION EQUIP. <i>(This section shall be repeated for each item of equipment)</i>	
6.1 to 6.6	As for 4.1 to 4.6 for Mechanical Equipment (see above).	
6.7	Documents	Circuit diagrams of instrumentation systems and of individual instruments. Installation arrangement.
7	CONTROL EQUIP.; ETC.	
7.1	Identifying Information	Identifying information for PLCs, transmitters, HMIs, computers, etc.; copied from the Equipment List.
7.2	I/O List	Cross-referenced listing of all I/Os used.
7.3	SCADA	Colour prints of SCADA mimic screens, control faceplates, sequences and trend screens. Schedule of alarm messages and TAG lists. File structures, lists and naming conventions.
7.4	Program	CDs containing all software. An annotated program listing.
7.5	Documents	Schedule of cable terminals. Copy of SCADA hardware diagnostic mimic.
8	DRAWINGS	
	Drawings	All drawings not filed elsewhere shall be filed in this section.

D78 STARTING, SITE TESTING AND COMMISSIONING OF PLANT

D78.1 General

The Contractor shall advise the Engineer when instructions may be given to the Building Contractor to execute any necessary screeding and finishings around the Works. Tenderers shall allow a reasonable period in their installation programme for this work to be done and no compensation for delay in the commencement of testing and commissioning shall accrue to the Contractor during such period.

D78.2 Preparation

Installation work shall be complete and accepted by the Engineer prior to commissioning.

Before starting up any section of the Works, the Contractor shall make all necessary checks to ensure that the installation has been correctly carried out, that all ducts, pipework, tanks, etc., are clean, that all equipment is correctly aligned, lubricated and connected up, and is in all respects ready to start with safety. The Contractor shall provide initial fill requirements, such as lubricating oil.

D78.3 Starting-Up and Testing

The Contractor shall arrange for the Engineer to be present at initial start up and also for any electrical and control instrumentation sub-contractors to be present.

The Contractor shall start up and test each section of the Works. These tests shall be carried out to certify that the Works is operating in accordance with the requirements specified and must be witnessed by the Engineer. All necessary modifications and rectifications shall be carried out during this period.

Setpoints for equipment and process parameters which are required for the operation of control systems shall be confirmed and recorded.

D78.4 SCADA System

During commissioning of a new installation which incorporates SCADA as part of the control system, each control system alarm and interlock shall be tested and the resulting alarm messages shall be modified by the Contractor to be acceptable to the Engineer.

A schedule of alarm messages and their full explanations shall be inserted in the Manual.

D78.5 Commissioning

When all tests have been completed to the satisfaction of the Engineer, the Works shall be commissioned. Unless the Engineer states otherwise, the complete plant, including all control functions and control systems shall be commissioned as a unit and the process performance requirements shall be achieved during normal operation.

Once the Works has been commissioned to the satisfaction of the Engineer, the Trial Operation Period shall start and shall consist of a continuous period of operation free from trouble. Unless otherwise stated, this period shall be four weeks. During the Trial Operation Period, the Contractor shall carry out all necessary servicing and any adjustments required. The plant staff will assist the Contractor in operating the Works during this period. The Contractor shall train the operational staff in the starting, operating and stopping of the Works, and shall train the maintenance staff on the routine maintenance requirements.

D78.6 Commissioning Report

A comprehensive commissioning test report, including the SCADA system commissioning procedure and schedule of alarm messages, shall be submitted by the Contractor prior to issue of the Certificate of Completion and shall be inserted in the Manual.

E: ENVIRONMENTAL MANAGEMENT SPECIFICATION

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E: ENVIRONMENTAL MANAGEMENT SPECIFICATION

For use with the General Conditions of Contract for Construction Works, Third Edition, 2015.

E1 SCOPE

The Environmental Management Programme (EMP) for the project is comprised of this Environmental Management (EM) Specification and its Annexures, including the "Additional environmental issues deemed to form part of the Environmental Management Specification" attached as Annexure D hereto, which together cover the requirements for controlling the impact on the environment of construction activities.

E2 INTERPRETATIONS

E2.1 Supporting specifications

The following standardised specification shall, *inter alia*, apply to this Contract:

- a) SANS 1200A, as may be varied or added to in the Scope of Work

E2.2 Application

This EM Specification contains clauses that are generally applicable to the undertaking of construction works in areas where it is necessary to impose pro-active controls on the extent to which the construction activities impact on the environment.

E2.3

In the event of any difference or discrepancy between the provisions of the Standardised Specifications and the provisions of the EM Specification, the latter shall prevail.

E2.4 Definitions and abbreviations

For the purposes of this EM Specification the following definitions and abbreviations shall apply:

E2.4.1 Environment

The surroundings within which humans exist and that are made up of –

- a) the land, water and atmosphere of the earth;
 - b) micro-organisms, plant and animal life;
 - c) any part or combination of i) and ii) and the interrelationships among and between them;
- and
- d) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

E2.4.2 Potentially hazardous substance

E2.4.3 A substance which, in the reasonable opinion of the Employer's Agent, can have a deleterious effect on the environment.

E2.4.4 Method Statement

A written submission by the Contractor to the Employer's Agent in response to the EM Specification or a request by the Employer's Agent, setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, in such detail that the Employer's Agent is enabled to assess whether the Contractor's proposal is in accordance with the Scope of Work and/or will produce results in accordance with the EM Specification.

E2.4.5 Reasonable

Unless the context indicates otherwise, means reasonable in the opinion of the Employer's Agent after he has consulted with a person suitably experienced in "environmental implementation

plans" and "environmental management plans" (both as defined in the National Environmental Management Act, 107 of 1998).

E2.4.6 Solid waste

All solid waste, including construction debris, chemical waste, excess cement/ concrete, wrapping materials, timber, tins and cans, drums, wire, nails, domestic waste, dead vegetation, asphalt products, etc.

E2.4.7 Contaminated water

Water contaminated by the Contractor's activities containing cements, concrete, lime, paint products, thinners, turpentine, chemicals, fuels, oils washing detergents, etc.

E2.4.8 Working area

Any area within the boundaries of the Site where construction is taking place.

E2.4.9 Contractor's camp or construction camp

The area designated for all temporary site offices, storage areas, construction plant parking areas, staff welfare facilities, etc.

E2.4.10 Employer's Agent

The person/firm so named in the Contract Data, whose function is to administer the Contract as agent of the Employer.

E2.4.11 Employer's Agent's Representative (ER)

The natural person appointed by the Employer's Agent in terms of the Contract, who shall observe the execution of the Works, examine and test materials and workmanship, and deliver and receive communications to/from the Contractor.

E2.4.12 Environmental Officer (EO)

Appointed by the Employer's Agent as his environmental representative on Site, with the mandate to enforce compliance with the EMP. The duties of the EO are stipulated in the City's guideline document for the EO and ER.

E2.4.13 Environmental Control Officer (ECO)

An independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of Environmental Authorisations (EAs), and the EMP for the project.

E2.4.14 Environmental Site Officer (ESO)

Employed by the Contractor as his environmental representative to monitor, review and verify compliance with the EMP by the Contractor. The ESO must ensure that he is involved at all phases of the construction (from site clearance to rehabilitation).

E2.4.15 Abbreviations

The following abbreviations occur in this EM Specification:

EMP - Environmental Management Programme
EM Specification – Environmental Management Specification
EO - Environmental Officer
ECO – Environmental Control Officer
ESO – Environmental Site Officer
ER – Employer's Agent's Representative
MSDS - Material Safety Data Sheets

E2.5 Employer's Agent's authority to delegate

In terms of Clause 3.2.4 of the General Conditions of Contract, Third Edition, 2015 (GCC 2015), the Employer's Agent has the authority to appoint a representative. Other than the Employer's Agent's Representative (ER) in terms of Clause 3.2, this can be in the form of an Environmental Officer (EO), who shall be responsible for monitoring compliance with the EMP. All instructions given by the EO shall go through the ER, who will then convey these to the Contractor, except in the case of an environmental emergency, in which case the EO can issue an instruction directly to the Contractor. An environmental emergency is one which, in the opinion of the EO, would cause serious environmental harm if not addressed immediately.

Depending on the nature/environmental sensitivity of the Contract the following variations in the organisational structure are possible:

- a) The ER may work together with an EO; or
- b) There may be an ER only (for construction projects with low potential for causing significant environmental impacts). In this case the ER has responsibility for the EO's functions.
- c) There may be an independently appointed Environmental Control Officer (ECO) who will fulfil essentially the same functions as the EO. The ECO may work with just the ER (if there is no EO) or may work with both the ER and EO.

The term "Employer's Agent" in this EM Specification refers to the Employer's Agent as defined in Clause E2.3.9 acting through the ER/EO/ECO as delegated.

E3 MATERIALS

E3.1 Materials handling, use and storage

The Contractor shall ensure that any delivery drivers are informed of all procedures and restrictions (including "no go" areas) required to comply with the EM Specification. The Contractor shall ensure that these delivery drivers are supervised during off-loading by someone with an adequate understanding of the requirements of the EM Specification.

Materials shall be appropriately secured to ensure safe passage between destinations. Loads, including but not limited to, sand, stone chip, fine vegetation, refuse, paper and cement, shall have appropriate cover to prevent them spilling from the vehicle during transit. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.

