SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI)

Contract No: G545/2025

REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2

PROCUREMENT DOCUMENT

APRIL 2025

Issued by:

South African National Biodiversity Institute
Private Bag X101
Silverton
0184
Gauteng

Contact:

Supply Chain Management
E-mail: sanbi.tenders@sanbi.org.za

Prepared by:

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Name of tenderer: .....

Address: .....

Tel no.: ..... **Fax no.:** .....

Email: .....

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PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI: G545/2025**

Advertising date:	**4 April 2025**	**Closing date:**	**30 April 2025**
Closing time:	**11:00**	**Validity period:**	**90 Days**

T1.1 Tender Notice and Invitation to Tender

THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE INVITES TENDERERS FOR THE PROVISION OF:
Request for bids for the appointment of a contractor for the repairs and upgrades of the existing nurseries and associated glasshouse infrastructure for the South African National Biodiversity Institute (SANBI) at the Kirstenbosch National Botanical Garden, Cape Town: Phase 2

It is estimated that tenderers should have a CIDB contractor grading of **6GB** or higher.

Tender documents will be available as from **4 April 2025** and will be available **ONLINE ONLY** on:

- SANBI website www.sanbi.org (click on “Opportunities”)
- CIDB Website
- National e-Tender Publication Portal

A compulsory briefing session will take place on site on **15 April 2025 at 11:00** at the Kirstenbosch National Botanical Garden in the **Old Mutual Conference Centre** (OMCC). Bidders are encouraged to direct all technical and bidding procedure enquiries to the email address below.

Bidders are encouraged to direct all technical and bidding procedure enquiries to the email address below.

Department:	Supply Chain Management
Email:	sanbi.tenders@sanbi.org.za
Cc:	rameez@virtualconsulting.co.za and A.Hendricks@sanbi.org.za
Cut-off date for enquiries:	**23 April 2025 at 12:00**

Any queries regarding the tender document or any related matter prior to submission of tenders must be directed to:

SANBI Representative (Technical Queries Only)	Mr Rameez Ishmail Virtual Consulting Engineers VCE (Pty) Ltd rameez@virtualconsulting.co.za

SANBI SCM Representative	sanbi.tenders@sanbi.org.za

The closing time and date for the receipt of tenders is **11:00** on **30 April 2025.**

The tenders will **NOT** be opened in public (please note that the two-envelope system is being followed). Requirements for sealing, addressing, delivery, opening and assessment of tenders are stated in the Tender Data.

PART T: THE TENDER
Part T1: Tendering Procedures

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI: G545/2025**

T1.2 Tender Data

The conditions of tender are the Standard Conditions of Tender as contained in Annex C of the CIDB Standard for Uniformity in Engineering and Construction Works Contracts – August 2019. (See www.cidb.org.za).

The Standard Conditions of Tender make several references to the Tender Data for details that apply specifically to this tender. The Tender Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and the Standard Conditions of Tender.

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

Clause number	Tender Data
C.1.1.1	The Employer is: South African National Biodiversity Institute (SANBI): The Employer's domicilium citandi et executandi (permanent physical business address) is: Pretoria National Botanical Garden 2 Cussonia Avenue, Biodiversity Centre Brummeria, Pretoria The Employer's address for communication relating to this project is: Private Bag X101 Silverton 0184
C.1.2	The Tender Documents issued by the Employer comprise the following documents: **PART T: THE TENDER** **Part T1: Tendering procedures** T1.1 - Tender notice and invitation to tender T1.2 - Tender data **Part T2: Returnable documents** T2.1 - List of returnable documents T2.2 - Returnable documents/schedules **PART C: THE CONTRACT** **Part C1: Agreements and Contract data** C1.1 - Form of offer and acceptance C1.2 - Contract data C1.3 - Construction guarantee C1.4 - Occupational Health & Safety Agreement 37(2)

Clause number	Tender Data
	Part C2: Pricing Data C2.1 - Pricing Instructions C2.2 - Bill of Quantities **Part C3: Scope of Works** C3.1 - Description of the works C3.2 - Construction **Part C4: Site Information** C4.1 - Site location **Appendices** Appendix A – Technical and Health & Safety Specifications Appendix B – Drawings
C.1.4	The employer's agent is: Virtual Consulting Engineers VCE (PTY) LTD **Contact Person: Rameez Ishmail** **Tel:** 021 685 0789 / 082 084 5835 **Fax:** 086 655 2690 **E-mail: rameez@virtualconsulting.co.za**
C.2.1	Only those tenderers who satisfy the following eligibility criteria are eligible to submit tenders Only those tenderers who score the minimum score in respect of the quality criteria stated in C.3.11.1 of this Tender Data shall be considered responsive and have their tenders evaluated further. (a) CIDB registration Only those tenderers who are registered with the CIDB, or are capable of being so prior to the evaluation of submissions, in a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25 (1B) or 25(7A) of the Construction Industry Development Regulations, for a **6GB** class of construction work, are eligible to have their tenders evaluated. Joint ventures are eligible to submit tenders provided that: 1. every member of the joint venture is registered with the CIDB; 2. the lead partner has a contractor grading designation in the **6GB** class of construction work; and 3. the combined contractor grading designation calculated in accordance with the Construction Industry Development Regulations is equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a **6GB** class of construction work or a value determined in accordance with Regulation 25 (1B) or 25(7A) of the Construction Industry Development Regulations. (b) National Treasury Central Supplier Database Tenderers who are not registered on the National Treasury Central Supplier Database at close of tender, shall submit a copy of their application of registration, with their tender submission. Tenders received from such tenderers who have not submitted proof of their registration within 21 days after the closing date for tender submissions, will not be considered.

Clause number	Tender Data
C.2.6	Failure to apply instructions contained in addenda may render a tenderer's offer non-responsive in terms of clause C.3.8.
C.2.7	The arrangements for a compulsory clarification meeting are as stated in the Tender Notice and Invitation to Tender. Tenderers must sign the attendance list in the name of the tendering entity. Addenda will be issued to and tenders will be received only from those tendering entities appearing on the attendance list
C.2.8	Request clarifications at least 7 working days before the closing time.
C.2.12	Main tender offers are required to be submitted together with alternative tenders. If a tenderer wishes to submit an alternative tender offer, the only criteria permitted for such alternative tender offer is that it demonstrably satisfies the Employer's standards and requirements, the details of which may be obtained from the Employer's Agent. Calculations, drawings and all other pertinent technical information and characteristics as well as modified or proposed Pricing Data must be submitted with the alternative tender offer to enable the Employer to evaluate the efficacy of the alternative and its principal elements, to take a view on the degree to which the alternative complies with the Employer's standards and requirements and to evaluate the acceptability of the pricing proposals. Calculations must be set out in a clear and logical sequence and must clearly reflect all design assumptions. Pricing Data must reflect all assumptions in the development of the pricing proposal. Acceptance of an alternative tender offer will mean acceptance in principle of the offer. It will be an obligation of the contract for the tenderer, in the event that the alternative is accepted, to accept full responsibility and liability that the alternative offer complies in all respects with the Employer's standards and requirements. The modified Pricing Data must include an amount equal to 5% of the amount tendered for the alternative offer to cover the Employer's costs in confirming the acceptability of the detailed design.
C.2.13.6	A two-envelope procedure will be followed as described in clause C.2.13.7.
C.2.13.7	Tenderers shall note the specific requirements for packaging of their tender documents and include only the following: Two (2) original documents marked original: Document A "FINANCIAL ENVELOPE and Original document B "TECHNICAL ENVELOPE". • Original Document A "FINANCIAL ENVELOPE" pack of original documents with Pricing included e.g. Form of Offer and Acceptance, bill of quantities, costing models and cash flows. • "Original document B "TECHNICAL ENVELOPE" pack of original documents **excluding** pricing e.g. Form of Offer and Acceptance, bill of quantities, costing models and cash flows and a Memory Stick with a Copy of "Original Document B" TECHNICAL ENVELOPE excluding pricing e.g. Form of Offer and Acceptance, bill of quantities, costing models and cash flows. Financial or pricing details should **ONLY** be included in the envelope marked "A FINANCIAL ENVELOPE".

Clause number	Tender Data
	NB: Failure to submit in the prescribed manner WILL lead to the bid being disqualified. The Service Provider is to ensure that the provided USB includes the proposal, is readable and is not corrupt. Failure to comply will lead to the bid being considered non-responsive. Please put the memory stick in the "Original Document B" TECHNICAL ENVELOPE (original document and memory stick in one envelope). **INCLUSION OF ANY PRICING INFORMATION ANYWHERE ON THE MEMORY STICK WILL LEAD TO THE BID BEING DISQUALIFIED.** The original document and the memory stick will be placed in one envelope and on the envelope sealed bearing the following: • The address as stated in C.2.15.1 below • The identification details as stated in C.2.15.1 below • Name of the Tenderer
C.2.13.9	Telephonic, telegraphic, telex, facsimile or e-mailed tender offers will not be accepted.
C.2.15.1	The Employer's address for delivery of tender offers and identification details to be shown on each tender offer package are: **Location of Tender box:** Biodiversity Centre **Physical address:** Pretoria National Botanical Garden 2 Cussonia Avenue Brummeria Pretoria **Identification details:** Tender number: **SANBI: G545/2025** **Title of Tender:** Request for bids for the appointment of a Contractor for the repairs of the existing nurseries and associated glasshouse infrastructure for the South African National Biodiversity Institute at the Kirstenbosch National Botanical Garden, Cape Town: Phase 2
C.2.15.2	The closing time for submission of tender offers is as stated in the Tender Notice and Invitation to Tender.
C.2.16.1	The tender offer validity period is **90 days**.
C.2.16.3	Where a tenderer, at any time after the opening of his tender offer but prior to entering into a contract based on his tender offer: (1) withdraws his tender; (2) gives notice of his inability to execute the contract in terms of his tender; or (3) fails to comply with a request made in terms of C.2.17, C.2.18 or C.3.9 such tenderer shall be barred from tendering on any of the Employer's future tenders for a period to be determined by the Employer, but not less than six (6) months, from the date of tender closure. The Employer may fully or partly exempt a tenderer from the provisions of this condition if he is of the opinion that the circumstances justify the exemption
C.2.18	The tenderer shall, when requested by the Employer to do so, submit the names of all management and supervisory staff that will be employed to supervise the Labour-Intensive portion of the works together with satisfactory evidence that such staff members satisfy the eligibility requirements.

Clause number	Tender Data
C.2.22	Tender Documents will **not be returned** to bidders
C.2.23	The tenderer is required to submit with his tender following **(failure to provide below documentation will result in the tender being rejected)**: 1) A copy of the Central Suppliers Database (CSD) registration report. 2) A printed copy of the Active Contractor's Listing off the CIDB website (www.cidb.org.za) 3) Letter of Good Standing from the office of the Compensation Commissioner as required by the Compensation for Occupational Injuries and Diseases Act (COIDA). The letter should be issued by the Department of Labour. 4) In the case of a Joint Venture/Consortium the tax Compliance status Pin or Compliant tax status on CSD report must be submitted for each member of the Joint Venture/Consortium." 5) The signed compulsory site briefing certificate. 6) Plant Documentation: Equipment owned by Contractor: registration documents must be provided. or Equipment to be rented (if any): letter of intent to hire with preferred rental companies (registration documents must be attached) 7) A professional Construction Health & Safey Officer with more than 5 years' experience with a Valid Professional Registration with **SACPCMP**. CV for proposed professional CHS Officer indicating: • Previous work experience of similar projects in the last five years • Total number of years' working experience in construction • Certified copies of Qualifications or artisan's certification or other recognised training courses completed
C.3.1.1	The Employer shall respond to clarifications received up to 7 working days before the tender closing time.
C.3.2	The Employer shall issue addenda until 5 working days before the tender closing time.
C.3.4.1	The tenders will not be opened in public
C.3.5.1	Follow procedure as described in clause C.2.13.7
C.3.7	In the event of disqualification, the Employer may, at his sole discretion, impose a specified period during which tender offers will not be accepted from the offending tenderer and report same to the CIDB and National Treasury.
C.3.11.1	The procedure for the evaluation of responsive tenders is stated in **Annexure A**.

Clause number	Tender Data
C.3.13	In addition to the requirements of the Condition of Tender, offers will only be accepted if: a) the tenderer submits a copy of the CSD registration report or registration number (refer to T2.1.12); b) the tenderer is registered with the Construction Industry Development Board in an appropriate contractor grading designation (refer to T2.1.11); c) the tenderer or any of its directors/shareholders is not listed on the Register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the public sector; d) the tenderer has completed the Compulsory Enterprise Questionnaire and there are no conflicts of interest which may impact on the tenderer's ability to perform the contract in the best interests of the employer or potentially compromise the tender process and persons in the employ of the state are permitted to submit tenders or participate in the contract (refer to T2.1.14); e) the tenderer is registered and in good standing with the compensation fund issued by the Department of Labour (Letter of good standing with COIDA); f) the employer is reasonably satisfied that the tenderer has in terms of the Construction Regulations, 2014, issued in terms of the Occupational Health and Safety Act, 1993, the necessary competencies and resources to carry out the work safely. g) A copy of Tax Compliance Status Pin or Tax compliant CSD report. h) Plant Documentation: Equipment owned by Contractor: registration documents must be provided. or Equipment to be rented (if any): letter of intent to hire with preferred rental companies (registration documents must be attached) i) A professional Construction Health & Safey Officer with more than 5 years' experience with a Valid Professional Registration with **SACPCMP**. CV for proposed professional CHS Officer indicating: • Previous work experience of similar projects in the last five years • Total number of years' working experience in construction • Certified copies of Qualifications or artisan's certification or other recognised training courses completed

Annexure A

This annexure contains all the criteria that the Employer shall use to evaluate tenders. In accordance with clause C.3.11 of the Standard conditions of tender. No other factors, methods or criteria shall be used. The tenderer shall provide all the information requested in the forms included in Part T2.2 – Returnable schedules.

Tenders shall be evaluated in three stages as follows:

- Stage 1 – Evaluation of Eligibility and Administrative compliance
- Stage 2 – Evaluation of Functionality
- Stage 3 – Evaluation of Tender Price and Preference

1 Stage 1: Eligibility and Administrative compliance

The first stage will determine whether bids are compliant with all mandatory and disqualifiable submission requirements. Bidders that are deemed compliant will be eligible for further evaluation.

The criteria as identified in Clauses C.2.23 and C.3.13 in the Tender Data will be used to determine the tender's eligibility.

For administrative compliance the tenderers must complete all the returnable forms in Part T2.2, the Bill of Quantities, and the Offer section in Part C1.1.

2 Stage 2: Functionality

The tenderers who complied with the eligibility and administrative criteria in stage 1 are considered for further evaluation on their capability to execute the project.

In this stage tenders will be evaluated on functionality according to the criteria listed below. Tenderers who fail to score a minimum of 70 points out of a possible 100 points on functionality criteria will not be eligible for further consideration.

Scoring quality

The functionality (quality) evaluation criteria are listed below. Maximum points for each criterion are in bold while points for each sub-criterion are indicated in brackets.

FUNCTIONALITY CRITERIA		
ID	**CRITERIA**	**POINTS**
1	**Implementation method and project plan or programme** **(a) Project methodology** • Method to be followed in delivering this project, the methodology and approach must be specific to the project and location of works. (this should include the PMBOK knowledge areas as well as all relevant project life cycle stages) • A team Organogram of the people who will be working on the project. • Time and quality management of the project • A list of subcontractors (if any) to be utilized for various disciplines and how the work will be dispatched to subcontractors considering the reasonable response times.	**25** (15)

Sub-Criteria	Points
No Methodology	0
Poor Methodology	3
Average Methodology	6
Above Average Methodology	9
Good Methodology	12
Comprehensive (Exceptional) Methodology	15

(b) Weekly plan/programme with milestones

- The programme should indicate the sequence of work execution.
- Milestones and resources linked to the activity.
- It should be practical, realistic and include all activities linked to the project.

(10)

Sub-Criteria	Points
No Programme	0
Poor Programme	2
Average Programme	4
Above Average Programme	6
Good Programme	8
Comprehensive (Exceptional) Programme	10

Note: Bidders must take cognisance of the weather measurements recorded for the last 10 years – Refer site information Section C4.1.2

2

Contractor's Experience

40

- Three relevant reference letters regarding work of similar scope and scale completed in the last ten (10) years

Sub-Criteria	Points
One relevant reference letter	5
Two relevant reference letters	10
Three relevant reference letters or more	15

(15)

- List of at least five other similar projects with appointment letters, completion certificates and telephonic references indicating work of similar value completed in the last ten (10) years.

Sub-Criteria	Points
One relevant Project	5
Two relevant Projects	10
Three relevant Projects	15
Four relevant Projects	20
Five relevant Projects	25

(25)

<table>
<tr><td></td><td>Notes:
Supporting documents required to support the claims above, (Corresponding orders/appointment letters, completion certificates and reference letters for projects must be submitted as proof). Bidders must submit all the requested documents as proof in order to be awarded the points.
• Both appointment letters and reference letters must be on the employer’s letterhead, dated and signed by the employer.
• Failure to complete and sign schedule of the tenderer`s experience will result in the bidder forfeiting these points.</td><td></td></tr>
<tr><td>3</td><td>Contractor's Resources – Personnel and Plant
Proposed personnel:
• CVs for proposed key personnel (At least 2 – Contracts Manager & Site Agent) indicating:
o Previous work experience
o Total number of years’ working experience in construction
o Individual experience on relevant similar work in last five years
o Certified copies of Qualifications or artisan’s certification or other recognised training courses completed
o Valid Professional Registration for Contracts Manager & Site Engineer (ECSA or SACPCMP)
Contracts Manager
<table>
<tr><th>Sub-Criteria</th><th>Points</th></tr>
<tr><td>CV experience of less than 5 years</td><td>0</td></tr>
<tr><td>CV experience of more than 5 years</td><td>5</td></tr>
<tr><td>CV experience of more than 10 years</td><td>10</td></tr>
<tr><td>CV experience of more than 15 years</td><td>15</td></tr>
<tr><td>CV experience of more than 20 years</td><td>20</td></tr>
</table>
Site Agent
<table>
<tr><th>Sub-Criteria</th><th>Points</th></tr>
<tr><td>CV experience of less than 5 years</td><td>0</td></tr>
<tr><td>CV experience of more than 5 years</td><td>5</td></tr>
<tr><td>CV experience of more than 10 years</td><td>10</td></tr>
<tr><td>CV experience of more than 15 years</td><td>15</td></tr>
</table></td><td>35
(20)
(15)</td></tr>
<tr><td colspan="2">TOTAL</td><td>100</td></tr>
</table>

Functionality shall be scored by not less than three evaluators in accordance with the following schedules:

Each evaluation criterion will be assessed in terms of five indicators – no response, poor, satisfactory, acceptable, good and very good. Scores ranging from of 0 to 5 will be allocated to no response, very poor, poor, acceptable, good and very good responses, respectively. The scores submitted by each of the evaluators will be averaged, weighted and then totalled to obtain the final score for functionality. The prompts for judgment and the associated scores used in the evaluation of quality shall be as follows:

Score	Prompt for judgement
0	Failed to address the question / issue
1	Very poor response: - response / answer / solution lacks convincing evidence of skill / experience sought or medium risk that relevant skills will not be available.
2	Poor response – some elements of the response / answer / solution are present but documentary evidence is mostly lacking in respect of the required information
3	Acceptable response / answer / solution to the particular aspect of the requirements and evidence given of skill / experience sought
4	Above acceptable - response / answer / solution demonstrating real understanding of requirements and evidence of ability to meet it.
5	Excellent - response / answer / solution provides confidence that the tenderer will add real value to the project.

The minimum number of evaluation points for functionality proposal is **70 points** in order to progress to stage 3 of the evaluation

3 Stage 3: Tender Price and Preference

The tenderers who complied with the functionality criteria in stage 2 are considered for further evaluation in terms of their Tender Price and Preference points.

3.1 Correction of arithmetical errors

Pursuant to clause C.3.9 of the standard conditions of tender as amended in the Tender Data, correction of arithmetical errors shall be undertaken.

3.2 Calculation of score for Tender Price

The score for Tender Price shall be calculated using the following formula:

$$N_F = W_f \times \left[1 - \left(\frac{P_t - P_{min}}{P_{min}}\right)\right]$$

Where:

N_F = the score for Tender Price awarded for the tender under consideration

W_f = the weighting given to financial offer, determined as follows:

- 90 where the Tender Price, inclusive of VAT, of all responsive tender offers received has a value in excess of R50 000 000,00; or

- 80 where the Tender Price, inclusive of VAT, of one or more responsive tender offers has a value that equals or is less than R50 000 000,00.

P_t = Tender Price of the tender under consideration

P_{min} = Tender Price of the lowest responsive tender

In the event that the calculated value of N_F is negative, the allocated score shall be 0

3.3 Financial and Preference

After calculation of the scores for Tender Price and for Preference, a combined score will be calculated as follows:

NT = NF + NP

Where:

NT = Total score for tender under consideration

NF = Score for Tender Price

NP = Score for Preference

The tender with the highest score should be recommended for appointment.

Annexure C

Standard Conditions of Tender

C.1 General

C.1.1 Actions

C.1.1.1 The employer 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 C.2 and C.3, timeously and with integrity, and behave equitably, honestly and transparently, comply with all legal obligations and not engage in anticompetitive practices.

C.1.1.2 The employer and the tenderer and all 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 employer shall declare any conflict of interest to whoever is responsible for overseeing the procurement process 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.

Note:

1) A conflict of interest may arise due to a conflict of roles which might provide an incentive for improper acts in some circumstances. A conflict of interest can create an appearance of impropriety that can undermine confidence in the ability of that person to act properly in his or her position even if no improper acts result.

2) Conflicts of interest in respect of those engaged in the procurement process include direct, indirect or family interests in the tender or outcome of the procurement process and any personal bias, inclination, obligation, allegiance or loyalty which would in any way affect any decisions taken.

C.1.1.3 The employer shall not seek and a tenderer shall not submit a tender without having a firm intention and the capacity to proceed with the contract.

C.1.2 Tender Documents

The documents issued by the employer for the purpose of a tender offer are listed in the tender data.

C.1.3 Interpretation

C.1.3.1 The tender data and additional requirements contained in the tender schedules that are included in the returnable documents are deemed to be part of these conditions of tender.

C.1.3.2 These conditions of tender, the tender data and tender schedules which are required for tender evaluation purposes, shall form part of any contract arising from the invitation to tender.

C.1.3.3 For the purposes of these conditions of tender, the following definitions apply:

a) **conflict of interest** means any situation in which:

i) someone in a position of trust has competing professional or personal interests which make it difficult to fulfill his or her duties impartially;

ii) an individual or tenderer is in a position to exploit a professional or official capacity in some way for their personal or corporate benefit; or

iii) incompatibility or contradictory interests exist between an employee and the tenderer who employs that employee.

b) **comparative offer** means the price after the factors of a non-firm price and all unconditional discounts it can be utilised to have been taken into consideration;

c) **corrupt practice** means the offering, giving, receiving or soliciting of anything of value to influence the action of the employer or his staff or agents in the tender process;

d) **fraudulent practice** means the misrepresentation of the facts in order to influence the tender process or the award of a contract arising from a tender offer to the detriment of the employer, including collusive practices intended to establish prices at artificial levels;

C.1.4 Communication and employer's agent

Each communication between the employer and a tenderer shall be to or from the employer's agent only, and in a form that can be readily read, copied and recorded. Communications shall be in the English language. The employer shall not take any responsibility for non-receipt of communications from or by a tenderer. The name and contact details of the employer's agent are stated in the tender data.

C.1.5 Cancellation and Re-Invitation of Tenders

C.1.5.1 An employer 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 engineering and construction works specified in the invitation;

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.

C.1.5.2 The decision to cancel a tender invitation must be published in the same manner in which the original tender invitation was advertised

C.1.5.3 An employer may only with the prior approval of the relevant treasury cancel a tender invitation for the second time.

C.1.6 Procurement procedures

C.1.6.1 General

Unless otherwise stated in the tender data, a contract will, subject to C.3.13, be concluded with the tenderer who in terms of C.3.11 is the highest ranked or the tenderer scoring the highest number of tender evaluation points, as relevant, based on the tender submissions that are received at the closing time for tenders.

C.1.6.2 Competitive negotiation procedure

C.1.6.2.1 Where the tender data require that the competitive negotiation procedure is to be followed, tenderers shall submit tender offers in response to the proposed contract in the first round of submissions. Notwithstanding the requirements of C.3.4, the employer shall announce only the names of the tenderers who make a submission. The requirements of C.3.8 relating to the material deviations or qualifications which affect the competitive position of tenderers shall not apply.

C.1.6.2.2 All responsive tenderers or at least a minimum of not less than three responsive tenderers that are highest ranked in terms of the evaluation criteria stated in the tender data shall be invited to enter into competitive negotiations based on the principle of equal treatment, keeping confidential the proposed solutions and associated information.

Notwithstanding the provisions of C.2.17, the employer may request that tenders be clarified, specified and fine-tuned in order to improve a tenderer's competitive position provided that such clarification, specification, fine-tuning or additional information does not alter any fundamental aspects of the offers or impose substantial new requirements which restrict or distort competition or have a discriminatory effect.

C.1.6.2.3 At the conclusion of each round of negotiations, tenderers shall be invited by the employer to revise their tender offer based on the same evaluation criteria, with or without adjusted weightings. Tenderers shall be advised when they are to submit their best and final offer.

C.1.6.2.4 The contract shall be awarded in accordance with the provisions of C.3.11 and C.3.13 after tenderers have been requested to submit their best and final offer.

C.1.6.3 Proposal procedure using the two stage-system

C.1.6.3.1 Option 1

Tenderers shall in the first stage submit technical proposals and, if required, cost parameters around which a contract may be negotiated. The employer shall evaluate each responsive submission in terms of the method of evaluation stated in the tender data, and in the second stage negotiate a contract with the tenderer scoring the highest number of evaluation points and award the contract in terms of these conditions of tender.

C.1.6.3.2 Option 2

C.1.6.3.2.1 Tenderers shall submit in the first stage only technical proposals. The employer shall invite all responsive tenderers to submit tender offers in the second stage, following the issuing of procurement documents.

C.1.6.3.2.2 The employer shall evaluate tenders received during the second stage in terms of the method of evaluation stated in the tender data, and award the contract in terms of these conditions of tender.

C.2 Tenderer's obligations

C.2.1 Eligibility

C.2.1.1 Submit a tender offer only if the tenderer satisfies the criteria stated in the tender data and the tenderer, or any of his principals, is not under any restriction to do business with employer.

C.2.1.2 Notify the employer of any proposed material change in the capabilities or formation of the tendering entity (or both) or any other criteria which formed part of the qualifying requirements used by the employer as the basis in a prior process to invite the tenderer to submit a tender offer and obtain the employer's written approval to do so prior to the closing time for tenders.

C.2.2 Cost of tendering

C.2.2.1 Accept that, unless otherwise stated in the tender data, the employer will not compensate the tenderer 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.

C.2.2.2 The cost of the tender documents charged by the employer shall be limited to the actual cost incurred by the employer for printing the documents. Employers must attempt to make available the tender documents on its website so as not to incur any costs pertaining to the printing of the tender documents.

C.2.3 Check documents

Check the tender documents on receipt for completeness and notify the employer of any discrepancy or omission.

C.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 employer only for the purpose of preparing and submitting a tender offer in response to the invitation.

C.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.

C.2.6 Acknowledge addenda

Acknowledge receipt of addenda to the tender documents, which the employer may issue, and if necessary apply for an extension to the closing time stated in the tender data, in order to take the addenda into account.

C.2.7 Clarification meeting

Attend, where required, a clarification meeting at which tenderers may familiarize themselves with aspects of the proposed work, services or supply and raise questions. Details of the meeting(s) are stated in the tender data.

C.2.8 Seek clarification

Request clarification of the tender documents, if necessary, by notifying the employer at least five (5) working days before the closing time stated in the tender data.

C.2.9 Insurance

Be aware that the extent of insurance to be provided by the employer (if any) might not be for the full cover required in terms of the conditions of contract identified in the contract data. The tenderer is advised to seek qualified advice regarding insurance.

C.2.10 Pricing the tender offer

C.2.10.1 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 fourteen (14) days before the closing time stated in the tender data.

C.2.10.2 Show VAT payable by the employer separately as an addition to the tendered total of the prices.

C.2.10.3 Provide rates and prices that are fixed for the duration of the contract and not subject to adjustment except as provided for in the conditions of contract identified in the contract data.

C.2.10.4 State the rates and prices in Rand unless instructed otherwise in the tender data. The conditions of contract identified in the contract data may provide for part payment in other currencies.

C.2.11 Alterations to documents

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

C.2.12 Alternative tender offers

C.2.12.1 Unless otherwise stated in the tender data, submit alternative tender offers only if a main tender offer, strictly in accordance with all the requirements of the tender documents, is also submitted as well as a schedule that compares the requirements of the tender documents with the alternative requirements that are proposed.

C.2.12.2 Accept that an alternative tender offer must be based only on the criteria stated in the tender data or criteria otherwise acceptable to the employer.

C.2.12.3 An alternative tender offer must only be considered if the main tender offer is the winning tender.

C.2.13 Submitting a tender offer

C.2.13.1 Submit one tender offer only, either as a single tendering entity or as a member in a joint venture to provide the whole of the works identified in the contract data and described in the scope of works, unless stated otherwise in the tender data.

C.2.13.2 Return all returnable documents to the employer after completing them in their entirety, either electronically (if they were issued in electronic format) or by writing legibly in non-erasable ink.

C.2.13.3 Submit the parts of the tender offer communicated on paper as an original plus the number of copies stated in the tender data, with an English translation of any documentation in a language other than English, and the parts communicated electronically in the same format as they were issued by the employer.

C.2.13.4 Sign the original and all copies of the tender offer where required in terms of the tender data. The employer will hold all authorized signatories liable on behalf of the tenderer. Signatories for tenderers proposing to contract as joint ventures shall state which of the signatories is the lead partner whom the employer shall hold liable for the purpose of the tender offer.

C.2.13.5 Seal the original and each copy of the tender offer as separate packages marking the packages as "ORIGINAL" and "COPY". Each package shall state on the outside the employer's address and identification details stated in the tender data, as well as the tenderer's name and contact address.

C.2.13.6 Where a two-envelope system is required in terms of the tender data, place and seal the returnable documents listed in the tender data 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 employer’s address and identification details stated in the tender data, as well as the tenderer's name and contact address.

C.2.13.7 Seal the original tender offer and copy packages together in an outer package that states on the outside only the employer's address and identification details as stated in the tender data.

C.2.13.8 Accept that the employer will 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.

C.2.13.9 Accept that tender offers submitted by facsimile or e-mail will be rejected by the employer, unless stated otherwise in the tender data.

C.2.14 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 employer as non-responsive.

C.2.15 Closing time

C.2.15.1 Ensure that the employer receives the tender offer at the address specified in the tender data not later than the closing time stated in the tender data. Accept that proof of posting shall not be accepted as proof of delivery.

C.2.15.2 Accept that, if the employer extends the closing time stated in the tender data for any reason, the requirements of these conditions of tender apply equally to the extended deadline.

C.2.16 Tender offer validity

C.2.16.1 Hold the tender offer(s) valid for acceptance by the employer at any time during the validity period stated in the tender data after the closing time stated in the tender data.

C.2.16.2 If requested by the employer, consider extending the validity period stated in the tender data for an agreed additional period with or without any conditions attached to such extension.

C.2.16.3 Accept that a tender submission that has been submitted to the employer may only be withdrawn or substituted by giving the employer’s agent written notice before the closing time for tenders that a tender is to be withdrawn or substituted. If the validity period stated in C.2.16 lapses before the employer evaluating tender, the contractor reserves the right to review the price based on Consumer Price Index (CPI).

C.2.16.4 Where a tender submission is to be substituted, a tenderer must submit a substitute tender in accordance with the requirements of C.2.13 with the packages clearly marked as “SUBSTITUTE”.

C.2.17 Clarification of tender offer after submission

Provide clarification of a tender offer in response to a request to do so from the employer during the evaluation of tender offers. This may include providing a breakdown of rates or prices and correction

of arithmetical errors by the adjustment of certain rates or item prices (or both). No change in the competitive position of tenderers or substance of the tender offer is sought, offered, or permitted.

Note: *Sub-clause C.2.17 does not preclude the negotiation of the final terms of the contract with a preferred tenderer following a competitive selection process, should the Employer elect to do so.*

C.2.18 Provide other material

C.2.18.1 Provide, on request by the employer, any other material that has a bearing on the tender offer, the tenderer's commercial position (including notarized joint venture agreements), preferencing arrangements, or samples of materials, considered necessary by the employer for the purpose of a full and fair risk assessment.

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 employer's request, the employer may regard the tender offer as non-responsive.

C.2.18.2 Dispose of samples of materials provided for evaluation by the employer, where required.

C.2.19 Inspections, tests and analysis

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

C.2.20 Submit securities, bonds and policies

If requested, submit for the employer's acceptance before formation of the contract, all securities, bonds, guarantees, policies and certificates of insurance required in terms of the conditions of contract identified in the contract data.

C.2.21 Check final draft

Check the final draft of the contract provided by the employer within the time available for the employer to issue the contract.

C.2.22 Return of other tender documents

If so instructed by the employer, return all retained tender documents within twenty-eight (28) days after the expiry of the validity period stated in the tender data.

C.2.23 Certificates

Include in the tender submission or provide the employer with any certificates as stated in the tender data.

C.3 The employer's undertakings

C.3.1 Respond to requests from the tenderer

C.3.1.1 Unless otherwise stated in the tender Data, respond to a request for clarification received up to five (5) working days before the tender closing time stated in the Tender Data and notify all tenderers who collected tender documents.

C.3.1.2 Consider any request to make a material change in the capabilities or formation of the tendering entity (or both) or any other criteria which formed part of the qualifying requirements used to prequalify a tenderer to submit a tender offer in terms of a previous procurement process and deny any such request if as a consequence:

a) an individual firm, or a joint venture as a whole, or any individual member of the joint venture fails to meet any of the collective or individual qualifying requirements;

b) the new partners to a joint venture were not prequalified in the first instance, either as individual firms or as another joint venture; or

c) in the opinion of the Employer, acceptance of the material change would compromise the outcome of the prequalification process.

C.3.2 Issue Addenda

If necessary, issue addenda that may amend or amplify the tender documents to each tenderer during the period from the date that tender documents are available until three (3) working days before the tender closing time stated in the Tender Data. If, as a result a tenderer applies for an extension to the closing time stated in the Tender Data, the Employer may grant such extension and, shall then notify all tenderers who collected tender documents.

C.3.3 Return late tender offers

Return tender offers received after the closing time stated in the Tender Data, unopened, (unless it is necessary to open a tender submission to obtain a forwarding address), to the tenderer concerned.

C.3.4 Opening of tender submissions

C.3.4.1 Unless the two-envelope system is to be followed, open valid tender submissions in the presence of tenderers' agents who choose to attend at the time and place stated in the tender data. Tender submissions for which acceptable reasons for withdrawal have been submitted will not be opened.

C.3.4.2 Announce at the meeting held immediately after the opening of tender submissions, at a venue indicated in the tender data, the name of each tenderer whose tender offer is opened and, where applicable, the total of his prices, number of points claimed for specific goals and time for completion for the main tender offer only.

C.3.4.3 Make available the record outlined in C.3.4.2 to all interested persons upon request.

C.3.5 Two-envelope system

C.3.5.1 Where stated in the tender data that a two-envelope system is to be followed, open only the technical proposal of valid tenders in the presence of tenderers' agents who choose to attend at the time and place stated in the tender data and announce the name of each tenderer whose technical proposal is opened.

C.3.5.2 Evaluate functionality of the technical proposals offered by tenderers, then advise tenderers who remain in contention for the award of the contract of the time and place when the financial proposals will be opened. Open only the financial proposals of tenderers, who score in the functionality evaluation more than the minimum number of points for functionality stated in the tender data, and announce the score obtained for the technical proposals and the total price and any points claimed on Specific Goals.

C.3.6 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, the final evaluation price and recommendations for the award of a contract, until after the award of the contract to the successful tenderer.

C.3.7 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.

C.3.8 Test for responsiveness

C.3.8.1 Determine, after opening and before detailed evaluation, 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.

C.3.8.2 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 Employer*'s* opinion, would:

a) detrimentally affect the scope, quality, or performance of the works, services or supply identified in the Scope of Work*,*

b) significantly change the Employer*'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 the non-conforming deviation or reservation.

C.3.9 Arithmetical errors, omissions and discrepancies

C.3.9.1 Check responsive tenders for discrepancies between amounts in words and amounts in figures. Where there is a discrepancy between the amounts in figures and the amount in words, the amount in words shall govern.

C.3.9.2 Check the highest ranked tender or tenderer with the highest number of tender evaluation points after the evaluation of tender offers in accordance with C.3.11 for:

a) the gross misplacement of the decimal point in any unit rate;

b) omissions made in completing the pricing schedule or bills of quantities; or

c) arithmetic errors in:

(i) line item totals resulting from the product of a unit rate and a quantity in bills of quantities or schedules of prices; or

(ii) the summation of the prices.

C.3.9.3 Notify the tenderer of all errors or omissions that are identified in the tender offer and either confirm the tender offer as tendered or accept the corrected total of prices.

C.3.9.4 Where the tenderer elects to confirm the tender offer as tendered, correct the errors as follows:

a) If bills of quantities or 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 quoted shall govern, and the unit rate shall be corrected.

b) 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 bills of quantities apply) to achieve the tendered total of the prices.

C.3.10 Clarification of a tender offer

Obtain clarification from a tenderer on any matter that could give rise to ambiguity in a contract arising from the tender offer.

C.3.11 Evaluation of tender offers

The Standard Conditions of Tender standardize the procurement processes, methods and procedures from the time that tenders are invited to the time that a contract is awarded. They are generic in nature and are made project specific through choices that are made in developing the Tender Data associated with a specific project.

Conditions of tender are by definition the document that establishes a tenderer’s obligations in submitting a tender and the employer’s undertakings in soliciting and evaluating tender offers. Such conditions establish the rules from the time a tender is advertised to the time that a contract is

awarded and require employers to conduct the process of offer and acceptance in terms of a set of standard procedures.

The CIDB Standard Conditions of Tender are based on a procurement system that satisfies the following system requirements:	
Requirement	**Qualitative interpretation of goal**
Fair	The process of offer and acceptance is conducted impartially without bias, providing simultaneous and timely access to participating parties to the same information.
Equitable	Terms and conditions for performing the work do not unfairly prejudice the interests of the parties.
Transparent	The only grounds for not awarding a contract to a tenderer who satisfies all requirements are restrictions from doing business with the employer, lack of capability or capacity, legal impediments and conflicts of interest.
Competitive	The system provides for appropriate levels of competition to ensure cost effective and best value outcomes.
Cost effective	Cost effective

The activities associated with evaluating tender offers are as follows:

a) Open and record tender offers received

b) Determine whether or not tender offers are complete

c) Determine whether or not tender offers are responsive

d) Evaluate tender offers

e) Determine if there are any grounds for disqualification

f) Determine acceptability of preferred tenderer

g) Prepare a tender evaluation report

h) Confirm the recommendation contained in the tender evaluation report

C.3.11.1 General

The employer must appoint an evaluation panel of not less than three persons conversant with the proposed scope of works to evaluate each responsive tender offer using the tender evaluation methods and associated evaluation criteria and weightings that are specified in the tender data.

C.3.12 Insurance provided by the employer

If requested by the proposed successful tenderer, submit for the tenderer*'s* information the policies and / or certificates of insurance which the conditions of contract identified in the contract data, require the employer to provide.