All manufactured and or imported materials shall, where reasonably possible, be stored within the Contractor's camp and, if so required by the Employer's Agent, out of the rain. The location and method of protection of such materials stored outside of the Contractor's camp and the method of rehabilitation of these areas, shall be subject to the Employer's Agent's approval.

Stockpile areas shall be approved by the Employer's Agent before any stockpiling commences.

E3.2 Hazardous substances

Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances in GN 1179 (25 August 1995)) stored on Site for use during construction shall be stored in secondary containers which are clearly and appropriately marked/signed. The relevant Material Safety Data Sheets (MSDS) shall be available on Site. Procedures detailed in the MSDSes shall be followed in the event of an emergency situation.

If potentially hazardous substances are to be stored on Site, the Contractor shall inform the Employer's Agent of such substances and provide a Method Statement detailing the substances/materials to be used, together with the storage, handling and disposal procedures of the materials. Hazardous substances shall be stored out of flood risk areas and disposal of these substances shall be at a licensed waste disposal facility.

E4 PLANT (referring to “Construction Equipment” as defined in GCC 2015, and the Contractor’s facilities as used in SANS 1200A)

E4.1 Fuel (petrol and diesel) and oil

E4.1.1 Storage

If fuel and oil is to be stored on Site, then the Contractor shall submit a Method Statement covering the procedures for dealing with accidental hydrocarbon spillage and leaks, and detailing how these liquids will be stored, handled and disposed of.

The Employer’s Agent shall approve the location of all fuel storage areas. All necessary approvals with respect to fuel storage and dispensing shall be obtained from the appropriate authorities. Symbolic safety signs depicting “**No Smoking**”, “**No Naked Lights**” and “**Danger**” conforming to the requirement of SANS 1186 are to be prominently displayed in and around the fuel storage area. There shall be adequate fire-fighting equipment at the fuel storage area.

The Contractor shall ensure that all liquid fuels and oils are stored in tanks with lids, which are kept firmly shut and adequately secured. The capacity of the tank shall be clearly displayed and the product contained within the tank clearly identified using the emergency information system detailed in SANS 0232 part 1. Fuel storage tanks shall have a capacity not exceeding 9000 litres and shall be kept on site only for as long as fuel is needed for construction activities, on completion of which they shall be removed.

The tanks shall be situated on a smooth impermeable base with an earth bund. The volume inside the bund shall be 110% of the total capacity of the largest storage tank. The base may be constructed of concrete, or of plastic sheeting with impermeable joints, covered by a layer of compacted earth to protect the sheeting. The impermeable lining shall extend to the crest of the bund. The floor of the storage area shall be sloped to enable any spilled fuel and/or fuel-contaminated water to be removed easily.

If any rainwater collects in the bunded areas, it shall be promptly removed and taken off Site to a disposal site approved by the Employer’s Agent.

Only empty and externally clean tanks may be stored on the bare ground. Empty and externally dirty tanks shall be sealed and stored on an area where the ground has been protected.

Adequate precautions shall be provided to prevent spillage during the filling of any tank and during the dispensing of the contents. If fuel is dispensed from 200 litre drums, the proper dispensing equipment shall be used, and the drum shall not be tipped in order to dispense fuel. The dispensing mechanism for the fuel storage tanks shall be stored in a waterproof container when not in use.

E4.1.2 Refuelling

Plant shall be refuelled at a designated refuelling area approved by the Employer’s Agent. The surface under the temporary refuelling area shall be protected against pollution to the reasonable satisfaction of the Employer’s Agent prior to any refuelling activities. The Contractor shall ensure that there is always a supply of absorbent material (e.g. Spill Sorb or Enretech #1 powder or equivalent) readily available that is designed to absorb, break down and encapsulate minor hydrocarbon spillage. The quantity of such material shall be able to handle a minimum of 200 litres of hydrocarbon liquid spill.

E4.1.3 Treatment and remediation

Treatment and remediation of hydrocarbon spill and leak areas shall be undertaken to the satisfaction of the Employer’s Agent. In the event of a hydrocarbon spill the source of the spillage shall be isolated and the spillage contained.

E4.2 Ablution and toilet facilities

Washing, whether of the person or of personal effects, defecating and urinating are strictly

prohibited other than at the facilities provided.

The Contractor shall provide ablution facilities for all personnel employed on the Site, including shelter, toilets and washing facilities. The Contractor's personnel will not be permitted to use the City's ablution facilities.

Toilet facilities provided by the Contractor shall occur in a ratio of not less than 1 toilet per 30 workers (1:15 is preferred) for each sex. Toilet facilities shall be located within the Contractor's camp, but also at work areas remote from the camp, all to the satisfaction of the Employer's Agent. All portable toilets shall be adequately secured to the ground to prevent them toppling over as a result of wind or any other cause.

The Contractor shall ensure that the entrances to these toilets are adequately screened from view, that they are maintained in a hygienic state, serviced regularly, that no spillage occurs when they are cleaned and that contents are removed from Site. Toilets shall also be emptied before any temporary site closure for a period exceeding one week. Discharge of waste from toilets into the environment and burial of waste is strictly prohibited. The Contractor shall provide toilet paper at all times.

No ablution facilities shall be located closer than 50m to any water body

A Method Statement shall be provided by the Contractor detailing the provision, location, and maintenance of ablution facilities.

E4.3 Eating areas

The Contractor shall designate eating areas within the approved Contractor's camp. The feeding of, or leaving of food for, animals is strictly prohibited. Sufficient bins, as specified in Clause E4.4 below, shall be present in these areas.

Any cooking on Site shall be done on well-maintained gas cookers with fire extinguishers present. No open fires for cooking purposes shall be permitted, unless for occasional use in facilities specifically provided for this purpose and within the confines of the Contractor's camp.

E4.4 Solid waste management

E4.4.1 Litter and refuse

The site shall be kept neat and clean at all times, littering is prohibited.

No on-site burying or dumping of any waste materials, vegetation, litter or refuse shall occur. The Contractor shall provide scavenger and weatherproof bins with lids, of sufficient number and capacity to store the solid waste produced on a daily basis. The lids shall be kept firmly on the bins at all times. Bins shall not be allowed to become overfull and shall be emptied regularly, at least once a week. Waste from bins may be temporarily stored on Site in a central waste area that is weatherproof and scavenger-proof, and which the Employer's Agent has approved. Wherever possible refuse shall be recycled, and containers for glass, paper, metals and plastics shall be provided and the contents delivered to suitable recycling facilities when necessary.

All other litter and refuse shall be disposed of off Site at an approved landfill site. The Contractor shall supply the Employer's Agent with a certificate of disposal.

E4.4.2 Construction waste

Where possible all construction waste or spoil material shall be recycled, either on Site or elsewhere. As a last resort all construction waste shall be disposed of off Site at an approved landfill site. The Contractor shall supply the Employer's Agent with a certificate of disposal.

E4.5 Contaminated water management

Potential pollutants of any kind and in any form shall be kept, stored, and used in such a manner that any spill or escape can be contained and the water table and/or any adjacent water courses

or bodies are not endangered. Spill kits which can be used to contain and/or mop up spills shall be available. Water containing such pollutants as cements, concrete, lime, chemicals, oils and fuels shall be discharged into a conservancy tank for removal from the Site to a licensed disposal facility. This particularly applies to water emanating from concrete batching plants and to runoff from fuel storage, refuelling or construction equipment washing areas. Wash down areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted.

No paint products, chemical additives and cleaners, such as thinners and turpentine, may be disposed of into the stormwater system or elsewhere on Site. Brush/roller wash facilities shall be established to the satisfaction of the Employer's Agent.

A Method Statement shall be provided by the Contractor detailing the management of contaminated water.

Should contaminated water be released into the environment, specifically into a water course, monitoring thereof shall commence in accordance to the National Water Act, 36 of 1998, Section 21(f) – refer to GN 399 (26 March 2004). Contaminated water must not be released into the environment without authorisation from the relevant authority.

The Contractor shall notify the Employer's Agent immediately of any pollution incidents on Site and, at his own cost, take all reasonable measures to contain and minimise the effects of the pollution.

Any rehabilitation of the environment required as a result of such pollution shall be carried out by the Contractor at his own cost in accordance with a Method Statement approved by the Employer's Agent.

E4.6 Site structures

The type and colour of roofing and cladding materials to the Contractor's temporary structures shall be selected to reduce the visual impact.

E4.7 Lights

The Contractor shall ensure that any lighting installed on the Site for his activities does not cause a reasonably avoidable disturbance to other users of the surrounding area.

Lighting installed shall, as far as practically possible, be energy efficient. Lighting utilised on Site shall be turned off when not in use.

E4.8 Workshop, equipment maintenance and storage

No workshops or plant maintenance facilities shall be constructed on Site for performing major or routine maintenance of equipment and vehicles.

The Contractor shall ensure that in those areas where, after obtaining the Employer's Agent's approval, the Contractor carries out emergency or minor routine plant maintenance, there is no contamination of the soil, water sources or vegetation. Drip trays to collect waste oil and other lubricants shall be provided in any areas of the Site where such maintenance takes place. Drip trays must be emptied regularly and after rain, and the contents disposed of at a licensed disposal facility.

All vehicles and plant shall be kept in good working order. Leaking vehicles and plant shall be repaired immediately or removed from the Site.

The washing of vehicles and plant on Site shall be restricted to emergency or minor routine maintenance requirements only. Washing may only be undertaken in areas designated by the Employer's Agent.

E4.9 Noise

The Contractor shall limit noise levels (for example, by installing and maintaining silencers on plant). The provisions of SANS 1200A Clause 4.1 regarding "built-up areas" shall apply.

Appropriate directional and intensity settings are to be maintained on all hooters and sirens.

No amplified music shall be allowed on Site. The use of audio equipment shall not be permitted, unless the volume is kept sufficiently low so as to be unobtrusive. The Contractor shall not use sound amplification equipment on Site, unless in emergency situations.

Construction activities generating output levels of 85 dB(A) or more in residential areas, shall be confined to the hours 08h00 to 17h00 Mondays to Fridays. Should the Contractor need to do this work outside of the above times, he shall do so only with the approval of the Employer's Agent, and the surrounding communities shall be informed prior to the work taking place.

E5 CONSTRUCTION

E5.1 Method Statements

The Contractor shall submit the environmental method statements required within such reasonable time as the Employer's Agent shall specify or as required by the EM Specification. The Contractor shall not commence any activity until the Method Statement in respect thereof has been approved and shall, except in the case of emergency activities, allow a period of two weeks for consideration of the Method Statement by the Employer's Agent.

The Employer's Agent may require changes to a Method Statement if the proposal does not comply with the specification or if, in the reasonable opinion of the Employer's Agent, the proposal may result in, or carries a greater than reasonable risk of, damage to the environment in excess of that permitted by the EM Specification.

E5.2 Approved Method Statements shall be readily available on the Site and shall be communicated to all relevant personnel. The Contractor shall carry out the Works in accordance with the approved Method Statement. Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the Contract.

Changes to the way the Works are to be carried out must be reflected by amendments to the original approved Method Statements, and these amendments require the signature of both the Contractor and the Employer's Agent.

Method Statements shall consider all environmental hazards and risks identified by the Contractor and/or Employer's Agent and shall contain sufficient information and detail to enable the Employer's Agent to assess the potential negative environmental impacts associated with the proposed activity and shall cover applicable details with regard to:

- a) construction procedures,
- b) materials and equipment to be used,
- c) getting the equipment to and from Site,
- d) how the equipment/material will be moved while on Site,
- e) how and where material will be stored,
- f) the containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur,
- g) the control of fire,
- h) timing and location of activities,
- i) compliance/non-compliance with the EM Specification,
- j) any other information deemed necessary by the Employer's Agent.

The format to be used for the required method statements is bound in Annexure A of this EM Specification. The Contractor (and, where relevant, any sub-contractors) must also sign the Method Statement, thereby indicating that the work will be carried out according to the methodology contained in the approved Method Statement.

E5.1.1 Method Statements to be provided within 14 days from the Commencement Date

- a) Layout and Preparation of Contractor's Camp (E5.4).

- b) Ablution Facilities: number of, location, cleaning, method of securing to the ground, etc. of portable toilets (E4.2).
- c) Solid Waste Management: number of, type, location, cleaning, method of securing to the ground, etc. of bins (E4.4).
- d) Environmental Awareness Training: logistics for the environmental awareness courses for all the Contractor's management staff, as well as other employees (E5.2).
- e) Emergency Procedures for Accidental Hydrocarbon Leaks and Spillages (E4.1 and E5.8).
- f) Asphalt and Bitumen: details of all methods and logistics associated with the use of bitumen and asphalt (E5.11).

E5.2 Environmental Awareness Training

It is a requirement of this Contract that environmental awareness training courses are run for all personnel on Site. Two types of courses shall be run: one for the Contractor's and subcontractors' management, and one for all site staff and labourers. Courses shall be run during normal working hours at a suitable venue provided by the Contractor. All attendees shall remain for the duration of the course and sign an attendance register that clearly indicates participants' names on completion, a copy of which shall be handed to the Employer's Agent. The Contractor shall allow for sufficient sessions to train all personnel. Subsequent sessions shall be run for any new personnel coming onto Site. A Method Statement with respect to the organisation of these courses shall be submitted.

Notwithstanding the specific provisions of this clause, it is incumbent upon the Contractor to convey the spirit of the EM Specification to all personnel involved with the Works.

E5.2.1 Training Course for Management and Foremen

The environmental awareness training course for management shall include all management and foremen. The course, which shall be presented by the Employer's Agent or his designated representative, shall be of approximately one hour duration. The course shall be undertaken prior to the commencement of work on Site.

E5.2.2 Training Course for Site Staff and Labour

The environmental awareness training course for site staff and labour shall be presented by the Contractor from material provided by the Employer's Agent. The course shall be approximately one hour long. The course shall be undertaken not later than 3 working days after the commencement of work on Site, with sufficient sessions to accommodate all available personnel.

All the Contractor's employees, sub-contractors' employees and any suppliers' employees that spend more than 1 day a week or four days in a month on Site shall attend the Environmental Awareness Training Course for Site Staff and Labour

E5.3 Contractor's Environmental Representative (ESO)

The Contractor shall appoint an environmental representative, also called an Environmental Site Officer (ESO), who shall be responsible for undertaking a daily site inspection to monitor compliance with this EM Specification. The Contractor shall forward the name of the environmental representative (ESO) to the Employer's Agent for his approval. The environmental representative (ESO) shall complete Environmental Site Inspection Checklists (Annexure B attached hereto) and these shall be submitted to the Employer's Agent once a week.

E5.4 Site division, demarcation and "no go" areas

The Contractor shall restrict all his activities, materials, plant and personnel to within the Site or any particular working areas specified or indicated on the drawings.

The Contractor shall erect and maintain permanent and/or temporary fences of the type and in the locations specified elsewhere in the Scope of Work or on the drawings. Such fences shall, if so specified, be erected before undertaking any construction activities.

Where environmentally sensitive areas are specified as "no go" areas, the Contractor shall ensure that, insofar as he has the authority, no person, plant or material shall enter the "no go" areas at any time.

A Method Statement detailing the layout and method of establishment of the Contractor's camp (including all offices, shelters, eating areas, storage areas, ablution facilities and other infrastructure required for the running of

the project) shall be provided.

E5.5 Access routes/ haul roads

On the Site and, if so required, within such distance of the Site as may be stated by the Employer's Agent, the Contractor shall control the movement of all vehicles and construction equipment, including that of his suppliers, so that they remain on designated routes, are distributed so as not to cause an undue concentration of traffic, and that all relevant laws are complied with. In addition, the movement of such vehicles and construction equipment shall be planned and operated so as to minimise disruption to regular users of the routes. As far as possible the Contractor shall use existing access and haul routes. Damage to existing access roads as a result of construction activities shall be repaired to the satisfaction of the Employer's Agent, using material similar to that originally used. The cost of the repairs shall be borne by the Contractor. New temporary access or haul routes may only be established with the prior approval of the Employer's Agent. The rehabilitation of such routes shall be to the Contractor's own cost and to the approval of the Employer's Agent.

Any directional signage required by the Contractor for the purposes of directing the movement of his own vehicles and construction equipment (or that of his subcontractors or suppliers) must be of a design and in a location approved by the Employer's Agent. Directional signage may not be erected in such a manner that it interferes with sight lines or pedestrian movement.

E5.6 Construction personnel information posters

The Contractor shall erect and maintain information posters for the information of his employees, depicting actions to be taken to ensure compliance with aspects of the EM Specification. A2 information posters, printed on white vinyl, shall be erected at the eating areas and any other locations specified by the Employer's Agent.

The specification for the poster is presented in Annexure C of this EM Specification. The symbols shall be black and the circles shall be red lines. The Contractor shall ensure that the construction personnel information posters are not damaged in any way, and shall replace a poster if any part of it becomes illegible.

E5.7 Fire control

Other than for cooking purposes as specified in Clause E4.3, no fires may be lit on Site. Any fires which occur shall be reported to the Employer's Agent immediately.

Smoking shall not be permitted in those areas where it is a fire hazard. Such areas shall include fuel storage and refuelling areas, and any other areas where the vegetation or other materials are susceptible to the start and rapid spread of fire.

In terms of the **NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT, 2004 (ACT NO. 39 OF 2004)** **THE 2017 NATIONAL FRAMEWORK FOR AIR QUALITY MANAGEMENT IN THE REPUBLIC OF SOUTH AFRICA** and Community Fire Safety By-law, burning is not permitted as a disposal method.

The Contractor shall appoint a Fire Officer (who may be the ESO) who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedure to be followed. The Contractor shall advise the relevant authority of a fire as soon as one starts and shall not wait until he can no longer control it. The Contractor shall forward the name of the Fire Officer to the Employer's Agent for his approval.

The Contractor shall comply with Clause 27 of the Construction Regulations, 2014 where applicable, and shall ensure that there is suitable and sufficient fire-fighting equipment available on Site at all times.

The Contractor shall be liable for any costs relating to the rehabilitation of burnt areas, should the fire be the result of the Contractor's activities on Site

The Contractor shall submit a Method Statement to the Employer's Agent covering the procedure to be followed in the event of a fire.

E5.8 Emergency procedures

The Contractor's attention is drawn to the Method Statements required in terms of Clauses E4.1 and E5.7 above. Such Method Statements shall include procedures to be followed by the Contractor in the event of an emergency.