C.3.13 Acceptance of tender offer

Accept the tender offer; if in the opinion of the employer, it does not present any risk and only if the tenderer:

a) is not under restrictions, or has principals who are under restrictions, preventing participating 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 No. 2008, bankrupt or being wound up, has his/her affairs administered by a

court or a judicial officer, has suspended his/her business activities or is subject to legal proceedings in respect of any of the foregoing;

e) complies with the legal requirements, if any, stated in the tender data; and

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

C.3.14 Prepare contract documents

C.3.14.1 If necessary, revise documents that shall form part of the contract and that were issued by the employer as part of the tender documents to take account of:

a) addenda issued during the tender period,

b) inclusion of some of the returnable documents and

c) other revisions agreed between the employer and the successful tenderer.

C.3.14.2 Complete the schedule of deviations attached to the form of offer and acceptance, if any.

C.3.15 Complete adjudicator's contract

Unless alternative arrangements have been agreed or otherwise provided for in the contract, arrange for both parties to complete formalities for appointing the selected adjudicator at the same time as the main contract is signed.

C.3.16 Registration of the award

An employer must, within twenty-one (21) working days from the date on which a contractor's offer to perform a construction works contract is accepted in writing by the employer, register and publish the award on the CIDB Register of Projects.

C.3.17 Provide copies of the contracts

Provide to the successful tenderer the number of copies stated in the Tender Data of the signed copy of the contract as soon as possible after completion and signing of the form of offer and acceptance.

C.3.18 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.

PART T: THE TENDER
Part T2: Returnable Documents

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

T2.1 List of Returnable Documents

1. RETURNABLE SCHEDULES REQUIRED FOR TENDER EVALUATION PURPOSES

Tender document name	Number of pages issued	Returnable document
Resolution of Board of Directors (T2.1.01)	1 Page	■ Yes □ No
Resolution of Board of Directors to enter into consortia or JV's (T2.1.02) (If Applicable)	2 Pages	■ Yes □ No
Special Resolution of Consortia or JV's (T2.1.03) (If Applicable)	3 Pages	■ Yes □ No
Schedule of proposed sub-contractors (T2.1.04)	1 Page	■ Yes □ No
Capacity of Tenderer (T2.1.05)	3 Pages	■ Yes □ No
Preference points claim form in terms of the Preferential Procurement Regulations 2022 (T2.1.06)	6 Pages	■ Yes □ No
Resources to be employed in terms of organization and staffing (T2.1.07)	2 Pages	■ Yes □ No
Estimated Monthly Expenditure (T2.1.08)	1 Page	■ Yes □ No
Compensation of Occupational Injuries and Disease Act (COIDA) (T2.1.18)	1 Page	■ Yes □ No

2. OTHER DOCUMENTS REQUIRED FOR TENDER EVALUATION PURPOSES

Tender document name	Number of pages issued	Returnable document
Bidders Disclosure (T2.1.10)	2 Pages	■ Yes □ No
Medical Certificate for the confirmation of permanent disabled status (T2.1.11)	1 Page	■ Yes □ No
Proof of registration with Construction Industry Development Board (T2.1.12)	1 Page	■ Yes □ No
Copy of CSD Registration Certificate (T2.1.14)	1 Page	■ Yes □ No
Financial Reference (T2.1.15)	1 Page	■ Yes □ No

Equipment Datasheets (T2.1.20)	1 Page	■ Yes □ No
Proof of Liability Insurance (T2.1.22)	1 Page	■ Yes □ No

3. RETURNABLE SCHEDULES THAT WILL BE INCORPORATED INTO THE CONTRACT

Tender document name	Number of pages issued	Returnable document
Record of Addenda to Tender Documents (T2.1.16)	1 Page	■ Yes □ No
Compulsory Enterprise Questionnaire (T2.1.17)	3 Pages	■ Yes □ No

4. OTHER DOCUMENTS THAT WILL BE INCORPORATED INTO THE CONTRACT

Tender document name	Number of pages issued	Returnable document
Applicable Form of Guarantee	3 Pages	■ Yes □ No
Priced Bill of Quantities	57 Pages	■ Yes □ No

C1.1 Offer portion of Form of Offer and Acceptance
C1.2 Contract Data (Part 2)
C1.3 Form of Guarantee

RETURNABLE DOCUMENT CHECKLIST

This form has been created as an aid to ensure a tenderer's compliance with the completion of the returnable schedules and subsequent placement in the correct **Technical** and **Financial** envelopes.

A FINANCIAL ENVELOPE (ORIGINAL TENDER DOCUMENT INCLUDING ALL PRICING & RETURNABLES)

The entire original tender document must be submitted in this envelope including the forms as listed below:

Reference No	Document Description	Tick if completed
Form C1.1	Form of Offer and Acceptance	
Form C1.2	Contract Data – Part 1	
Form C2.2	Priced Bill of Quantities	
Form T2.1.08	Estimated Monthly Expenditure	

B TECHNICAL ENVELOPE (ORIGINAL DOCUMENT + MEMORY STICK AND EXCLUDING PRICING)

Reference No	Document Description	Tick if completed
T2.1.01	Resolution of Board of Directors	
T2.1.02	Resolution of Board of Directors to enter into consortia or JV's (If Applicable)	
T2.1.03	Special Resolution of Consortia or JV's (If Applicable)	
T2.1.04	Schedule of proposed sub-contractors	
T2.1.05	Capacity of Tenderer	
T2.1.06	Preference points claim form in terms of the Preferential Procurement Regulations 2022	
T2.1.07	Resources to be employed in terms of organization and staffing	
T2.1.09	Site Inspection Certificate	
T2.1.10	Bidders Disclosure	
T2.1.11	Medical Certificate for the confirmation of permanent disabled status	
T2.1.12	Proof of registration with Construction Industry Development Board (T2.1.12)	
T2.1.13	Original Valid Tax Clearance Certificate	
T2.1.14	CSD Registration Report	
T2.1.15	Financial Reference	
T2.1.16	Record of Addenda to Tender Documents	
T2.1.17	Compulsory Enterprise Questionnaire	
T2.1.18	Compensation of Occupational Injuries and Disease Act (COIDA)	
T2.1.22	Proof of Liability Insurance	

PART T: THE TENDER
Part T2: Returnable Documents

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

T2.2 Returnable documents/Schedules

T2.1.01: RESOLUTION OF BOARD OF DIRECTORS

RESOLUTION of a meeting of the Board of *Directors / Members / Partners of:

.....

.....
(*legally correct full name and registration number, if applicable, of the Enterprise)*

Held at ..... (place)

On ..... (date)

RESOLVED that:

1. The Enterprise submits a Bid / Tender to the South African National Biodiversity Institute in respect of the following project:

   .....

   .....
   (*project description as per Bid / Tender Document)*

   Bid / Tender Number: .....*(Bid / Tender Number as per Bid / Tender Document)*

2. *Mr/Mrs/Ms: .....

   in *his/her Capacity as: **.....** *(Position in the Enterprise)*

   and who will sign as follows: .....

   be, and is hereby, authorised to sign the Bid / Tender, and any and all other documents and/or correspondence in connection with and relating to the Bid / Tender, as well as to sign any Contract, and any and all documentation, resulting from the award of the Bid / Tender to the Enterprise mentioned above.

	Name	Capacity	Signature
1			
2			
3			
4			

Note:

1. ** Delete which is not applicable*
2. ***NB**. This resolution must be signed by all the Directors / Members / Partners of the Bidding Enterprise.*
3. *Should the number of Directors / Members/Partners exceed the space available above, additional names and signatures must be supplied on a separate page.*

ENTERPRISE STAMP

T2.1.02: RESOLUTION OF BOARD OF DIRECTORS TO ENTER INTO CONSORTIA OR JOINT VENTURES

RESOLUTION of a meeting of the Board of *Directors / Members / Partners of:

.....

.....
(*Legally correct full name and registration number, if applicable, of the Enterprise)*

Held at ..... (place)

On ..... (date)

RESOLVED that:

1. The Enterprise submits a Bid /Tender, in consortium/Joint Venture with the following Enterprises:

   .....

   .....
   (List all the legally correct full names and registration numbers, if applicable, of the Enterprises forming the Consortium/Joint Venture)

   to the South African National Biodiversity Institute in respect of the following project:

   .....

   .....
   (*Project description as per Bid /Tender Document)*

   Bid / Tender Number: .....*(Bid / Tender Number as per Bid / Tender Document)*

2. *Mr/Mrs/Ms: .....

   in *his/her Capacity as: **.....** *(Position in the Enterprise)*

   and who will sign as follows: .....

   be, and is hereby, authorised to sign a consortium/joint venture agreement with the parties listed under item 1 above, and any and all Other documents and/or correspondence in connection with and relating to the consortium/joint venture, in respect of the project described under item 1 above.

3. The Joint Venture formation/arrangement will be in the following proportions:

Name of Contractor	Proportion (%)

4. The Enterprise accepts joint and several liability with the parties listed under item 1 above for the due fulfilment of the obligations of the joint venture deriving from, and in any way connected with, the Contract to be entered into with the Employer in respect of the project described under item 1 above.

5. The Enterprise chooses as its *domicilium citandi et executandi* for all purposes arising from this joint venture agreement and the Contract with the Employer in respect of the project under item 1 above:

   Physical address: .....

   .....

   ..... (code)

   Postal address: .....

   .....

   ..... (code)

   Telephone number: ..... (code)

   Fax number: ..... (code)

	Name	Capacity	Signature
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Note:

1. ** Delete which is not applicable.*
2. ***NB**. This resolution must be signed by all the Directors / Members / Partners of the Bidding Enterprise.*
3. *Should the number of Directors / Members / Partners exceed the space available above, additional names and signatures must be supplied on a separate page.*

ENTERPRISE STAMP

T2.1.03: SPECIAL RESOLUTION OF CONSORTIA OR JOINT VENTURES

RESOLUTION of a meeting of the duly authorised representatives of the following legal entities who have entered into a consortium/joint venture to jointly bid for the project mentioned below: (*legally correct full names and registration numbers, if applicable, of the Enterprises forming a Consortium/Joint Venture)*

1. .....

   .....

2. .....

   .....

3. .....

   .....

4. .....

   .....

5. .....

   .....

6. .....

   .....

7. .....

   .....

8. .....

   .....

Held at ..... (place)

On ..... (date)

RESOLVED that:

A. The above-mentioned Enterprises submit a Bid in Consortium/Joint Venture to the South African National Biodiversity Institute in respect of the following project:

   .....

   .....
   (*Project description as per Bid /Tender Document)*

   Bid / Tender Number: .....*(Bid / Tender Number as per Bid / Tender Document)*

   *Mr/Mrs/Ms: .....

   in *his/her Capacity as: **.....** *(Position in the Enterprise)*

and who will sign as follows: ..... be, and is hereby, authorised to sign the Bid, and any and all other documents and/or correspondence in connection with and relating to the Bid, as well as to sign any Contract, and any and all documentation, resulting from the award of the Bid to the Enterprises in Consortium/Joint Venture mentioned above.

B. The Enterprises constituting the Consortium/Joint Venture, notwithstanding its composition, shall conduct all business under the name and style of: .....

C. The Enterprises to the Consortium/Joint Venture accept joint and several liabilities for the due fulfilment of the obligations of the Consortium/Joint Venture deriving from, and in any way connected with, the Contract entered into with the Employer in respect of the project described under item A above.

D. Any of the Enterprises to the Consortium/Joint Venture intending to terminate the consortium/joint venture agreement, for whatever reason, shall give the Employer 30 day's written notice of such intention. Notwithstanding such decision to terminate, the Enterprises shall remain jointly and severally liable to the Employer for the due fulfilment of the obligations of the Consortium/Joint Venture as mentioned under item D above.

E. No Enterprise to the Consortium/Joint Venture shall, without the prior written consent of the other Enterprises to the Consortium/Joint Venture and of the Employer, cede any of its rights or assign any of its obligations under the consortium/joint venture agreement in relation to the Contract with the Employer referred to herein.

F. The Enterprises choose as the *domicilium citandi et executandi* of the Consortium/Joint Venture for all purposes arising from the consortium/joint venture agreement and the Contract with the Employer in respect of the project under item A above:

Physical address:.....

.....

..... (code)

Postal address: .....

.....

..... (code)

Telephone number: ..... (code)

Fax number: ..... (code)

	Name	Capacity	Signature
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

Note:

1. ** Delete which is not applicable.*
2. ***NB**. This resolution must be signed by all the Duly Authorised Representatives of the Legal Entities to the Consortium Joint Venture submitting this Bid.*
3. *Should the number of Duly Authorised Representatives of the Legal Entities joining forces in this Bid exceed the space available above, additional names and signatures must be supplied on a separate page.*
4. *Resolutions, duly completed and signed, from the separate Enterprises who participate in this Consortium/Joint Venture must be attached to the Special Resolution.*

T2.1.04: SCHEDULE OF PROPOSED SUBCONTRACTORS

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

We notify you that it is our intention to employ the following Subcontractors for work in this contract.

If we are awarded a contract we agree that this notification does not change the requirement for us to submit the names of proposed Subcontractors in accordance with requirements in the contract for such appointments. If there are no such requirements in the contract, then your written acceptance of this list shall be binding between us.

	Name and address of proposed Subcontractor	**Nature and extent of work**	**Previous experience with Subcontractor**
1			
2			
3			
4			

Name of representative	**Signature**	**Capacity**	**Date**

Name of organisation:	

T2.1.05: CAPACITY OF TENDERER

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

1. WORK CAPACITY: *(The Tenderer is requested to furnish the following particulars, attach additional pages if more space is required. Failure to furnish the particulars may result in the Tender being disregarded.)*

Skilled technicians employed		**Unskilled employees employed**	
Categories of technicians	**Number**	**Categories of employees**	**Number**

1.1. Provide full particulars of:

Machinery	**Equipment**	**Workshops**

2. PARTICULARS OF COMMITMENTS WHICH THE TENDERER HAS PREVIOUSLY COMPLETED AND PRESENTLY ENGAGED WITH:

2.1. Current projects:

	Project	Place (town)	Reference / Contact person	Contact Tel. No.	Contract amount	Contract period	Date of commencement	Scheduled date of completion
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

2.2. Previous projects:

	Project	Place (town)	Reference / Contact person	Contact Tel. No.	Contract amount	Contract period	Date of commencement	Scheduled date of completion	Actual date of completion
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

Name of Tenderer	**Signature**	**Date**

Any reference to words “Bid” or Bidder” herein and/or in any other documentation shall be construed to have the same meaning as the words “Tender” or “Tenderer”.

T2.1.06: PREFERENCE POINT SYSTEM

SBD 6.1

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2022

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

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

1. GENERAL CONDITIONS

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

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

1.2 To be completed by the organ of state

(*delete whichever is not applicable for this tender*).

a) The applicable preference point system for this tender is the 80/20 preference point system.

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

1.3 Points for this tender (even in the case of a tender for income-generating contracts) shall be awarded for:

(a) Price; and

(b) Specific Goals.

1.4 To be completed by the organ of state:

The maximum points for this tender are allocated as follows:

	POINTS
PRICE	80
SPECIFIC GOALS	20
Total points for Price and SPECIFIC GOALS	**100**

1.5 Failure on the part of a tenderer to submit proof or documentation required in terms of this tender to claim points for specific goals with the tender, will be interpreted to mean that preference points for specific goals are not claimed.

1.6 The organ of state reserves the right to require of a tenderer, either before a tender is adjudicated or

at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the organ of state.

2. DEFINITIONS

(a) **"tender"** means a written offer in the form determined by an organ of state in response to an invitation to provide goods or services through price quotations, competitive tendering process or any other method envisaged in legislation;

(b) **"price"** means an amount of money tendered for goods or services, and includes all applicable taxes less all unconditional discounts;

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

(d) **"tender for income-generating contracts"** means a written offer in the form determined by an organ of state in response to an invitation for the origination of income-generating contracts through any method envisaged in legislation that will result in a legal agreement between the organ of state and a third party that produces revenue for the organ of state, and includes, but is not limited to, leasing and disposal of assets and concession contracts, excluding direct sales and disposal of assets through public auctions; and

(e) **"the Act"** means the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000).

3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

3.1. POINTS AWARDED FOR PRICE

3.1.1 THE 80/20 OR 90/10 PREFERENCE POINT SYSTEMS

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

80/20 **or** **90/10**

$$Ps = 80\left(1 - \frac{Pt - P\,min}{P\,min}\right) \quad \text{or} \quad Ps = 90\left(1 - \frac{Pt - P\,min}{P\,min}\right)$$

Where

Ps = Points scored for price of tender under consideration

Pt = Price of tender under consideration

Pmin = Price of lowest acceptable tender

4. POINTS AWARDED FOR SPECIFIC GOALS

4.1. In terms of Regulation 4(2); 5(2); 6(2) and 7(2) of the Preferential Procurement Regulations, preference points must be awarded for specific goals stated in the tender. For the purposes of this tender the tenderer will be allocated points based on the goals stated in table 1 below as may be supported by proof/ documentation stated in the conditions of this tender:

4.2. In cases where organs of state intend to use Regulation 3(2) of the Regulations, which states that, if it is unclear whether the 80/20 or 90/10 preference point system applies, an organ of state must, in the tender documents, stipulate in the case of—

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

(b) any other invitation for tender, that either the 80/20 or 90/10 preference point system will apply and that the lowest acceptable tender will be used to determine the applicable preference point system,

then the organ of state must indicate the points allocated for specific goals for both the 90/10 and 80/20 preference point system.

Table 1: Specific goals for the tender and points claimed are indicated per the table below.

(Note to organs of state: Where either the 90/10 or 80/20 preference point system is applicable, corresponding points must also be indicated as such.

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

The specific goals allocated points in terms of this tender	Number of points allocated (90/10 system) (To be completed by the organ of state)	Number of points allocated (80/20 system) (To be completed by the organ of state)	Number of points claimed (90/10 system) (To be completed by the tenderer)	Number of points claimed (80/20 system) (To be completed by the tenderer)
Categories of persons historically disadvantaged by unfair discrimination on the basis of race. Information will be verified on the CSD report. Points will be allocated based on the percentage of ownership per goal Black Ownership = 10 Points		(10)		
Categories of persons historically disadvantaged by unfair discrimination on the basis of gender. Information will be verified on the CSD report. Points will be allocated based on the percentage of ownership per goal Female Ownership = 10 Points		(10)		
Total		20		

DECLARATION WITH REGARD TO COMPANY/FIRM

4.3. Name of company/firm……

4.4. Company registration number: ……...

4.5. TYPE OF COMPANY/ FIRM

- ϒ Partnership/Joint Venture / Consortium
- ϒ One-person business/sole propriety

- ϒ Close corporation
- ϒ Public Company
- ϒ Personal Liability Company
- ϒ (Pty) Limited
- ϒ Non-Profit Company
- ϒ State Owned Company

[TICK APPLICABLE BOX]

4.6. I, the undersigned, who is duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the specific goals as advised in the tender, qualifies the company/ firm for the preference(s) shown and I acknowledge that:

i) The information furnished is true and correct;

ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;

iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct;

iv) If the specific goals have been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the organ of state may, in addition to any other remedy it may have –

(a) disqualify the person from the tendering process;

(b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;

(c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;

(d) recommend that the tenderer or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and

(e) forward the matter for criminal prosecution, if deemed necessary.

……
SIGNATURE(S) OF TENDERER(S)

SURNAME AND NAME: ……
DATE: ……

ADDRESS: ……

……

……

……

T2.1.07: RESOURCES TO BE EMPLOYED IN TERMS OF ORGANIZATION AND STAFFING

The Tenderer shall list below the key personnel (including first nominee and the second choice alternate), whom he proposes to employ on the Contract should his tender be accepted, both at his headquarters and on the Site, to direct and for the execution of the work, together with their qualifications, experience, positions held and their nationalities.

DESIGNATION	NAME AND NATIONALITY OF: (i) NOMINEE (ii) ALTERNATE	SUMMARY OF QUALIFICATIONS, EXPERIENCE AND PRESENT OCCUPATION
HEADQUARTERS Partner/Director Project manager Other key staff (give designation)		

DESIGNATION	NAME AND NATIONALITY OF: (i) NOMINEE (ii) ALTERNATE	SUMMARY OF QUALIFICATIONS, EXPERIENCE AND PRESENT OCCUPATION
SITE OFFICE Site Agent Site Engineer/Technician Construction supervisor (give designation) Other key staff (give designation)		

T2.1.08: ESTIMATED MONTHLY EXPENDITURE

The Tenderer shall state below the estimated value of work to be completed every month, based on his preliminary programme and his tendered unit rates.

The amounts for contingencies and Contract Price Adjustment must not be included ****OR*** the amount for contingencies must not be included.

MONTH	VALUE
1	R .....
2	R .....
3	R .....
4	R .....
5	R .....
6	R .....
7	R .....
	COMPLETION OF CONTRACT
TOTAL	R .....

T2.2.09: Compulsory Site Inspection Meeting Certificate

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
BID No.:	**SANBI G545/2025**

This is to certify that I, _____representing

_____in the company of

_____ visited the site on: _____

I have made myself familiar with all local conditions likely to influence the work and the cost thereof. I further certify that I am satisfied with the description of the work and explanations given at the site inspection meeting and that I understand perfectly the work to be done, as specified and implied, in the execution of this contract.

Name of Tenderer	Signature	Date

Name of Principal Agent	Signature	Date

T2.1.10: Bidders Disclosure

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

1. PURPOSE OF THE FORM

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

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

2. Bidder's declaration

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

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

Full Name	Identity Number	Name of State institution

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

2.2.1 If so, furnish particulars:
……
……

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

2.3.1 If so, furnish particulars:
……
……

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

3 DECLARATION

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

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

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

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

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

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

3.5 There have been no consultations, communications, agreements or arrangements made by the bidder with any official of the procuring institution in relation to this procurement process prior to and during the bidding process except to provide clarification on the bid submitted where so required by the institution; and the bidder was not involved in the drafting of the specifications or terms of reference for this bid.

3.6 I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

I CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 1, 2 and 3 ABOVE IS CORRECT.
I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME IN TERMS OF PARAGRAPH 6 OF PFMA SCM INSTRUCTION 03 OF 2021/22 ON PREVENTING AND COMBATING ABUSE IN THE SUPPLY CHAIN MANAGEMENT SYSTEM SHOULD THIS DECLARATION PROVE TO BE FALSE.

……	..……
Signature	Date
……	……
Position	Name of bidder

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

T2.1.11: MEDICAL CERTIFICATE FOR THE CONFIRMATION OF PERMANENT DISABLED STATUS

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

I, **.....** (*surname and name*), Identity number,

.....do hereby declare that I am a registered medical practitioner, with my

practice number being....., practicing at .....

.....(Physical and postal addresses) declare that I have examined Mr/Mrs

....., identity number of .....

and have found the said person to be permanently disabled

or having a recurring disability.

"Disability" means, in respect of a person, a permanent impairment of a physical, intellectual, or sensory function, which results in restricted, or lack of, ability to perform an activity in the manner, or within the range, considered normal for a human being." – As per Preferential Procurement Policy Framework Act: No 5 of 2000 (PPPFA)

The nature of the disability is as follows:

.....

.....

.....

Thus signed at .....on this .....day of..... of.....

OFFICIAL STAMP OF
MEDICAL PRACTITIONER

.....

Signature

.....

Date

T2.1.12: PROOF OF REGISTRATION WITH CONSTRUCTION INDUSTRY DEVELOPMENT BOARD

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

The Tenderer shall provide a printed copy of the Active Contractor's Listing off the CIDB website. (www.cidb.org.za). In the case of a joint venture, a printed copy of the Active Contractor's listing must be provided for each member of the joint venture.

Name of Contractor: .....

Contractor Grading Designation: .....

CIDB Contractor Registration Number: .....

T2.1.14: COPY OF CSD REGISTRATION REPORT

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

A copy of Central Suppliers Database (CSD) Registration Report must be included for evaluation purposes.

T2.1.15: FINANCIAL REFERENCES

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

Notes to tenderer:

1. The tenderer shall attach to this form a letter from the bank in which it is declared how he conducts his account. The contents of the bank's letter must state the credit rating that the bank, in addition to the information required below, accords to the tenderer for the business envisaged by this tender. Failure to provide the required letter with the tender submission may render the tenderer's offer unresponsive in terms of tender condition C3.8.

2. The tenderer's banking details as they appear below shall be completed.

3. In the event that the tenderer is a joint venture enterprise, details of all the members of the joint venture shall be similarly provided and attached to this form.

Details of Company's Bank

DESCRIPTION OF BANK DETAIL	BANK DETAILS APPLICABLE TO TENDERER'S HEAD OFFICE
Name of bank	
Branch name	
Branch code	
Street address	
Postal address	
Name of manager	
Telephone number	
Fax number	
Account number	

T2.1.16: RECORD OF ADDENDA TO TENDER DOCUMENTS

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

I / We confirm that the following communications received from the South African National Biodiversity Institute before the submission of this tender offer, amending the tender documents, have been taken into account in this tender offer: *(Attach additional pages if more space is required)*

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

Name of Tenderer	Signature	Date

I / We confirm that no communications were received from the South African National Biodiversity Institute before the submission of this tender offer, amending the tender documents.

Name of Tenderer	Signature	Date

T2.1.17: COMPULSORY ENTERPRISE QUESTIONNAIRE

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

Section 1: Name of enterprise: .....

Section 2: VAT registration number, if any: .....

Section 3: PSIRA registration number, if any: .....

Section 4: Particulars of sole proprietors and partners in partnerships

Name*	Identity number*	Personal income tax number*

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

Section 5: Particulars of companies and close corporations

Company registration number: .....

Close corporation number: .....

Tax reference number: .....

Section 6: Record in the service of the state

Indicate by marking the relevant boxes with a cross, if any sole proprietor, partner in a partnership or director, manager, principal shareholder or stakeholder in a company or close corporation is currently, or has been within the last 12 months, in the service of any of the following:

- □ a member of any municipal council
- □ a member of any provincial legislature
- □ a member of the National Assembly or the National Council of Province
- □ a member of the board of directors of any municipal entity
- □ an official of any municipality or municipal entity
- □ an employee of any 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)
- □ a member of an accounting authority of any national or provincial public entity
- □ an employee of Parliament or a provincial legislature

If any of the above boxes are marked, disclose the following:

Name of sole proprietor, partner, director, manager, principal shareholder or stakeholder	Name of institution, public office, board or organ of state and position held	Status of service (tick appropriate column)	
		Current	Within last 12 months

*Insert separate page if necessary.

Section 7: Record of spouses, children and parents in the service of the state

Indicate by marking the relevant boxes with a cross, if any spouse, child or parent or a sole proprietor, partner in a partnership or director, manager, principal shareholder or stakeholder in a company or close corporation is currently, or has been within the last 12 months, in the service of any of the following:

- □ a member of any municipal council
- □ a member of any provincial legislature
- □ a member of the National Assembly or the National Council of Province
- □ a member of the board of directors of any municipal entity
- □ an official of any municipality or municipal entity
- □ an employee of any 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)
- □ a member of an accounting authority of any national or provincial public entity
- □ an employee of Parliament or a provincial legislature

Name of spouse, child or parent	Name of institution, public office, board or organ of state and position held	Status of service (tick appropriate column)	
		Current	Within last 12 months

*Insert separate page if necessary.

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

(i) authorises the Employer to obtain a tax clearance certificate from the South African Revenue Services that my/our tax matters are in order;

(ii) confirms that neither the name of the enterprise or the name of any partner, manager, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act, 2004;

(iii) confirms that no partner, member, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise, has within the last five years been convicted of fraud or corruption;

(iv) confirms that I/we are not associated, linked or involved with any other tendering entities submitting tender offers and have no other relationship with any of the Tenderers or those responsible for compiling the Scope of Work that could cause or be interpreted as a conflict of interest; and

(v) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of my belief both true and correct.

Signed: ..... Date: .....

Name: ..... Position: .....

Enterprise name: .....

T2.1.18: COMPENSATION OF OCCUPATIONAL INJURIES AND DISEASE ACT (COIDA)

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

Letter of Good Standing from the office of the Compensation Commissioner as required by the Compensation for Occupational Injuries and Diseases Act (COIDA) must be included for evaluation purposes. The letter should be issued by the Department of Labour.

T2.1.22: PROOF OF LIABILITY INSURANCE

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

The tender shall append their Proof of Liability Insurance behind this page.

PART C: THE CONTRACT
Part C1: Agreement and Contract Data

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

C1.1 Form of Offer and Acceptance

The Employer, identified in the Acceptance signature block, has solicited offers to enter into a contract for:

REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2

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

The tenderer, identified in the Offer signature block, has examined the draft contract as listed in the Acceptance section and agreed to provide this Offer.

By the representative of the tenderer, deemed to be duly authorised, signing this part of this Form of Offer and Acceptance the tenderer offers to perform all of the obligations and liabilities of the **Contractor** under the contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the conditions of contract identified in the Contract Data.

THE OFFERED TOTAL OF THE PRICES INCLUSIVE OF VAT IS:

(in words) ..... Rand;

R ..... (in figures)

THE OFFERED PRICES ARE AS STATED IN THE PRICING SCHEDULE

This Offer may be accepted by the Employer by signing the Acceptance part of this Form of Offer and Acceptance and returning one copy of this document including the Schedule of Deviations (if any) to the tenderer before the end of the period of validity stated in the Tender Data, or other period as agreed, whereupon the tenderer becomes the party named as the **Contractor** in the conditions of contract identified in the Contract Data.

Signature(s) .....

Name(s) .....

Capacity .....

For the Tenderer: .....

.....
(Insert name and address of organisation)

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

.....

[Failure of a Tenderer to complete and sign this form will invalidate the tender]

Acceptance

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 Contractor the amount due in accordance with the conditions of contract identified in the Contract Data. 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

Part C1	Agreements and Contract Data *[which includes this Agreement]*
Part C2	Pricing Data
Part C3	Scope of Work
Part C4	Site Information

and drawings and documents or parts thereof, which may be incorporated by reference into Parts C1 to C4 above.

Deviations from and amendments to the documents listed in the Tender Data and any Addenda thereto listed in the Tender Schedules, as well as any changes to the terms of the Offer agreed by the Tenderer and the Employer during this process of offer and acceptance, are contained in the Schedule of Deviations attached to and forming part of this Agreement. No amendments to or deviations from the said documents are valid unless contained in this Schedule, which must be duly signed by the authorised representative(s) of both parties.

The Tenderer shall within the time required to submit documentation in accordance with clause 5.3.2 of the Contract Data (C1.2) after receiving a completed copy of this Agreement, including the Schedule of Deviations (if any), contact the Employer's agent (whose details are given in the Contract Data) to arrange the delivery of any bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the Conditions of Contract identified in the Contract Data at, or just after, the date this Agreement comes into effect. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this Agreement.

Notwithstanding anything contained herein, this Agreement comes into effect on the date when the Tenderer receives one fully completed original copy of this document, including the Schedule of Deviations (if any). Unless the Tenderer (now Contractor) within five working days of the date of such receipt notifies the Employer in writing of any reason why he cannot accept the contents of this Agreement, this Agreement shall constitute a binding Contract between the parties.

Signature(s) .....

Name(s) .....

Capacity .....

For the Employer: .....

.....

.....
(Insert name and address of organisation)

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

.....

Schedule of Deviations

1 Subject .....

Details .....

.....

.....

.....

2 Subject .....

Details .....

.....

.....

.....

3 Subject .....

Details .....

.....

.....

.....

4 Subject .....

Details .....

.....

.....

.....

5 Subject .....

Details .....

.....

.....

.....

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

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

FOR THE TENDERER:

Signature(s) ....

Name(s) ....

Capacity ....

.....
[Name and address of organisation]

Name and signature of witness ..... Date .....

FOR THE EMPLOYER:

Signature(s) ....

Name(s) ....

Capacity ....

.....
[Name and address of organisation]

Name and signature of witness ..... Date .....

CONFIRMATION OF RECEIPT

The Tenderer (now Contractor), identified in the Offer part of this Agreement, hereby confirms receipt from the Employer, identified in the Acceptance part of this Agreement, of one fully completed original copy of this Agreement, including the Schedule of Deviations (if any) today:

The..... *[day]*

of ..... *[month]*

20.....*[year]*

at .....*[place]*

For the Contractor: .....
Signature

.....
Name

.....
Capacity

Signature and name of witness: .....
Signature

.....
Name

PART C: THE CONTRACT
Part C1: Agreement and Contract Data

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

C1.2 Contract Data

The Conditions of Contract are the **JBCC Series 2000 Principal Building Agreement (July 2007 Edition 5.0 - Reprint 1)** published by the Joint Building Contract Committee. Copies of these documents may be obtained from the **Association of South African Quantity Surveyors** (011-315 4140), the **Master Builders Association** (011-205 9000), the **South African Association of Consulting Engineers** (011-463 2022) or the **South African Institute of Architects** (011-486 0684).

The JBCC Principal Building Agreement Contract Data EC and the JBCC Principal Building Agreement Contract Data CE form an integral part of this agreement.

The **ASAQS Preliminaries (November 2007 Edition)** published by the Association of South African Quantity Surveyors for use with the said JBCC Principal Building Agreement shall be deemed to be incorporated in the bills of quantities.

The **Model Preambles for Trades (2008 Edition)** as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in the bills of quantities and no claims arising from brevity of description of items fully described in the said Model Preambles will be entertained.

Section C1.2.1: Contract Data: Employer to Contractor (EC)

Employer Addendum Code 2101-EC

For information purposes only. To be signed on appointment.

Introduction

This addendum contains all variables referred to in the **Principal Building Agreement** that are the responsibility of the Contractor to provide the appropriate information that is necessary for the Contractor to complete his tender. The Addendum must be completed in full and included in the tender documents. The Addendums "Contract Data – EC", "Contract Data – CE", "Contract Data – ES" and "Contract Data – SE" form part of the contract between the parties.

Definitions

The definitions used in this document and the interpretation thereof are as listed in the Principal Building Agreement. The work or phrase of a definition is in bold text and shall bear the meaning assigned to it in the Principal Building Agreement. Where such word or phrase is not highlighted it shall bear the meaning consistent with the context of its use. The listed defined word or phrase does not quality as a definition where information required to be stated in the contract data has not been provided.

Provision of Contract Data

Spaces requiring information must be filled in, shown as "not applicable" or deleted and not left blank. Where choices are offered, the non-applicable items are to be clearly struck out. Where insufficient space is provided the additional information should be annexed hereto and cross referenced to the applicable clause of the contract data.

Reference Clauses

Where relevant the Principal Building Agreement clause applicable to the required information is printed in italics under the Contract Data clause number i.e. [27.4.2]

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Section No.	Description
1.0	CONTRACTING AND OTHER PARTIES
2.0	CONTRACT AND SITE INFORMATION
3.0	INSURANCES AND SECURITIES
4.0	PRACTICAL COMPLETION DATES AND PENALTIES
5.0	DOCUMENTS AND GENERAL
6.0	CHANGES MADE TO THE STANDARD JBCC DOCUMENT
7.0	DECLARATION BY THE PRINCIPAL AGENT

CONTRACT DATA – EMPLOYER

1.0 CONTRACTING AND OTHER PARTIES

1.1 *[1.2]*	**Employer:**	South African National Biodiversity Institute		
	Postal Address:	Private Bag X101, Silverton, Gauteng	**Code:**	0184
	Physical Address:	Pretoria National Botanical Garden 2 Cussonia Avenue, Brummeria, Gauteng	**Code:**	0184
	Tel no.:	012 843 5000	**Fax no.:**	012 843 5205
	VAT no.			
	E-mail:			
1.2 *[5.1]*	**Principal Agent:**	Virtual Consulting Engineers VCE (Pty) Ltd	**Person:**	Mr Rameez Ishmail
	Postal Address:	P.O. Box 82, Crawford	**Code:**	7779
	Tel no.:	021 685 0789	**Fax no.:**	086 655 2690
	E-mail:	rameez@virtualconsulting.co.za		
1.2 *[5.2]*	**Agent (1):**		**Person:**	
	Agent's Service:			
	Postal Address:		**Code:**	
	Tel no.:		**Fax no.:**	
	E-mail:			
1.3 *[5.2]*	**Agent (2):**		**Person:**	
	Agent's Service:			
	Postal Address:		**Code:**	
	Tel no.:		**Fax no.:**	
	E-mail:			
1.4 *[5.2]*	**Agent (3):**		**Person:**	
	Agent's Service:			
	Postal Address:		**Code:**	
	Tel no.:		**Fax no.:**	
	E-mail:			
1.5	**Agent (4):**		**Person:**	

[5.2]	**Agent's Service:**			
	Postal Address:		**Code:**	
	Tel no.:		**Fax no.:**	
	E-mail:			
1.6 *[5.2]*	**Agent (5):**		**Person:**	
	Agent's Service:			
	Postal Address:		**Code:**	
	Tel no.:		**Fax no.:**	
	E-mail:			
1.7 *[5.2]*	**Agent (6):**		**Person:**	
	Agent's Service:			
	Postal Address:		**Code:**	
	Tel no.:		**Fax no.:**	
	E-mail:			
1.8 *[5.2]*	**Agent (7):**		**Person:**	
	Agent's Service:			
	Postal Address:		**Code:**	
	Tel no.:		**Fax no.:**	
	E-mail:			

1.9 *[5.5]* **Interest of principal agent or other agent in the project.** (Yes / No) **No**

Details where "yes": **N/A**

1.10 The **principal agent** named in 1.2 above is responsible for the preparation of the **contract data** schedule and must be contacted should the **contractor** be uncertain of the information provided or to be provided. Failure to complete the **contract data** schedule in full may result in the tender being disqualified.