Furthermore, in the event of an emergency the Contractor shall contact the City of Cape Town's Emergency Call Centre by telephoning 107 or 021 480 7700 (from a cell phone). Telephone numbers of emergency services, including the local fire fighting service, shall be posted conspicuously in the Contractor's office near the telephone.

E5.9 Health and safety

The Contractor shall comply with requirements of the Occupational Health and Safety Act, 85 of 1993 and Construction Regulations, 2014, the Health and Safety Specification and relevant clauses of GCC 2015, insofar as health and safety is concerned.

E5.10 Community relations

If so required, the Contractor shall erect and maintain information boards in the position, quantity, design and dimensions specified in the Scope of Work or as directed by the Employer's Agent. Such boards shall include contact details for complaints by members of the public in accordance with details provided by the Employer's Agent.

The Contractor shall keep a "Complaints Register" on Site. The Register shall contain all contact details of the person who made the complaint, and information regarding the complaint itself.

E5.11 General protections in terms of the National Heritage Resources Act, 25 of 1999

The Contractor shall take cognisance of the provisions of the National Heritage Resources Act, 25 of 1999 in respect of, *inter alia*, structures older than 60 years; archaeology, palaeontology and meteorites; burial grounds and graves; and public monuments and memorials.

E5.12 Protection of natural features

The Contractor shall not deface, paint, damage or mark any natural features (e.g. rock formations) situated in or around the Site for survey or other purposes, unless agreed beforehand with the Employer's Agent. Any features affected by the Contractor in contravention of this clause shall be restored/ rehabilitated to the satisfaction of the Employer's Agent. The cost of restoration/rehabilitation shall be borne by the Contractor.

The Contractor shall not permit his employees to make use of any natural water sources (e.g. springs, streams, open water bodies) for the purposes of swimming, personal washing and the washing of machinery or clothes.

E5.13 Protection of flora and fauna

Except to the extent necessary for the carrying out of the Works, as specified by the Employer's Agent, no vegetation shall be removed, damaged or disturbed.

The presence of any wild animals found on Site shall be reported to the Employer's Agent, who shall issue an instruction with regard to their removal or relocation. If a wild animal needs removal from the Site the Cape Nature (Metro Region) Conservation Services Manager may be contacted for assistance (tel 021 955 9132/9121/3122/9130). Trapping poisoning, injuring or shooting animals is strictly forbidden. No domestic pets or livestock are permitted on Site, with the exception of controlled watchdogs approved by the Employer's Agent.

Where the use of herbicides, pesticides and other poisonous substances has been specified, the Contractor shall submit a Method Statement to the Employer's Agent for approval.

E5.14 Erosion and sedimentation control

The Contractor shall take all reasonable measures to limit erosion and sedimentation due to the construction activities and shall, in addition, comply with such detailed measures as may be required by the Scope of Work. Where erosion and/or sedimentation, whether on or off the Site, occurs, rectification shall be carried out in accordance with details specified by the Employer's Agent. Where erosion and/or sedimentation occur due to the fault of the Contractor, rectification shall be carried out to the reasonable requirements of the Employer's Agent, at the Contractor's cost. In particular, the Contractor shall ensure that the City's stormwater system is kept free from sediment arising from the Works.

Any runnels or erosion channels developed during the construction period or during the vegetation establishment period shall be backfilled and compacted, and the areas restored to a proper condition. Stabilisation of cleared areas to prevent and control erosion shall be pro-actively managed by the Contractor. The method of stabilisation shall be determined in consultation with the Employer's Agent.

E5.15 Aesthetics

The Contractor shall take any requisite measures to ensure that construction activities do not have an undue negative impact on the aesthetics of the area.

E5.16 Temporary site closure

In the event of temporary site closure (for a period exceeding one week), the Contractor's ESO shall carry out checks and ensure that, amongst others, the following conditions pertain and report on compliance with this clause:

- a) Fire extinguishers are serviced and accessible.
 - b) There is adequate ventilation in enclosed spaces.
 - c) All hazardous substance stores are securely locked.
 - d) Fencing and barriers are in place.
 - e) Emergency and management contact details are prominently displayed and available.
 - f) Wind and dust mitigation measures, e.g. straw, brush packs, irrigation, etc. are in place.
 - g) Excavated and filled slopes and stockpiles are at a stable angle and capable of accommodating normal expected water flows.
 - h) There are sufficient detention ponds or channels in place.
 - i) Cement and materials stores are secured.
 - j) Toilets are empty and secured.
 - k) Central waste area and all refuse bins are empty and secured.
 - l) Contaminated water conservancy tank empty.
- m) Any bunded areas are clean and treated with an approved product where applicable (e.g. Spill Sorb or Enretech #1 powder or equivalent).
 - n) Drip trays are empty and secure

E5.17 Asphalt and bitumen

Bitumen drums/products, if stored on Site, shall be stored in an area approved by the Employer's Agent. This area shall be indicated on the Method Statement for the Layout and Preparation of the Contractor's Camp. The storage area shall be constructed with an appropriate base, bunding and sump to the satisfaction of the Employer's Agent. A Method Statement shall be provided in this regard.

When heating bitumen products, the Contractor shall take cognisance of appropriate fire risk controls. Heating shall only be undertaken using LPG or similar zero emission fuels. Appropriate fire fighting equipment shall be readily available on Site.

E5.18 Dust

The Contractors shall be solely responsible, at his cost, for the control of dust arising from his activities on Site, and for any costs involved in damages resulting from the dust. The Contractor shall take all reasonable measures to minimise the generation of dust

E5.19 Contractor's advertising signage

Any advertising on the Site or any part of the Works shall remain at the sole discretion of the Employer, who reserves the right to order, via the Employer's Agent, its removal, covering or re-sizing, wherever placed, at no cost to the Employer.

Apart from at the Contractor's camp, no signage advertising the Contractor, or any of its subcontractors, manufacturers, suppliers or service providers shall be placed, fixed or erected anywhere on the Site or on the Works without the prior approval of the Employer's Agent. No advertising signage will be permitted on any designated scenic route. Notwithstanding any prior approval given, the Employer's Agent may instruct the Contractor to remove, cover or re-size any advertising signage at any time at no cost to the Employer.

Advertising signage at the Contractor's camp shall be appropriately designed and sized with due consideration to the surrounding environment, views and sight lines.

Branding or identification markings on the Contractor's and subcontractor's vehicles and equipment is generally permitted, although the Employer reserves the right to instruct, via the Employer's Agent, the removal, covering or re-sizing of any branding, markings or signage, on any equipment (scaffolding, for example), which it considers inappropriate in the environment in which it is placed.

No third party advertising (that is, in respect of any person, business or product that is not associated with the Works) shall be permitted anywhere on the Site or Works.

E5.20 Clearance of Site on completion

On completion of the Works, and at final completion when all defects have been remedied or corrected, the Contractor shall, in addition to the requirements for clearance of the Site in terms of the Contract, ensure that he has complied with the following requirements in terms of this EM Specification:

E5.20.1 Clause E3.1

Clean-up of improperly secured transported materials, and rehabilitation of storage areas.

- E5.20.2 Clause E4.1.3
Remediation of hydrocarbon spill and leak areas.
- E5.20.3 Clause E4.4
Disposal of litter, refuse and Contractor's waste.
- E5.20.4 Clause E5.4
Removal of temporary fences and Contractor's camp.
- E5.20.5 Clause E5.5
Repair of access roads damaged by the Contractor, and rehabilitation of temporary access routes.
- E5.20.6 Clause E5.7
Rehabilitation of burnt areas should a fire be the result of Contractor's activities on Site.
- E5.20.7 Clauses E5.11 to 5.13
Rehabilitation of heritage and natural features, including vegetation which is damaged or disturbed, which required protection in terms of these clauses.
- E5.20.8 Clause E5.14
Rectification where erosion and/or sedimentation has occurred due to the fault of the Contractor .
- E5.20.9 Clause E5.19
Removal of Contractor's advertising signage.

E6 TOLERANCES

E6.1 Fines

Environmental management is concerned not only with the final results of the Contractor's operations, but also with the control of how these operations are carried out. Tolerance with respect to environmental matters applies not only to the finished product, but also to the standard of the day-to-day operations required to complete the Works.

It is thus required that the Contractor shall comply with the EM Specification on an on-going basis and any failure on his part to do so will entitle the Employer's Agent to certify the imposition of a fine. Fines may be issued per incident at the discretion of the Employer's Agent. Such fines will be issued in addition to any remedial costs incurred as a result of non-compliance with the environmental specifications. The Employer's Agent will inform the Contractor of the contravention and the amount of the fine, and will deduct the amount from monies due in payment certificates issued under the Contract.

Maximum fines for the following transgressions by either the Contractor and/or his sub-contractors may be imposed by the Employer's Agent, as follows:

	Maximum fine per incident
a) Vehicles, plant or materials related to the Contractor's operations, parked or stored outside the demarcated boundaries of the Site.	R 2 000
b) Persons, vehicles, plant or materials related to the Contractor's operations, found within the designated boundaries of a "no go" area.	R 4 000
c) Persistent and unrepaired oil leaks from machinery/not using a drip tray to collect waste oil and other lubricants/not using specified absorbent material to encapsulate hydrocarbon spillage/using inappropriate methods of refuelling (the use of a funnel rather than a pump).	R 3 000
d) Refuelling in areas not approved by the Employer's Agent.	R 3 000
e) Litter on Site.	R 1 000
f) Deliberate lighting of fires on Site.	R 5 000
g) Individual not making use of the Site ablution facilities.	R 1 000

- | | | |
|----|--|---------|
| h) | Damage to trees not specified to be removed. | R 5 000 |
| i) | Dust or excessive noise emanating from the site | R 1 000 |
| j) | Not containing water contaminated with pollutants such as cement, concrete, fuel, etc. | R 2 000 |

For each subsequent similar offence the fine shall be doubled in value to a maximum value of R50 000.

E7 TESTING

Not applicable to this tender.

E8 MEASUREMENT AND PAYMENT

E8.1 Basic principles

Except where separate pay items have been measured in the Bills of Quantities, all costs in respect of complying with the EM Specification are deemed to be covered by the sum tendered for complying with the EM Specification.

ANNEXURE A: ENVIRONMENTAL METHOD STATEMENT

CONTRACT:.....

DATE:.....

PROPOSED ACTIVITY (give title of method statement and reference number from the EMP):

WHAT WORK IS TO BE UNDERTAKEN (give a brief description of the works - attach extra information to ensure accurate description given):

WHERE THE WORKS ARE TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:

End Date:

HOW THE WORKS ARE TO BE UNDERTAKEN (provide as much detail as possible, including annotated sketches and plans where possible):



Note: please give too much information rather than too little. Please ensure that issues such as emergency procedures, hydrocarbon management, wastewater management, access, individual responsibilities, materials, plant used, maintenance of plant, protection of natural features, etc. are covered where relevant

DECLARATIONS

1) EMPLOYER'S AGENT'S REPRESENTATIVE/ENVIRONMENTAL OFFICER/ENVIRONMENTAL CONTROL OFFICER

The work described in this Method Statement, if carried out according to the methodology described, appears to be satisfactorily mitigated to prevent avoidable environmental harm:

_____ (signed) _____ (print name)

Dated: _____

2) CONTRACTOR

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to other signatories and that the Employer's Agent's Representative/Environmental Officer/Environmental Control Officer will audit my compliance with the contents of this Method Statement. I understand that this method statement does not absolve me from any of my obligations or responsibilities in terms of the Contract.

_____ (signed) _____ (print name)

Dated: _____

3) EMPLOYER'S AGENT

The works described in this Method Statement are approved.

_____ (signed) _____ (print name) _____ (designation)

Dated: _____

ANNEXURE B: ENVIRONMENTAL SITE INSPECTION CHECKLIST
TO BE SUBMITTED TO THE EMPLOYER'S AGENT ONCE A WEEK

CONTRACT:.....

DATE:.....

ENVIRONMENTAL ASPECT	YES/ NO (✓ or X)	COMMENTS
• All new personnel on Site are aware of the contents of the EMP and have been through the environmental awareness course.		
• Contractor's camp is neat and tidy and the labourers' facilities are of an acceptable standard.		
• Sufficient and appropriate fire fighting equipment is visible and readily available in the appropriate places.		
• Waste control and removal system is being maintained.		
• Fences are being maintained.		
• Drip trays are being utilised where there is a risk of spillage.		
• Bunded areas/drip trays are being emptied on a regular basis (especially after rain).		
• No leaks are visible from construction vehicles.		
• Refuelling of vehicles and plant occurs within designated areas, and appropriate refuelling apparatus and drip trays are being used.		
• "No go" areas, natural features, vegetation, etc. have not been damaged.		
• Dust control measures (if necessary) are in place and are effectively controlling dust.		
• Noise control measures (if necessary) are in place and are working effectively.		
• Erosion and sedimentation control measures (if necessary) are in place and are controlling effectively.		
• Material stockpiles are located within the boundary of the Site and are protected from erosion.		
• Other		

Completed by:.....

Signed:.....

ENVIRONMENTAL MANAGEMENT DO'S AND DON'TS	
	
Workers & equipment must stay inside the site boundaries at all times	Use the toilets provided Report full or leaking toilets
	
Do not swim in or drink from streams Do not throw oil, petrol, diesel, concrete or rubbish in the stream Do not work in the stream without direct instruction Do not damage the banks or vegetation of the stream	Only eat in demarcated eating areas Never eat near a river or stream Put packaging & leftover food into rubbish bins
	
Protect animals on the site Ask your supervisor or Contract's Manager to remove animals found on site	Do not litter - put all rubbish (especially cement bags) into the bins provided Report full bins to your supervisor The responsible person should empty bins regularly
	
Do not damage or cut down any trees or plants without permission Do not pick flowers	Always keep to the speed limit Drivers - check & report leaks Ensure loads are secure & do not spill
	
Put cigarette butts in a rubbish bin Do not smoke near gas, paints or petrol Do not light any fires without permission Know the positions of fire fighting equipment Report all fires Do not burn rubbish or vegetation without permission	Know all the emergency phone numbers
	
Work with petrol, oil & diesel in areas marked for this Report any petrol, oil & diesel leaks or spills Use a drip tray under vehicles & machinery Empty drip trays after rain & do not throw this water into a river	Fines of between R1000 and R5000 Removal from site Construction may be stopped
	
Try to avoid producing dust - wet dry ground & soil	Report any breaks, floods, fires, leaks and injuries to your supervisor Ask questions!
	
Do not make loud noises around the site, especially near schools and homes Report or repair noisy vehicles	

ANNEXURE D: ADDITIONAL ENVIRONMENTAL ISSUES DEEMED TO FORM PART OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME

Listed below are issues pertaining to the environment that form part of the Contract Document. The clause references relate to the **General Conditions of Contract for Construction Works, Third Edition, 2015 (GCC 2015)**. They are listed here to emphasise that they form part of the environmental considerations and requirements for this project. They must be read together with any Contract Specific Data referring thereto in Part C1.2 Contract Data. The comments made below on the various issues are to be taken as explanatory, in so far as environmental matters are concerned, and do not modify the clauses in any way.

1. Monitoring

Clause 3.1.1 makes provision for the Employer's Agent to administer the Contract in accordance with the provisions of the Contract, including the monitoring of any environmental variables.

2. Health and safety

Clauses 7(1) to 7(8) remind the Contractor of his obligations in terms of the Occupational Health and Safety Act (No. 85 of 1993) and Construction Regulations 2014

Clause 5.7 of SANS 1200A reinforces these requirements through the observation of proper and adequate safety arrangements.

3. Employer's Agent's authority to delegate

Clause 3.2.4 gives the Employer's Agent the authority to appoint a representative to act as the Environmental Officer (EO) for the Contract. The EO, who shall be responsible for monitoring compliance with the EMP, may be the Employer's Agent's Representative or any other person accountable to the Employer's Agent.

4. Employer's Agent's instructions

Clause 4.2.1 requires that the Contractor comply with the Employer's Agent's instructions on any matter relating to the Works. Moreover, Clause 4.2.2 ensures that the Contractor only takes instructions from the Employer's Agent, the Employer's Agent's Representative or a person authorised by the Employer's Agent in terms of Clause 3.2.4.

5. Compliance with applicable laws

Clause 4.3.1 requires that the Contractor comply with all applicable laws, regulations, etc. in fulfilling the Contract.

6. Protection of fossils, etc.

Clause 4.7.1 requires the Contractor to take reasonable precautions to prevent any person from damaging, *inter alia* anything of geological or archaeological interest, and requires that he inform the Employer's Agent and follows any instructions issued in this regard.

7. Housing, food and transport

Clause 4.10.1 requires the Contractor to make his own arrangements for payment, housing, feeding and transport for his employees, provided that if he uses any part of the Site for such purposes he shall obtain the Employer's Agent's prior approval.

Clause 4.2 of SANS 1200A further requires that facilities provided comply with local authority regulations and are maintained in a clean and sanitary condition.

8. Competent employees

Clause 4.11.1 requires that all persons employed on Site are careful, competent, and efficient. These attributes embrace knowledge of the environmental matters and issues dealt with in the EMP.

9. Removal from Site

Clause 4.11.2 makes provision for the Employer's Agent to instruct the removal from the Works and Site of any person who is guilty of misconduct, or is incompetent or negligent, or is an undesirable presence on Site.

Clause 7.1.1 requires that all Construction Equipment be in good working order. Accordingly, the Employer's Agent may order that any Construction Equipment not complying with the environmental specifications be removed from Site.

10. Unacceptable documentation

Clauses 5.3.1 and 5.3.2 require the Contractor to provide documentation required before commencement with Works execution, failing which the Employer may terminate the Contract. Such documentation includes the Protection of the Environment Declaration provided for in the Contract Document.

11. Programme and Method Statements

Clause 5.6.1 makes provision for the Employer's Agent to request the programmes for carrying out the Works.

Clause 5.6.2 makes provision for the Employer's Agent to request statements from the Contractor for the entire scope of the work. In the case of the environmental specifications, these would be submitted as Method Statements.

12. Hours of operation

Clause 5.8.1 restricts the Contractors hours of operation to between sunrise and sunset on working days (usually from Monday to Saturday), unless, *inter alia*, permitted by the Employer's Agent in writing.

Clause 5.7.2 further requires that in the event that permission is granted for night work, then such work shall be carried out without excessive noise and disturbance.