2.0 CONTRACT AND SITE INFORMATION

2.1 *[1.7]*	The **law** applicable to this **agreement**:	(Country / State)	**RSA**
2.2 *[1.1]*	**Works** identification:		**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
2.3 *[1.1]*	Site description:		**Kirstenbosch National Botanical Garden, Cape Town**
2.4 *[15.2.1]*	Possession of the **site** is to be given on:	(Date)	**Within 5 (five) working days after receipt of documentary evidence that:** • **Insurances have been effected *[12.2];*** • **Security has been provided to the Employer *[14.1];*** • **Contractor's Lien has been signed;** • **Safety Plan has been approved by the Employer.**
2.5 *[15.3]*	Period for the commencement of the **works** after the contractor takes possession of the **site:**	(Working days)	**5 (Five)**
2.6 *[15.4], [28.0]*	Completion of the works in **sections** is required.	(Yes / No) **No**	(No. of sections) **N/A**
2.7 *[3.3], [31.16.2]*	Waiver of the **contractor's** lien or right of continuing possession is required.	(Yes / No)	**No**
2.8 *[16.1]*	Defined restrictions to the **site** area. Where "yes" the specific requirements are described below or detailed in the **contract documents**.	(Yes / No)	**Yes**
2.9 *[16.4]*	Geotechnical investigation of the **site** has been undertaken. Where "yes" the results are included in the **contract documents.**	(Yes / No)	**N/A**
2.10 *[16.6]*	Existing premises will be occupied. Where "yes" the specific requirements are described below or detailed in the **contract documents.**	(Yes / No)	**No**
2.11 *[16.7]*	Provision of temporary services is required. Where "yes" the specific requirements are described below or detailed in the **contract documents.**	(Yes / No)	**Yes**
	2.11.1 **Water**	Option A Contractor – his cost Option B Employer – free of charge Option C Contractor – metered (contractor cost)	(A, B or C) **B**

2.11.2	**Electricity**	Option A Option B Option C	Contractor – his cost Employer – free of charge Contractor – metered (contractor cost)	(A, B or C)	**B**
2.11.3	**Telecom**	Option A Option B Option C	Contractor – his cost Employer – free of charge Contractor – metered (contractor cost)	(A, B or C)	**A**
2.11.4	**Ablutions**	Option A Option B Option C	Contractor – his cost Employer – free of charge Contractor – metered (contractor cost)	(A, B or C)	**A**
2.12 *[16.8]*	Protection of existing trees and shrubs is required. Where "yes" the specific requirements are described below or detailed in the **contract documents.**			(Yes / No)	**No**

3.0 INSURANCE AND SECURITIES

3.1 *[10.1.1], [12.6]*	Contract works insurance to be effected by:	(Employer / Contractor)	**Contractor**
	For the sum of:	(Amount)	**Contract Sum Plus 20%**
	With a deductible of:	(Amount)	**R20 000**
3.2 *[10.1.2], [11.1-3], [12.6]*	Supplementary / Special insurance to be effected by:	(Employer / Contractor)	**N/A**
	For the sum of:	(Amount)	**N/A**
	With a deductible of:	(Amount)	**N/A**
3.3 *[10.1.3], [12.6]*	Public liability insurance to be effected by:	(Employer / Contractor)	**Contractor**
	For the sum of:	(Amount)	**R5 000 000 per claim**
	With a deductible of:	(Amount)	**R20 000**
3.4 *[11.1.1]*	Support insurance to be effected by:	(Employer / Contractor)	**N/A**

	For the sum of:	(Amount)	**N/A**
	With a deductible of:	(Amount)	**N/A**
3.5 *[11.1.2-3], [12.1]*	Special insurance to be effected by:	(Employer / Contractor)	**N/A**
	Type:	**N/A**	
	For the sum of:	(Amount)	**N/A**
	With a deductible of:	(Amount)	**N/A**

4.0 PRACTICAL COMPLETION DATES AND PENALTIES

		Date	**Penalty Amount**
4.1 *[24.3.1], [30.1-36]*	For the **works** as a whole: The date for **practical completion** and the **penalty** per **calendar day** is:	**7 months after date of site handover (Excl. Builders Holiday)**	**R4 200-00 per calendar day (Excl. VAT)**

Or

4.2 *[24.3.1], [28.1]* For the **works** in **sections**:
The date for **practical completion** and the **penalty** per **calendar day** is:

	Date	**Penalty Amount**
Section 1	**N/A**	**R**
Section 2	**N/A**	**R**
Section 3	**N/A**	**R**
Section 4	**N/A**	**R**

5.0 DOCUMENTS AND GENERAL

5.1 *[3.7]*	Construction document copies to be supplied to the **contractor** free of charge.			(No. of copies)	**3**	
5.2 *[3.9]*	The **priced document** may be used as a specification of **materials and goods** and work methods.			(Yes / No)	**Yes**	
5.3 *[3.10]*	The **contractor** shall provide a schedule of rates.	(Yes / No)	**No**	(Addendum No.)	**Refer to Bill of Quantities**	
5.4 *[3.11]*	Changes made to **JBCC** standard documents.	(Yes / No)	**Yes**	(Addendum No.)	**Refer to Point 6 below**	
5.5 *[15.1.1]*	On acceptance of the tender the **priced document** is to be submitted within the stated **working days.**			(No. of days)	**Priced document to be submitted with Tender**	
5.6 *[22.2]*	Work to be undertaken by **direct contractors.**	(Yes / No)	**No**	(Addendum No.)	**N/A**	

5.7 *[24.9]* On achievement of practical completion the **contractor** is to hand over all certificates and manuals etc. related to the works.

5.8 *[31.1]*	Interim **payment certificate** to be issued by:	(Date of Month)	**25th**

5.8 *[4.1]* The following items of works shall be designed by the Contractor:

(1)	Certificates of compliance	(2)	All guarantees
(3)		(4)	
(5)		(6)	

6.0 STATE PROVISIONS AND SUBSTITUTIONS

6.1 *Replace the following definitions with:*

"CONSTRUCTION PERIOD" means the period commencing on the date of acceptance of the bid as stated in [15.2.1] And ending on the date of **practical completion**

"**INTEREST"** means the interest rate as determined by the Minister of Finance, from time to time, in terms of section 80(1)(b) of the Public Finance Management Act, 1999 (Act No. 1 of 1999).

6.2 *[3.6]* *Replace the last sentence with the following:*

The original signed set of contract documents shall be held by the **Employer**.

6.3 *Replace the clause with the following:*
[5.1]

In terms of the clauses listed hereunder the **Employer** has retained its authority and has not given a mandate to the **Principal Agent**. The **Employer** shall sign all documents in relation to the following clauses:

20.1, 20.7, 26.2.1, 26.3.1, 29.1, 29.2, 29.4.1, 29.4.3, 29.7, 29.8, 32.1, 32.6.2, 32.15, 34.3

Copies of the signed documents shall be provided to the **Principal Agent**.

6.4 *Replace the clause with the following:*
[8.4]

The **Contractor** shall bear the full risk of damage to and/or destruction of the **works** by whatever cause during construction of the **works** and hereby indemnifies and holds harmless the **Employer** against any such damage. The **Contractor** shall take such precautions and security measures and other steps for the protection and security of the **works** as the **Contractor** may deem necessary.

6.6 *Add the following clause:*
[9.3]

The **Employer's** rights to claim damages for the **Contractor's** omissions and actions will not be affected.

6.7 *Replace the clause with the following:*
[10.1]

The **Contractor** shall effect contract works insurances and, where available, supplementary insurance in respect of civil commotion, riot and strike shall be effected for the **works** for the Contractor's all risk and, in addition, covering the **Contractor's** subcontractors. Such insured amounts shall include the full value of materials and goods supplied by the **Employer** to the Contractor. Supplementary insurance shall not be effected where the **Employer** makes such an election as stated in [11.1.2 – 3]

6.8 *Add the following clause:*
[11.2]

The **Contractor** shall effect public liability insurance for not less than the amount and the deductible as stated in [10.1.3]. In addition the **Contractor** shall affect any relevant workmen's compensation or similar insurances as are required by **law**. The **Contractor** shall ensure that his sub-contractors effect their own similar insurances.

6.9 *Add the following clause:*
[11.3]

Should the **Employer** decide that the execution of the works could cause the weakening or interference with the support of the land adjacent to the **site**, the **Employer** shall state in [11.1.1] That the **Contractor** shall effect support insurance

6.12 *Replace the clause with the following:*
[12.3]

Where the **Contractor** fails to effect any of the required insurances or to keep them in force, the **Employer** may cancel this agreement in terms of clause [36.0]

6.14 *Replace the clause with the following:*
[14.1]

Security:

The securities to be provided by the **Contractor** are:

(1) Variable construction guarantee
(2) Fixed construction guarantee
(3) Advance payment guarantee

6.14 *Replace the clause with the following:*
[15.2.1]

Give the **Contractor** possession of site within ten (10) **working days** of the commencement of the **construction period** provided that the **Contractor** has complied with the terms of [15.1.1] and [15.1.2]

6.15 *Replace the clause with the following:*
[25.3]

Should the **Principal Agent** not issue a **works completion** list, in terms of [25.1] or [25.2.2], within seven (7) **calendar days** from the end of the inspection period, the **Contractor** shall notify the **Employer** and **Principal Agent**. Should the **Principal Agent** not issue such **works completion** list within seven (7) **calendar days** of such notice, the **Employer** may within seven (7) **calendar days** issue to the **Contractor** a **works completion** list. Should the **Employer**:

6.16 *Replace the clause with the following:*
[25.3.1]

Not issue such **works completion** list within seven (7) **calendar days**, then the **certificate of works completion** shall be deemed to have been issued on the date of expiry of the initial notice period and **works completion** shall be deemed to have been achieved on such date.

6.17 *Replace the clause with the following:*
[25.3.2]

Issue a **works completion** list and the work on the **works completion** list not have been completed or where further **defects** have become apparent, the **Employer** shall forthwith identify such items on the updated **works completion** list and notify the **Contractor**. The **Contractor** shall repeat the procedure in terms of [25.2.2] until such items have been completed to the satisfaction of the **Employer**.

6.18 *Replace the clause with the following:*
[26.1]

The defects liability period for the works shall commence on the date of works completion and end after three hundred and sixty-five (365) **calendar days** for items stated in the **bills of quantities**.

6.19 *Replace the clause with the following:*
[26.4]

Should the **Principal Agent** not issue a **defects** list in terms of [26.2.2 or 26.3.2], within seven (7) **calendar days** from the end of the **defects** liability period, the **Contractor** shall notify the **Employer** and **Principal Agent**. Should the **Principal Agent** not issue such **defects** list within seven (7) **calendar days** of receipt of such notice, the **Employer** may within seven (7) **calendar days** issue to the **Contractor** a **defects** list. Should the **Employer**:

6.20 *Replace the clause with the following:*
[26.4.1]

Not issue such **defects** list within seven (7) **calendar days**, then the **certificate of final completion** shall be deemed to have been issued on the date of expiry of the initial notice period and **final completion** shall be deemed to have been achieved on such date.

6.21 *Replace the clause with the following:*
[26.4.2]

Issue a **defects** list and the work on the **defects** list has not been completed or where further **defects** have become apparent, the **Employer** shall forthwith identify such items on the updated

defects list and notify the **Contractor**. The **Contractor** shall repeat the procedure in terms of [26.3.2] until such items have been completed to the satisfaction of the **Employer**

6.22 *Replace the clause with the following:*
[26.6]

A **certificate of final completion** issued in terms of [26.0] shall be *prima facie* evidence as to the sufficiency of the **works** and that the Contractor's obligations in terms of [2.0] and [15.0] have been fulfilled other than for **latent defects**.

6.23 *Replace the clause with the following:*
[27.1]

The **latent defects** liability period shall commence at the start of the **construction period** and end ten (10) years from the date of **final completion** where **final completion** in terms of [26.0] is achieved.

6.24 *Replace the clause with the following:*
[27.2]

Where cancellation of this **agreement** occurs before the achievement of **final completion** the **latent defects** liability period shall end ten (10) years from the date of cancellation.

6.27 *Replace the clause with the following:*
[31.4.2]

A reasonable estimate of the value of **materials and goods** in terms of [31.6] unless the **Employer** elects not to pay for such.

6.29 *Replace the clause with the following:*
[31.9]

The **Employer** shall pay the **Contractor** the amount certified within thirty (30) **calendar days** of the date for issue of the **payment certificate**. Payment shall be subject to the **Contractor** giving the **Employer** a **tax** invoice for the amount due.

6.30 *Replace the last sentence with the following:*
[31.11.2]

The principle agent shall calculate such default interest at the rate as determined by the Minister of Finance, from time to time, in terms of section 80(1)(b) of the Public Finance Management Act, 1999 (Act No. 1 of 1999).

6.31 *Replace the clause with the following:*
[31.12]

Where a **payment certificate** reflects an amount in favour of the **Employer**, the **Contractor** shall pay the amount certified within twenty-one (21) **calendar days** of the date of issue of the **payment certificate**. Where such an amount has not been paid, the **Contractor** shall be liable for default interest and the **Principal Agent** shall include such an amount in the **recovery statement** in terms of [33.0]. Payment shall be subject to the **Employer** giving the **Contractor** a **tax** invoice for the amount due. The **Principal Agent** shall calculate such interest at the rate as determined by the Minister of Finance, from time to time, in terms of section 80(1)(b) of the Public Finance Management Act, 1999 (Act No. 1 of 1999).

6.32 *Replace the clause with the following:*
[34.1]

The **Contractor** shall cooperate with and assist the **Principal Agent** in the preparation of the **final account** by timeously providing all relevant documents on request. The **Principal Agent** shall issue the final account to the **Contractor** within one hundred and twenty (120) **working days**.

6.33 *Add the following clause:*
[34.2]

The **Principal Agent** shall allow the **Employer** twenty (20) **working days**, within the period provided in [34.1] to accept the **final account** before presentation to the **Contractor** in terms of [34.3]

6.34 *Add the following:*
[34.5]

The final payment certificate shall be issued by the **Employer**.

6.35 *Replace the clause with the following:*
[34.9]

The **Employer** shall concurrently with the issue of the final **payment certificate** issue a statement to the **Contractor** showing the total amount of **tax** certified.

6.36 The **Employer** shall pay to the **Contractor** the amount certified for payment in the final **payment**
[34.10] **certificate** within thirty (30) **calendar days** of the date of issue of the final **payment certificate** subject to the **Contractor** giving the **Employer** a **tax** invoice for the amount due.

6.37 *Replace the last sentence with:*
[34.12]

Such interest shall be calculated at the rate as determined by the Minister of Finance, from time to time, in terms of section 80(1)(b) of the Public Finance Management Act, 1999 (Act No. 1 of 1999).

6.38 *Replace the clause with the following:*
[36.1]

The **Employer** may, without prejudice of any other rights available to him, cancel this **agreement** where the **Contractor:**

6.39 *Replace the clause with the following:*
[36.2]

Where the **Contractor** is in default, the **Employer** may notify the **Contractor**, either directly or through the **Principal Agent**, of his default and of the **Employer's** intention to cancel this **agreement** in terms of [36.1], should the default not be remedied.

6.40 *Replace the clause with the following:*
[37.2]

Where the **Employer** considers cancelling this **agreement** in terms of [37.1] the **Employer** shall notify the **Contractor** of the **Employer's** intention to cancel this **agreement**.

6.41 *Add the following clause:*
[39.2]

The **Employer** shall be entitled at any time to unilaterally terminate or cancel this **agreement** or any part thereof. Save for the following the **Contractor** shall not be entitled to claim any other amounts whatsoever in respect of such termination or cancellation of this **agreement**. The **Employer** shall be obliged to pay the **Contractor** as damages and/or loss of profit the lesser of:

6.42 *Add the following clause:*
[39.2.1]

An amount not exceeding ten per cent (10%) of the **contract sum.**

6.43 *Add the following clause:*
[39.2.2]

Ten per cent (10%) of the value of incomplete work.

6.43 *Add the following clause:*
[39.2.3]

The **Contractor's** actual damage or loss as determined by the **Employer** after receipt of evidence substantiating any such damage or loss.

6.44 *Replace the clause with the following:*
[40.2.2]

Litigation where the **Employer** so elects. Institution of the action shall be commenced and process served with one (1) year from the date of existence of the dispute, failing which the dispute shall lapse.

7.0 CHANGES MADE TO THE STANDARD JBCC DOCUMENT

Changes made to the standard JBCC document are listed in section 6 above.

8.0 DECLARATION BY THE PRINCIPAL AGENT

I, the Principal Agent named in 1.2 above, declare that the information provided above is complete and accurate at the time of calling for tenders. Where necessary, should any of the above information need to be varied, tenderers will be forthwith informed thereof in writing,

……
Principal Agent

……
Date

Section C1.2.2: Contract Data: Contractor to Employer (CE)

Contractor Addendum Code 2101-CE

Introduction

This addendum contains all variables referred to in the Principal Building Agreement that are the responsibility of the Contractor to provide the appropriate information that is necessary for the Contractor to complete his tender. The Addendum must be completed in full and included in the tender documents. The Addendums “Contract Data – EC”, “Contract Data – CE”, “Contract Data – ES” and “Contract Data – SE” form part of the contract between the parties.

Definitions

The definitions used in this document and the interpretation thereof are as listed in the Principal Building Agreement. The work or phrase of a definition is in **bold text** and shall bear the meaning assigned to it in the Principal Building Agreement. Where such word or phrase is not highlighted it shall bear the meaning consistent with the context of its use. The listed defined word or phrase does not quality as a definition where information required to be stated in the **contract data** has not been provided.

Provision of Contract Data

Spaces requiring information must be filled in, shown as “not applicable” or deleted and not left blank. Where choices are offered, the non-applicable items are to be clearly struck out. Where insufficient space is provided the additional information should be annexed hereto and cross referenced to the applicable clause of the **contract data**.

Reference Clauses

Where relevant the Principal Building Agreement clause applicable to the required information is printed in italics under the Contract Data clause number i.e. *[27.4.2]*

TABLE OF CONTENTS

Section No.	Description
1.0	CONTRACTING PARTY
2.0	SECURITIES
3.0	PAYMENT AND ADJUSTMENT OF PRELIMINARIES
4.0	EMPLOYER CHANGES TO JBCC STANDARD DOCUMENTS
5.0	THE TENDER

CONTRACT DATA – CONTRACTOR

1.0 CONTRACTING PARTY

1.1 *[1.2]* **Contractor:** _____

Postal Address: _____ **Code:** _____

_____

Physical Address: _____ **Code:** _____

E-mail: _____

Tel no.: _____ **Fax no.:** _____

VAT no.: _____

2.0 SECURITIES

2.1 The security provisions selected are:

2.1.1 *[14.3]*	Variable Construction Guarantee	(Yes / No)	
2.1.2 *[14.4]*	Fixed Construction Guarantee and Payment Reduction	(Yes / No)	
2.1.3 *[14.5]*	Advanced Payment is required. Where "Yes"	Amount	**N/A**
2.1.4 *[14.5]*	An Advance Payment Guarantee to be provided	(Yes / No)	**No**

3.0 PAYMENT AND ADJUSTMENT OF PRELIMINARIES

3.1 **Payment of preliminaries**

The payment of preliminaries shall be according to the option selected by the **contractor**. The amount included in each monthly **payment certificate** in respect of preliminaries as stated in the **contract data** shall be:

3.1.1 **Option A**

Assessed by the **principal agent** as an amount prorated to the value of the work duly executed in the same ratio as the preliminaries bears to the **contract sum** excluding:

- The amount for preliminaries
- Any contingency sum
- Any amount in respect of **CPAP**

All inclusive of **tax.**

3.1.2 **Option B**

Calculated from the priced items in the **bills of quantities / lump sum document**. The **contractor** and the **principal agent** shall agree on a division of the priced preliminaries items into:

- An initial or establishment charge
- A monthly charge
- A final or disestablishment charge

All inclusive of **tax.**

In arriving at such a division cognizance shall be taken of such factors as:

- Premiums for annually renewable insurance policies.
- Plant, scaffolding and the like remaining the property of the **contractor** or the hiring company and the capital costs thereof not treated as part of the initial charge.

Where the initial **construction period** is extended the monthly charge shall be recalculated on the same basis as was originally applied but taking into account the revised **construction period** and the amounts already paid to the **contractor.**

Should the **contractor** and the **principal agent** be unable to agree such division then the **principal agent** shall make a division of the amount of preliminaries to be incorporated in the valuations of each monthly **payment certificate.**

3.2 **Adjustment of preliminaries**

The amount of items of preliminaries shall be adjusted to take account of the theoretical financial effect which changes in time and/or value have on preliminaries. Such ad adjustment shall be based on the particulars provided by the **contractor** for this purpose in terms of Option A or B and shall preclude any further adjustment of preliminaries.

Adjustment of preliminaries in terms of Options A or B shall apply notwithstanding the actual employment of resources by the **contractor** in the execution of the **works**. The adjustment of preliminaries shall be based on the options as selected in the **contractor's tender.**

For the adjustment of the preliminaries both the **contract sum** and the **contract value** shall exclude:

- The amount of preliminaries
- Any contingency sum
- Any amount in respect of **CPAP**

All inclusive of **tax.**

3.2.1 **Option A**

The amount of preliminaries shall be adjusted in the following categories:

- An amount which shall not be varied.
- An amount which shall be varied in proportion to the **contract value** as compared with the **contract sum.**

- An amount which shall be varied in proportion to the **construction period** as compared to the initial **construction period** excluding revisions to the **construction period** for which the **contractor** is not entitled to adjustment of the **contract value** in terms of the **agreement.**

The **contractor** shall, within fifteen (15) working days of taking possession of the **site**, give the **principal agent** a breakdown, subdivided into the above categories, of the amount for preliminaries in tabulated form, all to the satisfaction of the **principal agent.**

Should the **contractor** fail to provide such information within the period stipulated then the amount for preliminaries shall be deemed to be subdivided into the following proportions:

- 10% (ten percent) which amount shall not be varied.
- 15% (fifteen percent) which amount shall be varied in proportion to the **contract value** as compared with the **contract sum.**
- 75% (seventy-five percent) which amount shall be varied in proportion to the **construction period** as compared with the initial **construction period.**

For a lump sum document, should the contractor fail to identify the amount for preliminaries, then such an amount shall be deemed to be 7,5% (seven and a half percent) of the contract sum excluding:

- Any contingency sum
- Any amount in respect of **CPAP**

All inclusive of **tax.**

Where sectional completion is required in terms of the agreement, the contractor shall provide the **principal agent** with the division of the above categorised amounts into sections. Should the **contractor** fail to provide such information within the period stipulated the categorised amounts shall be prorated to the value of each section.

3.2.2 **Option B**

The **contractor** shall, within fifteen (15) **working days** of taking possession of the site, provide the **principal agent** with a detailed breakdown of the amount for preliminaries. This breakdown shall set out, among others, full particulars of administrative, supervisory and other personnel, plant, transport and other resources and charges included in the amount for preliminaries. The **contractor** shall show the periods to which the individual items related with the charge rate for such items by means of a **programme** all to the satisfaction of the **principal agent.**

Where sectional completion is required in terms of the **agreement,** the **contractor** shall provide the **principal agent** with details of the resources required for each section and those that are common to sections. Should the **contractor** fail to provide such information within the period stipulated, Option A shall apply.

3.2.3 **Payment certificate cash flow**

The **contractor** shall provide all reasonable assistance to the **principal agent** in the preparation of cash flow projections of claims for **payment certificates** where required by the **employer**. The projections shall be based on the **programme** and shall be updated as and when the **programme** requires updating. The cooperation of the **contractor** in terms of this item shall not prejudice his right to receive payment in terms of the **agreement.**

3.2.4	The **contract value** shall be adjusted according **CPAP** [3.1]	(Yes / No)	**No**
3.2.5	Payment of preliminaries [3.1.1-2]	(A or B)	

3.2.6	Adjustment of preliminaries [3.2.1-2]	(A or B)	

4.0 EMPLOYER CHANGES TO JBCC STANDARD DOCUMENTS

4.1	Changes (if any) in terms of the Employer's Contract Data are accepted [3.11]. Where "no" an addendum referenced to this clause is to be attached.	(Yes / No)	**Yes. Refer to EC 6**

5.0 THE TENDER

5.1 This tender is to be submitted to the principal agent at the street address provided in the invitation to tender before the tender closing date and time stated herein.

5.2 By the submission of this tender to the **employer** the tenderer offers and agrees to contract for, execute and complete the **works** for the tender sum as stated below.

5.3 Tenders will be opened in public directly after the stated closing time. Only the total tender sum as stated in each tender will be announced.

5.4 The lowest or any tender will not necessarily be accepted.

5.5 This tender shall remain in full legal force for **one hundred and twenty (120) calendar days**. The tenderer accepts liability for damages as may be suffered by the **employer** should the tender validity period not be honoured.

5.6 This tender takes into account all listed items [4.0] for the purpose of preparing and submitting this tender.

5.7 The successful tenderer will be appointed in terms of the JBCC Principal Building Agreement.

5.8	**TENDER SUM COMPILATION**	**Amount**
5.8.1	Tenderer's work including **prime cost amounts**	R
5.8.2	**Employer allowances** stated by the **principal agent**	R
5.8.3	**SUB TOTAL**	R
5.8.4	*Add* **tax** on 5.8.3	R
5.8.5	**TOTAL TENDER SUM inclusive of tax**	R
5.8.6	Tender Sum in words	

Thus done and signed at ..... on .....

.....	.....
Name of Signatory	Capacity of Authorised Signatory
.....	.....
As witness	for and on behalf of the Tenderer who warrants authorisation hereto

PART C: THE CONTRACT
Part C1: Agreement and Contract Data

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

C1.3 Form of Construction Guarantee (Pro Forma)

C1.3.1 FIXED CONSTRUCTION GUARANTEE - JBCC 2000 PRINCIPAL BUILDING AGREEMENT (Edition 5.0 of July 2007)

To:
South African National Biodiversity Institute
Private Bag X101
Silveron
0184

Sir,

FIXED CONSTRUCTION GUARANTEE FOR THE EXECUTION OF A CONTRACT IN TERMS OF JBCC 2000 (5.0 EDITION JULY 2007)

1. With reference to the contract between .....(hereinafter Referred to as the "Contractor") and the South African National Biodiversity Institute (hereinafter referred to as the "Employer"), Contract/Tender No: **SANBI G545/2025 Request for bids for the appointment of a contractor for the repairs and upgrades of the existing nurseries and associated glasshouse infrastructure for the South African National Biodiversity Institute (SANBI) at the Kirstenbosch National Botanical Garden, Cape Town: Phase 2** (hereinafter referred to as the "contract") in the amount of

   R ……..(insert amount), … **.....**

   .....(insert amount in words), (hereinafter referred to as the contract sum),

   I / We, ...

   in my/our Capacity as ..... and hereby

   representing .....

   (hereinafter referred to as the "**Guarantor**") advise that the **Guarantor** holds at the **Employer's** disposal the sum of R....., (insert amount in figures)

   .....(insert amount in words) being 5% of the contract sum (excluding VAT), for the due fulfillment of the contract.

2. The **Guarantor** hereby renounces the benefits of the exceptions *non numeratae punia; non causa debiti; excussionis et divisionis;* and *de duobus vel pluribus reis debendi* which could be pleaded against the enforcement of this guarantee, with the meaning and effect whereof I/we declare myself/ourselves to be conversant, and undertake to the **Employer** the amount guaranteed, on receipt of a written demand from the **Employer** to do so, stating that the **Employer** has a right of recovery against the **Contractor** in terms of 33.0 of the contract.

3. Subject to the above, but without in any way detracting from the **Employer's** rights to adopt any of the procedures provided for in the contract, the said demand can be made by the **Employer**, at any stage prior to the expiry of this guarantee.
4. The amount id by the **Guarantor** in terms of this guarantee may be retained by the **Employer** on condition that upon the issue of the last final **payment certificate**, the **Employer** shall account to the **Guarantor** showing how this amount has been expended and refund any balance due to the **Guarantor**.

5. The **Employer** shall have the absolute right to arrange his affairs with the **Contractor** in any manner which the **Employer** deems fit and the **Guarantor** shall not have the right to claim his release on account of any conduct alleged to be prejudicial to the **Guarantor**. Without derogating from the aforegoing, any compromise, extension of the **construction period**, indulgence, release or variation of the **Contractor's** obligation shall not affect the validity of this guarantee.

6. The **Guarantor** reserves the right to withdraw from this guarantee at any time by depositing the guaranteed amount with the **Employer**, whereupon the Guarantor's liability seizes.

7. This guarantee is neither negotiable nor transferable, and

   (a) must be surrendered to the **Guarantor** at the time when the **Employer** accounts to the **Guarantor** in terms of clause 4 above, or
   (b) shall lapse on the date of the last **certificate of practical completion**.

8. This guarantee shall not be interpreted as extending the **Guarantor's** liability to anything more than payment of the amount guaranteed.

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

AS WITNESS

1. .....

2. .....

.....
By and on behalf of

.....

.....

(insert the name and physical address of the Guarantor)

Name: .....

Capacity: .....
(Duly authorised thereto by resolution attached marked Annexure A)

Date: .....

A. No alterations and/or additions of the wording of this form will be accepted.
B. The physical address of the Guarantor must be clearly indicated and will be regarded as the Guarantor's *domicilium citandi et executandi*, for all purposes arising from this guarantee.
C. This GUARANTEE must be returned to: .....
.....

C1.3.2: VARIABLE CONSTRUCTION GUARANTEE - JBCC 2000 PRINCIPAL BUILDING AGREEMENT (Edition 5.0 of July 2007)

To:

South African National Biodiversity Institute
Private Bag X101
Silverton
0184

Sir,

VARIABLE CONSTRUCTION GUARANTEE FOR THE EXECUTION OF A CONTRACT IN TERMS OF JBCC 2000 (5.0 EDITION JULY 2007)

5. With reference to the contract between ..... (hereinafter referred to as the "**Contractor**") and the **South African National Biodiversity Institute** (hereinafter referred to as the "**Employer**"), **Contract/Tender No: SANBI G545/2025 Request for bids for the appointment of a contractor for the repairs and upgrades of the existing nurseries and associated glasshouse infrastructure for the South African National Biodiversity Institute at the Kirstenbosch National Botanical Garden, Cape Town: Phase 2** (hereinafter referred to as the "contract") in the amount of (hereinafter referred to as the "contract") in the amount of

R ……..(insert amount), … **.....**

.....(insert amount in words),
(hereinafter referred to as the contract sum),
I / We, ...

in my/our Capacity as ..... and hereby

representing .....

(hereinafter referred to as the "**Guarantor**") advise that the **Guarantor** holds at the **Employer's** disposal the sum of R....., (insert amount in figures)

.....(insert amount in words)
being 10% of the contract sum (excluding VAT), for the due fulfillment of the contract.

1. I / We advise that the **Guarantor's** liability in terms of this guarantee shall be as follows:

   (a) From and including the date on which this guarantee is issued and up to and including the date of payment of the amount in the last final **payment certificate**, the **Guarantor** will be liable in terms of this guarantee to the maximum amount of 10% of the **contract sum** (excluding VAT);

   (b) The **Guarantor's** liability shall reduce to 3 % of the **contract value** (excluding VAT) as determined at the date of the last **certificate of practical completion**, subject to such amount not exceeding 10% of the **contract sum** (excluding VAT).

   (c) The **Guarantor's** liability shall reduce to 1 % of the **contract value** (excluding VAT) as determined at the date of the last **certificate of final completion**, subject to such amount not exceeding 10 % of the **contract sum** (excluding VAT).

   (d) This guarantee shall expire on the date of the last **final payment certificate**.

   (e) The **practical completion certificate** and the **final completion certificate** referred to in this guarantee shall mean the certificates issued in terms of the contract.

2. The **Guarantor** hereby renounces the benefits of the exceptions *non numeratae punia; non causa debiti; excussionis et divisionis;* and *de duobus vel pluribus reis debendi* which could be pleaded against the enforcement of this guarantee, with the meaning and effect whereof I/we declare myself/ourselves to be conversant, and undertake to y the **Employer** the amount guaranteed on receipt of a written demand from the **Employer** to do so, stating that the **Employer** has a right of recovery against the **Contractor** in terms of 33.0 of the contract.

4. Subject to the above, but without in any way detracting from the **Employer's** rights to adopt any of the procedures provided for in the contract, the said demand can be made by the **Employer** at any stage prior to the expiry of this guarantee.

5. The amount id by the **Guarantor** in terms of this guarantee may be retained by the **Employer** on condition that upon the issue of the last **final payment certificate**, the **Employer** shall account to the **Guarantor** showing how this amount has been expended and refund any balance due to the **Guarantor**.

6. The **Employer** shall have the absolute right to arrange his affairs with the **Contractor** in any manner which the **Employer** deems fit and the **Guarantor** shall not have the right to claim his release on account of any conduct alleged to be prejudicial to the **Guarantor**. Without derogating from the aforegoing, any compromise, extension of the construction period, indulgence, release or variation of the **Contractor's** obligation shall not affect the validity of this guarantee.

7. The **Guarantor** reserves the right to withdraw from this guarantee at any time by depositing the amount guaranteed with the **Employer**, whereupon the **Guarantor's** liability ceases.

8. This guarantee is neither negotiable nor transferable, and

   (a) must be surrendered to the **Guarantor** at the time when the **Employer** accounts to the **Guarantor** in terms of clause 5 above, or
   (b) shall lapse in accordance with clause 2(d) above.

9. This guarantee shall not be interpreted as extending the **Guarantor's** liability to anything more than the payment of the amount guaranteed.

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

AS WITNESS

1. .....

2. .....

.....
By and on behalf of

.....

.....

(insert the name and physical address of the Guarantor)

Name: .....

Capacity: .....
(Duly authorised thereto by resolution attached marked Annexure A)

Date: .....

A. No alterations and/or additions of the wording of this form will be accepted.

B. The physical address of the Guarantor must be clearly indicated and will be regarded as the Guarantor's *domicilium citandi et executandi*, for all purposes arising from this guarantee.

C. This GUARANTEE must be returned to: .....

.....

PART C: THE CONTRACT
Part C1: Agreement and Contract Data

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

C1.4 Occupational Health and Safety Agreement 37(2)

AGREEMENT MADE AND ENTERED INTO BETWEEN THE

SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI)

(Hereinafter called the **"EMPLOYER"**)

.....

(Contractor / Mandatary / Company / CC Name)

IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT, ACT NO. 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 there under.

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 Sub-contractors employed by me will enter into an Occupational Health and Safety Agreement separately, and that such Sub-contractors comply with the conditions set.

I hereby declare that I have read and understand the appended Occupational Health and Safety Conditions and undertake to comply therewith at all times.

I hereby also undertake to comply with the Occupational Health and Safety Specification and Plan.

Signed at ..... this ..... day of..... 20.....

....
WITNESS MANDATARY

Signed at ..... this ..... day of..... 20.....

....
WITNESS FOR AND ON BEHALF OF THE EMPLOYER

OCCUPATIONAL HEALTH AND SAFETY CONDITIONS

1. The Chief Executive Officer of the Contractor shall assume the responsibility in terms of Section 16(1) of the Occupational Health and Safety Act (as amended). Should the Contractor assign any duty in terms of Section 16(2), a copy of such assignment shall immediately be provided to the representative of the Employer as defined in the Contract.

2. All work performed on the Employer's premises shall be performed under the supervision of the construction supervisor who understand the hazards associated with any work that the Contractor performs on the site in terms of Construction Regulations 2003.

3. The Contractor shall appoint a Competent Person who shall be trained on any occupational health and safety aspect pertaining to them or to the work that is to be performed.

4. The Contractor shall ensure that he familiarises himself with the requirements of the Occupational Health and Safety Act and that he, his employees, and any sub-contractors, comply with them.

5. Discipline in the interests of occupational health and safety shall be strictly enforced.

6. Personal protective equipment shall be issued by the Contractor as required and shall be worn at all times where necessary.

7. Written safe work procedures and appropriate precautionary measures shall be available and enforced, and all employees shall be made conversant with the contents of these practices.

8. No substandard equipment/machinery/articles or substances shall be used on the site.

9. All incidents referred to in terms of Section 24 of the Occupational Health and Safety Act shall be reported by the Contractor to the Department of Labour and the Employer.

10 The Employer hereby obtains an interest in the issue of any formal inquiry conducted in terms of Section 32 of the Occupational Health and Safety Act and into any incident involving a Contractor and/or his employees and/or his Sub-Contractor/s.

11. No use shall be made of any of the Employer's machinery / plant / equipment / substance / personal protective equipment or any other article without prior arrangement and written approval.

12. No alcohol or any other intoxicating substance shall be allowed on the site. Any person suspected of being under the influence of alcohol or any other intoxicating substance shall not be permitted access to or allowed to remain on the site.

13. Prior to commencement of any work, verified copies of all documents mentioned in the agreement, must be presented to the Employer.

PART C: THE CONTRACT
Part C2: Pricing Data and Bill of Quantities

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

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PART C: THE CONTRACT
Part C2: Pricing Instruction and Bill of Quantities

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

C2.1 Pricing Instructions

1. GENERAL INFORMATION

a. Bills of Quantities
The **bills of quantities** forms part of and must be read and priced in conjunction with all the other documents forming part of the **contract documents**, the Standard Conditions of Tender, Conditions of Contract, Specifications, Drawings and all other relevant documentation.

b. Value Added Tax
The **contract sum** must include for Value Added Tax (VAT). All rates, provisional sums, etc. in the **bills of quantities** must however be net (exclusive of VAT) with VAT calculated and added to the total value thereof in the Final Summary.

c. Fixed Price Contract
Tenderers are to take note that contract price adjustments are not applicable to this contract. Tenderers should therefore make provision in the **contract sum**, schedule of rates, etc., for possible price increases during the contract period, as no claims in this regard shall be entertained.

2. PRICING INFORMATION

1. These schedules of quantities contain sequentially numbered pages as indicated in the contents list. Tenderers are required to check that the pages in their schedules of quantities are complete. If any pages are duplicated or omitted, or if any quantity or typing is unclear or if the schedules of quantities contain any obvious errors, the tenderer shall immediately notify the engineer so that the problem may be rectified. No responsibility for any errors arising from any of the above shall be accepted by the engineer.

2. The schedules of quantities form part of and shall be read in conjunction with the specification, which contains full description of the work required to be performed and the materials and equipment to be supplied and used in the execution of the works. Tenderers shall refer to the specification for the full meaning and description of work to be executed and materials and equipment to be supplied or used in the execution of the work.

3. Tenders shall be submitted with schedules of quantities completed in full. Non or partial completion of the schedules of quantities shall render tenders liable for disqualification.

4. The total tender price as carried forward to the tender form, after correction for arithmetic extension errors, etc. shall be the contract price as awarded to the successful tenderer. Tenderers are requested to check multiplication and addition of the schedules of quantities. The rate submitted shall be regarded as the price offered per item.

5. No changes, additions or omissions to the contents of the schedules of quantities shall be

permitted. If any changes, additions or omissions are made these shall not be recognised and the original wording of the schedules of quantities shall apply.

6. The priced schedules of quantities of tender shall be checked by the principal agent. The principal agent reserves the right to request adjustments to one or more individual tender prices and to rectify contradictions and thereby alter the total tender price as submitted. The acceptance of this tender does not preclude the principal agent from querying or requesting of the contractor to adjust the rates at any stage during the contract period or any extension thereto.

7. The responsibility of the accuracy of the quantities included in the schedules, remains with the person who prepared the schedules. The tenderer is relieved from the responsibility of the measurement of quantities at tender stage and the tender amounts shall be for the quantities as listed in the schedules. It is however expected from the tenderer to include for minor construction items such as would be required for the complete execution of works in accordance with the specification.

8. The quantities in these schedules of quantities shall not be used for the ordering of materials.

9. Changes in the scope of works included in the schedule of quantities shall be permitted and shall be measured and priced at the tariffs as included in the schedules of quantities and shall form an addition to or omission from the total of the schedule of quantities. Any changes not covered by any rates in the schedules of quantities shall be agreed and priced as non-schedule items in accordance with the conditions of contract.

10. The extent and value of variations shall be in accordance with the conditions of contract. Variations to the works prior to the execution thereof shall be priced as above. Variations to work already executed shall not necessarily be priced in accordance with the schedule of quantities and shall be judged individually on merit.

11. Except where the separate rate for the material and labour components of any item is specifically called for, the unit price of such item shall be deemed to include the supply and installation of that item.

    The description of any items shall, except where otherwise specified, allow for the purchase, delivery, off-loading, storage, packing, lifting, placing, positioning and fixing in position, cutting and wastage, dies and patterns, models and equipment, temporary work, return of packing material, fixing costs, profit or other obligations of the contract arising out of the conditions of contract.
    All items prices shall exclude VAT but include any other tax or levy as applicable.

    All items are measured to the net final quantity as indicated on the drawings with the completed work in the position as indicated on the drawing. All prices and rates shall allow for wastage for whatever reason, irrespective of any other standard measurement which may be currently used elsewhere.

12. Should the contractor identify any additional issues or items which in his opinion are necessary for the complete and proper execution of the works, he shall identify such items in a covering letter attached to his tender and submit rates for these items. Mistakes in the physical measurement of items in the schedules of quantities shall be rectified but no claim shall be considered for the non-measurement of doubtful or minor items or claims resulting of criticism of method of measurement used or descriptions given. The priced schedule of quantities shall not be adjusted on the grounds of the items which in the opinion of the tenderer should have been brought into account unless so detailed in the accompanying letter.

13. The schedule of quantities shall be adjusted to reflect the quantities of materials used on completion of whole or part of the works as a result of remeasurement, qualification or variations. The remeasured quantities shall form the basis for the calculation of payment certificates. The

schedules of quantities are not intended for the ordering of materials, etc. and the contractor is advised to extract the quantities for the ordering of materials directly from the drawings and specification. Any order placed directly from the schedules of quantities shall be solely at the contractor's risk.