13. Suspension of Works

Clause 5.11.1 enables the Employer's Agent to suspend the progress of the Works or any part thereof, which may be as a result of some default or breach of the Contract on the part of the Contractor.

14. Site clean-up

Clause 5.15.1 requires that, on completion of the Works, the Contractor shall clear away and remove from the Site all Construction Equipment, surplus materials, rubbish and Temporary Works of every kind and leave the whole of the Site and Works clean and in a safe condition. All streams and watercourses shall be restored to the condition as at the commencement of the Works. Should the Contractor fail to do the work upon notice from the Employer's Agent, the Employer may in terms of Clause 7.8.3, employ others to carry out the work and recover the cost of doing so from the Contractor.

15. Access to the Works

Clause 7.3.1 makes provision for the Employer's Agent to authorise the Environmental Officer (EO) to have access to the Works and Site.

16. Pollution prevention and interferences

Clause 8.1.2 requires that all operations necessary for the execution of the Works be carried out so as not to cause unnecessary noise or pollution, or to interfere unnecessarily or improperly with public services, or the access to, use and occupation of public or private roads and footpaths or properties.

Clause 5.6 of SANS 1200A further requires the Contractor to minimise dust nuisance and pollution of streams and inconvenience to or interference with the public.

17. Dust

Clause 8.1.2 requires that all operations necessary for the execution of the Works be carried out so as not to cause unnecessary pollution.

Clause 5.6 of SANS 1200A requires that the Contractor take all reasonable measures to minimise any dust nuisance.

18. Noise

Clause 8.1.2 requires that all operations necessary for the execution of the Works be carried out so as not to cause unnecessary noise.

Clause 4.1 of SANS 1200A requires that when working in built-up areas, the Contractor shall provide and use suitable and effective silencing devices for pneumatic tools and other plant that would otherwise cause a noise level exceeding 85dB.

19. Protection of existing environment

Clause 8.1.3 requires that the Contractor uses every reasonable means to prevent any roads or bridges to or in the vicinity of the Site being subjected to damage by excessive loads, or disruption due to excessive traffic, occasioned by his transport arrangements.

20. Reinstatement

Clauses 8.2 and 8.4 make provision for the Contractor to repair and make good any damage to the Works in his care (other than "excepted risks"), and bear any costs associated with such reinstatement.

21. Reporting accidents

Clause 8.5.1 requires the Contractor to report to the Employer's Agent every occurrence on the Site which causes environmental damage.

H: HEALTH AND SAFETY SPECIFICATION

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H9.25 Other hazards...

H: HEALTH AND SAFETY SPECIFICATION

For use with the General Conditions of Contract for Construction Works, Third Edition, 2015.

H1 DEFINITIONS

For the purposes of this Specification, the definitions given in the Occupational Health and Safety Act, 85 of 1993 and the Construction Regulations, 2014, and the following definitions, shall apply:

- a) "Construction Regulations, 2014" means the Construction Regulations (GNR. 84 of 7 February 2014) published in terms of the OHS Act.
- b) "Contractor" means the Principal Contractor as defined in the Construction Regulations, 2014.
- c) "Employer" means the Client or his agent as defined in the Construction Regulations, 2014.
- d) "Employer's Agent" means the person/firm so named in the Contract Data whose function is to administer the Contract as agent of the Employer, acting through, if appointed, a Health and Safety Agent.
- e) "OHS Act" means the Occupational Health and Safety Act, 85 of 1993.
- f) "subcontractor" means any contractor employed by the Contractor to perform construction work.

H2 SCOPE

In terms of the OHS Act and the Construction Regulations, 2014 the Employer must provide the Contractor with a Health and Safety Specification, to which the Contractor must respond with a Health and Safety Plan for approval by the Employer.

The purpose of this Specification is to ensure that a contractor entering into a contract with the Employer maintains an acceptable level of compliance with regard to health and safety issues during the performance of the Contract. In this regard the Health and Safety Specification forms an integral part of the Contract and the Contractor shall ensure that his subcontractors and/or suppliers comply with the requirements of this Specification.

H3 INTERPRETATION

The OHS Act and its associated regulations shall have precedence in the interpretation of any ambiguity or inconsistency between it and this Specification.

Responsibility for health and safety relating to the Works lies with the Contractor as described in this Specification. Nothing stated in or omitted from this Specification shall in any way limit the Contractor's obligations and liabilities in terms of the OHS Act.

H4 GENERAL REQUIREMENTS

The Contractor shall:

- a) create and maintain a safe and healthy work environment;
- b) execute the Works in a manner that complies with all the requirements of the OHS Act and all its associated regulations, and in so doing, minimize the risk of incidents occurring; and
- c) respond to the instructions issued by the Employer's Agent through the Employer's Agent's Representative, except in the case of a health and safety issue which requires the Contractor's immediate attention, in which case the Employer's Health and Safety Agent can issue an instruction directly to the Contractor.

H5 ADMINISTRATION

H5.1 Application for construction work permit

In terms of Regulation 3 of the Construction Regulations, 2014, read together with the exemptions published by the Department of Labour in Government Notice dated 7 July 2015, a client who intends to have construction work carried out, must at least thirty days before that work is to be carried out apply to the Provincial Director in writing for a construction work permit to perform construction work if the works contract is of a value exceeding one hundred and thirty million Rand (R130 000 000) or Construction Industry Development Board (CIDB) grading level 9. In such cases, the Employer's Agent will not issue an instruction to commence executing the Works, and the Contractor will not be permitted to commence with Works execution, until such time as the required construction work permit has been issued by the Provincial Director.

The employer will apply for the construction work permit as soon as possible after its Bid Adjudication Committee has awarded the contract based on the draft Health and Safety Plan submitted. Should the issuing of a construction work permit be delayed by the submission of a draft Health and Safety Plan which, in the opinion of either the Employer's Health and Safety Agent, or the Provincial Director of the Department of Labour, is unacceptable, no claim for an extension of time will be entertained.

The issuing of a construction work permit by the Department of Labour shall in no way nullify the requirement to submit a Health and Safety Plan to the Employer's Health and Safety Agent for discussion and approval (in terms of Clause H8.3 of this specification) before commencement with Works execution.

H5.2 Notification of intention to commence construction work

The Contractor shall notify the Provincial Director of the Department of Labour in writing using the pro forma contained in Annexure 2 of the Construction Regulations, 2014 before construction work commences, and retain a copy of such notification in the health and safety file, if such work will:

- a) include excavation work;
- b) include working at a height where there is a risk of falling;
- c) include the demolition of a structure; or
- d) include the use of explosives to perform construction work.

The Contractor shall ensure that no work commences on an electrical installation which requires a new supply or an increase in electricity supply before the person who supplies or contracts or agrees to supply electricity to that electrical installation has been notified of such work.

The Contractor shall ensure that no asbestos work is carried out before the Provincial Director of the Department of Labour has been notified in writing.

H5.3 Occupational Health and Safety Agreement

The Contractor shall enter into an Agreement with the Employer before the commencement of the Works on Site.

H5.4 Good standing with the Compensation Fund or a licensed compensation insurer

The Contractor shall provide the Employer's Agent with a letter of good standing from the Compensation Commissioner or a licensed compensation insurer before the commencement of the Works on Site.

H5.5 Emergency procedures

The Contractor shall submit for acceptance to the Employer's Agent a health and safety

emergency procedure, which includes but is not limited to fire, spills, accidents and exposure to hazardous substances, which:

- a) identifies the key personnel who are to be notified of any emergency;
- b) sets out details of available emergency services, including contact particulars; and
- c) the actions or steps which are to be taken during an emergency.

The Contractor shall within 24 hours of an emergency taking place notify the Employer's Agent in writing of the emergency and briefly outline what happened and how it was dealt with.

H5.6 Health and safety file

The Contractor shall ensure that a Health and Safety file, which shall include all documentation required in terms of the provisions of the OHS Act, the Construction Regulations, 2014 and this Health and Safety Specification, is open and kept on Site at all times.

The Health and Safety file shall be made available for inspection by any inspector, subcontractor, the Employer, the Employer's Agent, the Employer's Health and Safety Agent, or employee of the Contractor, upon the request of such persons.

The Contractor shall hand over the Health and Safety file to the Employer's Agent upon Works completion of the Contract and, if applicable, a certificate of compliance accompanied by a test report for the electrical installation in accordance with the provisions of the Electrical Installation Regulations, 1992.

H5.7 Health and safety committee

Where applicable, the Contractor shall establish a health and safety committee, and shall convene health and safety meetings as provided for in the OHS Act.

The Employer's Agent or the Employer's Health and Safety Agent shall be invited to attend such meetings as an observer.

The Contractor shall ensure that minutes of the health and safety committee meetings are kept.

H5.8 Inspections, formal enquires and incidents

The Contractor shall inform the Employer's Agent:

- a) beforehand of inspections, investigations or formal inquiries of which he has been notified by an inspector; and
- b) as soon as reasonably practicable of the occurrence of an incident (as defined in the OHS Act) on the Site.

The Contractor shall record all incidents and notify the Employer's Agent of any incident, except in the case of a traffic accident on a public road, as soon as possible after it has occurred and report such incident to an inspector as designated in terms of the OHS Act.

The Contractor shall investigate all incidents and issue the Employer's Agent with copies of such investigations.

H5.8 Personal protective equipment and clothing

The Contractor shall ensure that all workers are issued with the necessary personal protective clothing.

H6 APPOINTMENTS

H6.1 Appointment of construction manager

The Contractor shall, prior to commencing the Works on Site, appoint a full-time competent person as the construction manager, with the duty of managing all construction work on a single site,

including the duty of ensuring occupational health and safety compliance. In the absence of the construction manager an alternative must be appointed by the Contractor.

The Contractor may, having considered the size of the project, appoint, in writing, one or more assistant construction managers for different sections thereof.

No construction manager may manage any construction work on or in any construction site other than the Site in respect of which he or she has been appointed.

H6.2 Appointment of construction supervisor, and health and safety officers

The construction manager shall appoint a competent employee(s) in writing as the construction supervisor(s) for the Site, who will be responsible for construction activities and ensuring occupational health and safety compliance on the construction site. The Contractor may, having considered the size of the project, appoint, in writing, one or more competent employees to assist the appointed construction supervisor(s).

The Contractor may, having considered the size of the project, the degree of danger likely to be encountered or the accumulation of hazards or risks on the Site, appoint a full-time or part-time construction health and safety officer in writing, who has in the Contractor's opinion the necessary competencies and resources, to assist the Contractor in the control of all health and safety related aspects on the Site.

The Contractor shall compile and maintain an organogram which outlines the roles and responsibilities of the construction supervisor's assistants, and health and safety officers.

H6.3 Other competent persons

The Contractor shall appoint in writing competent persons to supervise or inspect, as relevant, any of the following:

- a) temporary works operations;
- b) excavation work;
- c) demolition work;
- d) scaffolding work operations;
- e) suspended platform work operations;
- f) rope access work;
- g) material hoists;
- h) operation of bulk mixing plant;
- i) explosive activated fastening device;
- j) cranes;
- k) construction vehicles and mobile plant (equipment);
- l) the stacking and storage of articles on the Site; and
- m) fire equipment.

The Contractor shall appoint in writing competent persons to:

- l) induct employees in health and safety; and
- m) prepare a fall protection plan.

H6.4 Health and safety representative(s)

The Contractor shall appoint in writing, if necessary in terms of the OHS Act, a health and safety employee representative(s), whose duties shall be as described in the OHS Act.

H7 EMPLOYER'S HEALTH AND SAFETY AGENT

The Employer's Health and Safety Agent shall:

- a) audit the Contractor's compliance with the requirements of this Specification prior to the commencement of any physical construction activities on the Site;
- b) accept or reject all safety plans, giving reasons for rejecting such plans;

- c) monitor the effective implementation of all safety plans;
- d) conduct periodic and random audits on the health and safety file to establish compliance with the requirements of this Specification and the Contractor's health and safety plan; and
- e) visit the site at regular intervals to conduct site inspections, and based upon such visits issue, wherever necessary, any notices and/or instructions to the Contractor or any of the Contractor's subcontractors with a copy to the Employer's Agent and, where relevant, to the Contractor.

The Contractor shall invite the Employer's Health and Safety Agent to audit compliance with the requirements of this Specification before commencing with any new construction activity on the Site.

The Contractor shall permit the Employer's Health and Safety Agent to audit the Contractor's compliance with the approved Health and Safety Plan, and shall provide any assistance and/or documentation as may be required in this regard.

H8 CREATING AND MAINTAINING A SAFE AND HEALTHY WORK ENVIRONMENT

H8.1 General

The Contractor shall with respect to the Site and the construction works that are contemplated:

- a) cause a preliminary hazard identification to be performed by a competent person before commencing any physical construction activity;
- b) evaluate the risks associated with such work constituting a hazard to the health and safety of such employees and the steps that need to be taken to comply with the OHS Act; and
- c) as far as is reasonably practicable, prevent the exposure of such employees to the hazards concerned or, where prevention is not reasonably practicable, minimize such exposure.

The Contractor shall ensure that:

- d) all reasonably practicable steps are taken to prevent the uncontrolled collapse of any new or existing structure or any part thereof, which may become unstable or is in a temporary state of weakness or instability due to the carrying out of construction work;
- e) no structure or part of a structure is loaded in a manner which would render it unsafe;
- f) relevant information, if any, provided by the designer of the structure is taken into account in the risk assessment; and
- g) the designer of any temporary works complies with the requirements of regulation 6(2) of Construction Regulations, 2014.

The Contractor shall carry out regular inspections and audits to ensure that the Works are being performed in accordance with the requirements of this Specification and the Contractor's health and safety plan.

H8.2 Risk assessment

The Contractor shall before the commencement of any construction work on Site and during such construction work, cause risk assessment(s) to be performed by a competent person appointed in writing. Such assessment(s) shall as a minimum:

- a) identify the risks and hazards to which persons may be exposed to;
- b) analyse and evaluate the identified risks and hazards based on a documented method;
- c) document a plan of safe work procedures, including the use of any personal protective equipment or clothing and the undertaking of periodic "toolbox talks" or inductions before undertaking hazardous work, in order to mitigate, reduce or control the risks and hazards that have been identified;
- d) provide a monitoring plan; and

- e) provide a review plan.

The Contractor shall ensure that as far as is reasonably practicable, ergonomic related hazards are analysed, evaluated and addressed in the risk assessment.

The Contractor must review the relevant risk assessment -

- f) where changes are effected to the design and or construction that result in a change to the risk profile; or
- g) when an incident has occurred.

H8.3 Health and safety plans

The Contractor shall prior to commencing the Works to which this Specification applies, submit to the Employer's Health and Safety Agent for approval a suitable and sufficiently documented health and safety plan, based on this Specification and the risk assessment that is conducted.

The health and safety plan shall include, but not be limited to, the following:

- a) The safety management structure, including the names of all designated persons such as the construction supervisor and any other competent persons;
- b) Safety method statements and procedures to be adopted to ensure compliance with the OHS Act; Construction Regulations, 2014 and this Health and Safety Specification;
- c) The provision and use of temporary services;
- d) Personal protective equipment, devices and clothing required;
- e) Emergency procedures;
- f) Provision of workers' welfare facilities;
- g)
- h) Induction and training;
- i) Arrangements for monitoring and control to ensure compliance with the safety plan; and
- j) Provision and maintenance of the health and safety file and all other relevant documentation.

The Contractor shall provide each subcontractor with the sections of this Health and Safety Specification pertaining to the construction work to be performed by that subcontractor. The subcontractor shall provide the Contractor with a health and safety plan pertaining to his work, for incorporation into the Contractor's health and safety plan.

The Contractor shall discuss the submitted health and safety plan with the Employer's Health and Safety Agent, modify such plan in the light of the discussions and resubmit the modified plan for approval.

The Contractor shall apply the approved health and safety plan from the date of its approval and for the duration of the Works to which this Specification applies.

The Contractor shall conduct periodic audits for compliance with the approved health and safety plan at intervals agreed upon with the Employer's Health and Safety Agent, but at least once every month.

The Contractor shall update the health and safety plan whenever changes to the Works are brought about.

H8.4 Responsibilities towards employees and visitors

The Contractor shall, as far as is reasonably practicable, cause every employee to be made conversant with the hazards to his health and safety attached to any work which he has to perform, any article or substance which he has to produce, process, use, handle, store or transport and any plant or machinery which he is required or permitted to use, as well as with the precautionary measures which should be taken and observed with respect to those hazards or

safe work procedures.

The Contractor shall ensure that all employees under his control are informed, instructed and trained by a competent person regarding any hazard and the related work procedures before any work commences, and thereafter at such times as may be determined in the risk assessment.

The Contractor shall cause a record of all induction training to be kept, which indicates the names, identity numbers and job description of all those who attended such training.

The Contractor shall not allow or permit any employee to enter the Site, unless such person has undergone health and safety induction training pertaining to the hazards prevalent on the Site at the time of entry.

The Contractor shall ensure that all of his employees have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner on the prescribed form.

The Contractor shall ensure that each visitor to the Site, save where such visitor only visits the site office and is not in direct contact with the construction work activities:

- a) undergoes health and safety instruction pertaining to the hazards prevalent on the Site; and
- b) is in possession of and using the necessary personal protective equipment.

The Contractor shall cause a record of all induction training to be kept in the Health and Safety file.

The Contractor shall provide suitable on-site signage to alert workers and visitors to health and safety hazards and requirements. Such signage shall include but not be limited to:

- c) prohibited unauthorized entrance;
- d) signage to indicate what personal protective equipment is to be worn; and
- e) activity related signs.

The Contractor shall not permit any person who is or who appears to be under the influence of intoxicating liquor or drugs, to enter or remain at a workplace.

H8.5 Subcontractors

The Contractor may only subcontract work in terms of a written subcontract and shall only appoint a subcontractor should he be reasonably satisfied that such a subcontractor has the necessary competencies and resources to safely perform the work falling within the scope of the subcontract.

The Contractor shall ensure that all of his obligations in respect of subcontractors in terms of the Construction Regulations, 2014 are adhered to.

H8.6 Work permits and wayleaves

The Contractor shall be responsible for obtaining all the wayleaves, permissions or permits applicable to working near any existing services or other infrastructure on Site, and shall abide by the safety conditions imposed by such wayleaves, permissions or permits.

H8.7 Access to the Site

The Contractor shall ensure that access to the Site is strictly controlled and that, where possible, only authorised persons are permitted onto the Site.