14. The unit rates as entered in the schedule of quantities with the exclusion of dayworks items shall in all cases include any present and applicable sales tax or similar statutory duties.

PART C: THE CONTRACT
Part C2: Pricing Data and Bill of Quantities

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

C2.2 Bill of Quantities

TENDER NO: **G545/2025**
CLIENT: SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI)

TITLE OF THE PROJECT: ***REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2***

SCHEDULES FOR REPAIR WORK		**REPAIR**
SCHEDULE NO 1:	PRELIMINARY AND GENERAL	**100**
SCHEDULE NO 2:	STRUCTURAL AND BUILDING RELATED REPAIR WORK	**200**
SCHEDULE NO 3:	MECHANICAL SERVICES	**300**

Tender No: G545/2025
CLIENT: SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI)

REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2

SCHEDULE OF QUANTITIES

NB TENDERES MUST COMPLETE THE SCHEDULE OF QUANTITIES IN BLACK INK

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION A)

ITEM	DESCRIPTION	AMOUNT
	MEANING OF TERMS "TENDER / TENDERER" Any reference to the words "Tender" or "Tenderer" herein and/or in any other documentation shall be construed to have the same meaning as the words "Bid" or "Bidder" **PRELIMINARIES** The JBCC Preliminaries Code 2101, July 2007 edition for use with the JBCC Principal Building Agreement Edition 5.0 (Reprint 1) Code 2101, July 2007 is taken to be incorporated herein. The tenderer is deemed to have referred to these documents for the full intent and meaning of each clause. These clauses are referred to by number and heading only. Where standard clauses or options are not applicable to the contract such modifications or corrections as are necessary are given under each relevant clause. Where an item is not relevant to this specific contract such item is marked "N/A" signifying "Not Applicable" **PRICING OF PRELIMINARIES** Should Option A, as set out in clause B10.3.1 hereinafter be used for the adjustment of preliminaries then each item priced is to be allocated to one or more of the three categories Fixed, Value Related or Time Related and the respective amounts entered in the spaces provided under each item Items not priced in these Preliminaries shall be deemed to be included elsewhere in these Bills of Quantities **SECTION A: JBCC PRINCIPAL BUILDING AGREEMENT** **DEFINITIONS**	
A1.0	**DEFINITIONS AND INTERPRETATION** Refer to Contract Data Fixed:_____Value related:_____Time related:_____ **Item**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION A)

ITEM	DESCRIPTION	AMOUNT
	OBJECTIVE AND PREPARATION	
A2.0	**OFFER, ACCEPTANCE AND PERFORMANCE** Clause 2.0 Fixed:_____Value related:_____Time related:_____ **Item**	
A3.0	**DOCUMENTS** Clause 3.0 Clause 3.2.1 is amended by replacing “14.1” with “14.0” Clause 3.7 is amended by the addition of the following: The **contractor** shall supply and keep a copy of the **JBCC** Series 2000 Principal Building Agreement and Preliminaries applicable to this contract on the site, to which the employer, **principal agen**t and **agents** shall have access at all times Clause 3.11 is amended by replacing the second reference to “principal agent” with the word **“employer”** Fixed:_____Value related:_____Time related:_____ **Item**	
A4.0	**DESIGN RESPONSIBILITY** Clause 4.0 Fixed:_____Value related:_____Time related:_____ **Item**	
A5.0	**EMPLOYER’S AGENTS** Clause 5.0 Clause 5.1.2 is amended to include clauses 32.6.3, 34.3, 34.4 and 38.5.8 Fixed:_____Value related:_____Time related:_____ **Item**	
A6.0	**CONTRACTOR'S SITE REPRESENTATIVE** Clause 6.0 Fixed:_____Value related:_____Time related:_____ **Item**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION A)

ITEM	DESCRIPTION	AMOUNT
A7.0	**COMPLIANCE WITH LAWS AND REGULATIONS** Clause 7.0 Note: A separate clause has been included in Section C: Specific Preliminaries of the **bills of quantities / lump sum document** for the **contractor** to have the opportunity to price for all the requirements of the Occupational Health and Safety Act, Construction Regulations and Health and Safety Specification Fixed:_____Value related:_____Time related:_____ **Item**	
A8.0	**WORKS RISK** Clause 8.0 Fixed:_____Value related:_____Time related:_____ **Item**	
A9.0	**INDEMNITIES** Clause 9.0 Fixed:_____Value related:_____Time related:_____ **Item**	
A10.0	**GENERAL INSURANCES** Clause 10.0 Clause 10.0 is amended by the addition of the following clauses: **10.5 Damage to the Works** (a) Without in any way limiting the **contractor's** obligations in terms of the contract, the contractor shall bear the full risk of damage to and/or destruction of the **works** by whatever cause during construction of the **works** and hereby indemnifies and holds harmless the employer against any such damage. The **contractor** shall take such precautions and security measures and other steps for the protection and security of the **works** as the contractor may deem necessary (b) The **contracto**r shall at all times proceed immediately to remove or dispose of any debris arising from damage to or destruction of the **works** and to rebuild, restore, replace and/or repair the **works** (c) The **employer** shall carry the risk of damage to or destruction of the **works** and materials paid for by the **employer** that is the result of the excepted risks as set out in 10.6 (d) Where the **employer** bears the risk in terms of this contract, the **contractor** shall, if requested to do so, reinstate any damage or destroyed portions of the **works** and the costs of such reinstatement shall be measured and valued in terms of 32.0 hereof	

ITEM	DESCRIPTION	AMOUNT
	10.6 Injury to Persons or loss of or damage to Properties (a) The **contractor** shall be liable for and hereby indemnifies the **employer** against any liability, loss, claim or proceeding whether arising in common law or by statute, consequent upon personal injuries to or the death of any person whomsoever arising out of or in the course of or caused by the execution of the **works** unless due to any act or negligence of any person for whose actions the **employer** is legally liable (b) The **contracto**r shall be liable for and hereby indemnifies the employer against any liability, loss, claim or proceeding consequent upon loss of or damage to any moveable or immovable or personal property or property contiguous to the **site**, whether belonging to or under the control of the **employer** or any other body or person, arising out of or in the course of or by reason of the execution of the **works** unless due to any act or negligence of any person for whose actions the **employe**r is legally liable (c) The **contractor** shall, upon receiving a **contract instruction** from the **principal agent**, cause the same to be made good in a perfect and workmanlike manner at his own cost and in default thereof the **employe**r shall be entitled to cause it to be made good and to recover the cost thereof from the **contractor** or to deduct the same from amounts due to the **contractor** (d) The **contractor** shall be responsible for the protection and safety of such portions of the premises placed under his control by the **employer** for the purpose of executing the **works** until the issue of the **certificate of practical completion** (e) Where the execution of the **works** involves the risk of removal of or interference with support to adjoining properties including land or structures or any structures to be altered or added to, the **contracto**r shall obtain adequate insurance and will remain adequately insured or insured to the specific limit stated in the contract against the death of or injury to persons or damage to such property consequent on such removal or interference with the support until such portion of the **works** has been completed **10.7 High risk insurance** In the event of the project being executed in a geological area classified as a “High Risk Area”, that is an area which is subject to highly unstable subsurface conditions that might result in catastrophic ground movement evident by sinkhole or doline formation the following will apply: **10.7.1 Damage to the works** The **contractor** shall, from the **commencement date** of the **works** until the date of the **certificate of practical completion** bear the full risk of and hereby indemnifies and holds harmless the **employer** against any damage to and/or destruction of the **works** consequent upon a catastrophic ground movement as mentioned above. The **contractor** shall take such precautions and security measures and other steps for the protection of the **works** as he may deem necessary When so instructed to do so by the **principal agent**, the **contractor** shall proceed immediately to remove and/or dispose of any debris arising from damage to or destruction of the **works** and to rebuild, restore, replace and/or repair the **works**, at the **contractor’s** own costs	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION A)

ITEM	DESCRIPTION	AMOUNT
	10.7.2 Injury to persons or loss of or damage to property The **contractor** shall be liable for and hereby indemnifies and holds harmless the **employer** against any liability, loss, claim or proceeding arising at any time during the period of the contract whether arising in common law or by statute, consequent upon personal injuries to or the death of any person whomsoever resulting from, arising out of, or caused by a catastrophic ground movement as mentioned above The **contractor** shall be liable for and hereby indemnifies the **employe**r against any and all liability, loss, claim or proceeding consequent upon loss of or damage to any moveable or immovable or personal property or property contiguous to the **site**, whether belonging to or under the control of the **employer** or any other body or person whomsoever arising out of or caused by a catastrophic ground movement, as mentioned above, which occurred during the period of the contract **10.7.3** It is the responsibility of the **contracto**r to ensure that he has adequate insurance to cover his risk and liability as mentioned in 10.7.1 and 10.7.2. Without limiting the **contractor's** obligations in terms of the contract, the **contractor** shall, within twenty-one (21) **calendar days** of the commencement date but before commencement of the **works**, submit to the employer proof of such insurance policy, if requested to do so **10.7.4** The employer shall be entitled to recover any and all losses and/or damages of whatever nature suffered or incurred consequent upon the **contractor's** default of his obligations as set out in 10.7.1; 10.7.2 and 10.7.3. Such losses or damages may be recovered from the **contractor** or by deducting the same from any amounts still due under this contract or under any other contract presently or hereafter existing between the **employe**r and the **contractor** and for this purpose all these contracts shall be considered one indivisible whole Fixed:_____Value related:_____Time related:_____ **Item**	
A11.0	**SPECIAL INSURANCES** Clause 11.0 Fixed:_____Value related:_____Time related:_____ **Item**	
A12.0	**EFFECTING INSURANCES** Clause 12.0 Fixed:_____Value related:_____Time related:_____ **Item**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION A)

ITEM	DESCRIPTION	AMOUNT
A13.0	***No clause***	
A14.0	**SECURITY** Clause 14.0 Clauses 14.1 - 14.8 are amended by replacing them with the following: 14.1 In respect of contracts with a **contract sum** up to R1 million, the **security** to be provided by the **contractor** to the **employer** will be a payment reduction of five per cent (5%) of the value certified in the **payment certificate** (excluding VAT) 14.1.1 The payment reduction of the value certified in a **payment certificate** shall be mutatis mutandi in terms of 31.8(A) 14.1.2 The **employer** shall be entitled to recover expense and loss from the payment reduction in terms of 33.0 provided that the **employer** complies with the provisions of 33.4 in which event the **employer's** entitlement shall take precedence over his obligations to refund the payment reduction **security** or portions thereof to the **contractor** 14.2 In respect of contracts with a **contract sum** above R1 million, the **contractor** shall have the right to select the **security** to be provided in terms of 14.3, 14.4, 14.5, 14.6, or 14.7 as stated in the **schedule**. Such **security** shall be provided to the **employer** within twenty-one (21) **calendar days** from **commencement date**. Should the **contractor** fail to select the **security** to be provided or should the **contractor** fail to provide the **employer** with the selected security within twenty-one (21) **calendar days** from **commencement date**, the **security** in terms of 14.7 shall be deemed to have been selected 14.3 Where **security** as a cash deposit of ten per cent (10%) of the **contract sum** (excluding VAT) has been selected: 14.3.1 The contractor shall furnish the employer with a cash deposit equal in value to ten per cent (10%) of the contract sum (excluding VAT) within twenty-one (21) calendar days from commencement date 14.3.2 Within twenty-one (21) calendar days of the date of practical completion of the works the employer shall reduce the cash deposit to an amount equal to three per cent (3%) of the contract value (excluding VAT), and refund the balance to the contractor 14.3.3 Within twenty-one (21) calendar days of the date of final completion of the works the employer shall reduce the cash deposit to an amount equal to one per cent (1%) of the contract value (excluding VAT) and refund the balance to the contractor 14.3.4 On the date of payment of the amount in the final payment certificate, the employer shall refund the remainder of the cash deposit to the contractor 14.3.5 The employer shall be entitled to recover expense and loss from the cash deposit in terms of 33.0 provided that the employer complies with the provisions of 33.4 in which event the employer's entitlement shall take precedence over his obligations to refund the cash deposit security or portions thereof to the contractor	

ITEM	DESCRIPTION	AMOUNT
	14.3.6 The parties expressly agree that neither the employer nor the contractor shall be entitled to cede the rights to the deposit to any third party 14.4 Where security as a variable construction guarantee of ten percent (10%) of the contract sum (excluding VAT) has been selected: 14.4.1 The **contractor** shall furnish the employer with an acceptable variable **construction guarantee** equal in value to ten per cent (10%) of the **contract sum** (excluding VAT) within twenty-one (21) **calendar days** from **commencement date** 14.4.2 The variable **construction guarantee** shall reduce and expire in terms of the Variable **Construction Guarantee** form included in the invitation to tender 14.4.3 The **employer** shall return the variable **construction guarantee** to the **contractor** within fourteen (14) **calendar days** of it expiring 14.4.4 Where the **employer** has a right of recovery against the **contractor** in terms of 33.0, the employer shall issue a written demand in terms of the variable **construction guarantee** 14.5 Where **security** as a fixed **construction guarantee** of five per cent (5%) of the **contract sum** (excluding VAT) and a five per cent (5%) payment reduction of the value certified in the **payment certificate** (excluding VAT) has been selected: 14.5.1 The **contractor** shall furnish a fixed **construction guarantee** to the **employer** equal in value to five per cent (5%) of the **contract sum** (excluding VAT) 14.5.2 The fixed **construction guarantee** shall come into force on the date of issue and shall expire on the date of the last certificate of **practical completion** 14.5.3 The **employer** shall return the fixed **construction guarantee** to the **contractor** within fourteen (14) **calendar days** of it expiring 14.5.4 The payment reduction of the value certified in a **payment certificate** shall be in terms of 31.8 (A) and 34.8 14.5.5 Where the **employer** has a right of recovery against the **contractor** in terms of the 33.0 the **employer** shall be entitled to issue a written demand in terms of the fixed **construction guarantee** or may recover from the payment reduction or may do both 14.6 Where **security** as a cash deposit of five per cent (5%) of the **contract sum** (excluding VAT) and a payment reduction of five per cent (5%) of the value certified in the **payment certificate** (excluding VAT) has been selected: 14.6.1 The **contractor** shall furnish the **employer** with a cash deposit equal in value to five per cent (5%) of the **contract sum** (excluding VAT) within twenty-one (21) **calendar days** from **commencement date**	

ITEM	DESCRIPTION	AMOUNT
	14.6.2 Within twenty-one (21) **calendar days** of the date of **practical completion** of the **works** the **employer** shall refund the cash deposit in total to the **contractor** 14.6.3 The payment reduction of the value certified in a **payment certificate** shall be mutatis mutandi in terms of 31.8(A) 14.6.4 Where the **employer** has a right of recovery against the **contractor** in terms of 33.0, the **employer** may issue a written notice in terms of 33.4 or may recover from the payment reduction or may do both 14.7 Where **security** as a payment reduction of ten per cent (10%) of the value certified in the **payment certificate** (excluding VAT) has been selected: 14.7.1 The payment reduction of the value certified in a **payment certificate** shall be mutatis mutandi in terms of 31.8(B) 14.7.2 The **employer** shall be entitled to recover expense and loss from the payment reduction in terms of 33.0 provided that the **employer** complies with the provisions of 33.4 in which event the **employer's** entitlement shall take precedence over his obligations to refund the payment reduction or portions thereof to the **contractor** 14.8 Payments made by the guarantor to the **employer** in terms of the fixed or variable **construction guarantee** shall not prejudice the rights of the **employer** or **contractor** in terms of this **agreement** 14.9 Should the contractor fail to furnish the security in terms of 14.2, the employer, in his sole discretion and without notification to the contractor, is entitled to change the contractor's selected form of security to that of a ten per cent (10%) payment reduction of the value certified in the payment certificate (excluding VAT), whereafter 14.7 shall be applicable **EXECUTION**	
A15.0	**PREPARATION FOR AND EXECUTION OF THE WORKS** Clause 15.0 Clause 15.1.1 is amended by replacing it with: Clause 15.1.2 is amended by replacing it with: The **security** selected in terms of 14.0 Clause 15.1 is amended by the addition of the following clause: 15.1.4 An acceptable health and safety plan, required in terms of the Occupational Health and Safety Act, (Act 85 of 1993), R84 of February 7, 2014 Construction Regulations that came into effect within twenty-one (21) **calendar days** of **commencement date**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION A)

ITEM	DESCRIPTION	AMOUNT
	Clause 15.2.1 is amended by replacing it with the following clause: Give the **contractor** possession of the **site** within ten (10) **working days** of the **contractor** complying with the terms of 15.1.4 Fixed:_____Value related:_____Time related:_____ **Item**	
A16	**SITE AND ACCESS** Clause 16.0 Fixed:_____Value related:_____Time related:_____ **Item**	
A17.0	**CONTRACT INSTRUCTIONS** Clause 17.0 Clause 17.1.11 is amended by deleting the words “and the appointment of Fixed:_____Value related:_____Time related:_____ **Item**	
A18.0	**SETTING OUT OF THE WORKS** Clause 18.0 Fixed:_____Value related:_____Time related:_____ **Item**	
A19.0	**TEMPOARARY WORKS AND PLANT** Clause 19.0 Fixed:_____Value related:_____Time related:_____ **Item**	
A20.0	**NOMINATED SUBCONTRACTORS** Clause 20.0 Clause 20.1.3 is amended by replacing it with the following: No clause Fixed:_____Value related:_____Time related:_____ **Item**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION A)

ITEM	DESCRIPTION	AMOUNT
A21.0	**SELECTED SUBCONTRACTORS** Clause 21.0 Clause 21 is amended by replacing it with: No clause Fixed:_____Value related:_____Time related:_____ **Item**	
A22.0	**EMPLOYER'S DIRECT CONTRACTORS** Clause 22.0 Fixed:_____Value related:_____Time related:_____ **Item**	
A23.0	**CONTRACTOR'S DOMESTIC SUBCONTRACTORS** Clause 23.0 Fixed:_____Value related:_____Time related:_____ **Item**	
	COMPLETION	
A24.0	**PRACTICAL COMPLETION** Clause 24.0 Fixed:_____Value related:_____Time related:_____ **Item**	
A25.0	**WORKS COMPLETION** Clause 25.0 Fixed:_____Value related:_____Time related:_____ **Item**	
A26.0	**FINAL COMPLETION** Clause 26.0 Clause 26.1.2 is amended by inserting Fixed:_____Value related:_____Time related:_____ **Item**	
A27.0	**LATENT DEFECTS LIABILITY PERIOD** Clause 27.0 Fixed:_____Value related:_____Time related:_____ **Item**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION A)

ITEM	DESCRIPTION	AMOUNT
A28.0	**SECTIONAL COMPLETION** Clause 28.0 Fixed:_____Value related:_____Time related:_____ **Item**	
A29.0	**REVISION OF DATE FOR PRACTICAL COMPLETION** Clause 29.0 Clause 29.2.5 is amended by replacing it with: No clause Fixed:_____Value related:_____Time related:_____ **Item**	
A30.0	**PENALTY FOR LATE OR NON-COMPLETION** Clause 30.0 Fixed:_____Value related:_____Time related:_____ **Item**	
	PAYMENT	
A31.0	**INTERIM PAYMENT TO THE CONTRACTOR** Clause 31.0 Clause 31.5.2 is amended by replacing “14.7.1” with “14.0” Clause 31.8 is amended by replacing it with the following two alternative clauses: **Alternative A** 31.8(A) Where a **security** is selected in terms of 14.1; 14.5 or 14.6, the value of the **works** in terms of 31.4.1 and **materials and goods** in terms of 31.4.2 shall be certified in full. The value certified shall be subject to the following percentage adjustments: 31.8(A).1 Ninety-five per cent (95%) of such value in interim **payment certificates** issued up to the date of **practical completion** 31.8(A).2 Ninety-seven per cent (97%) of such value in interim **payment certificates** issued on the date of **practical completion** and up to but excluding the date of **final completion** 31.8(A).3 Ninety-nine per cent (99%) of such value in interim **payment certificates** issued on the date of f**inal completion** and up to but excluding the final **payment certificate** in terms of 34.6 31.8(A).4 One hundred per cent (100%) of such value in the final **payment certificate** in terms of 34.6 except where the amount certified is in favour of the **employer.** In such an event the payment reduction shall remain at the adjustment level applicable to the final **payment certificate**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION A)

ITEM	DESCRIPTION	AMOUNT
	Alternative B 31.8(B) Where **security** as a payment reduction in terms of 14.7 has been selected, the value of the **works** in terms of 31.4.1 and **materials and goods** in terms of 31.4.2 shall be certified in full. The value certified shall be subject to the following percentage adjustments: 31.8(B).1 Ninety per cent (90%) of such value in interim **payment certificate**s issued up to the date of **practical completion** 31.8(B).2 Ninety-seven per cent (97%) of such value in interim **payment certificate**s issued on the date of **practical completion** and up to but excluding the date of **final completion** 31.8(B).3 Ninety-nine per cent (99%) of such value in interim **payment certificates** issued on the date of **final completion** and up to but excluding the final **payment certificate** in terms of 34.6 31.8(B).4 One hundred per cent (100%) of such value in the final **payment certificate** in terms of 34.6 except where the amount certified is in favour of the **employer**. In such an event the payment reduction shall remain at the adjustment level applicable to the final **payment certificate** Clause 31.12 is amended by deleting the following: Payment shall be subject to the employer giving the contractor a tax invoice for the amount due Fixed:_____Value related:_____Time related:_____ **Item**	
A32.0	**ADJUSTMENT TO THE CONTRACT VALUE** Clause 32.0 Clauses 32.5.1, 32.5.4 and 32.5.7 are amended by the addition of the following at the end of the sentence: "due to no fault of the **contracto**r" Fixed:_____Value related:_____Time related:_____ **Item**	
A33.0	**RECOVERY OF EXPENSE AND LOSS** Clause 33.0 Fixed:_____Value related:_____Time related:_____ **Item**	
A34.0	**FINAL ACCOUNT AND FINAL PAYMENT** Clause 34.0 Clause 34.1 is amended by removing Clause 34.2 is amended by inserting	

ITEM	DESCRIPTION	AMOUNT
	Clause 34.8 is amended by deleting the words "where **security** as a fixed **construction guarantee** in terms of 14.4 has been selected or where payment reduction has been applied in terms of 14.7.1" Clause 34.13 is amended by replacing "seven (7) **calendar days**" with "twenty-one (21) **calendar days**" and deleting the words "subject to the **employer** giving the **contractor** a tax invoice for the amount due" Fixed:_____Value related:_____Time related:_____ **Item**	
A35.0	**PAYMENT TO OTHER PARTIES** Clause 35.0 Fixed:_____Value related:_____Time related:_____ **Item**	
A36.0	**TERMINATION BY EMPLOYER – CONTRACTOR'S DEFAULT** Clause 36.0 Clause 36.1 is amended by the addition of the following clauses 36.1.3 refuses or neglects to comply strictly with any of the conditions of contract 36.1.4 estate being sequestrated, liquidated or surrendered in terms of the insolvency laws in force within the Republic of South Africa 36.1.5 in the judgement of the **employer**, has engaged in **corrupt** or **fraudulent practices** in competing for or in executing the contract Clause 36.3 is amended by removing the reference to "No clause" and replacing the words **"principal agent"** with **"employer"** Clause 36.0 is amended by the addition of the following clause: Clause 36.0 is amended by the addition of the following clause:\ 36.7 Notwithstanding any clause to the contrary, on cancellation of this **agreement** either by the **employer** or the **contractor**; or for any reason whatsoever, the contractor shall on written instruction, discontinue with the **works** on a date stated and withdraw himself from the site. The contractor shall not be entitled to refuse to withdraw from the **works** on the grounds of any lien or right of retention or on the grounds of any other right whatsoever Fixed:_____Value related:_____Time related:_____ **Item**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION A)

ITEM	DESCRIPTION	AMOUNT
A37.0	**TERMINATION BY EMPLOYER – LOSS AND DAMAGE** Clause 37.0 Clause 37.3.5 is amended by replacing “ninety (90)” with “one-hundred and twenty (120)” Clause 37.0 is amended by the addition of the following clause: 37.5 Notwithstanding any clause to the contrary, on cancellation of this **agreement** either by the **employer** or the **contractor**; or for any reason whatsoever, the **contractor** shall on written instruction, discontinue with the **works** on a date stated and withdraw himself from the **site**. The **contractor** shall not be entitled to refuse to withdraw from the works on the grounds of any lien or right of retention or on the grounds of any other right whatsoever Fixed:_____Value related:_____Time related:_____ **Item**	
A38.0	**TERMINATION BY CONTRACTOR – EMPLOYER’S DEFAULT** Clause 38.0 Clause 38.5.4 is amended by replacing “ninety (90)” with “one-hundred and twenty (120)” Clause 38.0 is amended by the addition of the following clause: 38.7 Notwithstanding any clause to the contrary, on cancellation of this **agreement** either by the **employer** or the **contractor;** or for any reason whatsoever, the **contractor** shall on written instruction, discontinue with the **works** on a date stated and withdraw himself from the **site**. The **contractor** shall not be entitled to refuse to withdraw from the **works** on the grounds of any lien or right of retention or on the grounds of any other right whatsoever Fixed:_____Value related:_____Time related:_____ **Item**	
A39.0	**TERMINATION – CESSATION OF THE WORKS** Clause 39.0 Clause 39.3.5 is amended by the addition of the following at the end of the sentence: “within one hundred and twenty (120) **working days** of completion of such a report” Fixed:_____Value related:_____Time related:_____ **Item**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION A)

ITEM	DESCRIPTION	AMOUNT
	DISPUTE	
A40.0	**SETTLEMENT OF DISPUTES** Clause 40.0 Clause 40.2.2 is amended by replacing “one (1) year” with “three (3) years” Clause 40.6 is amended by removing the reference to: No clause Clause 40.7.1 is amended by replacing “(10)” with “(15)” and by the addition of the following: Whether or not mediation resolves the dispute, the parties shall bear their own costs concerning the mediation and equally share the costs of the mediator and related costs Fixed:_____Value related:_____Time related:_____ **Item**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION B)

ITEM	DESCRIPTION	AMOUNT
B1.1	***Definitions and interpretation*** See also clause A1.0 of Section A for additional and/or amended definitions which shall apply equally to this Section Fixed:_____Value related:_____Time related:_____ **Item**	
B2.0	**DOCUMENTS**	
B2.1	***Checking of documents*** Fixed:_____Value related:_____Time related:_____ **Item**	
B2.2	***Provisional bills of quantities*** Fixed:_____Value related:_____Time related:_____ **Item**	
B2.3	***Availability of construction documentation*** Fixed:_____Value related:_____Time related:_____ **Item**	
B2.4	***Interests of agents*** Fixed:_____Value related:_____Time related:_____ **Item**	
B2.5	***Priced documents*** Fixed:_____Value related:_____Time related:_____ **Item**	
B2.6	***Tender submission*** Clause 2.6 is amended by replacing “JBCC Form of Tender” with “The Tender Page 97” Fixed:_____Value related:_____Time related:_____ **Item**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION B)

ITEM	DESCRIPTION	AMOUNT
B3.0	**THE SITE**	
B3.1	***Defined works area***	
B3.2	***Geotechnical investigation***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B3.3	***Inspection of the site***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B3.4	***Existing premises occupied***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B3.5	***Previous work – dimensional accuracy***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B3.6	***Previous work – defects***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B3.7	***Services – known***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B3.8	***Services – unknown***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B3.9	***Protection of trees***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B3.9	***Protection of trees***	
	Fixed:_____Value related:_____Time related:_____ **Item**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION B)

ITEM	DESCRIPTION	AMOUNT
B3.10	***Articles of value***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B3.11	***Inspection of adjoining properties***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B4. 0	**MANAGEMENT OF CONTRACT**	
B4.1	***Management of the works***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B4.2	***Programme for the works***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B4.3	***Progress meetings***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B4.4	***Technical meetings***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B4.5	***Labour and plant records***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B5.0	**SAMPLES, SHOP DRAWINGS AND MANUFACTURERS' INSTRUCTIONS**	
B5.1	***Samples of materials***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B5.2	***Workmanship samples***	
	Fixed:_____Value related:_____Time related:_____ **Item**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION B)

ITEM	DESCRIPTION	AMOUNT
B5.3	***Shop drawings***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B5.4	***Compliance with manufacturers' instructions***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B6.0	**TEMPORARY WORKS AND PLANT**	
B6.1	***Deposits and fees***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B6.2	***Enclosure of the works***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B6.3	***Advertising***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B6.4	**Plant, equipment, sheds and offices**	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B6.5	***Main notice board***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B6.6	***Subcontractors' notice board***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B7.0	**TEMPORARY SERVICES**	
B7.1	***Location***	
	Fixed:_____Value related:_____Time related:_____ **Item**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION B)

ITEM	DESCRIPTION	AMOUNT
B7.2	***Water***	
	Fixed:_____Value related:_____Time related:_____	
	Item	
B7.3	***Electricity***	
	Fixed:_____Value related:_____Time related:_____	
	Item	
B7.4	***Telecommunication facilities***	
	Fixed:_____Value related:_____Time related:_____	
	Item	
B7.5	***Ablution facilities***	
	Fixed:_____Value related:_____Time related:_____	
	Item	
B8.0	**PRIME COST AMOUNTS**	
B8.1	***Responsibility for prime cost amounts***	
	Fixed:_____Value related:_____Time related:_____	
	Item	
B9.0	**ATTENDANCE ON N/S SUBCONTRACTORS**	
B9.1	***General attendance***	
	Fixed:_____Value related:_____Time related:_____	
	Item	
B9.2	***Special attendance***	
	Fixed:_____Value related:_____Time related:_____	
	Item	
B9.3	***Commissioning – fuel, water and electricity***	
	Fixed:_____Value related:_____Time related:_____	
	Item	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION B)

ITEM	DESCRIPTION	AMOUNT
B10.0	***FINANCIAL ASPECTS***	
B10.1	***Statutory taxes, duties and levies***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B10.2	***Payment for preliminaries***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B10.3	***Adjustment of preliminaries***	
	Clauses B10.3.1 and B10.3.2 are amended by replacing “within fifteen (15)	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B10.4	***Payment certificate cash flow***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B11.0	**GENERAL**	
B11.1	***Protection of the works***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B11.2	***Protection / isolation of existing / sectionally occupied works***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B11.3	***Security of the works***	
	Fixed:_____Value related:_____Time related:_____ **Item**	
B11.4	***Notice before covering work***	
	Fixed:_____Value related:_____Time related:_____ **Item**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION B)

ITEM	DESCRIPTION	AMOUNT
B11.5	***Disturbance*** Fixed:_____Value related:_____Time related:_____ **Item**	
B11.6	***Environmental disturbance*** Fixed:_____Value related:_____Time related:_____ **Item**	
B11.7	***Works cleaning and clearing*** Fixed:_____Value related:_____Time related:_____ **Item**	
B11.8	***Vermin*** Fixed:_____Value related:_____Time related:_____ **Item**	
B11.9	***Overhand work*** Fixed:_____Value related:_____Time related:_____ **Item**	
B11.10	***Instruction manuals and guarantees*** Fixed:_____Value related:_____Time related:_____ **Item**	
B11.11	***As built information*** Fixed:_____Value related:_____Time related:_____ **Item**	
B11.12	**Tenant installations** Fixed:_____Value related:_____Time related:_____ **Item**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION B)

ITEM	DESCRIPTION	AMOUNT
B12.0	**SCHEDULE OF VARIABLES**	
B12.1	***Schedule of variables***	
	This **schedule** contains all variables referred to in this document and is divided into pre-tender and post-tender categories. The pre-tender category must be completed in full and included in the tender documents. Both the pre-tender and post-tender categories form part of these **Preliminaries**	
	12,1,1 **PRE-TENDER INFORMATION**	
	Refer to Contract Data	
	12,1,2 **POST-TENDER INFORMATION**	
	Refer to Contract Data	
	Fixed:_____Value related:_____Time related:_____ **Item**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION C)

ITEM	DESCRIPTION	AMOUNT
	SECTION C: SPECIFIC PRELIMINARIES **Section C** contains specific preliminary items which apply to this contract except where N/A (Not Applicable) appears against an item	
C1.0	**CONTRACT DRAWINGS** * Select relevant paragraph and delete whichever is not applicable depending on whether the contract is based on a ***bills of quantities*** or ***lump sum document*** * The drawings issued with the tender documents do not comprise the complete set but serve as a guide only for tendering purposes and for indicating the scope of the work to enable the tenderer to acquaint himself with the nature and extent of the **works** and the manner in which they are to be executed Should any part of the drawings not be clearly understood by the tenderer he shall, before submitting his tender, obtain clarification in writing from the **principal agent** Fixed:_____Value related:_____Time related:_____ **Item**	
C2.0	**PREAMBLES** The Specifications shall be read in conjunction with the **bills of quantities / lump sum document** and be referred to for the full descriptions of work to be done and materials to be used The speciifications are issued and shall be read in conjunction with the drawings and the **bills of quantities / lump sum document** Fixed:_____Value related:_____Time related:_____ **Item**	
C3.0	**TRADE NAMES** Wherever a trade name for any product has been described in the **bills of quantities / lump sum document**, the tenderer's attention is drawn to the fact that any other product of equal quality may be used subject to the written approval of the **principal agent** being obtained prior to the closing date for submission of tenders If prior written approval for an alternative product is not obtained, the product described shall be deemed to have been tendered for Fixed:_____Value related:_____Time related:_____ **Item**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION C)

ITEM	DESCRIPTION	AMOUNT
C4.0	**IMPORTED MATERIALS AND EQUIPMENT** Where imported items are listed in the tender documents, the tenderer shall provide all the information called for, failing which the price of any such item, materials or equipment shall be excluded from currency fluctuations. (refer to Annexure D Imported Content Declaration) Notwithstanding any provisions elsewhere regarding the adjustment of contract prices, the price of any item, material or equipment listed in terms of this clause shall be excluded from the Contract Price Adjustment Provisions (if applicable) Fixed:_____Value related:_____Time related:_____ **Item**	
C5.0	**OCCUPATIONAL HEALTH AND SAFETY ACT** The **contractor** shall comply with all the requirements as set out in the Construction Regulations, 2014 issued under the Occupational Health and Safety Act, 1993 (Act No 85 of 1993) It is required of the **contractor** to thoroughly study the Health and Safety Specification that must be read together with and is deemed to be incorporated under this Section of the **bills of quantities / lump sum document** The **contractor** must take note that compliance with the Occupational Health and Safety Act, Construction Regulations and Health and Safety Specification is compulsory. In the event of partial or total non-compliance, the **principal agent**, notwithstanding the provisions of clause A31.0 of Section A or any other clause to the contrary, reserves the right to delay issuing any progress **payment certificate** until the **contractor** provides satisfactory proof of compliance. The **contractor** shall not be entitled to any compensation of whatsoever nature, including interest, due to such delay of payment Provision for pricing of the Occupational Health and Safety Act, Construction Regulations and Health and Safety Specification is made under this clause and it is explicitly pointed out that all requirements of the aforementioned are deemed to be priced hereunder and no additional claims in this regard shall be entertained 0.1 Prepararion of Health and Safety Plan. Impleamentation and maintenance of Health and Safety Plan Fixed:_____Value related:_____Time related:_____ **Item**	

SCHEDULE NO 1: PRELIMINARY AND GENERAL (SECTION C)

ITEM	DESCRIPTION	AMOUNT
	0.2 Health and Safety Training. Implementation and maintenance of Training Fixed:_____Value related:_____Time related:_____ **Item** 0.3 Personal Protective Clothing and equipment. Maintenance of Personal Protective Clothing and Equipment Fixed:_____Value related:_____Time related:_____ **Item** 0.4 Fences, Signs and Barricades. Maintenance of Fence, Signs and Barricades Fixed:_____Value related:_____Time related:_____ **Item** 0.5 Establishment of Safety Administration. Implementation and maintenance of Safety Administration Fixed:_____Value related:_____Time related:_____ **Item** 0.6 Other Health and Safety Fixed-charge Obligations. Other Health and Safety Time-Related Obligations Fixed:_____Value related:_____Time related:_____ **Item**	

SCHEDULE NO 1: PRELIMINARIES AND GENERAL

COLLECTION Item		Page	AMOUNT
	SECTION A: JBCC PRINCIPAL BUILDING AGREEMENT		
	Definitions		
A1.0	Definitions and interpretation	1.1-1	
	Objective and Preparation		
A2.0	Offer, acceptance and performance	1.1-2	
A3.0	Documents	1.1-2	
A4.0	Design responsibility	1.1-2	
A5.0	Employer's agents	1.1-2	
A6.0	Contractor's Site representative	1.1-2	
A7.0	Compliance with laws and regulations	1.1-3	
A8.0	Works risk	1.1-3	
A9.0	Indemnities	1.1-3	
A10.0	General insurances	1.1-3	
A11.0	Special insurances	1.1-5	
A12.0	Effecting insurances	1.1-5	
A13.0	Assignment	1.1-6	
A14.0	Security	1.1-6	
	Execution		
A15.0	Preparation for and execution of the works	1.1-8	
A16.0	Site and Access	1.1-9	
A17.0	Contract instructions	1.1-9	
A18.0	Setting out of the works	1.1-9	
A19.0	Temporary Works and Plant	1.1-9	
A20.0	Nominated subcontractors	1.1-9	
A21.0	Selected subcontractors	1.1-10	
A22.0	Employer's direct contractors	1.1-10	
A23.0	Contractor's domestic subcontractors	1.1-10	
	Completion		
A24.0	Practical completion	1.1-10	
A25.0	Works completion	1.1-10	
A26.0	Final completion	1.1-10	
A27.0	Latent defects liability period	1.1-10	
A28.0	Sectional completion	1.1-11	
A29.0	Revision of date for practical completion	1.1-11	
A30.0	Penalty for late or non-completion	1.1-11	
	Payment		
A31.0	Interim payment to the contractor	1.1-11	
A32.0	Adjustment to the contract value	1.1-12	
A33.0	Recovery of expense and loss	1.1-12	
A34.0	Final account and final payment	1.1-12	
A35.0	Payment to other parties	1.1-13	
	Cancellation		
A36.0	Termination by employer – contractor's default	1.1-13	
A37.0	Termination by employer – loss and damage	1.1-14	
A38.0	Termination by contractor – employer's default	1.1-14	
A39.0	Termination – cessation of the works	1.1-14	
	Dispute		
A40.0	Settlement of disputes	1.1-15	
		Carried forward R	

SCHEDULE NO 1: PRELIMINARIES AND GENERAL

COLLECTION Item		Page	AMOUNT
	SECTION B: JBCC PRELIMINARIES		
B1.0	Definitions and interpretation		
B1.1	Definitions and interpretation	1.1-17	
B2.0	**Documents**		
B2.1	Checking of documents	1.1-18	
B2.2	Provisional bills of quantities	1.1-18	
B2.3	Availability of construction documentation	1.1-18	
B2.4	Interests of agents	1.1-18	
B2.5	Priced documents	1.1-18	
B2.6	Tender submission	1.1-18	
B3.0	**The Site**		
B3.1	Defined works area	1.1-19	
B3.2	Geotechnical investigation	1.1-19	
B3.3	Inspection of the site	1.1-19	
B3.4	Existing premises occupied	1.1-19	
B3.5	Previous work – dimensional accuracy	1.1-19	
B3.6	Previous work – defects	1.1-19	
B3.7	Services – known	1.1-19	
B3.8	Services – unknown	1.1-19	
B3.9	Protection of trees	1.1-19	
B3.10	Articles of value	1.1-20	
B3.11	Inspection of adjoining properties	1.1-20	
B4.0	**Management of contract**		
B4.1	Management of the works	1.1-20	
B4.2	Programme for the works	1.1-20	
B4.3	Progress meetings	1.1-20	
B4.4	Technical meetings	1.1-20	
B4.5	Labour and plant records	1.1-20	
B5.0	**Samples, shop drawings and manufacturers' instructions**		
B5.1	Samples of materials	1.1-20	
B5.2	Workmanship samples	1.1-20	
B5.3	Shop drawings	1.1-21	
B5.4	Compliance with manufacturers' instructions	1.1-21	
B6.0	**Temporary works and plant**		
B6.1	Deposits and fees	1.1-21	
B6.2	Enclosure of the works	1.1-21	
B6.3	Advertising	1.1-21	
B6.4	Plant, equipment, sheds and offices	1.1-21	
B6.5	Main notice board	1.1-21	
B6.6	Subcontractors' notice board	1.1-21	
B7.0	**Temporary services**		
B7.1	Location	1.1-21	
B7.2	Water	1.1-22	
B7.3	Electricity	1.1-22	
B7.4	Telecommunication facilities	1.1-22	
B7.5	Ablution facilities	1.1-22	
		Carried forward R	

SCHEDULE NO 1: PRELIMINARIES AND GENERAL

COLLECTION Item		Page	AMOUNT
B8.0	**Prime cost amounts**		
B8.1	Responsibility for prime cost amounts	1.1-22	
B9.0	**Attendance on N/S subcontractors**		
B9.1	General attendance	1.1-22	
B9.2	Special attendance	1.1-22	
B9.3	Commissioning – fuel, water and electricity	1.1-22	
B10	**Financial aspects**		
B10.1	Statutory taxes, duties and levies	1.1-23	
B10.2	Payment for preliminaries	1.1-23	
B10.3	Adjustment of preliminaries	1.1-23	
B10.4	Payment certificate cash flow	1.1-23	
B11.0	**General**		
B11.1	Protection of the works	1.1-23	
B11.2	Protection / isolation of existing / sectionally occupied works	1.1-23	
B11.3	Security of the works	1.1-23	
B11.4	Notice before covering work	1.1-23	
B11.5	Disturbance	1.1-24	
B11.7	Works cleaning and clearing	1.1-24	
B11.8	Vermin	1.1-24	
B11.9	Overhand work	1.1-24	
B11.10	Instruction manuals and guarantees	1.1-24	
B11.11	As built information	1.1-24	
B11.12	Tenant installations	1.1-24	
B12.0	**Schedule of Variables**		
B12.1	Schedule of variables	1.1-25	
		Carried forward R	

SCHEDULE NO 1: PRELIMINARIES AND GENERAL

COLLECTION Item			Page	AMOUNT
	SECTION C: JBCC PRELIMINARIES			
C1.0	Contract drawings		1.1-26	
C2.0	Preambles		1.1-26	
C3.0	Trade names		1.1-26	
C4.0	Imported materials and equipment		1.1-27	
C5.0	Occupational Health and Safety Act		1.1-27	
	SECTION 1 PRELIMINARIES			
	CARRIED TO FINAL SUMMARY		R	
		SUBTOTALS:		
		Category: Fixed R		
		Category: Value R		
		Category: Time R		

SCHEDULE NO 2: STRUCTURAL AND BUILDING RELATED REPAIR WORK

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	200.00	**STRUCTURAL AND BUILDING SERVICES**				
	201.00	**BA : ROOFS**				
BA.01	**201.01**	**Supply and install cladding, sheeting and netting**				
		.01 1,2 mm corrugated UV2 polycarbonate roof sheeting "clear", 0.76m width sheets including fixings:				
		.01 Roof covering with pitches exceeding 15° and tunnel curvature, fixed to timber or steel purlins	m^2	80		
		.02 Side wall cladding fixed to timber or steel purlins	m^2	370		
		.03 Side wall cladding fixed to timber or steel purlins and members of domed structures	m^2	550		
		.02 1,2mm UV2 polycarbonate opaque IBR or equivalent 50% translucent sheeting, 0.76m width including fixings:				
		.01 Roof covering with pitches not exceeding 15°, fixed to timber or steel purlins	m^2	300		
		.03 Supply and installation of roof sheeting 1,2 mm corrugated UV2 polycarbonate sheeting "white", 0.76m width including fixings:				
		.01 Roof covering with pitches exceeding 15° and tunnel curvature, fixed to timber or steel purlins	m^2	905		
		.02 Side wall cladding fixed to timber or steel purlins	m^2	90		
		.03 Side wall cladding fixed to timber or steel purlins of domed structures	m^2	520		
		.04 Supply and install 80% shade cloth made from HDPE monofilament over nursery tunnel including brackets and fasteners:				
		.01 Shade netting fixed over nursery tunnel including locking mechanism and rope fixings with brackets fixed to polycarbonate sheeting	m^2	595		
		.05 80% shade cloth made from knitted HDPE monofilament (Hardware measured elsewhere):				
		.01 Roll-up side wall netting fixed to timber or steel members (including roller mechanism)	m^2	934		
		.02 Pitches not exceeding 15°, fixed to steel mechanism including clips and brackets	m^2	624		
	Carried forward					

SCHEDULE NO 2: STRUCTURAL AND BUILDING RELATED REPAIR WORK

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
		.06 80% shade cloth made from knitted HDPE monofilament or similar approved fixed to new domed steel shade port structure (Hardware measured elsewhere):	m^2	2000		
		.07 Supply and install 60% "Aluminet" made from knitted metalized HDPE (Hardware measured elsewhere):				
		.01 Pitches not exceeding 15°, fixed to steel mechanism (Clips and brackets elsewhere)	m^2	2510		
		.08 Anti-virus 50 Mesh Net made of 0,22mm stabilized HDPE monofilaments transparent:				
		.01 Side wall fixed to timber or steel purlins	m^2	1940		
		.09 1.0mm Thick polypropylene sheeting or equivalent approved sheeting:				
		.01 Side wall cladding fixed to steel purlins	m^2	100		
BA.06	**201.02**	**Supply and install sundry items, etc.:**				
		.01 Galvanised sheet iron flashings with CHROMADEK silicone polyester finish to one side of sundry items to corrugated polycarbonate or concealed fixing roof sheeting complete as				
		.01 Ridge flashing	m	72		
BA.03	**201.03**	**Carefully remove existing cladding, sheeting and netting:**				
		.01 Existing polycarbonate sheeting roof covering removed from timber or steel purlins or girts	m^2	986		
		.02 Existing polycarbonate sheeting side wall cladding removed from timber or steel purlins or girts	m^2	1530		
		.03 Existing IBR sheeting roof covering removed from timber or steel purlins or girts	m^2	244		
		.04 Existing shade net	m^2	659		
		.05 Existing insect netting	m^2	1945		
		.06 Existing Aluminet	m^2	2740		
		.07 Existing polypropylene sheeting	m^2	100		
	Carried forward					

SCHEDULE NO 2: STRUCTURAL AND BUILDING RELATED REPAIR WORK

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
BA.08	**201.04**	**Supply and install rainwater goods:**				
		.01 2mm Thick Stainless steel 340 profile bent sheeting to slip into existing gutter and fixed with SS304 screws and sealed with Sikaflex 11FC or similar:				
		.01 600 mm slip-in box gutter	m	40		
		.02 Fasteners and sealant	m	40		
SANS 1200 D	**202.00**	**EXCAVATION, FILLING ETC OTHER THAN BULK**				
	202.01	**EXCAVATION ETC**				
8.3.2(a)	**202.02**	**Excavation in earth not exceeding 2m**				
		.01 Excavation of 500 x 500 x 600mm deep holes to receive steel and timber posts or columns	m^3	53		
		.02 Excavation in earth not exceeding 500mm deep including backfilling for fence line	m^3	14		
8.3.2(b)	**202.03**	**Extra over trench and hole excavations and earth for excavation in:**				
		.01 Soft rock	m^3	3		
		.02 Hard rock	m^3	3		
8.3.2(c)	**202.04**	**Extra over all exavations for carting away**				
		.01 Surplus material from bulk excavations and/or stock piles on site to a dumping site located by the contractor (This rate of carting away of excavated material shall be deemed to include loading excavated material onto trucks directly from the excavations or, alternatively, from stock piles situated on the building site, and spoiled at a site located by the contractor not exceeding 10km in one direction from the site	m^3	3		
5.1.3	**202.05**	**Keeping excavations free of water**				
		.01 Keeping excavations free of all water other than subterranean water	Sum	1		
	Carried forward					

SCHEDULE NO 2: STRUCTURAL AND BUILDING RELATED REPAIR WORK

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
8.3.4	**202.06**	**Selected earth filling obtained from the excavations and/or prescribed stock piles on site, compacted to 95% Mod AASHTO density**				
		.01 Backfilling to trenches, holes, etc	m^3	22		
SANS 1200 DM	**202.07**	**Compaction of surfaces**				
		.01 Compaction of natural or excavated ground surface including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 95% Mod AASHTO density	m^2	60		
SANS 1200 C PSC 8.2.1	**202.08**	**Site Clearance**				
		.01 Digging up and removing rubbish, debris, vegetation, hedges, shrubs, bush, etc and trees not exceeding 200mm girth	m^2	600		
SANS 1200 G	**203.00**	**CONCRETE, FORMWORK AND REINFORCEMENT**				
8.4.3	**203.01**	**UNREINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES**				
		.01 25MPa/19mm concrete				
		.01 Mass concrete class 25MPa/19mm concrete bases to anchor columns to the ground	m^3	15		
	204.00	**BUILDING WORK**				
BD.03	**204.01**	**Joinery:**				
		.01 Supply and install items measured by number:				
		.01 Aluminium sliding door, 1000 mm wide x 2 100 mm high with plexiglass panels (900mm x 450mm) and door handle.	No	2		
		.02 Aluminium sliding door frame for 1000 mm wide x 2 100 mm high fixed to steel purlins	No	2		
		.03 Aluminium double sliding doors, 900 mm wide x 2 032 mm each, on sliding track fixed to steel purlins above sliding door including with plexiglass panel (900mm x 450mm) and door handle.	No	8		
		.04 Aluminium sliding door, door frame for 900 mm wide x 2 032 mm high double doors fixed to steel purlins	No	8		
	Carried forward					

SCHEDULE NO 2: STRUCTURAL AND BUILDING RELATED REPAIR WORK

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
		.05 Aluminium hinged door, 1000 mm wide x 2 100 mm high with plexiglass panel (900mm x 450mm) and door handle.	No	5		
BD.04	**204.02**	**Ironmongery, steelwork, glass, wall finishings, etc.:**				
		.01 Supply and install items measured by number:				
		.01 Four lever mortice lockset with one pair anodized aluminium handles and back plate type B3085, two keys, back plates and striking plate cut and welded into existing gate with spring return	No	1		
		.02 Overhead Manual aluminet shade cloth stainless steel pulley set:				
		.01 BG stainless steel single mini pulley with shackle mounting	No	50		
		.02 BG stainless steel double pulley with shackle mounting	No	10		
		.03 Halyard pulley 36mm with side mount	No	10		
		.04 Nylon wire peg UV stabilised (Crocodile clip)	No	350		
		.05 Terry Clamp Nylon 17mm-19mm	No	500		
		.06 Static LSK rope 20mm thick to be connected to pulley system	m	300		
		.07 2.5mm polyester wire black (Bayco line)	m	500		
		.08 2.5mm polyester wire transparent (Bayco line)	m	1500		
		.09 2.5mm galvanised steel straining wire	m	500		
		.02 Items measured by area:				
		.01 Install 90% shade roll up sails, knitted construction with double lock stitches, including a manual pulley system. Sails to be in triangular shape, mildew, mould and tear resistant	m^2	100		
	Carried forward					

SCHEDULE NO 2: STRUCTURAL AND BUILDING RELATED REPAIR WORK

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
BD.05	**204.03**	**Corrective work to existing structures:**				
		.01 Repair and re-fix:				
		.01 Attend to, service and repair as necessary aluminium sliding door 1600 x 2100mm high overall including replacing any defective or missing parts, ancillary items and ensure door is properly aligned to open and close correctly.	No	8		
		.02 Attend to, service and repair as necessary hinged nursery tunnel doors, incl new lockset and door handles	No	5		
		.02 Servicing of Green house roller doors:				
		.01 Alignment, lubrication, replacement of worn or corroded roller framing, mechanisms, wheels and fasteners to green house tubular frame, polycarbonate cladded 2000 x 2200mm roller doors	No	8		
		.03 Remove:				
		.01 All types of locksets with handles	No	1		
		.02 Aluminium sliding door 1000 x 2100mm high	No	2		
		.03 Aluminium double sliding door 900 x 2032mm high	No	8		
		.04 Aluminium hinged single door 1000 x 2100mm high	No	5		
		.04 Break out/hack up/demolish and remove:				
		.01 Roll up blinds	m^2	120		
BD.04	**204.04**	**Brickwork:**				
		.01 Brickwork of NFX bricks (14 MPa nominal	m^3	3		
	Carried forward					

SCHEDULE NO 2: STRUCTURAL AND BUILDING RELATED REPAIR WORK

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
SANS 1200H	**205.00**	**STEELWORK**				
	205.01	**Structural Steelwork and joinery:**				
		.01 Items measured by number:				
		.01 Bolts, fasteners, etc.				
		.01 M12 holding bolts 65mm long including 13mm ID and 24mm OD x 2.4mm thick washer	No	84		
		.02 M16 holding down bolts 350mm long including 17mm ID and 30mm OD x 3mm thick washers	No	20		
		.02 Design, supply, installation and assembly of steel frame canopy structure to support polycarbonate roof sheeting including bases (see DWG 0533-PH2-21).				
		.01 Side wall of Building 8	Sum	1		
		.03 Glass pane installed into existing nursery side cladding				
		.01 900x1500 aluminium window with glass panel to be installed along with new steel purlin and bolted and fixed to existing columns and purlins.	No	2		
8.3.1	**205.02**	**Supply and install new items:**				
		.01 Design, supply, installation, delivery and assembly of steel shade structure frame:				
		.01 Galvanised mild steel circular hollow section, CHS, 76mm diameter, 3mm thick columns or similar approved, 2,5m high cast in concrete bases (concrete measured elsewhere) including all fixings	t	2		
		.02 Galvanised mild steel circular hollow section, CHS, 76mm diameter, 3mm thick purlins, ties, struts and cross bracing or similar approved fixed to steel columns including bolts, washers and ancillary items	t	16		
	Carried forward					

SCHEDULE NO 2: STRUCTURAL AND BUILDING RELATED REPAIR WORK

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
		.02 Supply, installation and assembly of replacement sections of corroded posts:				
		.01 500mm long 76mm Diameter mild steel circular hollow sections with 4,5mm baseplates with 4x M12 holes welded to existing hollow sections and bolted to concrete base with chemically anchored M12 SS304 Threaded studs and nuts (cold galvanised finish)	t	0.1		
		.02 Supply and installation of mild steel circular hollow sections, CHS, 76mm diameter, 3mm thick fixed with or without connecting plates, including cutting and fixing in position (cold galvanised finish)	t	0.2		
		.03 Supply and installation of "Storm Boundary Fence" fence (including stay posts- standards, straining wire)				
		.01 1m high mesh fence (with a 500mm underdig)	m	90		
		.03 Supply and Installation of suspension brackets for suspended irrigation pipe network:				
		.01 Stainless steel 304 hose clamps 15-30mm to tie irrigation pipework to strain wires	No	80		
		.04 Supply and Installation of steel "Y" fence dropper	m	140		
BH.03	**205.03**	**Remove existing joinery items by length:**				
		.01 Break out/hack up/demolish, remove and prepare to receive new:				
		.01 Mild steel circular hollow section	m	50		
	206.00	**BJ: PAINT WORK**				
		PREVIOUSLY PAINTED SURFACES:				
BJ.02	**206.01**	**Paint to previously painted surfaces:**				
		.01 Remove all traces of protective coating from galvanised surfaces with galvanised iron cleaner, prepare and apply one coat galvanised iron primer and two coats superior quality universal enamel paint, on galvanised steel				
		.01 Rails, posts, pipes, steel structures etc.	m	300		
	Carried forward					

SCHEDULE NO 2: STRUCTURAL AND BUILDING RELATED REPAIR WORK

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
		.02 Plaster surfaces:				
		.01 Prepare and repair, brush to remove all loose contaminants, rinse and apply suitable bonding liquid one coat approved alkali resistant primer to bare substrate areas and two coats approved pure acrylic paint on existing painted surfaces:				
		.01 Internal walls	m^2	40		
		.02 Prepare surfaces and remove all loose material, apply high gloss enamel paint.				
		.01 Clean dirt, remove paint, sand-blast, repair/weld worn and corroded steel sections (working at heights).	m^2	40		
		.02 Paint steel sections including columns, beams, webs members and flanges (working at heights)	m^2	1200		
		.03 Allow for the provision, erection, use, dismantling and transportation of scaffolding, crash deck or high rise access control for internal building use.				
		.01 Supply, transportation to site, erection and dismantling of scaffolding/ crash deck.	Sum	1		
		.02 Rental charge for scaffolding per week	No	4		
		.04 Allow for control and protection of internal flora	Sum	1		
	207.00	**BB : CARPENTRY AND JOINERY FOR ROOFS**				
BB.04	**207.01**	**Remove existing joinery items by length:**				
		.01 Timber shade covering frame	m	1808		
		.02 Gum poles (up to 160mm dia) and columns	m	684		
BB.01	**207.02**	**Supply and install new items measured by length:**				
		.01 38 x 114 mm Wrought sloping SAP rafters H3 treated.	m	5		
		.02 100-120mm Diameter tapered poles SA Pine CCA H4 treated, fixed to base/foundation.	m	160		
		.03 140-160mm Diameter tapered poles SA Pine CCA H4 treated, fixed to base/foundation.	m	125		
	Carried forward					

SCHEDULE NO 2: STRUCTURAL AND BUILDING RELATED REPAIR WORK

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
		.04 152mm x 50mm SA Pine Grade 5 H3 treated Timber Rafters fixed to timber beam.	m	162		
		.05 228mm x 50mm SA Pine Grade 5 H3 treated Timber Rafter including fixing.	m	10		
		.06 228mm x 76mm SA Pine Grade 5 H3 treated Timber Rafters bolted to timber post/column.	m	128		
	207.03	**Sundries**				
		.01 "Teco" or other approved truss hanger for 50mm rafter bolted to timber including 8mm fixing bolts	No	100		
BB.01	**207.04**	**Supply and install new items measured by area:**				
		.01 100 g/sqm heavy duty fabric weed guard and weed control ground cover membrane sheet, UV stabilised and pegged to ground with polypropylene pegs	m^2	350		
	TOTAL SCHEDULE NO 2: CARRIED TO SUMMARY: REPAIR WORK					

SCHEDULE NO 3: MECHANICAL SERVICES

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	300.00	**MECHANICAL SERVICES** Properly priced Bills of Quantities shall accompany this Tender submitted and failure of Tenderers to comply with this requirement may invalidate the Tender; in this connection, the attention of the Tenderer is directed to the Tender Data. **JBCC and Contract Specific Data** The Tenderer is particularly referred to the full text of all the clauses of the aforementioned JBCC as amended and supplemented by the Contract Specific Data, and is to provide in the items below for all costs and charges Allow for all costs and expenses in connection with:				
	301.00	**GENERAL ITEMS**				
		.01 12 Month Maintenance Cost for all work and equipment in the scope of work, including 2 services during 24 month maintenance period - 6 months after commissioning and at end of guarantee period	Item	1		
		.02 Operating and Maintenance Manuals of all Mechanical Services:				
		.01 Consisting of 3 printed copies including electronic media of all files and drawings in .pdf and .dwg format all compiled in labeled files	No	3		
		.02 Instructing and training the employer's staff in operation of system and equipment prior to hand over to the Client	Item	1		
	302.00	**BUILDING 2:**				
	302.01	**Supply and install irrigation piping, controllers, valves, piping, frames etc.**				
		.01 Programmable Irrigation controller as specified (IP68) on hot dipped galvanised pole mounting frame (with concrete bases) , 6-station, backlit LCD display, bypass rain sensor in plastic frame mounted cabinet and lock mechanism, 230V AC	No	1		
		.02 Ø110 PVC Main shut off valve	No	1		
		.03 Ø25 double filtered Solenoid valves 24VAC -Double-beaded diaphragm seal, plastic globe, jar-top bonnet, female BSP connections with flow control, self-cleansing, normally closed -Rainbird or Hunter equivalent	No	12		
		.04 Valve solenoids only 24VAC	No	12		
	303.00	**BUILDING 3:**				
	303.01	**Supply and install irrigation piping, controllers, valves, piping, frames etc.**				
		.01 Ø25 HDPE piping	m	50		
		.02 Ø15 x 750mm PVC Standpipe with adjustable (0-360°) Spray nozzles similar or equal to existing	No	50		
	Carried forward					

SCHEDULE NO 3: MECHANICAL SERVICES

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
		.03 HDPE pipe fittings				
		.01 Ø25 HDPE bends/ sockets	No	25		
		.02 Ø25 HDPE tees	No	25		
	303.02	**Supply and install irrigation piping, controllers, valves, piping, frames etc.**				
		.01 Programmable Irrigation controller as specified (IP68) on hot dipped galvanised pole mounting frame (with concrete bases) , 6 station, backlit LCD display, bypass rain sensor in plastic frame mounted cabinet and lock mechanism, 230V AC	No	1		
		.02 Ø25 double filtered Solenoid valves 24VAC -Double-beaded diaphragm seal, plastic globe, jar-top bonnet, female BSP connections with flow control, self-cleansing, normally closed -Rainbird or Hunter equivalent	No	12		
		.03 Valve solenoids only 24VAC	No	12		
		.04 Ø25 HDPE piping	m	50		
		.05 Ø15 x 750mm PVC Standpipe with adjustable (0-360°) Spray nozzles similar or equal to existing	No	50		
		.06 Ø15-25 HDPE pipe fittings				
		.01 Ø25 HDPE bends/ sockets	No	25		
		.02 Ø25 HDPE tees	No	25		
		.07 Ø110 PVC Main shut off valve	No	1		
	304.00	**BUILDING 4**				
		.01 Supply and Install : Motorised/ Solenoid operated Brass Fogger/ Misting irrigation valve -230V, Ø25mm, pilot operated, NBR seal, SS Core tube, Normally Closed	No	4		
	305.00	**BUILDING 6**				
		.01 Service and refurbish aluminet screen mechanisms, including holding down brackets attached to Aluminet shade material, bearings and fasteners (x4 Separate aluminet systems)	Sum	1		
		.02 Reinstate fogger/spray irrigation system - Deep cleaning, lubrication, dealing with leaks and ensuring all fasteners are in place	No	2		
		.03 Supply and install Irrigation microjet blue/green 180/ 360° sprayer/ mister incl head, peg, pipe and connector	No	50		
	Carried forward					

SCHEDULE NO 3: MECHANICAL SERVICES

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
		.04 Supply and install adjustable ABS greenhouse hanging anti-drip Fogger/ Misting nozzle Heads, 8-18L flow, spraying dia 0,7-3m	No	50		
		.05 Repair and Service exisiting Extract Ventilation Fans, Ø1000 / 1,1kW motor, incl automatic louvre system in galvanised/coated steel frame and louvres	No	1		
		.06 Supply and install new External Vertical Shade motor 0,5kW	No	3		
		.07 Reinstate External vertical shade mechanisms incl vertical roller brackets (3 off - each) and swivel arms connected to motor gearbox, and guideswith SS304 cables and crimps fixed to structure	No	3		
		.08 Service thermostatic valves	No	6		
		.09 Repair and Service exisiting Ventilation Fan with louvres complete, centrifugal operated dampers, 1400x1400	No	3		
		.10 Supply, install and connect PIR Intruder sensor to central alarm intruder system	No	3		
		.11 Supply and install new motor for aluminet system - 0,5kW	No	3		
	306.00	**BUILDING 6.1 AND 6.2**				
		.01 Repair external shade net rollers, motor arms and stablise support system	No	3		
		.02 Supply and install new motor for external shade roller nets - 0,5kW	No	3		
		.03 Supply and install adjustable ABS greenhouse hanging anti-drip Fogger/ Misting nozzle Heads, 8-18L flow, spraying dia 0,7-3m	No	100		
		.04 Supply and Install : Motorised/ Solenoid operated Brass Fogger/ Misting irrigation valve -230V , Ø25mm , pilot operated, NBR seal, SS Core tube, Normally Closed	No	4		
		.05 Repair and Service existing Extract Ventilation Fans, Ø1200 / 1,1kW motor, incl automatic louvre system in galvanised/coated steel frame and louvres	No	4		
		.06 Repair and Service existing Extract Ventilation Fans, Ø1000 / 1,1kW motor, incl automatic louvre system in galvanised/coated steel frame and louvres	No	2		
		.07 Supply, install and connect PIR Intruder sensor to central alarm intruder system	No	4		
		.08 Reinstate water wall 6m wide x 1.8m high x 100mm deep	No	1		
	Carried forward					

SCHEDULE NO 3: MECHANICAL SERVICES

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
		.09 Supply and Install new water wall pump 1.1kW pool pump	No	1		
		.10 Supply and install new motor for aluminet system - 0,5kW	No	4		
	307.00	**BUILDING 7**				
	307.01	**Supply and install new irrigation piping, including spray nozzles and brackets:**				
		.01 Ø25 HDPE piping	m	250		
		.02 Ø25 HDPE elbows	No	5		
		.03 Ø25 HDPE tees	No	40		
		.04 Ø25 HDPE spray nozzles	No	40		
		.05 SS304 6mm cable incl crimps	m	120		
		.06 SS304 cable clamps	No	60		
		.07 SS304 pole eye bolts	No	50		
	307.02	**BUILDING 8**				
		.01 Supply and install Temperature and Humidity Sensor unit sensor incl steel brackets fixed to structure - 0-100%RH, -40 to 120°C , RS485	No	1		
		.02 Supply and install new motor for aluminet system - 0,5kW	No	1		
		.03 Supply and install new mechnisms to aluminet system, including holding down brackets attached to Aluminet shade material, bearings and fasteners	Sum	1		
		.04 Supply, install and connect PIR Intruder sensor to central alarm intruder system	No	1		
	308.00	**BUILDING 9**				
		.01 Repair external horizontal screen control with new guide ropes and stabilising support system to building structure – Electrically operated (Roller pipe deflection to be corrected)	No	1		
		.02 Supply, Install, test and commision new motor for shade roller nets - 0,5kW	No	4		
		.03 Supply and install new Extract Ventilation Fans, Ø1200 / 1,1kW motor, incl automatic louvre system in galvanised/coated steel frame and louvres	No	1		
		.04 Supply and install new Extract Ventilation Fans, Ø1000 / 1,1kW motor, incl automatic louvre system in galvanised/coated steel frame and louvres	No	1		
	Carried forward					

SCHEDULE NO 3: MECHANICAL SERVICES

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
		.05 Supply and install aluminium ventilation fan dampers, including galvanised sheetmetal housing 1400x1400	No	2		
		.06 Supply and install irrigation piping including brackets, fittings and spray nozzles - 5 rows				
		.01 Ø25 HDPE piping	m	150		
		.02 Ø25 HDPE bends/ sockets	No	10		
		.03 Ø25 HDPE tees	No	30		
		.04 Supply and install Irrigation microjet blue/green 180/ 360° sprayer/ mister incl head, peg, pipe and connector	No	50		
		.05 Supply, install and connect PIR Intruder sensor to central alarm intruder system	No	1		
	309.00	**OTHER - SITE 1:**				
	309.01	**Supply and install:**				
		.01 Alarm panel with remote control capabilities for all PIR's incl cabling and conduits routed fixed to structures	Sum	1		
	309.02	**Supply and install hardware for new Climate Control System for Site 1:**				
		.01 Priva Temperature and Humidity sensors incl. brackets and fixed to structure	No	6		
		.02 Water temperature sensors for heating control	No	2		
		.03 Training on Climate control system and configuration of tablets	No	1		
		.04 Hand held tablet for remote monitoring and control	No	2		
	309.03	**Supply, install and make good for Site 1:**				
		.01 Supply and install 6mm SS304 Cable to Horizontal and Vertical screens	m	100		
		.02 Repair Aermec 36kW heat pump	Item	1		
		.03 Service Aermec 36kW heat pump	Item	1		
		.04 Allow for new 1000 litre Kwikot Hot water vessel	No	1		
		.05 Allow for hot water circulation pump 0.37kW 1-phase	No	1		
		.06 Allow for HDPE pipes and connection for hot water pump and Kwikot tank	Sum	1		
	Carried forward					

SCHEDULE NO 3: MECHANICAL SERVICES

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
	309.04	**Labour Site 1:**				
		.01 Allowance for investigation and inspection to mechanical components				
		.01 Aluminet Shade systems and mechanisms	No.	2		
		.02 Thermal bed systems	No.	6		
		.02 Allowance for disconnection and/or removal of mechanical components				
		.01 Solenoid valves	No.	48		
		.02 Irrigation pipework	No.	500		
		.03 Irrigation standpipes and sprayers	No.	140		
		.04 Fogger irrigation components	No.	6		
		.05 Waterwall	No.	1		
		.06 Ventilation Fans	No.	2		
	310.00	**ALUMINET AUTOMATION IN BUILDING 10**				
		.01 Supply and Install:				
		.01 0,5 kW Motor and gearbox including Base plate, brackets and flange connection to motor gearbox, isolators and power supply	No	1		
		.02 Galvanised steel Adjustable Dropper bracket with bearing	No	8		
		.03 Galvanised steel flanged dia 50mm shaft incl hanger Supports and bearings and threaded ends with pipe sockets	No	2		
		.04 50mm Galvanised shaft with hanger brackets and flanged ends for motor connection, BSP sockets	No	1		
	311.00	**<u>BUILDINGS 12 AND 13</u>**				
		.01 Supply and install new Extract Ventilation Fans, Ø1000 / 1,1kW motor, incl automatic louvre system in galvanised/coated steel frame and louvres	No	2		
		.02 Supply and install 8m x 1,2m water wall medium	No	2		
	Carried forward					

SCHEDULE NO 3: MECHANICAL SERVICES

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
		.03 Supply, Install and Reinstate irrigation system:				
		.01 Ø25 HDPE piping	m	100		
		.02 Ø25 double filtered Solenoid valves 24VAC - Double-beaded diaphragm seal, plastic globe, jar-top bonnet, female BSP connections with flow control, self-cleansing, normally closed -Rainbird or Hunter equivalent	No	4		
		.03 Ø15 x 750mm PVC Standpipe with adjustable (0-360°) Spray nozzles similar or equal to existing	No	50		
		.04 Reinstate water wall 8m wide x 1.2m high x 100mm deep	m^2	10		
		.05 Supply, Install, test and commision new irrigation pump with 1,1kW motor	No	1		
		.06 Reinstate water wall 8m wide x 1.0m high x 100mm deep	m^2	8		
		.07 Supply and Install water wall pump 1.1kW pool pump	No	2		
		.08 Supply, install and connect PIR Intruder sensor to central alarm intruder system	No	1		
	311.01	**Back draught dampers on Whirly Birds:**				
		.01 Supply and Install:				
		.01 Duct transition piece- horizontal to vertical galvanised/ coated	No	4		
		.02 Ducting Back Draught Flaps galvanised / coated	No	6		
	311.02	**Solar Hot water system for warming bed:**				
		.01 Supply and Install:				
		.01 Hot water geyser 100litre push through type with PRV etc	No	1		
		.02 0.1kW Hot water circulating pump	No	2		
		.03 hot water thermostatic control valve	No	2		
		.04 hot water isolating valves	No	4		
		.05 HDPE 20mm circulation piping	Sum	1		
	312.00	**BUILDINGS 14, 15 AND 16**				
		.01 Supply and install new Extract Ventilation Fans, Ø1000 / 1,1kW motor, incl automatic louvre system in galvanised/coated steel frame and louvres	No	1		
	Carried forward					

SCHEDULE NO 3: MECHANICAL SERVICES

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
		.02 Supply and install new Extract Ventilation Fans, Ø600 / 0,5kW motor, incl automatic louvre system in galvanised / coated steel frame and louvres	No	2		
		.03 Supply and install 1,6m x 1,0m water wall medium	No	2		
		.04 Supply and install water wall pump with 1,1kW motor	No	2		
		.05 Supply, Install and Reinstate irrigation system:				
		.01 Ø25 HDPE piping	m	100		
		.02 Ø25 double filtered Solenoid valves 24VAC - Double-beaded diaphragm seal, plastic globe, jar-top bonnet, female BSP connections with flow control, self-cleansing, normally closed -Rainbird or Hunter equivalent	No	4		
		.03 Ø15 x 750mm PVC Standpipe with adjustable (0-360°) Spray nozzles similar or equal to existing	No	50		
	313.00	**BUILDING 17**				
		.01 Supply and install new ball valve in existing JoJo tank	No	2		
		.02 Repair Aermec 13,6kW heat pump	No	2		
		.03 Service Aermec 13,6kW heat pump	No	2		
		.04 Supply and install 200 liter hot water storage tank and connect to exisitng heat pump	No	2		
		.05 Supply and install Irrigation microjet blue/green 180/ 360° sprayer/ mister incl head, peg, pipe and connector	No	100		
		.06 Service thermal bed valves, pipe insulation and equipment	No	8		
		.07 Supply and install Galvanised grating to floor channels (220x8mm)	m	36		
		.08 Supply and install new 1,1kW pump for water tank	No	1		
	314.00	**BUILDING 22**				
	314.01	**Supply and install irrigation piping including fittings and spray nozzles:**				
		.01 Ø25 HDPE piping	m	75		
		.02 Ø25 HDPE elbows	No	5		
		.03 Ø25 HDPE tees	No	30		
		.04 Ø25 HDPE spray nozzles	No	30		
		.05 Ø25 PVC ball valves	No	10		
	Carried forward					

SCHEDULE NO 3: MECHANICAL SERVICES

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
	314.02	**Supply and install cable and hanger system for irrigation network:**				
		.01 Ø15 x 750mm PVC Standpipe with adjustable (0-360°) Spray nozzles similar or equal to existing	No	50		
		.02 Galvanised steel lip channel 100x50x20x2.0 frame with concrete bases 200x200 to replace existing timber units	No	18		
		.03 Galvanised U-brackets for manifold pipe on galvanised steel frame	No	36		
	315.00	**BUILDING 18**				
		.01 Repair external shade net rollers, swivel motor arms and stablising support cable system	No	4		
		.02 Supply and Install new motor for shade roller nets - 0,5kW	No	4		
		.03 Supply and Install Temperature and Humidity Sensors unit sensors incl brackets and fixed to structure	No	2		
		.04 Supply and install Irrigation microjet blue/green 180/ 360° sprayer/ mister incl head, peg, pipe and connector	No	100		
		.05 Supply and Install : Motorised/ Solenoid operated Brass Fogger/ Misting irrigation valve -230V , Ø25mm , pilot operated, NBR seal, SS Core tube, Normally Closed	No	4		
		.06 Supply and install circulation fans Ø600 / 1,1kW motor	No	2		
		.07 Repair and service roof ventilator mechanical mechanisms:				
		.01 Service motor and gearbox, incl seals, lubrication, power supply connections and windings	No	4		
		.02 Supply and install replacement electric motor 0.75kW	No	4		
		.03 Supply and install replacement gearbox 0,75kW output 20 rpm	No	4		
		.04 Supply and install replacement steel semi-circular toothed rack	No	4		
		.08 Supply, install and connect PIR Intruder sensor to central alarm intruder system	No	1		
		.09 Supply and install rectangular irrigation valve box into ground for solenoid irrigation valves -300mm	No	1		
	Carried forward					

SCHEDULE NO 3: MECHANICAL SERVICES

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
		.10 Service hot water generation plant:				
		.01 Replace flexible ducting with galvanised ducting dia 250mm	m	24		
		.02 Service Heatpumps (3kW each)	No	2		
		.03 Service hot water cylinder (100l pressure type)	No	1		
		.11 Supply and install new motor for aluminet system - 0,5kW	No	2		
		.12 Ø25 double filtered Solenoid valves 24VAC -double beaded diaphragm seal, plastic globe, jar-top bonnet, female BSP connections with flow control, self-cleansing, normally closed -Rainbird or Hunter equivalent	No	20		
		.13 Valve solenoids only 24VAC	No	10		
		.14 Ø15 x 750mm PVC Standpipe with adjustable (0-360°) Spray nozzles similar or equal to existing	No	50		
		.15 Supply and install Irrigation microjet blue/green 180/ 360° sprayer/ mister incl head, peg, pipe and connector	No	50		
	316.00	**BUILDING 11**				
		.01 Inspect and/or service pneumatic actuators to high level shutters	No	18		
		.02 Supply and install pneumatic actuators to high level shutters - Micro linear type, 3A at 24V DC, 6000N push, 4000N pull, 4,2mm/sec, IP42 with preset limit switch	No	4		
		.03 Replace External Timber Slatted Gate, complete with Handles, Spring closure , Signage and locking mechanism	Sum	1		
	317.00	**OTHER - SITE 2:**				
	317.01	**Supply and install:**				
		.01 Alarm panel with remote control capabilities for all PIR's incl cabling and conduits routed fixed to structures	Sum	1		
	317.02	**Supply and install hardware for new Climate Control System for Site 2:**				
		.01 New Computer controlled Climate Control System for Site 2:				
		.01 Priva Temperature and Humidity sensors incl brackets and fixed to structure	No	6		
		.02 Water temperature sensors for heating control	No	2		
		.02 Hand held tablet for remote monitoring and control	No	2		
	Carried forward					

SCHEDULE NO 3: MECHANICAL SERVICES

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
	317.03	**Supply, install and make good for Site 2:**				
		.01 Service / Repair heat pump no 1	Item	1		
		.02 Service /repair heat pump no 2	Item	1		
		.03 1000 litre water vessel	No	1		
		.04 Hot water circulation pump 0.37kW 1 phase	No	1		
		.05 HDPE pipes and fittings for connection of hot water pump and tanks	Sum	1		
		.06 Servicing of 7 x hydraulic Mixrite Ferligation system TF-25 (0,2 - 25m^3/hr) , 1-8 bar, 50mm connection, blue-sleeve	No	8		
		.07 Dia 40mm Thermo plastic Y-Type Inline strainer/filter for suction inlet of irrigation and water wall pumps incl HDPE fittings, UV coated , Stainless steel screen filter, 130 micron	No	10		
	317.04	**Labour Site 2:**				
		.01 Allowance for investigation and inspection to mechanical components				
		.01 Motor Geaboxes	No.	8		
		.02 Solenoid valves	No.	4		
		.03 Actuators	No.	18		
		.04 Thermal bed systems	No.	8		
		.02 Allowance for disconnection and/or removal of mechanical components				
		.01 Solenoid valves	No.	8		
		.02 Irrigation pipework	No.	200		
		.03 Irrigation standpipes and sprayers	No.	200		
		.04 Water supply pumps	No.	6		
		.05 Waterwall	No.	4		
		.06 Ventilation Fans	No.	5		
	Carried forward					

SCHEDULE NO 3: MECHANICAL SERVICES

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
	318.00	**CLIMATE CONTROL SYSTEM**				
	318.01	**DISTRIBUTION BOARDS**				
		.01 All DB's shall be complete with frame, Neutral & Earth Bar, at least 20% spare capacity per switchgear modules, DIN or Samite fixing, suitable knockouts for 32, 25 & 20mm conduits, Door & cover details per listed DB Type, generally all metal DB's shall be painted or epoxy coated, Switchgear and internal components measured separately				
		.01 Supply and Install surface mounted DB with lockable door, 12 way Din Rail	No	2		
		.02 Supply and install new legend	No	3		
		.03 Fit Fed From label on all DB's - Printed self-adhesive label, engraved self-adhesive label, or engraved label with brass screws	No	3		
		.02 Earth and bond distribution Boards Installations	No	2		
		.03 Supply and installation of circuit breakers / Switches (SABS approved):				
		.01 10-40A, 6kA triple pole	No	10		
		.02 10-30A, 6kA double pole	No	4		
		.03 PH failure and reversal 400VAC (Electro Mechanical)	No	2		
		.04 24VDC Relay 230VAC~400VAC (Similar or equal to Finder)	No	11		
		.05 1P+N Surge Protector, 10kA Din Rail (similar or equivalent to CBI)	No	2		
		.04 Supply and install contactors:				
		.01 230V ac Coil, 3-Pole, 9A, 5kW	No	4		
		.05 Supply and installation of isolators and Plugs (SABS approved):				
		.01 32A, 3-Pole rotary lockable IP65, Gewesis or similar approved	No	25		
		.02 32A, 2-Pole rotary lockable IP65, Gewesis or similar approved	No	25		
		.03 2 x 3Pin, 1 x 2Pin Surge Protected Adapter	No	4		
		.06 Supply and install earth leakage units (SABS approved):				
		.01 60A, 6kA double pole	No	2		
	Carried forward					

SCHEDULE NO 3: MECHANICAL SERVICES

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
	318.02	**CERTIFICATE OF COMPLIANCE**				
		Allow for Certificate of Compliance (COC) in terms of the Occupational and Health Safety Act, OHS ACT of 1993, Allow for testing , earthing and balancing of Phases as well as commissioning of the whole electrical lighting and power installation				
		.01 Distribution Board	No	3		
	318.03	**WIRING**				
		.01 Replace wiring :				
		.01 1,5 mm² 3 core PVC insulated	m	300		
		.02 2,5 mm² 3 core STP, PVC insulated	m	200		
		.03 2,5 mm² 3 core cu SWA	m	300		
		.04 4 mm² 3 core surfix cable	m	150		
		.02 Wire ways conduits and accessories To Include Excavations (Incl. Trenching and backfilling 300mm Deep)				
		.01 25mm PVC	m	500		
		.02 25mm Round Box PVC, 2Way	No	10		
	318.04	**ELECTRONICS**				
		.01 Data				
		.01 Wireless Alarm Transmitter and Receiver Unit with Antenna (IP65)	No	4		
		.02 Wireless Network Range Extenders (IP65)	No	4		
		.03 WiFi Module	No	2		
		.02 Supply and Install Priva Compass 4S multi controller network, advanced climate and irrigation control system station cabinet for control of up to 10 modules. Priva Gateway, Priva Blue ID C4 controller, 230 VAC, 50-60Hz, IP55 enclosure and Priva Compass Operator interface.				
		.01 Supply and Install at Site 1	No	1		
		.02 Supply and Install at Site 2	No	1		
		.03 Priva Weather station mast fixed to structure	No	2		
		.04 Priva Temperature and Humidity sensors incl brackets and fixed to structure (IP65)	No	4		
		.05 Water temperature sensors for heating control (IP65)	No	2		
	Carried forward					

SCHEDULE NO 3: MECHANICAL SERVICES

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
	318.05	**COMMUNICATION (Supply and Install)**				
		.01 Cat5E Shielded (UV) network cable per 500m Drum (twisted pairs Solid Copper)	No	2		
		.02 Remote Monitoring Work Station	No	2		
		.03 Sensor cabling and accessories (IP65)	m	200		
	318.06	**COMMISSIONING AND MANUALS**				
		Complete system installation, testing, configuration & commissioning				
		.01 Supply	No	2		
		.02 Training on Climate control system and configuration	Sum	1		
	TOTAL SCHEDULE NO 3: CARRIED TO SUMMARY: REPAIR WORK					

TENDER NO: G545/2025

SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI)

REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2

SUMMARY OF SCHEDULE OF QUANTITIES: REPAIR WORK

SCHEDULE NO 1:	PRELIMINARY AND GENERAL	R .....
SCHEDULE NO 2:	STRUCTURAL AND BUILDING RELATED REPAIR WORK	R .....
SCHEDULE NO 3:	MECHANICAL SERVICES	R .....
CONTINGENCY		R 300 000.00

TOTAL OF SCHEDULE OF QUANTITIES - REPAIR WORK CARRIED TO CALCULATION OF TENDER SUM **R** .....

SIGNED ON BEHALF OF TENDERER: ……..

TENDER NO: G545/2025

SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI)

REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2

CALCULATION OF TENDER SUM

TOTAL OF SCHEDULE OF QUANTITIES - REPAIR WORK	R .....
SUBTOTAL	**R** .....
VALUE-ADDED TAX (VAT) The tenderer shall add 15% of the subtotal for value-added tax	R .....
TENDER SUM CARRIED TO FORM OF TENDER	**R** .....

SIGNED ON BEHALF OF TENDERER: ……..

PART C: THE CONTRACT
Part C3: Scope of Work

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

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C3.2	CONSTRUCTION	170
C3.3	MANAGEMENT	172

PART C: THE CONTRACT
Part C3: Scope of Work

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

C3.1. Description of the Works

C3.1.1 Employer's Objectives

The employer's objective is to deliver improved infrastructure in the Kirstenbosch National Botanical Garden.

C3.1.2 Overview of the Works

The project entails the repairs and upgrades of the existing nurseries and associated glasshouse infrastructure for the South African National Biodiversity Institute at the Kirstenbosch National Botanical Garden, Cape Town.

C3.1.3 Extent of the Works

The Contractor must ensure that the construction work complies with the design criteria outlined in part C3 of the tender document, which defines the project's scope of work. This scope encompasses various tasks related to structural, mechanical and electrical engineering, including but not restricted to the following:

Buildings 2 and 3

Structural related work:

- The existing shade structure is constructed using timber pole uprights cast into the ground with timber bracing and timber/steel rafter sections forming the roof structure framework. The complete timber structure is to be removed along with shade netting and stockpiled in store areas demarcated by the client before being replaced with a new compliant steel framed structure and covered with new shaded material. The galvanised hollow tube steel structures will consist of pole footings cast into concrete bases as per manufacturers specifications. Galvanised hollow tubes form the domed roof structure creating a frame for the tensioned shade netting (black in colour).

- Side netting systems with matching colour are to be supplied and installed to the shade port structures as per design drawings. The side netting will allow galvanised hollow sections fitted into a seamed sleeve at the base of the side net with tie down facilities in both open and close positions.

Mechanical/electrical related work:

- The existing irrigation system is to be recommissioned. Defective HDPE pipes, fittings, valves, solenoids and sprinklers are to be replaced and installed to ensure full operation of the system. Irrigation control is done by a specified programmable irrigation controller mounted in a IP68 weatherproof enclosure on an independent galvanised steel frame stand. Each irrigation line is to include manual isolation valves with a main 110Ø shut off valve. All piping to be installed subface at a minimum depth of 150 mm.

- 24V AC power supply and control cables to the programmable irrigation controller and solenoid valves are to be reinstated where damaged or missing. The programmable irrigation timer shall include an isolating on/off switch and an external LED strobe to indicate power status. The control panel shall feature a double-door design, with an inner door dedicated to mounting on/off switches, each equipped with an indicator signal light. Additionally, the system shall incorporate a day timer with a manual override function and a 230V, 16A switched socket outlet (SSO).

- Solenoids are to be tested for complete replacement of valve or solenoid only.

- The programmable controller is to be programmed as per Horticulturist timetable and tested before commissioning. A weather resistant industrial padlock is to be supplied with the lockable enclosure.

Building 4

Structural related work:

- The replacement of existing anti-virus insect netting with new insect netting in areas where netting is damaged or aged.

- The aluminet pulley system is to be serviced and lubricated to ensure full, seamless operation.

- The supply and installation of new double doors with new weather resistant high-level hanger roller doors and a bottom guide system similar to the existing doors at the two access points to the nursery.

Mechanical/electrical related work:

- Installation of a high-pressure fogging actuator valve.

- Installation of alarm sensors along with pressure and temperature transducer sensors connected to the centralised climate control computer monitoring and central intruder alarm systems.

Building 5

Structural related work:

- The replacement of existing anti-virus insect netting with new insect netting in areas where netting is damaged or aged.

- The aluminet pulley system is to be serviced and lubricated to ensure full, seamless operation (to include pulleys, bayco lines, clips and brackets). Aluminet is also to be replaced in areas where they are in a deteriorated condition.

- The supply and installation of new double doors with new weather resistant high-level hanger roller doors and a bottom guide system similar to the existing doors at nursery access points.

Mechanical/electrical related work:

- No mechanical or electrical related repair work required.

Building 6 Complex

Structural related work:

- Supply and installation of polycarbonate roof sheeting to replace existing sheeting including corrosion resistant fasteners, flashing and sealants.

- Supply and installation of new polycarbonate cladding to replace existing damaged cladding.

- Supply and install new antivirus side netting where existing material has been damaged, weathered or aged.

Mechanical/electrical related work:

- Detailed inspection, servicing repair or replacement of defective, aged or corroded aluminet motorised systems to ensure full operation of the shade systems. All bearings, clips, fasteners and cables are to be inspected, tested and replaced where necessary. The 0,5kW electrical motors controlling the aluminet shade screen systems are to be replaced including base plates, flange connections and necessary brackets.

- Repair of non-operating and corroded parts of the ventilation fan systems are to be executed including the automatic louvres and steel frame. Ventilation wall fans are to be serviced to allow full operation including louvre mechanisms. Repairs of air circulation fans include electrical motors, belts, external louvres along with the centrifugal actuators and electrical components.

- Replacement of non-operational/ faulty irrigation foggers and their solenoid operated fogging actuator valves. Ensure the system is free of leaks and all corroded components are to be replaced with non-corrosive units.

- Repair of the vertical external screen control system with new guide ropes and stabilise the support system to the building structure (electrical motor operated). This includes the replacement of the shade material, swivel arms, cables, roller guide mechanisms and servicing/replacement of motors to a fully operational state. The external drive motors and gearboxes are to be replaced with new matching units including base plates, flange connections and necessary brackets, SS304 cabling and fittings complete.

- Inspection and servicing of thermal bed heating elements, thermal valves and actuators.

- Supply and installation of PIR intruder alarm systems connected to the centralised alarm system.

- Repair and reinstatement of water/wet wall and filter media including the supply and installation of new 1,1kW circulation pump system.

- Supply and installation of temperature and humidity transducer sensors including mounting brackets and cabling to central climate control system.

- Microjet sprayers, hangers, drippers and misting units are to be replaced where defective and weathered units are to be identified after testing. This is to include the replacement of piping and support brackets where necessary.

- The lockable room in the potting nursery to house the centralised climate control PC as well as central intruder alarm station.

- The external heat pump is to be serviced to operational status. This includes the supply and installation of a hot water storage vessel including all piping and isolation valves.

Building 7

Structural related work:

- The existing shade structure is constructed from timber pole uprights cast into the ground with steel tube sections forming the roof structure framework. The complete timber and steel tube structures, and shade netting are to be removed and stockpiled in store areas demarcated by client before being replaced with a new compliant steel framed structure and covered with new shaded material. The new galvanised hollow tube steel structures will consist of pole footings cast into concrete bases as per manufacturers specifications. Galvanised hollow tubes form the domed roof structure creating a frame for the tensioned shade netting (black in colour).

- Side netting systems with matching colour are to be supplied and installed to the shade port structures as per design drawings. The side netting will allow galvanised hollow sections fitted into a seamed sleeve at the base of the side net with tie down facilities in both open and close positions.

Mechanical/electrical related work:

- Replacement of worn 25 mm HDPE pipes and leaking fittings.

- Replacement of faulty sprinkler heads.

- Installation of SS304 cables with eyebolt fixing to posts to suspend pipes, hanger sprinklers and dripper irrigation heads.

Building 8

Structural related work:

- A steel shade structure is to be manufactured, supplied and installed as per design drawings to reduce the ingress of moisture into the structure.
- Installation of a new window and supporting frame at the potting shed area.

- The supply and installation of new double doors with new weather resistant high-level hanger roller doors and a bottom guide system similar to the existing doors.

- The replacement of existing anti-virus insect netting with new insect netting in areas where netting is damaged or aged.

Mechanical/electrical related work:

- Detailed inspection, servicing repair or replacement of defective, aged or corroded aluminet motorised systems to ensure full operation of the shade systems. All bearings, clips, fasteners and cables are to be inspected, tested and replaced where necessary. The 0,5kW electrical motors controlling the aluminet shade screen systems are to be replaced including base plates, flange connections and necessary brackets.

- Supply and installation of temperature and humidity transducer sensors including mounting brackets cabling to central climate control system.

- Supply and installation of PIR intruder alarm system connected to the centralised alarm system.

Building 9

Structural related work:

- Replacement of polycarbonate sheeting at the base of the perimeter of the structure (including fasteners and sealant where necessary).

- The supply and installation of new double doors with new weather resistant high-level hanger roller doors and a bottom guide system similar to existing doors is to be executed.

- The replacement of existing anti-virus insect netting with new insect netting in areas where netting is damaged or aged.

Mechanical/electrical related work:

- Supply and install of new extraction and ventilation fans to specified power and size. This is to include power supply connections which are to be tested before fully commissioned. Fans and frames are to be coated to ensure corrosion protection and touched up if damaged during installation or delivery phases. Fans to include louvres and automatic control.

- Repair of the external vertical screen mechanism with new guide ropes, clips, seamed screen and stabilisers to the support the system via the building structure in the form of cables and brackets. The roller motor is to be replaced with a new matching or uprated unit including gearbox and connections to the screen with swivel arms including base plates, flange connections and necessary brackets. Cables are to be SS304 and include all fittings.

- Works to include the repair of the automated aluminet shaft.

- Installation of a new ground level irrigation system with 1 m high standpipes fitted with spray nozzles connected to the existing header with manual isolation valves.
- Supply and installation of temperature and humidity transducer sensors including mounting brackets and cabling to the central climate control system.

- Supply and installation of PIR intruder alarm systems connected to the centralised alarm system.

Building 10

Structural related work:

- The replacement of existing aged anti-virus insect netting with new insect netting (where specified).

Mechanical/electrical related work:

- Supply and install new motorised aluminet system complete with motor gearbox, shaft, cables, clip mechanisms and pulley systems including base plates, flange connections and necessary brackets. The new system to be similar to the existing SANBI nurseries design. All brackets are to be coated and fasteners to be SS304. The aluminet automation is to be controlled by the central climate control system.

- Supply and installation of temperature and humidity transducer sensors including mounting brackets cabling to central climate control system.

- Supply and installation of PIR intruder alarm systems connected to centralised alarm system.

Buildings 12 and 13

Structural related work:

- Replacement of all polycarbonate sheeting complete with fittings and flashing.

- Supply and install of shade netting externally on the tunnels Including holding down brackets.

- Door servicing and maintenance, including the installation of new locking mechanisms.

Mechanical/electrical related work:

- Supply and installation of new extraction and ventilation fans to specified power and size. To include power supply connections and testing before fully commissioned. Fans and frames are to be coated to ensure corrosion protection and touched up if damaged during installation or delivery phases. Fans to include louvres and automated control.

- Supply and installation of replacement irrigation fittings to ensure full operation of irrigation network including HDPE piping, solenoid valves, standpipes and sprinklers.

- Repair and reinstatement of water/wet wall and filter media including the supply and installation of new 1,1kW circulation pump system.

- Supply and installation of PIR intruder alarm systems connected to the centralised alarm system.

- Supply and install new back draught dampers on whirly birds including galvanised transition pieces and flaps.

- Repair of water/wet wall steel frame structure.

- Supply and installation of new hot water system for hot beds are required. The works include a 1000L capacity geyser, circulating pump, thermostatic control valves, isolating valves and 20mm diameter HDPE piping.

Buildings 14, 15 and 16

Structural related work:

- Replacement of all polycarbonate sheeting at the steel framed structures. (Research, Karoo and Quarantine Nursery structures). The works is to include removal of existing sheeting and supply and install of replacement sheeting including corrosion resistant fasteners, flashing and sealants.

Mechanical/electrical related work:

- Supply and installation of new extraction and ventilation fans to specified power and size. Works to include power supply connections and testing before fully commissioned. Fans and frames to be coated to ensure corrosion protection and touched up if damaged during installation or delivery. Fans to include louvres and automated control.

- Repair and reinstatement of water/wet wall and filter media including the supply and installation of new 1,1kW circulation pump system.

- Supply and install of replacement irrigation fittings to ensure full operation of irrigation network including HDPE piping, solenoid valves, standpipes and sprinklers.

- Replacement of non-operational/faulty and solenoid and fogger valves including new dripper irrigation sprinklers and standpipes.

Building 17

Structural related work:

- The western open side of the structure is to be cladded with new polycarbonate sheeting.

- Gratings are to be installed at open drainage channels.

- Corroded steel frame members are to be replaced with new steel members. Additionally, the steel frame structure is to be wire brushed and painted with a robust waterproofing agent.

- All doors are to be serviced and lubricated or replaced where necessary (including wheels).

Mechanical/electrical related work:

- The Jojo water supply storage tank to receive new level control ball float valves.
- The 36kW external heat pump is to be repaired and serviced to ensure full operation. Additionally, the heat pump system is to receive new 200 L hot water storage cylinder complete with interconnecting pipework and valves connected to the heat pump.
- Supply and installation of new 1,1kW water supply pump system.
- Servicing of thermostatic valves to operational status.
- Supply and installation of microjet misting irrigation units including pegs, pipes and fittings.

Buildings 19, 20, 21, 23 and 24 (Buildings 23 and 24 existing shade structures)

Structural related work:

- The Building 19 structure is to be demolished and replaced with a new timber structure which is to be covered with shade netting (including footings etc).
- The Building 20 is to receive a new compliant steel domed structure (as per Buildings 2, 3 and 7) and covered with new shaded material. The galvanised hollow tube steel structures will consist of pole footings cast into concrete bases as per manufacturers specifications. Galvanised hollow tubes form the domed roof structure creating a frame for the tensioned shade netting (black in colour).
- The Building 21 structure is to be demolished and replaced with a new timber structure and covered with polycarbonate roof sheeting.
- All other existing steel structures (Buildings 23 and 24) surrounding these areas are to receive side netting systems (to match existing). The side netting will allow galvanised hollow sections fitted into a seamed sleeve at the base of the side net with tie down facilities in both open and close positions.

Mechanical/electrical related work:

- Galvanised steel lip channel frames are to be manufactured and installed at the external areas to house the irrigation pipe manifolds with isolating valves. The brackets are to be cast into concrete bases in the ground. The irrigation pipes are to be fastened to the steel bracket with U-clamps.
- Diameter 15 x 750 mm PVC standpipes are to be supplied and installed to replace defective non-operational units.

Building 18

Structural related work:

- Polycarbonate roof sheeting along with the steel frame members are to be replaced where damaged or missing.

- New side cladding anti-virus Insect netting is to be installed along the perimeter of the structure.
- Replacement shade netting is to be installed on the sides of the structure to assist with the control of the sunlight in the structure.

Mechanical/electrical related work:

- Repair of the external vertical screen mechanism with new guide ropes, clips, seamed screen and stabilisers to the support the system via the building structure in the form of cables and brackets. The roller motor is to be replaced with a new matching or uprated unit including gearbox and connections to screen with swivel arms including base plates, flange connections and necessary brackets. Cables are to be SS304 and include all fittings.

- Supply and installation of temperature and humidity transducer sensors including mounting brackets and cabling to the central climate control system.

- Replacement of non-operational/faulty solenoid and fogger valves including new dripper irrigation sprinklers and standpipes.

- Microjet sprayers, hangers, drippers and misting units are to be replaced where defective. The replacement is to include piping and brackets where necessary.

- Supply and installation of post mounted circulation fans including power supply terminations and isolators.

- The roof is fitted with open-able vents fitted with pinions and spherical racks driven by motorised gearboxes. Replacement of motors and servicing of gearboxes of the roof vents with bi-directional motors and rack and pinion system is required.

- Motors and gearboxes which are operational and in a good state are to be serviced and reinstated to full operational status.

- Damaged semi-circular racks are to be replaced with identical units.

- Supply and installation of PIR intruder alarm systems connected to the centralised alarm system.

- Supply and installation of new ground irrigation boxes as per specification to house solenoid valves.

- Solenoids are to be tested to determine whether complete replacement of valves are necessary or solenoid only. Signal and power cables are to be replaced where damaged or corroded.

- Heat pumps are to be repaired and serviced to ensure full operation. This is to include the replacement of flexible ducting and the addition of a new 100L hot water storage cylinder with valves and piping to the heat pump.

- Supply and Installation of new matching or uprated motors including base plates, flange connections, and necessary brackets to the motorised aluminet systems.

- Diameter 15 x 750 mm PVC standpipes, microjets, sprinklers and misting units are to be supplied and installed to replace defective non-operational units.

Building 22

Structural related work:

- Steel Y-dropper posts are to be installed to suspend the hanging irrigation system along with new ground sheet.

- The proposed area is located adjacent to Building 18.

Mechanical/electrical related work:

- SS304 cable system to be fastened to Y-dropper posts to suspend the irrigation piping and fittings.

- Overhead drip irrigation system to be installed.

- The new irrigation system is to include 25 mm diameter HDPE piping, valves, fittings and nozzles.

Building 1

Structural related work:

- Two existing timber structures are to be replaced with new timber structures including timber posts and rafters along with new polycarbonate sheeting and corrosion proof fasteners.

- Fencing with an under dig is to be installed along the perimeter of the building area for pest control.

Mechanical/electrical related work:

- The sprinkler system is to be inspected and tested, components found defective are to be replaced to ensure full operation of the irrigation system.

Building 11

Structural related work:

- The internal steel lattice framework of the structure is to undergo recoating. Steel members are to be cleaned, free of contaminants and loose material before coated to specific paint codes.

- Works require flora protection and a crash deck for working at heights.

Mechanical/electrical related work:

- The actuators to the conservatory roof windows need to be inspected and tested for potential replacement.

- An internal access gate requires replacement complete with handles, spring closure, signage and a locking mechanism.

Other:

- The various buildings house fertigation mixers which require servicing. These mixers will be blue type hydraulic type catering for max flow of 25m^3/hr at adjustable 1-8bar with 50 mm connections.

- The sites 1 and 2 require a central intruder alarm system.

- Diameter 40 mm plastic Y-Type in-line strainers are to be supplied and installed at various positions around the sites. The strainers are to incorporate HDPE fittings, weather and UV resistant material, stainless steel micron 130 um filter screen

Additional scope required for the installation of the new climate control system

An automatic Climate Control System accompanied by a weather station are to be installed and must replace the existing system and be linked to nurseries and buildings.

Two systems are to be installed, that are slaved to a common cloud-based interface.

The system should have the following characteristics:

- The computerised system is to be integrated with full humidity control, temperature sensing and day timers to automatically control the ambient conditions inside all the facilities and control the shade fabric positions (horizontal and vertical) and irrigation based on the internal needs of the facility.
- The computerised system needs to be replaced with current technology (plc and logic control) and have wireless communication to site management for monitoring and control.
- All cables must be checked for reuse or replacement, however additional control cabling will be needed to various sensors.
- All sensors will require replacement (humidity, temperature and screen position).
- The ambient conditions can be monitored with wireless technology and connected to cellular phone/s using GSM technology. Handheld tablet controllers are to be supplied.
- The computerised/plc system will have a Human-Machine Interface (HMI) as a user interface or dashboard that connects a person to the system for ease of set point resets and other required condition – seasonal or otherwise.
- The control system needs to be fully automated and incorporate wind velocity sensitive sensors for opening and closing the roof panels where necessary.
- The system should also trigger an alarm system which will notify the user client of any abnormal conditions in their respective buildings. The alarm system is to be installed and capable of alerting the user client of any intrusion in the nurseries.
- Internationally proven with a track record of acceptability with local back up
- A process computer is required to optimise the growing process.
- The controls should be flexible and able to adapt to expectations.
- Reliable and user-friendly for daily use for control of: Irrigation, climate, photosynthesis, water, and/or energy.
- Basic and advanced levels.
- I/O modules according to the site requirements.

- Crop control modules to control the amount of light, water dosage, and/or the humidity level and temperature within a crop zone.
- Irrigation module for irrigation valve control.
- Climate control to optimize temperature, air humidity and air flow.
- Photosynthesis module
- Water modules for control of irrigation valves with the right amount of water and fertilizers.
- Two off Computer controlled Climate Control System will be installed to replace the existing units. The units are specified above. The system and software should have expansion capability with remote control monitoring and control. The system will include the free issue of four off handheld tablets configured with both android and/or IOS connectivity.
- Desk top computers (Quad CORE i7) with will be supplied and configured for the new Climate control systems. UPS Units will be supplied for each system computer for minimum 4- hour electrical back up

Weather Stations

- An industrial Weather Stations will be supplied for each Computer Controlled Climate Control System.

- A (Magellan MX 420 Weather Station) or similar will have a rugged multi-parameter weather sensor with an internal compass and GPS for critical weather monitoring with automatic wind direction alignment on the go.

- The 4-20 mA signal output interfaces to PLC, DCS and SCADA systems.

- (Modbus/OPC communication is available with the Weather MicroServer monitoring any CWS weather station.)

- Additionally, real time monitoring, data logging, and graphing are available with a stand-alone Weather Display Console and/or Weather Master Software.

- The Weather MicroServer can also be connected to offer Internet-ready data as well as additional industrial protocols.

Features:

- Weather protected multi-sensor design.
- GPS for compensated wind speed.
- Automatic self-alignment of wind direction using internal compass.
- Reliable, quick deploy/install.
- Low power consumption - ideal for battery or solar-powered installations.
- No mechanical components.

Additional scope required for the installation of the new Intruder Alarm system

- Site 1 (Southern nurseries region) and Site 2 (Northern nurseries region) will have independent Intruder Alarm Systems, each with a control panels. The panel will have remote control capabilities for all PIR's installed as well as GSM connectivity to cellular telephones as well as wireless sirens.

Electrical scope for supply and control systems

The electrical infrastructure requires the supply and installation of electrical services to accommodate the various upgrades and maintenance works to the nursery buildings at Site 1 and 2.

Electrical related work:

- The supply, installation and setup of the new climate control system which includes the weather station, centralised computer system, sensors and cabling, motor and ventilation control systems, power supply and reticulation, as well as the intruder alarm and mobile control systems.

- Distribution board's shall be complete with frame, neutral and earth bar, and at least 20% spare capacity per switchgear modules.

- Supply and installation of circuit breakers/switches, relays, contactors, rotatory isolators and earth leakage units (all SABS approved)

- Allow for Certificate of Compliance (COC) in terms of the Occupational and Health Safety Act, OHS ACT of 1993, allow for testing, earthing and balancing of phases as well as commissioning of the whole electrical lighting and power installation.

- 1,5 – 4 mm^2 PVC/ SWA/ STP cables supply and installation in excavated or surface mount conduits.

- Wire way conduits and accessories to be supplied and installed as specified.

- The project consists of the following electrical components in brief

    - Wireless Alarm Transmitter and Receiver Unit with Antenna (IP65)
    - Wireless Network Range Extenders (IP65)
    - Wi-Fi Modules
    - 4S Priva Compass station cabinets
    - Priva Weather station mast
    - Priva Temperature and Humidity sensors including brackets and fixed to structure (IP65)
    - Cat5E Shielded (UV) network cables

- Operation and Maintenance Manuals which covers all mechanical and electrical systems are to be provided. The manuals to cover, but not limited to, (layout, general arrangement, construction) drawings, specification, programming, complete information documentation, as-

builts, MSD and data plate information, user manuals, set points, control documentation, operating procedures and photo reports of installation.

- The contracts requires the organisation, attendance, documentation supply and execution of training sessions to clients, staff and stakeholders in regard to all system installation and operation thereof.

The project period will be 7 months.

C3.1.4 Location of the Works

The site is located at the Kirstenbosch National Botanical Garden (KNBG), Rhodes Drive, Newlands, Cape Town and includes all nursery structures.

C3.1.5 Description of Site and Access

Kirstenbosch National Botanical Garden lies in the heart of the Cape Floristic Region, also known as the Cape Floral Kingdom. It is the first botanic garden in the world to be included within a natural World Heritage Site.

The 36-hectare garden is part of a 528-hectare estate that contains protected mountainside supporting natural forest and fynbos along with a variety of animals and birds. The Kirstenbosch Estate borders the Table Mountain National Park, and the Garden merges seamlessly with the natural fynbos and forest of the mountain.

Kirstenbosch displays a wide variety of the unique plant life of the Cape Flora. Plants from all the diverse regions and biomes of southern Africa are also grown at Kirstenbosch, with over 7 000 species in cultivation.

The garden is accessible via Rhodes Drive, Newlands.

C3.1.6 Temporary Works

All design and construction of any temporary works must be approved by the Principal Agent.

PART C: THE CONTRACT
Part C3: Scope of Work

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

C3.2. Construction

C3.2.1 Construction Standards

The “Model Preambles for Trades (2008 Edition)” recommended and published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in the Bills of Quantities, with amendments as follows: References to “Architect” in the Model Preambles are to be read as “Principal Agent” shall apply to this contact.

This publication is available from The Association of South African Quantity Surveyors, P.O. Box 3527, Halfway House, 1685 - telephone (011) 315-4140, before a Tender is submitted.

The SANS 1200 Standardised Specification for Civil Engineering Construction prepared by Standards South Africa and specific amendments and additions to the SANS 1200 Standardized Specifications shall apply to this contract.

The SANS 1200 Standardised Specification publications are available from Standard south Africa, Private Bag X 191,Pretoria, 0001.

C3.2.2 Plant and Materials

C3.2.2.1 Plant and Materials Supplied by the Employer

None

C3.2.2.2 Materials, Samples and Shop Drawings

All materials are to be tested by a commercial laboratory as directed by the Engineer.

C3.2.3 Construction Equipment

C3.2.3.1 Requirements for Equipment

The Contractor is required to use plant and equipment that is sufficient for the contract.

C3.2.3.2 Equipment Provided by the Employer

None

C3.2.4 Existing Services

C3.2.4.1 Known Services

As-built information is unavailable at the time of tender, the onus still lies with the main Contractor to ensure that no services are damaged during the construction phase.

C3.2.4.2 Treatment of Existing Services

Contractor to use caution.

C3.2.4.3 Use of Detection Equipment for the Location of Underground Services

At main Contractor's discretion.

C3.2.4.4 Damage to Services

It is the responsibility of the Contractor to ensure that no services are damaged during the construction process. In case the known services are damaged, the main Contractor shall be responsible for the repair off the services to the original state before it was damaged, as well as all cost associated with the damaged service.

C3.2.5 Site Establishment

C3.2.5.1 Services and Facilities Provided by the Employer

None.

C3.2.5.2 Facilities Provided by the Contractor

The onus lies with the main Contractor to find a suitable camp site, approved by the Employer.

C3.2.5.3 Storage

No requirements are specified.

C3.2.5.4 Other Facilities and Services

No requirements are specified.

C3.2.5.5 Vehicles and Equipment

No requirements are specified.

C3.2.5.6 Advertising Rights

It is the main Contractor's responsibility that no suppliers advertise on site. Any advertisement from suppliers shall be removed at the cost of the main Contractor.

C3.2.5.7 Notice Boards

The main Contractor is allowed to place a Notice board on site. The maximum allowed size of this board should be 2 x 3m.

C3.2.6 Site Usage

The Contractors are not allowed to work outside the allowed working hours, as agreed with the Engineer. The disturbance to the residence should be kept at a minimum.

PART C: THE CONTRACT
Part C3: Scope of Work

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
CONTRACT NO:	**SANBI G545/2025**

C3.3. Management

C3.3.1 Planning and Programming

C3.3.1.1 General

This clause describes the requirements for the preparation, submission, updating and revision of the programme for the works. The requirements are in addition to or in expansion of the JBCC PBA clause [15.6].

The programme shall be used by the contractor to plan and execute the works. The programme shall also be used by the Principal Agent to monitor progress and be the sole basis for the assessment of revisions of the date for Practical Completion.

The programme shall be produced by the contractor as follows:

a) A programme for the totality of the works shall be submitted to the principal agent for acceptance. If the principal does not accept such programme, it shall be revised and amended until it is accepted by the principal agent. This programme will then be regarded as the baseline programme.

b) This baseline programme shall be updated with actual progress on a monthly basis, or any more frequent basis as necessitated by construction events. The contractor may submit to the principal for acceptance revisions to the baseline programme.

c) Acceptance by the Principal Agent of any programme submitted by the contractor does not make such programme a contract document, nor does it mandate that the works shall be constructed strictly in accordance therewith. The contractor at all times remains responsible for the construction of the works.

C3.3.1.2 Submission of Programme

Within 10 (ten) working days of been given possession of the site the Contractor shall submit to the Principal Agent for his review and acceptance a programme for the whole of the works showing the order in which the contractor proposes to execute the works. This programme becomes the baseline programme upon acceptance by the Principal Agent. The baseline programme shall have regard to the contract completion dates, any other milestones and any restraints set out in the contract. Thereafter, if the actual progress does not conform with the baseline programme, the Principal Agent is entitled to require the Contractor to submit a revised programme showing the order of activities necessary to ensure completion of the works by the contract completion dates.

The Contractor shall supply the Principal Agent with an electronic copy of each programme, together with a print-out bar chart or tabular report in a pre-agreed format. All programmes shall be prepared and submitted using Microsoft Project software.

Within 10 (ten) working days of the contractor submitting a programme complete with all the information required by this clause to the principal agent for acceptance, the principal agent will accept the programme or state reasons for not accepting the programme. If such reasons are given, the contractor shall take account of the reasons and resubmit the programme within 5 (five) working days.

If the Principal Agent fails to act the programme is deemed to be rejected.

C3.3.1.3 Default in submission of programs

Should the contractor fail to submit a programme for acceptance as the baseline programme or not update the programme as described above, the principal agent shall be entitled to withhold 25% of the amount due to the contractor in interim payment certificates until the contractor has complied with its obligations in this regard.

C3.3.2 Health and Safety

C3.3.2.1 Health and Safety specification

In terms of the Occupational Health and Safety Act (Act 85 of 1993) (OHSA) and the Construction Regulation 2014, the Client 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 Client.

The purpose of this Specification is to ensure that Principal Contractors entering into a contract with the Employer maintain an acceptable level of performance with regard to health and safety issues during the performance of the contract. In this regard the OHSA Specification form an integral part of the Contract and the Principal Contractor shall ensure that their contractors and/or suppliers comply with the requirements of this Specification.

PART C: THE CONTRACT
Part C4: Site Information

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
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PART C: THE CONTRACT
Part C4: Site Information

PROJECT TITLE:	**REQUEST FOR BIDS FOR THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASSHOUSE INFRASTRUCTURE FOR THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN: PHASE 2**
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C4.1 Site Information

C4.1.1 Site Location

The site is located at the Kirstenbosch National Botanical Garden, Rhodes Drive, Newlands, Cape Town.

Upper Kirstenbosch (Site 1-Southern Nurseries Region)

Figure 1. Upper Kirstenbosch NBG Nursery layout (Site 1)

Lower Kirstenbosch (Site 2-Northern Nurseries Region)

Figure 2. Lower Kirstenbosch NBG Nursery layout (Site 2)

C4.1.2 Weather Information

The weather measurements to be recorded for each calendar month are:

- The cumulative rainfall (mm)
- The number of days with rainfall more than 10 mm

If any one of these weather measurements recorded within a calendar month, before the Completion Date for the whole of the works and at the place stated in this Contract Data is shown to be more than the amount sated below, then the contractor may notify the consultant of and inclement weather claim.

Month	Number of days with rain more than 10 mm
January	2
February	3
March	3
April	5
May	9
June	11
July	10
August	10
September	8
October	5
November	4
December	4

APPENDIX A: SPECIFICATIONS

PARTICULAR SPECIFICATION

PAA PLUMBING AND DRAINAGE INSTALLATION

CONTENTS

PAA 01 SCOPE
PAA 02 GENERAL DESCRIPTION OF INSTALLATION
PAA 03 TECHNICAL DETAILS OF EXISTING INSTALLATION
PAA 04 STATUS OF EXISTING INSTALLATION
PAA 05 DETAILS OF REPAIR WORK
PAA 06 MEASUREMENT AND PAYMENT
PAA 07 DETAILS OF MAINTENANCE WORK

PAA 01 SCOPE

(a) This specification covers the particulars of the maintenance work to the plumbing and drainage installations at SANBI. This particular specification shall be read in conjunction with the Technical Specification AA: Plumbing and Drainage Installation, and all additional and technical specifications compiled as part of this document, in particular the following Additional Specifications:

SA: General Maintenance
SB: Operating and Maintenance Manuals
SC: General Decommissioning, Testing and Commissioning Procedures
SD: General Training

The intended maintenance work to this installation will restore the existing installation to a safe, efficiently functional system that complies with all statutory regulations and applicable standards, in the process repairing all defects and shortfalls.
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PAA 01.02 OCCUPATIONAL HEALTH AND SAFETY

The Contractor shall be required to comply with the Occupational Health and Safety Act 85 of 1993, Construction Regulations 2014 and related regulations. Non-compliance with these regulations, in any way whatsoever, will be adequate reason for suspending the Works.

PAA 01.01 GENERAL PLUMBING AND DRAINAGE INFORMATION

All the buildings are connected to water meters.

PAA 02 GENERAL DESCRIPTION OF INSTALLATIONS

The existing plumbing and drainage installations provide potable hot and cold water to the various buildings on these sites. The potable cold-water installation is provided with supply points from the underground reticulation networks outside the buildings to an above ground reticulation network via service ducts, ceiling voids and chased into walls to outlet points. The potable hot-water installation is provided with supplies from various domestic or industrial geysers where applicable.

This contract also provides for repair and maintenance of the fire water piped reticulation network, excluding the fire fighting equipment which is dealt with under Particular Specification PJC: Conventional Fire Fighting equipment.

Technical details of sanitary and brassware, as well as the plumbing and drainage installations are given in PAA 03.

PAA 03 TECHNICAL DETAILS OF EXISTING INSTALLATIONS

At the time of compilation of this document the existing installations consisted of the equipment and plant listed below with their relevant technical details.

PAA 03.01 SANITARY AND BRASSWARE: GENERAL

	SANITARY WARE	BRASSWARE	TRAP
WCs (cistern)	Armitage Shanks/Vaal: white, floor-mounted, vitreous china	Brass shut-off valves	Not applicable
Cistern (WC)	Wall-mounted, white, CI; Wall-mounted, white, vitreous china; Wall-mounted, white, plastic	Brass shut-off valves	Not applicable
Urinals (flush)	Armitage Shanks, white, wall-mounted, vitreous china; Citimetal stainless steel wall-mounted.	Junior flush valve, exposed type, shut-off valves; Brass shut-off valves	CP bottle trap. Flexi P-trap; Flexi S-trap
WHBs	Armitage Shanks, white wall-mounted, white enamel; Wall-mounted stainless steel	Cobra 15 mm, CP star handle pillar taps, mixer taps	Flexi P-trap; Flexi S-trap
Showers		15 mm CP under-tile stop-cocks, mixers	
Wash troughs	Stainless steel, double bowl, wall-mounted	Cobra 15 mm, CP star handle wall type taps	Flexi P-trap
Baths	Steel enamel, white, 2 m long and acrylic	Cobra 20 mm, CP star handle wall type taps	Not applicable
Sinks	Stainless steel, cabinet-mounted	20 mm CP star handle taps, 20 mm Cobra taps CP sink mixer with over arm swivel outlet	Flexi P-trap, lead P-trap
Wash tubs	Concrete double bowl	CP wall type taps	Lead P-trap

PAA 03.02 SANITARY DRAINAGE PIPING: GENERAL

	PIPE	FITTINGS	EQUIPMENT
Gullies	VCP	CI or plastic grating	Not applicable
Waste pipes	GMS, uPVC	Brass, uPVC	Not applicable
Soil pipes	S&S CI, uPVC	S&S CI, uPVC	Not applicable
Cleaning eyes	CI (ABC), uPVC	Not applicable	Not applicable
Vent pipes	S&S CI	S&S CI	Not applicable

PAA 03.03 DOMESTIC WATER PIPING: GENERAL

	PIPE	FITTINGS	EQUIPMENT
Cold-water piping	Cu GMS	Conex, soldered GMS	Brass gate shut-off valve Brass gate shut-off valve
Hot-water piping	Cu GMS	Conex, soldered GMS	Brass gate shut-off valve Brass gate shut-off valve

PAA 03.04 FIRE WATER PIPING: GENERAL

	PIPE	FITTINGS	EQUIPMENT
Fire water piping	GMS, Cu	GMS, Conex soldered	See specifications

PAA 03.06 FIRE WATER INSTALLATION QUANTITIES

The firefighting equipment currently installed is listed in Particular Specification PJC: Conventional Fire Fighting Equipment. The piped reticulation networks to these equipment items shall form part of this contract where applicable.

PAA 04 STATUS OF EXISTING INSTALLATION

The status of the equipment and installation at the time of compilation of this document is summarised below:

PAA 04.01 SANITARY AND BRASSWARE

The Scope of Works requires full Maintenance from the inception of the Contract on all facilities, buildings, installations, infrastructure and equipment regardless of any other repair related works that may occur during the Contract Period.

PAA 04.02 PLUMBING AND DRAINAGE INSTALLATION

The Scope of Works requires full Maintenance from the inception of the Contract on all facilities, buildings, installations, infrastructure and equipment regardless of any other repair related works that may occur during the Contract Period.

PAA 05 DETAILS OF REPAIR WORK

The following work shall form part of the repair work to Building Services. This work shall be done in accordance with the relevant regulations, codes, specifications and Technical Specification AA: Plumbing and Drainage Installations, as set out in this document. The work to be included is set out in PAA 05.01 and PAA 05.02 below and shall be read in conjunction with the Schedule of Quantities and Technical Specifications.

The repair work shall be carried out in accordance with the requirements of Additional Specification SC: General Decommissioning, Testing and Commissioning Procedures.

PAA 05.01 GENERAL DESCRIPTION OF WORK

The Contractor shall inspect the items, systems, equipment, components and installations listed below. This inspection shall involve the determination of any defects, leaks, damages, shortfalls, structural soundness, repairs required, details of existing equipment, suitability of equipment for the purpose it serves, etc. The Contractor shall report back to the Engineer in writing on all the above and the following items. No repair work shall commence prior to approval by the Engineer:

(a) Sanitary and brassware, including traps, brackets, piping, pan connectors, etc;

(b) Sanitary drainage installation, including fittings, traps, floor drains, gullies, cleaning eyes, manholes, grease and oil separators, etc;

(c) Domestic water piped installation, including fittings, valves, strainers, lagging and cladding, non-return valves, safety valves, etc;

(d) Fire water piped installation, including fittings, valves, non-return valves, pressure gauges, etc;

(e) Bracketing system;

(f) Domestic geysers including valves, pressure reducing valves, strainers, vacuum breakers, safety valves, non-return valves, lagging and cladding, etc.

(g) Industrial geysers including valves, pressure reducing valves, strainers, vacuum breakers, safety valves, non-return valves, lagging and cladding, etc.

The general scope of work at the time of going on tender is defined as follows:

(a) Replacing of irreparably damaged, missing and unsuitable sanitary and brassware, including the isolation, removal and stripping of the existing equipment;

(b) Replacing of irreparably damaged, corroded and unsuitable sanitary drainage piping, including fittings, brackets, traps, floor drains, oil and grease separators, cleaning eyes and gullies, etc;

(c) Replacing of irreparably damaged, corroded and unsuitable domestic water piping, including fittings, brackets, valves, strainers, water meters, lagging and cladding, etc;

(d) Replacing of irreparably damaged, corroded and unsuitable fire water piping, including fittings, brackets, valves, non-return valves, pressure gauges, etc;

(e) Replacing of irreparably damaged and corroded domestic or industrial geysers, including valves, pressure-reducing valves, air release valves, strainers, non-return valves, vacuum breakers and safety valves;

(f) Servicing, cleaning and repair of existing sanitary ware including removal of stains, repair of chipped enamel, replacing of damaged and missing seats and lids, de-scaling and cleaning of cisterns and servicing of filling and flushing mechanisms, fixing of loose fixtures and brackets, cleaning of traps, etc;

(g) Servicing, overhauling and cleaning of existing brassware, including dismantling, de-scaling, repair kits, replacing of washers, gland packing and gaskets, replacing of missing tap handles and flushing assemblies, etc;

(h) Servicing, cleaning and repair of existing domestic water and drainage pipe installations, including traps, floor drains, gullies, manholes, valve chambers, grease and oil separators, brackets, valves, vacuum breakers, strainers, pipe lagging and cladding, etc;

(i) Servicing and repair of existing fire water piped reticulation, including fittings, valves, pressure gauges, brackets, etc;

(j) Servicing, cleaning and repair of domestic geysers, including de-scaling, testing for leaks, replacing of elements, safety valves and thermostats if required, etc;

(k) Handing over of complete systems on completion of the repair work to the satisfaction of the Engineer, when the maintenance period shall commence;

(l) The supply and compilation of operating and maintenance manuals;

(m) The testing, adjusting and commissioning of all systems;

(n) The introduction of a maintenance control plan, including logging, recording and control procedures.

PAA 05.02 <u>PLUMBING AND DRAINAGE INSTALLATION</u>

The work to this installation shall at least include, but not be limited to the work listed below. Any items, components or installations not detailed in particular but found to be defective or inoperative during the inspection and report phase, shall be repaired or replaced as instructed by the Engineer.

PAA 05.02.01 <u>Various Sites</u>

(i) Service and repair domestic hot and cold-water installations, including pressure testing of existing systems, and replace items that are beyond repair. Where necessary, replace entire system with capillary soldered copper pipe system.

(ii) Service and repair drainage system, including rodding of system, and replace damaged or leaking pipes and fittings, manhole covers, cleaning and inspection eyes, gullies and gully gratings.

(iii) Service and repair brassware, such as taps, stop-cocks and flushing mechanisms with repair kits, and replace items that are missing or beyond repair.

(iv) Service and repair sanitary ware, including chip repair, de-staining and re-coating of baths, WC bowls and wash hand basins, dent removal and de-staining of wash troughs and kitchen sinks and replacement of damaged or missing parts such as WC seats and lids and cistern lids. Replace missing or irreparably damaged equipment. The following replacement items shall be installed where required:

(1) Ceramic and Plastic cisterns
(2) Steel enamel bathtubs
(3) Stainless steel wash troughs

(4) Ceramic wash hand basins

(v) Service and repair domestic geysers, including de-scaling, testing for leaks, replacement of electrical heating elements if required, servicing or replacement of valves, or replace leaking and corroded geysers where necessary.

PAA 06 MEASUREMENT AND PAYMENT

All new building work and repair work to existing structures and buildings necessitated by repairs to the plumbing and drainage services as scheduled, shall be done in accordance with the structural and building section of the Technical and Particular Specifications. The costs of such building and repair works shall be deemed to be included in the tendered rates for the applicable items as scheduled in this section.

PAA.01 INSPECTION AND REPORT ON EXISTING INSTALLATIONS……..……Unit: installation

The unit of measurement shall be the installation reported on.

The tendered rate for the installation shall include full compensation for the inspection and written report on all items, systems, components, equipment and installations, including the establishment of defects, leaks, damage, shortfalls, structural soundness, repairs required, details of existing equipment and suitability of the equipment for the purpose it serves.

PAA.03 ISOLATION, STRIPPING, DISMANTLING AND REMOVAL OF EXISTING BRASSWARE, SANITARY WARE AND PIPING INSTALLATIONS ..... …..……...Unit: number, metre

The unit of measurement shall be the number of each item of brassware and sanitary ware and metre of piping removed, including fixtures and fittings.

The tendered rates shall include full compensation for the isolation, dismantling and removal of irreparably damaged, broken and/or unsuitable brassware (flush valves, taps, mixers, shower roses, under tile stop-cocks, demand bib taps, hose bib taps, shut-off valves, etc) and sanitary ware (water closets, cisterns, basins, urinals, baths, wash troughs, sinks, etc) including all associated pipe work, brackets, traps, pan connectors, etc.

The tendered rates shall also include full compensation for the isolation, stripping, dismantling and removal of irreparably damaged, broken or unsuitable pipe work installed on surface, underground, chased into walls, in ceiling voids and/or service ducts, as well as the plugging off of connections to this pipe work.

The tendered rate shall also include full compensation for the removal off site and/or to storage of all removed items as mentioned above.

PAA.04 ISOLATION, STRIPPING, DISMANTLING AND REMOVAL OF EXISTING GEYSER INSTALLATIONS ..... ……..Unit: number

The unit of measurement shall be the number of each geyser installation removed, including associated pipe work and fittings.

The tendered rates shall include full compensation for the isolation, stripping, dismantling and removal of irreparably damaged, broken and/or corroded domestic geysers, including shut-off valves, non-return valves, strainers, pressure-reducing valves, vacuum breakers, air release valves, safety valves, etc, and the removal off site.

PAA.05 **SUPPLY AND INSTALLATION OF SANITARY WARE AND BRASSWARE**……..……Unit: metre, number

The unit of measurement shall be the number of each item of sanitary and brassware supplied and installed, including all associated pipe work and fittings.

The tendered rate shall include full compensation for the supply, delivery, positioning, installation, testing, cleaning, commissioning and hand-over of sanitary and brassware including all necessary pipe work, traps, brackets, fittings, bends, junctions, cleaning eyes, etc, to connect the sanitary and brassware to the existing water supply and/or drainage installation.

The tendered rate shall also include full compensation for chasing and/or building into walls and the reinstating of existing surfaces such as floors, walls, ceilings, etc.

PAA.06 **SUPPLY AND INSTALLATION OF DRAINAGE PIPING INSTALLATION** .....……..……...Unit: metre

The unit of measurement shall be the metre of each type of piping in the installation supplied and installed, including all fixtures and fittings.

The tendered rates shall include full compensation for the supply, delivery, installation, testing, cleaning, commissioning and handover of new drainage piping, installed on surface against walls or soffits, underground, in ceiling voids, chased or built into walls and/or service ducts, including all necessary bends, junctions, tees, cleaning eyes, covers, traps, floor drains, gratings, brackets, hangers, etc, to hand over a complete and effective installation that complies with local government regulations.

The tendered rates shall also include full compensation for the necessary underground works such as excavation, pipe bedding, fill blanket, backfilling and compaction and for the reinstatement of existing surfaces such as floors, walls, ceiling, roads, paving, etc, as well as connection to the existing drainage installation.

PAA.07 **SUPPLY AND INSTALLATION OF DOMESTIC WATER PIPING INSTALLATION** ..... …….. Unit: metre

The unit of measurement shall be the metre of each type of piping in the installation supplied and installed, indicating all fixtures and fittings.

The tendered rates shall include full compensation for the supply, delivery, installation, testing, cleaning, sterilising, commissioning and hand-over of new water piping installed on surface against walls or soffits, underground, in ceiling voids, chased or built into walls and/or in service ducts, including all necessary bends, tees, reducers, elbows, valves, strainers, adapters, brackets, hangers, etc, to hand over a complete and effective installation that complies with local government regulations.

The tendered rates shall also include full compensation for the supply and installation of hot-water pipe insulation and cladding.

The tendered rates shall also include full compensation for the necessary underground works such as excavation, pipe bedding, fill blanket, backfilling and compaction and for the reinstatement of existing surfaces such as floors, walls, ceilings, roads, paving, etc, as well as connection to the existing domestic water installation.

PAA.08 **SUPPLY AND INSTALLATION OF DOMESTIC GEYSER INSTALLATION**.....……...Unit: number

The unit of measurement shall be the number of each geyser installation supplied and installed, including all associated pipe work and fittings.

The tendered rates shall include full compensation for the supply and installation of domestic geysers, including shut-off valves, non-return valves, strainers, pressure-reducing valves, vacuum breakers, air release valves, safety valves, etc, as well as connection to existing piping and electrical supply.

PAA.09 **SUPPLY AND INSTALLATION OF FIRE WATER RETICULATION PIPEWORK**..... Unit: metre

The unit of measurement shall be the metre of each type of pipe work supplied and installed in the firewater reticulation, including all fixtures and fittings.

The tendered rate shall include full compensation for the supply, delivery, installation, testing, cleaning, commissioning and hand-over of new fire water reticulation pipe work installed on surface against walls or soffits and/or underground, including all necessary bends, tees, reducers, elbows, valves, adapters, brackets, hangers, pressure gauges, etc, to hand over a complete and effective installation that complies with local government regulations.

The tendered rates shall also include full compensation for the necessary underground work such as excavation, pipe bedding, fill blanket, backfilling and compaction and for the reinstatement of existing surfaces such as floors, walls, ceilings, roads, paving, etc, as well as connection to the existing fire water reticulation network.

PAA.10 **SERVICING, CLEANING AND REPAIR OF SANITARY WARE**..... ……...Unit: number

The unit of measurement shall be the number of each item of sanitary ware serviced, cleaned and repaired, including all associated pipe work and fittings.

The tendered rate shall include full compensation for the repair or replacement of all damaged or missing parts, servicing of all movable parts, cleaning of stained sanitary ware with approved cleaning agent, fixing of loose fixtures and brackets according to manufacturer's specifications, de-scaling and cleaning of cisterns and servicing of filling and flushing mechanisms, cleaning of all traps, fixing or replacing of damaged or missing shower, urinal and channel outlet gratings and any other work or action required to hand over an effective system that complies with local government regulations.

PAA.11 **SERVICING, OVERHAULING AND CLEANING OF BRASSWARE** ..... Unit: number

The unit of measurement shall be the number of each item of brassware serviced, overhauled or cleaned, including all associated pipe work and fittings.

The tendered rate shall include full compensation for dismantling, cleaning and de-scaling, replacement of all gaskets, gland packing and seals on all valves, repair or replacement of all damaged or missing parts, replacement kits for worn or leaking flush valves, taps and mixers, repair or replacement of leaking, corroded or damaged flush pipes, readjusting of timing mechanisms on flush valves and metering taps and any other work or action required to hand over an effective system that complies with local government regulations.

PAA.12 **SERVICING, CLEANING AND REPAIR OF DOMESTIC WATER AND DRAINAGE PIPE INSTALLATIONS**…….. Unit: number, metre, item

The unit of measurement shall be the metre of each type of pipe installation serviced, cleaned and repaired, including all fixtures and fittings.

The tendered rates shall include full compensation for inspection, sampling testing, servicing, cleaning and repair of existing piping and equipment such as:

(a) Video surveying of all underground drainage pipe work to establish root ingress, damaged and corroded pipe work, fat build-up, blockages, incorrect falls, sagging and to provide as-built information;

(b) Initial unblocking and cleaning of all drainage pipe work, traps, floor drains and gullies;

(c) Pressure testing of piping and taking of water piping samples to determine state of corrosion and scaling;
(d) Repair work to damaged manholes, gullies, cleaning eyes, valve chambers, etc, including builders' work and benching;

(e) Repair of existing bracketing systems including fixing and repair of existing brackets and hangers, as well as the supply and installation of additional brackets where required;
(f) Emptying, cleaning, checking, testing and repair of oil and grease separators;

(g) Service and repair to all valves, strainers, pressure-reducing valves, water meters, non-return valves, air release valves and vacuum breakers, including new gaskets, gland packing and seals;

(h) Taking of water samples and bacteriological testing to determine the compliance with the relevant codes of practice;

(i) Repairing and/or replacement of damaged hot-water pipe lagging and cladding;
(j) Preparation, painting and repainting of pipe work and;

(k) Any other work or action to hand over an effective installation that complies with local government regulations.

PAA.13 **SERVICING, CLEANING AND REPAIR OF DOMESTIC GEYSERS**..... ……..……... Unit: number

The unit of measurement shall be the number of domestic geysers serviced, cleaned and repaired, including all fixtures and fittings.

The tendered rate shall include full compensation for the isolation, servicing, cleaning and repair of domestic geysers in accordance with the manufacturer's specifications, including de-scaling, testing for leaks, replacing of elements, replacement of safety valve and replacement of thermostat and set point, and replacement of connections if required and any other work or action to hand over an effective system that complies with local government regulations.

PAA.14 **SERVICING AND REPAIR OF FIRE WATER PIPED RETICULATION NETWORKS** ..... ……..… Unit: metre

The unit of measurement shall be the metre of each type of piping in the firewater network serviced and repaired, including all fixtures and fittings.
The tendered rates shall include full compensation for the inspection, testing, servicing and repair of existing piping and equipment such as:

(a) Pressure testing of piping and taking of pipe samples to determine the extent of corrosion and scaling;

(b) Repair or replacement of damaged, leaking, broken and corroded pipe work or fittings;

(c) Repair and service to all valves, including new gaskets, gland packing and seals;

(d) Repair, service, adjustment and calibration of all pressure gauges;

(e) Repair and fixing of existing brackets and hangers and the installation of additional brackets and hangers where required;

(f) Any other work or action to hand over an effective system that complies with local government regulations.

PAA.15 CLEANING OUT SEPTIC TANKS AND DISPOSE OF CONTENTS OFF-SITE …. Unit: number

The unit of measurement shall be the number of septic tanks thoroughly cleaned and pumping the waste into a tanker and disposing of all the waste off site at a wastewater dumping area.

PAA.16 SUPPLY AND INSTALLATION OF DOMESTIC GEYSER INSTALLATION.....Unit: number

The unit of measurement shall be the number of each geyser installation supplied and installed, including all associated pipe work and fittings.

The tendered rates shall include full compensation for the supply and installation of industrial geyser installations including isolating lever-ball valves (from 22 to 50mm), 400kPa expansion relief valve, drain connection, overflow pipe, inline circulating pump (25mm), Temperature and pressure safety valve, electrical control panel, bulk hot water vessel, pump supply cable, dual thermostat, hot water outlet, y-strainer, pressure gauge, non-return valve, temperature gauge, balanced cold water and expansion valve stand pipe.

PAA.17 SERVICING, CLEANING AND REPAIR OF ..... INDUSTRIAL GEYSERS ……

The unit of measurement shall be the number of industrial geysers serviced, cleaned and repaired, including all fixtures and fittings.

The tendered rate shall include full compensation for the isolation, servicing, cleaning and repair of industrial geysers in accordance with the manufacturer's specifications, including de-scaling, testing for leaks, servicing, checking or replacing of isolating lever-ball valves (from 22 to 50mm), 400kPa expansion relief valve, drain connection, overflow pipe, inline circulating pump (25mm), Temperature and pressure safety valve, electrical control panel, dual thermostat, y-strainer, pressure gauge, non-return valve, temperature gauge, and any other work or action to hand over an effective system that complies with local government regulations.

PAA.18 RE-INSTALLATION OF EXISTING GEYSER INSTALLATIONS AT LOCATION INDICATED BY ENGINEER..... ……..Unit: number

The unit of measurement shall be the number of each geyser re-installed including associated pipe work and fittings.

The tendered rates shall include full compensation for the re-installation of the isolated domestic geysers, including servicing, cleaning and repair of domestic geysers in accordance with the manufacturer's specifications scaling, testing for leaks, replacing of elements, and replacement of thermostat and set point, replacement of two shut-off valves, non-return valve, strainer, two vacuum breakers, safety valve and replacement pipe work not exceeding 10m from the previous location according to SANS specifications and any other work or action to hand over an effective system that complies with local government regulations.

PAA.19 SUPPLY AND INSTALLATION OF DOMESTIC .... GALVANISED GEYSER DRIP TRAY ……

The unit of measurement shall be the number of each geyser drip tray installation supplied and installed, including isolation and re-installation of geyser.

The tendered rates shall include full compensation for the supply and installation of the geyser drip trays including isolation of geyser and re-installation of geyser on drip tray.

PAA.20 SUPPLY AND INSTALLATION OF SOLAR POWERED GEYSER INSTALLATION.....……...Unit: number

The unit of measurement shall be the number of each solar powered geyser installation supplied and installed, including all associated pipe work and fittings.

The tendered rates shall include full compensation for the supply and installation of solar powered geysers which shall include all solar storage tanks and solar collector panels, including shut-off valves, non-return valves, strainers, pressure-reducing valves, vacuum breakers, air release valves, safety valves, etc, as well as connection to existing piping, electrical, lagging & cladding supply.

PAA.21 SUPPLY AND INSTALLATION OF DOMESTIC HEAT PUMP INSTALLATION ..... ……...Unit: number

The unit of measurement shall be the number of each heat pump installation supplied and installed, including all associated pipe work and fittings.

The tendered rates shall include full compensation for the supply and installation of a heat pump installation which shall include the heat pump, circulating pump set, shut-off valves, non-return valves, strainers, pressure-reducing valves, vacuum breakers, air release valves, safety valves, etc., as well as connection to existing piping and electrical connection.(storage tank measured separately)

PAA 07 DETAILS OF MAINTENANCE WORK

PAA 07.01 GENERAL

The Contractor shall be responsible for the complete maintenance of all the equipment, components, installations and systems forming part of this repair and maintenance contract and as set out in PAA 03.05. The Contractor shall strictly adhere to Additional Specification SA: General Maintenance, and Technical Specification AA: Plumbing and Drainage Installations, with regard to the maintenance period, obligations, responsibilities, actions and activities, etc, which shall also include the following maintenance actions:

(a) Routine preventative maintenance. A guideline to the required actions is provided in specification AA. The actions will not be limited to these guidelines, but shall include all additional actions, work, materials, etc. necessary to maintain this installation at an acceptable level.

(b) Corrective maintenance as described and defined in Additional Specification SA: General Maintenance.

(c) Breakdown maintenance as described and defined in Additional Specification SA: General Maintenance.

Fatal breakdown shall be defined as any equipment, components and systems preventing the supply of water to fire hydrants and fire hoses due to a failure of this system at the particular point of incident.

Emergency breakdown shall be defined as any equipment, components and systems preventing the provision of water and the drainage of the equipment to the consumer points due to a failure of part of this system at the particular point of incident.

TECHNICAL SPECIFICATION

BA ROOF COVERINGS

CONTENTS

BA 01 SCOPE
BA 02 STANDARD SPECIFICATIONS
BA 03 MEASUREMENT AND PAYMENT

BA 01 SCOPE

This specification covers the removal of existing roof coverings and waterproofing and the supply, delivery and installation of new roof coverings and water-proofing to various types of buildings.

Roof coverings shall mean the scope of work related to the removal of existing roof coverings, water-proofing and ancillary items, the supply and installation of new roof sheeting, roofing screws, purlins, flashings, rainwater goods, water-proofing, fascias and barge boards. This specification also includes minor work related to trusses, purlins, paintwork, minor plumbing work and water-proofing to concrete roofs.

BA 02 STANDARD SPECIFICATIONS

BA 02.01 GENERAL STANDARD SPECIFICATIONS

The latest edition, including all amendments to date of tender, of the following specifications, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof:

SANS 1200HB	-	Cladding and Sheeting
SANS 1783-4	-	Softwood brandering and battens
SANS 935	-	Hot-dip (galvanised) zinc coatings
SANS 1273	-	Fasteners for sheet roof and wall coverings

BA 02.02 Occupational Health and Safety

The Contractor shall be required to comply with the Occupational Health and Safety Act 85 of 1993, Construction Regulations 2014 and related regulations. Non-compliance with these regulations, in any way whatsoever, will be adequate reason for suspending the Works.

BA 02.2 ADDITIONAL SPECIFICATIONS

Technical Specification BB: Carpentry and Joinery for Roofs and Ceilings
Technical Specification BC: Waterproofing of Concrete Roofs

BA 02.3 ADDITIONAL REQUIREMENTS FOR REPAIR OF PROFILED ROOF SHEETING (NON-CONCEALED FIXING AND CONCEALED FIXING)

BA 02.3.1 Roof sheeting

Existing roof sheeting shall either be replaced or to a small extent be repaired according to the Schedule of Quantities and as instructed by the Engineer. Where new sheeting is specified, the existing roof sheeting must be removed. Each day's removed sheeting shall be fully covered with new roof sheeting at the end of the day. Plastic sheeting or equivalent approved protection to minimize damage possibilities due to rain, etc and to protect the personnel and occupied buildings. The new roof sheeting shall be 1,25 mm thick polycarbonate UV2 corrugated/IBR or equivalent approved for roof slopes exceeding 15º. Concealed fixed type polycarbonate UV2 roof sheeting will in general be used to cover roofs with slopes not exceeding 15º. The sheeting must be laid in long lengths without end overlaps. The broad flutes must be turned up at the apex to form a dam, and turned down at the eaves to form a drip. Metal closers 0,8 mm thick galvanised (or Chromadek), complete with polyclosers set in one run of silicone sealant, are required at apexes, ridges, side and head walls, etc. The Contractor shall take all necessary dimensions and measurements on site prior to manufacturing and installation. Z275 galvanising spelter shall be used and the Contractor shall provide SANS certificates of compliance to the Engineer. Various standard dark colours will be used for flashings, gutters and down pipes. In all cases the roofing must be laid strictly in accordance with the manufacturer's specifications.

In certain cases, existing roof sheeting that is removed from buildings, will be re-used to repair similar types of structures.

BA 02.3.2 Main fasteners to timber purlins: Polycarbonate corrugated or equivalent approved sheeting

90 mm x no. 14 hexagon head (H/H) carbon steel (C/S) cadmium plated Posidriv or equivalent approved roofing screws with 29 mm diameter x 1,0 mm thick galvanised conical washers and poly-isobutyl grommet assembly must be used. Main fasteners for steel purlins are to be 65 mm long. Fasteners to be provided at alternating ribs and all side laps.

BA 02.3.3 Side lap fasteners: Polycarbonate corrugated or equivalent approved sheeting

Stitching will be done with 25 mm x no. 14 H/H C/S posidriv or equivalent approved roofing screws @ 600 c/c maximum with 29 mm diameter x 1,0 mm thick galvanised conical washers and poly-isobutyl grommet assembly. Provide 10 x 1, 6 mm thick butyl rubber sealer strip between sheets.

BA 02.3.4 Flashings

0, 8 mm thick Chromadek/galvanised flashings at ridge caps, side and head walls, drips, corners, etc, as described elsewhere. The minimum length of an overlap between flashings is 150 mm. Apply two runs of silicone sealant between flashings. Flashings to be stitched together with 25 mm x no. 14 H/H C/S posidriv or equivalent approved roofing screws with 29 mm diameter x 1, 0 mm thick galvanised conical washers at end laps and longitudinally @ 400 c/c maximum at ribs, etc. The Contractor shall take all necessary dimensions and measurements on site prior to manufacturing and installation.

BA 02.3.5 Sealant

Silicone sealant with an amine cure system with primer shall be used to waterproof all flashings and rainwater goods, viz. gutters and down pipes. Two runs of silicone shall be provided at end overlaps.

BA 02.3.6 Pipe flashings

EPDM/silicone pipe-through-roof flashings to diameter or equivalent approved pipe flashings shall be used to waterproof pipe protrusions through the roof sheeting. Installation shall be done strictly in accordance with the manufacturer's specification and shall include the application of EPDM/silicone pipe through roof flashing and sealant and fastening of flashing to surface with TEKS or equivalent approved self-drilling fasteners.

BA 02.3.7 Insulation

No insulation repairs are required. In certain cases insulation may be necessary to reduce heat load or to comply with hygiene requirements as in abattoirs.

Specification for non-visible roof insulation material:

Heavy grammage double sided reflective aluminium foil (heavy grade) laid on 1,6 mm diameter galvanised straining wires at 300 mm centres to the manufacturer's specification. The insulation shall be laid longitudinally over the purlins and lapped 150 mm at joints.

Specification for visible roof insulation material:

White thermal insulation low density polyethylene bubble and Aluminium foil backing fire retardant grade laid on 1,6 mm diameter white plastic (PVC) coated straining wires at 383 mm centres to the manufacturer's specification. The insulation shall be laid longitudinally over the purlins and lapped at joints.

BA 02.4 ADDITIONAL REQUIREMENTS FOR REPAIR OF PROFILED SIDE WALL CLADDING (NON-CONCEALED FIXING AND CONCEALED FIXING)

BA 02.4.1 Side wall cladding

Existing side wall cladding shall either be repaired or replaced in accordance with the Schedule of Quantities. Where new cladding is specified, the existing side wall cladding must be removed. Each day's removed cladding shall be fully covered with new cladding at the end of the day. The new side wall cladding shall be 1,25 mm thick polycarbonate UV2 corrugated or equivalent approved. The cladding must be laid in long lengths without end overlaps. Metal closers 0,8 mm thick galvanised (or Chromadek), complete with polyclosers set in one run of silicone sealant, are required at gables, ridges, side and head walls, etc. The Contractor shall take all necessary dimensions and measurements on site prior to manufacturing and installation. Z275 galvanising spelter shall be used and the Contractor shall provide SANS certificates of compliance to the Engineer. Heavy duty profiled polycarbonate sheets shall be used for sheeting. Various standard dark colours for flashings, gutters and down pipes will be used. In all cases the cladding must be laid strictly in accordance with the manufacturer's specifications.

BA 02.4.2 **Main fasteners to timber girts: Polycarbonate corrugated/IBR (and equivalent approved) and profiled translucent sheeting**

90 mm x no. 14 hexagon head (H/H) carbon steel (C/S) cadmium plated posidriv or equivalent approved roofing screws with 29 mm diameter x 1,0 mm thick galvanised conical washers and poly-isobutyl grommet assembly must be used. Main fasteners for steel girts are to be 65 mm long. Fasteners to be provided at alternating ribs.

BA 02.4.3 **Side lap fasteners: Polycarbonate corrugated (or equivalent approved) sheeting**

Stitching will be done with 25 mm x no. 14 H/H C/S posidriv or equivalent approved roofing screws @ 600 c/c with 29 mm diameter x 1,0 mm thick galvanised conical washers and poly-isobutyl grommet assembly. Provide 10 x 1,6 mm butyl rubber sealer strip between sheets.

BA 02.4.4 **End overlaps**

If unavoidable, the end overlap shall be 300 mm minimum between sheeting and sealed with two rows of silicone sealant between the sheets. Bolt the ribs in the overlap region with the profiled polycarbonate sheeting with galvanised no. 14 gutter bolts, bonded washers and nuts through every alternative rib.

BA 02.4.5 **Side overlaps: Vertical profiled translucent sheeting**

Stitching will be done with 6 mm cadmium-plated cladding bolts and nuts x 25 mm long @ ± 300 c/c with 19 mm diameter x 1,0 mm thick galvanised conical washers and poly-isobutyl grommet assembly.

BA 02.5 **RAINWATER GOODS**

BA 02.5.1 **Gutters**

Standard size:
100 x 75 x 0,8 thick standard Chromadek/galvanised non-supporting beaded gutter. Galvanised brackets to be provided at every truss. Brackets to be painted to specification in the Schedule of Quantities.
Alternatively standard 140 x 127 x 83 x 0,6 mm thick concealed fix profile sheeting baked enamel/galvanised fascia gutter with galvanised gutter clips can be used.

Typical size for other buildings:
125 x 100 x 0,8 thick standard Chromadek self-supporting beaded gutter.

Dark colours to Consultant's specification.

The Contractor shall take all necessary dimensions and measurements on site prior to manufacturing and installation.

BA 02.5.2 **Joints in gutters, valleys, etc**

150 mm overlap sealed with an approved silicone and riveted together with 2 rows of sealed pop rivets. Linings to valleys and secret gutters, etc, shall have an overlap of 225 mm.

BA 02.5.3 Gutter accessories and ancillary items

End stops: 0,8 mm thick Chromadek/galvanised finished end stops joined to gutter on site and sealed as for joints in gutters.

Outlets: 0,8 mm thick Chromadk/galvanised finished outlets fixed to gutter with pop rivets and sealed with an approved silicone. Outlet to slip into down pipe.

Fascia straps: 25 mm wide x 1,0 mm thick galvanised straps at +/- 686 mm c/c.

Corner joints: Corner joints to be neatly mitred, pop riveted together and sealed with an approved silicone.

Sealant: Clear silicone sealant with amine cured system and primer shall be used to waterproof gutters and down pipes.

BA 02.5.4 Down pipes

Standard sizes:
100 x 75 x 0, 6 thick Chromadek/galvanised down pipes
100 x 100 x 0,8 thick Chromadek/galvanised down pipes

Dark colours to Consultant's specifications.

Down pipes to have double-seamed joints. Down pipes, shoes, offsets, etc, shall be joined together by means of 100 mm slip joints and pop riveted together.

The Contractor shall take all necessary dimensions and measurements on site prior to manufacturing and installation.

BA 02.5.5 Down pipe acessories

Brackets: Standard galvanised brackets shall be spaced at centres not exceeding 2,4 metres.

Brackets to be primed and painted with 2 coats of high gloss enamel.

Shoes, offsets and spreaders: Manufactured from 0,8 mm thick Chromadek/galvanised material, cut and mitred to suit. All joints to be sealed with an approved silicone sealant.

BA.02.5.6 General

The Contractor will be responsible for the stability of the supporting structure during and after removal of existing roof cladding and sheeting.

SANS 1200 HB "Cladding and Sheeting" will be applicable for the erection of all new roofs.

The Contractor must give a minimum 3 year guarantee for the watertight roof and workmanship. **The manufacturer must carry out inspections at regular intervals during the construction period. He must issue a certificate of acceptance and compliance on completion to the client.**

BA 03 MEASUREMENT AND PAYMENT

BA.03.1 DETAILS OF MATERIAL TO BE USED

For detail descriptions of materials, thicknesses, dimensions and ancillary items to be used, as specified in the various payment items of roof sheeting, cladding, flashings, etc; refer to the scheduled list below:

Flashings: Refer to Technical Specifications BA	
Roof:	**Galvanised / Chromadek IBR or equivalent**
0,8 mm thick Chromadek Ridge Flashing	462 mm girth (231 + 231), 3 x bends (2 are shallow bends). Fix flashing to roof sheeting with Posidriv screws and washers. 150 mm overlap sealed with 2 rows of pop rivets and 2 rows of silicone; 2 rows of broad flute polyclosers bedded in silicone, 2 rows x 0,6 mm thick Chromadek broad flute metal closers. Bend up trough to form a dam.
0,8 mm thick Galvanised Ridge Flashing	462 mm girth (231 + 231), 3 x bends (2 are shallow bends). Fix flashing to roof sheeting with Posidriv screws and washers. 150 mm overlap fixed and sealed with 2 rows of pop rivets and 2 rows of silicone; 2 rows of broad flute polyclosers bedded in silicone, 2 rows x 0,6 mm thick Galvanised broad flute metal closers. Bend up trough to form a dam.
0,6 mm thick Chromadek Eaves Closer	Fix standard serrated narrow flute eaves closer to timber purlin. Patch plaster and touch up paint work.
0,8 mm thick Chromadek Apex Trim	462 mm girth (231 + 231 vertical), 3 x bends (2 are shallow bends). Fix flashing to roof sheeting with Posidriv screws and washers. 150 mm overlap fixed and sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row of broad flute polycloser bedded in silicone, 2 rows x 0,6 mm thick Chromadek broad flute metal closers. Bend up trough to form a dam.
0,8 mm thick Galvanised Apex Trim	462 mm girth (231 + 231 vertical), 3 x bends (2 are shallow bends). Fix flashing to roof sheeting with Posidriv screws and washers. 150 mm overlap fixed and sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row of broad flute polycloser bedded in silicone, 2 rows x 0,6 mm thick galvanised broad flute metal closers. Bend up trough to form a dam.
0,8 mm thick Chromadek Headwall Flashing	385 mm girth (231 + 154 vertical) headwall flashing, 2 x bends (1 is a shallow bend). Fix flashing to roof sheeting with Posidriv screws and washers. 150 mm overlap fixed and sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row of broad flute polycloser bedded in silicone, 1 row x 0,6 mm thick Chromadek broad flute metal closer. Bend up trough to form a dam. 154 mm girth (114 + 25 + 15 lip @ 15º) Chromadek counter flashing, 3 x bends (1 is a shallow bend). Counter flashing to overlap with headwall flashing with at least 75 mm. Cut 6 mm wide groove into brick wall for counter flashing. Prime joint and seal with an approved 6 x 6 mm poly-urethane sealant.
0,8 mm thick Galvanised Headwall Flashing	385 mm girth (231 + 154 vertical) headwall flashing, 2 x bends (1 is a shallow bend). Fix flashing to roof sheeting with Posidriv and washers. 150 mm overlap fixed and sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row of broad flute polycloser bedded in silicone, 1 row x 0,6 mm thick Galvanised broad flute metal closer. Bend up trough to form a dam. 154 mm girth (114 + 25 + 15 lip @ 15º) galvanised counter flashing, 3 x bends (1 is a shallow bend). Counter flashing to overlap with headwall flashing with at least 75 mm. Cut 6 mm wide groove into brick wall for counter flashing. Prime joint and seal with an approved 6 x 6 mm poly-urethane sealant.
Extra over for cutting into brick wall	6 mm wide groove x 30 mm deep into brick wall. Clean groove from dust and prime groove.
0,8 mm thick Chromadek Hip	462 mm girth (231 + 231), 3 x bends (2 are shallow bends). Fix flashing to roof sheeting with Posidriv screws and washers. 150 mm overlap sealed with 2 rows of

Flashing	pop rivets and 2 rows of silicone. 2 rows of broad flute polyclosers bedded in silicone, 2 rows x 0,6 mm thick Chromadek broad flute metal closers on rake. Bend up trough to form a dam.
0,8 mm thick Galvanised Hip Flashing	462 mm girth (231 + 231), 3 x bends (2 are shallow bends). Fix flashing to roof sheeting with Posidriv screws and washers. 150 mm overlap sealed with 2 rows of pop rivets and 2 rows of silicone. 2 rows of broad flute polyclosers bedded in silicone, 2 rows x 0,6 mm thick Chromadek broad flute metal closers on rake. Bend up trough to form a dam.
0,8 mm thick Chromadek Apron Flashing	462* mm girth (308 + 154* vertical, girt position determines final upstand length on site), 3 x bends (2 are shallow bends). Fix flashing to roof sheeting with Posidriv screws and washers. 150 mm overlap sealed with 2 rows of pop rivets and 2 rows of silicone. 2 rows of broad flute polyclosers bedded in silicone, 1 row x 0,6 mm thick Chromadek broad flute metal closer. Bend up trough to form a dam.
0,8 mm thick Galvanised Apron Flashing	462* mm girth (308 + 154* vertical, girt position determines final upstand length on site), 3 x bends (2 are shallow bends). Fix flashing to roof sheeting with Posidriv screws and washers. 150 mm overlap sealed with 2 rows of pop rivets and 2 rows of silicone. 2 rows of broad flute polyclosers bedded in silicone, 1 row x 0,6 mm thick Galvanised broad flute metal closer. Bend up trough to form a dam.
0,8 mm thick Chromadek Eaves Flashing	462* mm girth (154 vertical + 308*, girt position determines final upstand length), 3 x bends (2 are shallow bends). Fix flashing to roof sheeting with Posidriv screws and washers. 150 mm overlap sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row each of broad and narrow flute polyclosers bedded in silicone, 1 row each x 0,6 mm thick Chromadek broad and narrow flute metal closers. Turn down trough to form a drip. Overhang length of roof sheeting to be determined on site.
0,8 mm thick Galvanised Eaves Flashing	462* mm girth (154 vertical + 308*, girt position determines final upstand length), 3 x bends (2 are shallow bends). Fix flashing to roof sheeting with Posidriv screws and washers. 150 mm overlap sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row each of broad and narrow flute polyclosers bedded in silicone, 1 row each x 0,6 mm thick galvanised broad and narrow flute metal closers. Turn down trough to form a drip. Overhang length of roof sheeting to be determined on site.
0,8 mm thick Chromadek Gable Flashing (residential type)	308 mm girth (262 + 46 vertical), 3 x bends (2 are shallow bends). Fix flashing to roof sheeting with Posidriv screws and washers. 150 mm overlap sealed with 2 rows of pop rivets and 2 rows of silicone. Flashing to be fitted tightly over gable fascia board. Provide one row of continuous silicone on rib.
0,8 mm thick Galvanised Gable Flashing (residential type)	308 mm girth (262 + 46 vertical), 3 x bends (2 are shallow bends). Fix flashing to roof sheeting with Posidriv screws and washers. 150 mm overlap sealed with 2 rows of pop rivets and 2 rows of silicone. Flashing to be fitted tightly over gable fascia board. Provide one row of continuous silicone on rib.
0,8 mm thick Chromadek Gable Flashing (industrial type)	462 mm girth (262 +200 vertical), 3 x bends (2 are shallow bends). Fix flashing to roof sheeting with Posidriv screws and washers. 150 mm overlap sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row x 0,6 mm thick Chromadek broad flute metal closer on side wall cladding. Provide one row of continuous silicone on rib.
0,8 mm thick Galvanised Gable Flashing (industrial type)	462 mm girth (262 + 200 vertical), 3 x bends (2 are shallow bends). Fix flashing to roof sheeting with Posidriv screws and washers. 150 mm overlap sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row x 0,6 mm thick galvanised broad flute metal closer on side wall cladding. Provide one row of continuous silicone on rib.
0,8 mm thick Chromadek Side Wall Flashing	385 mm girth (231 + 154 vertical) side wall flashing, 2 x bends (1 is a shallow bend). Fix flashing to roof sheeting with Posidriv screws and washers. 150 mm overlap fixed and sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row of broad flute polycloser bedded in silicone (only for vertical side wall cladding). 154 mm girth (114 + 25 + 15 lip @ 15º) Chromadek counter flashing, 3 x bends (1 is a shallow bend). Counter flashing (side wall is a brick wall) to overlap with side wall flashing with at least 75 mm. Cut 6 mm wide groove into brick wall parallel to roof sheeting

	for counter flashing. Prime joint and seal with an approved 6 x 6 mm poly-urethane sealant.
0,8 mm thick Galvanised Side Wall Flashing	385 mm girth (231 + 154 vertical) side wall flashing, 2 x bends (1 is a shallow bend). Fix flashing to roof sheeting with Posidriv screws and washers. 150 mm overlap fixed and sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row of broad flute polycloser bedded in silicone (only for vertical side wall cladding). 154 mm girth (114 + 25 + 15 lip @ 15º) galvanised counter flashing, 3 x bends (1 is a shallow bend). Counter flashing (side wall is a brick wall) to overlap with side wall flashing with at least 75 mm. Cut 6 mm wide groove into brick wall parallel to roof sheeting for counter flashing. Prime joint and seal with an approved 6 x 6 mm poly-urethane sealant.
0,8 mm thick Galvanized Roof Overhang Barge Flashing	616 mm girth (286 + 300 vertical + 20 + 10 vertical) standard Craft-Lock barge flashing, 4 x bends (1 is a shallow bend). Fix flashing to roof sheeting with Posidriv screws and washers, and to 250 x 25 wide x 2,5 thick with 25 mm lip galvanised bracket. The galvanised bracket to be screwed to rafter ends with 2 countersunk brass screws. 150 mm overlap fixed and sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row of broad flute polycloser bedded in silicone, 1 row x Chromadek broad flute metal closer bedded in a row of silicone. Bend up trough to form a dam.
0,8 mm thick Chromadek Roof Overhang Barge Flashing	616 mm girth (286 + 300 vertical + 20 + 10 vertical) standard Craft-Lock barge flashing, 4 x bends (1 is a shallow bend). Fix flashing to roof sheeting with Posidriv screws and washers, and to 250 x 25 wide x 2,5 thick with 25 mm lip galvanised bracket. The galvanised bracket to be screwed to rafter ends with 2 countersunk brass screws. 150 mm overlap fixed and sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row of broad flute polycloser bedded in silicone, 1 row x Galvanised broad flute metal closer bedded in a row of silicone. Bend up trough to form a dam.
0,8 mm thick Chromadek Side Roof Overhang Flashing (carports)	616 mm girth (286 + 300 vertical + 20 + 10 vertical), 4 x bends (1 is a shallow bend). Fix flashing to roof sheeting with Posidriv screws and washers, and to 250 x 25 wide x 2,5 thick with 25 mm lip galvanised bracket. The galvanised bracket to be screwed to timber rafter ends with 2 countersunk brass screws or to be site welded to steel purlins. 150 mm overlap fixed and sealed with 2 rows of pop rivets and 2 rows of silicone.
0,8 mm thick Galvanised Side Roof Overhang Flashing (carports)	616 mm girth (286 + 300 vertical + 20 + 10 vertical), 4 x bends (1 is a shallow bend). Fix flashing to roof sheeting with Posidriv screws and washers, and to 250 x 25 wide x 2,5 thick with 25 mm lip galvanised bracket. The galvanised bracket to be screwed to timber rafter ends with 2 countersunk brass screws or to be site welded to steel purlins. 150 mm overlap fixed and sealed with 2 rows of pop rivets and 2 rows of silicone.
0,8 mm thick Galvanised Valley Flashing	770 mm girth (308 + 27 vertical + 100 wide gutter + 27 vertical + 308), 6 x bends (2 x shallow bends). Fix valley gutter to top of valley rafters with Posidriv screws and washers (seal with silicone). Cut and bend valley gutter at main gutter with 25 mm down lip. 225 mm overlap fixed and sealed with 2 rows of pop rivets and 2 rows of silicone. 2 rows of narrow flute polyclosers in ribs bedded in silicone.
0,8 mm thick Galvanised Valley Side Wall Flashing	616 mm girth (308 + 27 vertical + 140 wide gutter + 141 vertical), 4 x bends (1 is a shallow bend). Fix valley gutter to top of valley rafter with Posidriv screws and washers (seal with silicone) and impact nails (6 mm dia x 60 long @ 200 c/c) to brick wall. Cut and bend valley gutter at main gutter with 25 mm down lip. 225 mm overlap fixed and sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row of narrow flute polyclosers in ribs bedded in silicone. 154 mm girth (114 + 25 + 15 lip @ 15º) galvanised counter flashing, 3 x bends (1 is a shallow bend). Counter flashing (side wall is a brick wall) to overlap with side wall flashing with at least 75 mm. Cut 6 mm wide groove into brick wall parallel to roof sheeting for counter flashing. Prime joint and seal with an approved 6 x 6 mm poly-urethane sealant.
0,8 mm thick Chromadek Flat	1200* mm wide (25 mm lips on sides bend down to angle of rib) x 925 mm girth, * width of roof monitors determine the final width of flat back flashing. Flat back

Back Flashing	flashing for full length between monitor and ridge. Fix flashing to roof sheeting with Posidriv screws or sealed type Aluminium blind pop rivets. 150 mm overlap fixed and sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row of broad flute polycloser bedded in silicone at bottom end of flat back flashing.
0,8 mm thick Galvanised Flat Back Flashing	1200* mm wide (25 mm lips on sides bend down to angle of rib) x 925 mm girth, * width of roof monitors determine the final width of flat back flashing. Flat back flashing for full length between monitor and ridge. Fix flashing to roof sheeting with Posidriv screws or sealed type Aluminium blind pop rivets. 150 mm overlap fixed and sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row of broad flute polycloser bedded in silicone at bottom end of flat back flashing.
0,8 mm thick Chromadek Wall Gutter	616 mm girth (154 vertical x 462 at slope), 1 x bend. Fix boundary/side valley gutter to top of valley rafter with Posidriv screws and washers (seal with silicone) and impact nails (6 mm dia. x 60 long @ 200 c/c) to brick wall. 225 mm overlap fixed and sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row x 0,6 mm thick galvanised narrow flute closers in ribs fixed to purlins with Posidriv screws and washers; seal with silicone. 154 mm girth (114 + 25 + 15 lip @ 15º) Chromadek counter flashing, 3 x bends (1 is a shallow bend). Counter flashing (side wall is a brick wall) to overlap with side wall flashing with at least 75 mm. Cut 6 mm wide groove into brick wall for counter flashing. Prime joint and seal with an approved 6 x 6 mm poly-urethane sealant.
0,8 mm thick Galvanised Wall Gutter	616 mm girth (154 vertical x 462 at slope), 1 x bend. Fix boundary/side valley gutter to top of valley rafter with Posidriv screws and washers (seal with silicone) and impact nails (6 mm dia. x 60 long @ 200 c/c) to brick wall. 225 mm overlap fixed and sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row x 0,6 mm thick galvanised narrow flute closers in ribs fixed to purlins with Posidriv screws and washers; seal with silicone. 154 mm girth (114 + 25 + 15 lip @ 15º) galvanised counter flashing, 3 x bends (1 is a shallow bend). Counter flashing (side wall is a brick wall) to overlap with side wall flashing with at least 75 mm. Cut 6 mm wide groove into brick wall for counter flashing. Prime joint and seal with an approved 6 x 6 mm poly-urethane sealant.
0,8 mm thick Chromadek Corner Piece Flashing (for monitors)	231 wide x 77 vertical x 462 long, shallow bend for horizontal portion. Fix flashing to roof sheeting with Posidriv screws or sealed type Aluminium blind pop rivets. Seal overlap with 2 rows of pop rivets and 2 rows of silicone. Provide broad flute polyclosers bedded in silicone in troughs.
0,8 mm thick Galvanised Corner Piece Flashing (for monitors)	231 wide x 77 vertical x 462 long, shallow bend for horizontal portion. Fix flashing to roof sheeting with Posidriv screws or sealed type Aluminium blind pop rivets. Seal overlap with 2 rows of pop rivets and 2 rows of silicone. Provide broad flute polyclosers bedded in silicone in troughs.
Walls: (m)	
0,8 mm thick Chromadek External Vertical Flashing	462 mm girth (231 + 231), 3 x bends (2 x shallow bends). Fix flashing to roof sheeting with Posidriv screws and washers. 150 mm overlap sealed with 2 rows of pop rivets and 2 rows of silicone.
0,8 mm thick Galvanised External Vertical Flashing	462 mm girth (231 + 231), 3 x bends (2 x shallow bends). Fix flashing to roof sheeting with Posidriv screws with washers. 150 mm overlap sealed with 2 rows of pop rivets and 2 rows of silicone.
0,8 mm thick Chromadek Internal Vertical Flashing	462 mm girth (231 + 231), 3 x bends (2 x shallow bends). Fix flashing to roof sheeting with Posidriv screws with washers. 150 mm overlap sealed with 2 rows of pop rivets and 2 rows of silicone.
0,8 mm thick Galvanised Internal Vertical Flashing	462 mm girth (231 + 231), 3 x bends (2 x shallow bends), fix flashing to roof sheeting with Posidriv screws with washers. 150 mm overlap sealed with 2 rows of pop rivets and 2 rows of silicone.
0,8 mm thick Chromadek Drip	154 mm girth (64 vertical + 50 + 20 vertical + 20) standard drip flashing to suit roof sheet, 3 x bends. Fix flashing to girts or roof sheeting with sealed type Aluminium

Flashing	blind pop rivets or Posidriv screws with washers. 50 mm overlap sealed with one row of silicone and stitched together with sealed Aluminium blind type pop rivets.
0,8 mm thick Galvanised Drip Flashing	154 mm girth (64 vertical + 50 + 20 vertical + 20) standard drip flashing, 3 x bends. Fix flashing to girts or roof sheeting with sealed type Aluminium blind pop rivets or Posidriv screws with washers. 50 mm overlap sealed with one row of silicone and stitched together with sealed blind type pop rivets.
0,8 mm thick Chromadek Window Flashings	154 mm girth 3 x bends. Different flashing details for sill, jamb and top of window. Contractor to provide details to Engineer for approval. One row of narrow flute polyclosers bedded in silicone above and below window frame. Fix flashings to girts or roof sheeting with Posidriv screws and washers or sealed type Aluminium blind pop rivets. 100 mm overlap sealed with 2 rows of pop rivets and 2 rows of silicone. Seal around window frame with silicone to waterproof flashings. 1 row x 0,6 mm thick Chromadek broad flute metal closer for sill flashing.
0,8 mm thick Galvanised Window Flashings	154 mm girth 3 x bends. Different flashing details for sill, jamb and top of window. Contractor to provide details to Engineer for approval. One row of narrow flute polyclosers bedded in silicone above and below window frame. Fix flashings to girts or roof sheeting with Posidriv screws and washers or sealed type Aluminium blind pop rivets. 100 mm overlap sealed with 2 rows of pop rivets and 2 rows of silicone. Seal around window frame with silicone to waterproof flashings. 1 row x 0,6 mm thick galvanised broad flute metal closer for sill flashing.
0,8 mm thick Chromadek Door Flashings	154 mm girth 3 x bends. Different flashing details for sill, jamb and top of window. Contractor to provide details to Engineer for approval. One row of narrow flute polyclosers bedded in silicone above and below window frame. Fix flashings to girts or roof sheeting with Posidriv screws and washers or sealed type Aluminium blind pop rivets. 100 mm overlap sealed with 2 rows of pop rivets and 2 rows of silicone. Seal around window frame with silicone to waterproof flashings. 1 row x 0,6 mm thick chromadek broad flute metal closer for sill flashing
0,8 mm thick Galvanised Door Flashings	154 mm girth 3 x bends. Different flashing details for sill, jamb and top of window. Contractor to provide details to Engineer for approval. One row of narrow flute polyclosers bedded in silicone above and below window frame. Fix flashings to girts or roof sheeting with Posidriv screws and washers or sealed type Aluminium blind pop rivets. 100 mm overlap sealed with 2 rows of pop rivets and 2 rows of silicone. Seal around window frame with silicone to waterproof flashings. 1 row x 0,6 mm thick galvanised broad flute metal closer for sill flashing
0,8 mm thick Chromadek Bull Nose Flashing	462 mm girth (262 +200 vertical), 3 x bends excluding curving (2 are shallow bends), Fix flashing to roof sheeting with Posidriv screws and washers. 300 mm max. overlaps (run outs) sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row x 0,6 mm thick Chromadek broad flute metal closer on side wall cladding. Provide one row of continuous silicone on rib. Contractor to measure radius on site prior manufacturing.
0,8 mm thick Galvanised Bull Nose Flashing	462 mm girth (262 + 200 vertical), 3 x bends excluding curving (2 are shallow bends). Fix flashing to roof sheeting with Posidriv screws and washers. 300 mm max. overlaps (run outs) sealed with 2 rows of pop rivets and 2 rows of silicone. 1 row x 0,6 mm thick Galvanised broad flute metal closer on side wall cladding. Provide one row of continuous silicone on rib. Contractor to measure radius on site prior manufacturing.
Roof Insulation: (m^2)	
White Bubble Foil on white straining wires (abattoirs only)	Lay insulation strictly to manufacturer's specifications. Use 1,6 mm diameter white PVC coated straining wires @ 300 mm c/c max. Refer to clause 2.3.7 of Technical Specification BA: Roof Coverings.
420 RSA heavy duty reinforced reflective Aluminium foil	Lay insulation strictly to manufacturer's specifications. Refer to clause 2.3.7 of Technical Specification BA: Roof Coverings.

Rainwater Goods:(m)	
100 x 75 x 0,8 mm thick Chromadek beaded non-supporting box gutter	Provide 25 x 1 mm thick galvanised fascia straps @ 686 c/c to support fascia of gutters; fix with 6 mm galvanised gutter bolts, nuts and washers. All accessories and ancillary items included. Roof sheeting troughs to be have drip bend.
100 x 75 x 0,6 mm thick Chromadek down pipes; height < 3 m	Provide one down pipe for every 6 m of gutter length. For gutter length of 3 to 6 m, provide two down pipes. All accessories and ancillary items included.
100 x 75 x 0,6 mm thick Chromadek down pipes; 3 m < height < 5 m	Provide one down pipe for every 6 m of gutter length. For gutter length of 3 to 6 m, provide two down pipes. All accessories and ancillary items included.
125 x 100 x 0,8 mm thick Chromadek self-supporting box gutter	Gutter to be braced back to the roof sheeting with a 25 x 1 mm thick galvanised fascia straps @ 686 c/c. The detail can only be applied to sheeting with a max. cantilever of 450 mm from first purlin. Roof sheeting troughs to be have drip bend.
125 x 100 x 0,8 mm thick Chromadek down pipes	Provide one down pipe for every 6 m of gutter length. For gutter length of 4,5 to 6 m, provide two down pipes. All accessories and ancillary items included.
100 x 100 x 0,8 mm thick Chromadek down pipes	Provide one down pipe for every 6 m of gutter length. For gutter length of 4,5 to 6 m, provide two down pipes. All accessories and ancillary items included.
Pipe Flashings: (No. and Dia.)	
Dektite pipe flashings to diameter	For all residential type of buildings, pipe protrusions through roof sheeting will be eliminated by re-routing existing pipe work. For all other pipe protrusions: Use Dektite no. 2 for pipe diameters 40 - 80 mm and Dektite no. 4 for pipe diameters 80 - 150 mm. Dektite flashings are made of E.P.D.M. rubber compound of a carbon black colour.
0,8 mm thick Chromadek Cravat and Cowl Flashing to diameter	Refer to roof and wall details no 1 and 2. (Bound into the back of this document).
Pipework: (No.)	
Re-route existing pipes; diameter and number	Re-routing of roof void geyser pipework: Disconnect and remove existing overflow pupe from Latco - and or Safety Valve, supply and connect new 15-28mm dia polycop pipe to existing Latco - and or Safety Valve including all necessary fittings, adaptors, brackets, etc and re-route pipework in ceiling or roof void to protrude through external wall, including making good of external wall, irrespective of finish. Allow approximately 7m horizontal and 3m vertical pipework to ground level per geyser, complete with standard primer, one undercoat and two coats of super acrylic paint to exposed pipework to match existing paint system and colour. Ventilation pipework: Remove existing 100mm dia ventilation pipe section protruding through roof covering. Install 90° bend below roof level and re-route ventilation pipe to clear overhang. Install 90° reducing 100 x 50 bend and rise with 50mm dia pipe to 600mm. Install standard sewer pipe ventilation cowl on top of ventilation pipework. Pipe material must adapt to existing material of ventilation pipework. The bracketing and supports of the ventilation pipework shall be as per manufactuers specifications. Standard primer, one coat undercoat and two coats of super acrylic paint to exposed pipework to match existing paint system and colour.

BA.03.01 DETAILS OF ROOF PAINT REPAIR WORK

Roof painting requirements will be itemised in the Bill of Quantities and will be instructed to the Contractor.

BA 03.2 SCHEDULED ITEMS

BA.01 Supply and install cladding and sheeting: Unit: m^2

The area measured will be that of the exposed surface of the finished building as specified in, Subclause 8.1.1 of SANS 1200 HB.

Separate items will be scheduled for roof sheeting and side cladding, subdivided for each type of sheeting, cladding and finish, each profile and straight or curved sheets.

The rate shall cover the cost of supplying, delivering, storing on Site, handling, moving, installing and fixing the sheeting or cladding (finished or prepainted as scheduled) complete with all necessary fasteners (all sheeting, cladding and accessories are to be supplied by a South African based manufacturer and are subject to a three year written guarantee for water tightness and workmanship). The rate shall also cover the cost of cutting, notching, waste, all scaffolding, temporary supports, hoisting facilities and safety precautions (see Subclause 8.1.1 of SANS 1200HB).

BA.02 Forming cranks, bullnoses, etc: Unit: m

Cranks, bullnoses, etc will be measured by length, with bullnoses to a maximum of 600mm radius and bend to maximum of 90°.

Separate items for cranks, bullnoses, etc, will be scheduled for each different type of sheeting, profile and finish.

The rate shall cover the cost of supplying, delivery, storing on Site, handling, moving, installing and fixing of cranks, bullnoses, etc and shall be measured as an extra over the specified roof sheeting. The rate shall also cover the cost of cutting, notching, waste, all necessary scaffolding, temporary supports, hoisting facilities and safety precautions (see Subclause 8.1.2 of SANS 1200 HB).

BA.03 Carefully remove existing cladding and sheeting: Unit: m^2

The area measured will be that of the exposed surface of finished building (see Subclause 8.1.1 of SANS 1200 HB).

Separate items will be scheduled for roof covering and side cladding, without differentiating amongst different profiles, etc.

The rate shall cover the cost of removing of existing roof sheeting or side cladding inclusive of flashings and sundry items from timber or steel purlins, and the removal from site of all such material. The rate shall also cover the cost of any scaffolding, temporary supports, hoisting facilities etc as well as credit for the redundant material becoming the property of the Contractor.

The rate shall also cover all temporary necessary dust screens, sheets, plastic linings, etc laid horizontal or vertical inside existing roof spaces or voids on top of ceilings, trusses, etc to protect all contents inside the buildings while replacing or repairing the roof coverings.

BA.04 **Carefully remove and store existing cladding and sheeting:** **Unit: m^2**

The area measured will be that of the exposed surface of finished building (see Subclause 8.1.1 of SANS 1200 HB).

Separate items will be scheduled for roof covering and side cladding without differentiating amongst different profiles etc.

The rate shall cover the cost of removing of existing roof sheeting or side cladding inclusive of flashings and sundry items from timber or steel purlins, the temporary storage of the removed sheeting or cladding at a store area (position of store area to be indicated on site). The rate shall also cover the cost of any scaffolding, temporary supports, hoisting facilities etc.

The rate shall also cover all temporary necessary dust screens, sheets, plastic linings, etc laid horizontal or vertical inside existing roof spaces or voids on top of ceilings, trusses, etc to protect all contents inside the buildings while replacing or repairing the roof coverings.

BA.05 **Re-erect: Stockpilled cladding and sheeting:** **Unit: m^2**

The area measured will be that of the exposed surface off the finished building (see Subclause 8.1.1 of SANS 1200 HB).

Separate items will be scheduled for roof covering and side cladding without differentiating amongst different profiles, etc..

The rate shall cover the cost of preparing, re-erecting, handling, moving, installing existing stockpiled sheeting and cladding including new fixing fastners, etc complete. The rate shall also cover the cost of cutting, notching, waste, all scaffolding, temporary supports, hoisting facilities and safety precautions (see Subclause 8.1.1 of SANS 1200HB).

BA.06 **Supply and install sundry items, etc:** **Unit: m**

Flashing, ridging, etc will be measured by length.

Separate items will be scheduled for each type, finish and shape of sundry item.

The rate shall cover the cost of supplying, delivery, storing on Site, handling, moving, installing and fixing the relevant item complete with all fasteners and sundry items as stipulated in BA.02.3.4.
The rate shall also cover the cost of cutting, notching, waste and of all scaffolding, temporary supports, hoisting facilities and safety precautions (see Subclause 8.1.1 of SANS 1200 HB).

BA.07 **Supply and install roof insulation:** **Unit: m^2**

The area measured will be that of the exposed surface, no deductions being made for openings left or cut for protrusions such as those specified in Subclause 5.7 of SANS 1200 HB, or for ventilators and the like. Deductions will be made for windows and other openings of similar dimensions.

The rate shall cover the costs of supplying, delivery, storing on Site, handling, moving, installing and fixing complete with all necessary fasteners as specified in BA.02.3.7, and

shall also cover cost of cutting, notching, waste and of all scaffolding, temporary supports, hoisting facilities and safety precautions (see Subclause 8.1.1 of SANS 1200 HB).

BA.08 **Supply and install rainwater goods:** ..... **Unit: m**

Rainwater goods and similar lengths of constant profile will be measured by length.

Sundry items such as stop-ends, bends, shoes, etc are deemed to be included in the tendered rate per metre.

Separate items will be scheduled for each type, finish, shape and when relevant, profile of rainwater goods. The rate shall cover the cost of supplying, delivery, storing on Site, handling, moving installing and fixing the relevant goods complete with all necessary fasteners, etc as specified in BA.02.5 (all complete and subject to a three year written guarantee on watertightness and workmanship). The rate shall also cover the cost of cutting, notching and waste, and of all scaffolding, temporary supports, hoisting facilities and safety precautions (see Subclause 8.1.1 of SANS 1200 HB).

BA.09 **Carefully remove existing rainwater goods:** ..... **Unit: m**

The length measured will be that of the exposed length of finished building.

No separate items will be scheduled for size, thickness, material, profile, galvanized or Galvanised baked enamel finished items.

The rate shall cover the cost of removing of existing rainwater goods inclusive of brackets and sundry items from timber or steel purlins and trusses, the cost of any scaffolding, temporary supports, hoisting facilities etc and the allowance of credit for material to become the property of the Contractor and to be removed from the site.

BA.10 **Miscellaneous items:**

(a) Measured by number:

(i) (Description of item) ..... Unit: No

(ii) Etc.

(b) Measured by linear metre:

(i) (Description of item) ..... Unit: m

(ii) Etc.

The unit of measurement shall be the number or metre as applicable to each item.

The tendered rates shall include full compensation for manufacturing or providing and installing each item complete as per BA.03.1.

BA.11 **Roof rehabilitation:** ..... **Unit: m^2**

The area measured will be that of the exposed surface of building as specified in Subclause 8.1.1 of SANS 1200 HB. Separate items will be scheduled for roof sheeting and side cladding, without differentiating between different profiles, finishings, fixing methods, etc.

The rate shall cover the cost for inspecting, removing existing and supplying and fixing new posidriv screws and mechanisms, sealants, sealer strips, etc complete.

The rate shall also cover the cost of cutting, waste, all scaffolding, temporary supports, etc all to the approval of the Engineer.

BA.12 **Supply and install additional fixing screws, etc:** **Unit: No**

The unit of measurement will be the number of additional screws installed.

The rate shall cover the cost for removing defective fixing screws as indicated by the Engineer, and replacing aforesaid with new posidriv or equivalent approved fixing screws in similar previous positions.

No separate items will be scheduled for roof sheeting, side cladding or different profiles. Payment under this item shall not include the screws to be replaced under the roof rehabilitation item above.

BA.13 **Carefully remove and re-erect ventilation units:** **Unit: No**

The unit of measurement will be number of ventilation units removed, temporarily stored and resized to similar positions.

The rate shall cover the cost for carefully removing existing ventilation units approximately 2,5m^2 in area from existing roof structures, temporary storage, servicing of existing ventilation units, cleaning, re-erecting later onto new roof sheeting (irrespective of type or profile of sheeting), new ventilation flashings and counter flashings, sealants, fixing screws, fasteners, etc complete. The rate shall also cover the cost for cutting openings into new sheeting for ventilation units, waste, all necessary scaffolding, temporary supports, hoisting facilities and safety precautions (see Subclause 8.1.1 of SANS 1200 HB).

BA.14 **Carefully remove and re-erect birdproofing:** **Unit: m^2**

The area measured will be that of the exposed surface to be covered with bird-proofing.

The rate shall cover the cost for carefully removing chicken wire bird-proofing stapled to each roof truss tie beam at roof overhang between beam-filling and fascia board, temporary storage, cleaning of bird-proofing, re-erecting later into similar previous position. The rate shall also cover the cost for cutting, fixing staples, waste, scaffolding, etc.

BA.15 **Prepare existing roof sheeting and repaint:** **Unit: m^2**

The area measured will be that of the exposed surface of roof sheeting painted (measured on flat area as for roof coverings.)

The rate shall cover the cost for removing existing paint and cleaning surfaces with an approved degreaser and scotch brite pads and rinsing thoroughly by means of pressure washing to receive one new primer coat and one coat dual pack poly-urethane enamel system with acrylic finish roof paint, supplying, delivery and applying new primer and finishing coat, etc., without distinguishing between roof sheeting, side cladding, profile, finish, etc., as specified in BA 03.02

The rate shall also cover the cost of waste, all necessary scaffolding, etc.

BA.16 **Replacement of existing roof tiles in patchwork:** **Unit: number**

The unit of measurement will be number of roof tiles removed, installation of new roof tiles similar to existing roof tiles.
The rate shall cover the cost for carefully removing existing roof tiles approximately 350mm x 350mm in area from existing roof structures, installation of new roof tiles and ridge flashings, sealants, fixing screws, fasteners, etc complete. The rate shall also cover the cost, waste, all necessary scaffolding, temporary supports, hoisting facilities and safety precautions.

BA.17 **Pressure Clean existing roof tiles:** **Unit: m^2**

The area measured will be that of the exposed surface of roof tiles pressure cleaned (measured on flat area as for roof coverings.)

The rate shall cover the cost for removing existing dirt and cleaning surfaces by means of pressure washing with an approved degreaser and rinsing thereof.

The rate shall also cover the cost of water connection, all necessary scaffolding, etc.

TECHNICAL SPECIFICATION

BB CARPENTRY AND JOINERY FOR ROOFS AND CEILINGS

CONTENTS

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BB 02 STANDARD SPECIFICATIONS
BB 03 VARIATIONS AND ADDITIONS TO STANDARD SPECIFICATIONS
BB 04 DETAIL OF REPAIR WORK
BB 05 MAINTENANCE
BB 06 MEASUREMENT AND PAYMENT

BB 01 SCOPE

Carpentry and joinery shall mean the maintenance of materials and components such as removal of existing timber roof trusses, purlins, ceilings, etc, and the installation of new timber trusses and other timber roof members, structural beams, purlins, battens and ceilings. This specification does not include work related to roof coverings and paintwork, which are specified elsewhere.

This specification covers the corrective maintenance repairs of existing timber members in roof trusses, the removal and replacement of existing timber members from roof trusses and associated timber roof members and ceilings. This specification also covers the supply, delivery and installation of new timber trusses, purlins, battens and beams for various types of timber related structures and ceilings.

The complete scope of repair work shall be as described in BB 04: Detail of repair work.

Maintenance of this part of the installation shall be performed in accordance with Additional Specification SA: General Maintenance and part 4.2 (Scope of Services, availability and Matrix of Services).

BB 02 STANDARD SPECIFICATIONS

BB 02.01 GENERAL STANDARD SPECIFICATIONS

The latest edition, including all amendments up to date of tender, of the following specifications, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof:

SANS 10243	-	The design, manufacture and erection of timber trusses
SANS 266	-	Gypsum plasterboard
SANS 1783 - 2	-	Stress-graded softwood: general structural timber
SANS 1783 - 4	-	Softwood brandering and battens
SANS 803	-	Fibre-cement boards

BB 02.02 ADDITIONAL SPECIFICATIONS

Technical Specification BA: Roof coverings
Technical Specification BD: Walls
Technical Specification BJ: Paintwork

BB 02.03 OCCUPATIONAL HEALTH AND SAFETY

The Contractor shall be required to comply with the Occupational Health and Safety Act 85 of 1993, Construction Regulations 2014 and related regulations. Non-compliance with these regulations, in any way whatsoever, will be adequate reason for suspending the Works.

BB 03 VARIATIONS AND ADDITIONS TO STANDARD SPECIFICATIONS

BB 03.01 ADDITIONAL REQUIREMENTS FOR REPAIR OF TIMBER ROOF STRUCTURES

BB 03.01.01 Timber trusses

(a) Replacing timber trusses

The Engineer shall inspect timber trusses for defects and establish which timber trusses must be replaced.

Reasons for replacing trusses will include but not be limited to the following:

(i) Deflection exceeding acceptable limits;
(ii) Inadequacy in design, e.g. structural strength, structural instability, load conditions;
(iii) Decay of large portions of truss members (defective timber);
(iv) Large portions of truss members having so many defects e.g. cracked timber, corroded connector nail plates, etc, that it will be uneconomical to repair the defects.

(b) Repair of timber trusses

Repair work shall include but not be limited to the following:

(i) Strengthening of truss members, connections, splices and anchorage at supports;
(ii) Strengthening of truss members due to unforeseen loads, notching and cutting for services by other contractors;
(iii) Repair of truss members where large knots and wanes occur;
(iv) Replacing metal plate connectors in cases of corrosion, incorrect application of connector plates, incorrect size of connector plates, unsymmetrically fitted connector plates, connector plates with teeth flattened, minimum bite of less than 65 mm of a connector plate on a truss member;
(v) Replacing of decayed timber, particularly rafter ends at roof overhangs and at roofing screws. Timber subjected to insect attack and fungal decay should be treated with an appropriate preservative. Where there is a low risk of decay or insect attack, two coats of Creosote may be applied to the timber;
(vi) Replacing and/or repair of cracked timber members. Galvanised connector plates and metal straps may be considered;
(vii) Maximum slenderness ratio must be less than 180 for compression members that carry forces resulting from dead and live loads. Compression members 36 mm thick and longer than 1,8 m must have a continuous longitudinal runner centrally placed (or T-bracing) and properly connected and braced. For members that resist loads caused by wind, the slenderness ratio must be less than 250;
(viii) Plumb of trusses should not exceed 100 mm or total span/20 whichever is the least;
(ix) Exposed portions of the trusses shall be painted to match existing appearance.

The roof trusses shall be fully braced. The Engineer shall give instructions regarding the provision of bracing members to the roof system.

BB 03.01.02 Purlins (for sheeted roofs, battens for tiled roofs)

(a) Replacing timber purlins

The Engineer shall inspect timber purlins for defects and possible reuse. The Engineer shall establish which timber purlins need to be replaced.

Reasons for replacing purlins will include but not be limited to the following:

(i) Decayed timber, particularly at gable overhangs;
(ii) Broken, warped and brittle timber;
(iii) Worn-out roof screw holes;
(iv) Inadequacy in design, e.g. structural strength and excessive deflection due to large spans;
(v) Inappropriate spacing of purlins for the specific roof covering.

(b) Repair of timber purlins

Repair work shall include but not be limited to the following:

(i) For roof pitches under 45º the purlins shall be erected on edge (narrow edge).
(ii) All purlins shall be secured to rafters at each intersection in addition to nails. In roof voids a single 3,2 mm diameter galvanised wire tie bound twice with twisted ends or a galvanised bent plate connector shall be used for securing purlins to rafters. On roof overhangs only galvanised bent plate connectors shall be used for securing purlins to rafters.
(iii) Splices shall be staggered. Splices that do not conform to the requirements of clauses 8.5.1 and 8.5.2 of SANS 10234 must be repaired. Nailed galvanised plate connectors on either side of purlins are also acceptable.
(iv) Exposed portions of the purlins shall be painted to match existing appearance.

Skew nailing of purlins to trusses shall not be closer than 30 mm from the edge of the member.

BB 03.01.03 Structural timber

(a) Replacing structural timber

The Engineer shall inspect members of structural timber, i.e. beams and columns, for defects and shall establish which of these members must be replaced. Reasons for replacement will include but not be limited to the following:

(i) Deflection exceeding acceptable limits;
(ii) Inadequacy in design, e.g. structural strength, structural instability, load conditions;
(iii) Decay of a large portion of the member (defective timber);
(iv) Replacing of decayed timber, particularly at ends of beams.

(b) Repair of structural timber

Repair work shall include but not be limited to the following:

(i) Strengthening of members, connections, splices and anchorage at supports;
(ii) Strengthening of members due to unforeseen loads, notching and cutting for services by other contractors;
(iii) Exposed portions of structural timber shall be painted to match existing appearance;
(iv) Bolt connections shall be in accordance with the requirements of SANS 10163.

BB 03.01.04 Ceilings

(a) Brandering to ceilings

Brandering to ceilings shall be replaced where:

(i) Ceiling boards are replaced;
(ii) Brandering is broken, rotten and beyond any further use.

The brandering shall continue over at least three bays and shall be staggered to ensure that splices do not all occur in one line. Brandering must be provided for light fitting support.

(b) Gypsum ceiling boards

Repairs to existing ceilings shall include the installation of new 6,4 mm thick gypsum ceiling boards with metal H-section jointing strips. The new ceiling boards shall be nailed to brandering with galvanised or cadmium-plated clout-headed nails.

Gypsum ceiling boards shall not be used in wet areas such as in ablutions, abattoirs, kitchens and bathrooms.

Ceiling boards shall be in long lengths, symmetrically arranged with smaller panels, closely butted and secured at 150 mm centres to brandering as specified.

Where it is necessary to replace ceiling boards onto existing brandering, new boards shall be installed by first drilling through and then securing with cadmium-plated flat headed wood screws, or alternatively by shot nailing to suit, to avoid unnecessary vibration or impact damage to adjacent elements.

Gypsum cove cornices 76 mm wide shall be provided where existing cornices are to be replaced.

Existing trap doors in ceilings shall be reused. If required, new 650 x 650 mm trap doors shall be installed.

No ceiling insulation must be provided unless specified.

Painting of the ceiling shall be done in accordance with Technical Specification BJ: Paintwork.

(c) Fibre cement ceiling boards

Fibre cement ceiling boards shall be installed in wet areas such as in ablutions, abattoirs, kitchens and bathrooms.

Fibre cement ceiling boards shall be 6 mm thick, complying with the requirements of SANS 803 and of the flat pressed type.

The boards shall be nailed to the brandering with 2 mm diameter galvanised or cadmium-plated clout-headed nails, spaced at 100 mm centres at edges of boards and 150 mm centres along the intermediate brandering. Ceiling boards shall be in long lengths, symmetrically arranged with smaller panels as required and closely butted.

Replacement of new ceiling boards onto existing brandering shall be done as described in BB 03.01.04(b) above.

Fibrous plasterboard cove cornices to ceilings shall be of 100 mm girth, provided by an approved manufacturer. Gypsum cove cornices 76 mm wide can be used in kitchens and bathrooms of houses. Powder-coated wall angles 25 mm wide shall be used for cornices in abattoirs.

Existing trap doors in ceilings shall be reused. If required, new 650 x 650 mm trap doors shall be installed.

Painting of the ceiling shall be done in accordance with Technical Specification BJ: Paintwork.

(d) Exposed T-system suspended ceilings

Repairs to existing suspended ceilings will include but not be limited to the following:

(i) Replace damaged panels with new ceiling boards;
(ii) Replace sections of damaged T-strips or H-strips;
(iii) Replace cornices;
(iv) Tension, fix and realign existing hangers;
(v) Install new hangers as required;
(vi) Clean ceiling boards, including washing of the ceiling boards with a mixture of water and sugar soap and wiping dry, or painting the ceiling boards.

(e) External gable fibre cement boards for side cladding

External tongued and grooved boarding shall be removed and replaced with 6 mm thick flat pressed fibre cement boarding. The boarding shall be fixed to new brandering as specified in this section. Provide painted 25 x 25 mm meranti quarter rounds at edges as required.

The boarding shall be painted in accordance with Technical Specification BJ: Paintwork.

BB 03.01.05 Fascia and barge boards

Repairs to fascia and barge boards shall include but not be limited to the following:

(a) Replace damaged and broken fibre cement fascia and barge boards.
(b) Replace missing, corroded and damaged H-profile jointing strips.
(c) Replace all nails with suitable length and diameter brass screws. Provide nylon plugs to timber where necessary.

(d) Align and fix existing fascia and barge boards.
(e) Paint fascia and barge boards in accordance with Technical Specification BJ: Paintwork. All sides including the edges must be painted.

(f) The roof covering shall cover the top edge of the fascia on gables.

BB 03.01.06 Timber trusses, purlins and battens

(a) Existing timber trusses and roof structure

(i) General

(1) The Contractor shall establish proper access and install adequate lighting to the roof voids to enable detailed inspections of structural deficiencies by the Engineer. Temporary scaffold planks shall be laid across bottom chords to allow access to all critical areas. After inspection, the extent of repairs is to be agreed with the Engineer.

(2) All completed work shall be inspected and approved by the Engineer.

(3) All new timber work shall comply with SANS 10163.

(4) Timber grade shall be S5 and replacement sizes are to match existing unless otherwise agreed.

(5) Repair details on attached sheets R1 to R3 shall form the basis for repairs. Any deviations from