The Contractor shall control the access to Site of his own personnel and equipment, and that of his subcontractors and suppliers, in such a way so as to ensure that the safety of all public pedestrian and vehicular traffic is not compromised.

H8.8 First aid and emergency procedures

The Contractor shall, where more than five employees are employed at a workplace, provide a first aid box or boxes at or near the workplace, which shall be available and accessible for the treatment of injured persons at that workplace. Such first aid boxes shall contain suitable first aid equipment.

The Contractor shall ensure, where there are more than 10 employees employed on the Site, that for every group of up to 50 employees at that workplace at least one person is readily available during normal working hours who is in possession of a valid certificate of competency in first aid.

The following information shall be conspicuously posted in the offices of the Contractor for the duration of the Contract:

- a) Telephone numbers of emergency services;
- b) The names of all safety representatives and safety officers; and
- c) The name(s) of the competent first aider(s).

The Contractor shall post, in prominent places, notices indicating where the first aid box(es) is/are kept, as well as the name of the person in charge of the first aid box.

H8.9 Housekeeping

The Contractor shall ensure, *inter alia*, that suitable housekeeping is continuously implemented on the Site, including provision for the:

- a) removal of scrap, waste and debris, and materials which are no longer required for use, at appropriate intervals (in accordance with Construction Regulation 27); and
- b) proper stacking and storage of materials and equipment (in accordance with Construction Regulations 27 and 28).

H8.10 Fire precautions

The Contractor shall ensure that all appropriate measures are taken to minimize the risk of fire and that appropriate procedures and equipment are in place to deal with the event of a fire, all in accordance with Construction Regulation 29 and the Environmental Management Specification in Part C3.5 of the Scope of Work.

H8.11 Facilities for workers

The Contractor shall provide ablution facilities and eating areas all as specified in the Environmental Management Specification in Part C3.5 of the Scope of Work.

H9 GENERAL HAZARDS AND RISKS APPLICABLE TO WORK REQUIRED IN TERMS OF THIS TENDER

H9.1 Existing Site conditions

H9.2 Information provided by the designer (CR 6(1))

H9.3 Environmental hazards

H9.4 Traffic hazards

H9.5 Construction materials (hazardous substances)

H9.6 Fall protection (working at heights) (CR 10)

H9.7 Structures (CR 11)

H9.8 Temporary works (CR 12)

- H9.9 Excavation work (CR 13)**
- H9.10 Demolition work (CR 14)**
- H9.11 Tunneling (CR 15)**
- H9.12 Scaffolding (CR 16)**
- H9.13 Suspended platforms (CR 17)**
- H9.14 Rope access work (CR 18)**
- H9.15 Material hoists (CR 19)**
- H9.16 Bulk mixing plant (CR 20)**
- H9.17 Explosive actuated fastening device (CR 21)**
- H9.18 Cranes (CR 22)**
- H9.19 Construction vehicles and mobile plant (equipment) (CR 23)**
- H9.20 Electrical installations and machinery (CR 24)**
- H9.21 Flammable liquids (CR 25)**
- H9.22 Water environments (CR 26)**
- H9.23 Overhead Work (CR 27(g))**
- H9.24 Confined spaces**
- H9.25 Other hazards...**

(14.1) MONTHLY PROJECT LABOUR REPORT (EXAMPLE)

ANNEX 1

CITY OF CAPE TOWN MONTHLY PROJECT LABOUR REPORT



Instructions for completing and submitting forms

General

- 1 The Monthly Project Labour Reports must be completed in full, using typed, proper case characters; alternatively, should a computer not be available, handwritten in black ink.
- 2 Incomplete / incorrect / illegible forms will not be accepted.
- 3 Any conditions relating to targeted labour stipulated in the Contract (in the case of contracted out services or works) shall apply to the completion and submission of these forms.
- 4 This document is available in Microsoft Excel format upon request from the City's EPWP office, tel 021 400 9406, email EPWPLR@capetown.gov.za.

Project Details

- 5 If a field is not applicable insert the letters: NA
- 6 Only the Project Number supplied by the Corporate EPWP Office must be inserted. The Project Number can be obtained from the Coordinator or Project Manager or from the e-mail address in point 4 above.
- 7 On completion of the contract or works project the anticipated end date must be updated to reflect the actual end date.

Beneficiary Details and Work Information

- 8 Care must be taken to ensure that beneficiary details correspond accurately with the beneficiary's ID document.

- 9 A new beneficiary is one in respect of which a new employment contract is signed in the current month. A certified ID copy must accompany this labour report on submission.
- 10 Was the beneficiary sourced from the City's job seeker database?
- 11 The contract end date as stated in the beneficiary's employment contract.
- 12 Where a beneficiary has not worked in a particular month, the beneficiary's name shall not be reflected on this form at all for the month in question.
- 13 Training will be recorded separately from normal working days and together shall not exceed the maximum of 23 days per month
- 14 Workers earning more than the maximum daily rate (currently R450 excluding any benefits) shall not be reflected on this form at all.

Submission of Forms

- 15 Signed hardcopy forms must be scanned and submitted to the City's project manager in electronic (.pdf) format, together with the completed form in Microsoft Excel format.
- 16 Scanned copies of all applicable supporting documentation must be submitted along with each monthly project labour report. Copies of employment contracts and ID documents are only required in respect of new beneficiaries.
- 17 If a computer is not available hardcopy forms and supporting documentation will be accepted.

PROJECT DETAILS

Numbers in cells below e.g (6) refer to the relevant instruction above for completing and submitting forms

CONTRACT OR WORKS PROJECT NAME: (6)		EPWP SUPPLIED PROJECT NUMBER: (6)														
DIRECTORATE:		DEPARTMENT:														
CONTRACTOR OR VENDOR NAME:		CONTRACTOR OR VENDOR E-MAIL ADDRESS:														
CONTRACTOR OR VENDOR CONTACT PERSON:		CONTRACTOR OR VENDOR TEL. NUMBER:	CELL WORK													
PROJECT LABOUR REPORT CURRENT MONTH (mark with "X")																
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR				

ACTUAL START DATE (yyyy/mm/dd)	ANTICIPATED / ACTUAL END DATE (yyyy/mm/dd) (7)
TOTAL PROJECT EXPENDITURE / VALUE OF WORK DONE TO-DATE (INCLUDING ALL COSTS, BUT EXCLUDING VAT)	
R	

MONTHLY PROJECT LABOUR REPORT



BENEFICIARY DETAILS AND WORK INFORMATION

CONTRACT OR WORKS PROJECT NUMBER:

Year	Month

Sheet		
1	of	

No.	(8) First name	(8) Surname	(8) ID number	(9) New Beneficiary (Y/N)	Gender (M/F)	Disabled (Y/N)	(10) Job seeker database (Y/N)	Contract start date (DDMMYY)	(11) Contract end date (DDMMYY)	(12) No. days worked this month (excl. training)	(13) Training days	(14) Rate of pay per day (R - c)
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

0 0 R -

Declared by Contractor or Vendor to be true and correct:	Name	Signature
	Date	

Received by Employer's Agent / Representative:	Name	Signature
	Date	

(14.2) BBBEE SUB-CONTRACT EXPENDITURE REPORT (PRO FORMA)

TENDER NO. AND DESCRIPTION:

SUPPLIER:

B-BBEE SUB-CONTRACT EXPENDITURE REPORT

Rand Value of the contract (as defined in Schedule 4: Preference Schedule) (P*)	R	B-BBEE Status Level of Prime Supplier	
---	---	---------------------------------------	--

Name of Sub-contractor (list all)	B-BBEE Status Level of supplier ¹	Total value of Sub-contract (excl. VAT) ¹	Value of Sub-contract work to date (excl. VAT) ¹	Value of Sub-contract work to Sub-contractors with a lower B-BBEE Status Level than supplier
Sub-contractor A		R	R	R
Sub-contractor B		R	R	R
Sub-contractor C		R	R	R
¹ Documentary evidence to be provided			Total:	R
			Expressed as a percentage of P*	%

Signatures

Declared by supplier to be true and correct:

.....

Date:

.....

Verified by CCT Project Manager:

.....

Date:

.....

(14.3) PARTNERSHIP/ JOINT VENTURE (JV) / CONSORTIUM/ EXPENDITURE REPORT (PRO FORMA)

TENDER NO. AND
DESCRIPTION:

SUPPLIER:

PARTNERSHIP/ JOINT VENTURE (JV)/ CONSORTIUM EXPENDITURE REPORT

Rand value of the contract (as defined in Schedule 4: Preference Schedule) (P*)	R	B-BBEE Status Level of Partnership/ Joint Venture (JV)/ Consortium	
---	---	--	--

Name of partners to the Partnership/ JV / Consortium (list all)	B-BBEE Status Level of each partner at contract award	Percentage contribution of each partner as per the Partnership/ JV/ Consortium Agreement ¹	Total value of partner's contribution (excl. VAT) ¹ B = A% x P*	Value of partner's contribution to date (excl. VAT) ¹ C	Value of partner's contribution as a percentage of the work executed to date D = C/P*x100
		A			
Partner A		%	R	R	%
Partner B		%	R	R	%
Partner C		%	R	R	%

¹Documentary evidence to be provided

Signatures

Declared by
supplier to
be true and
correct:

Date:

Verified by
CCT Project
Manager:

Date: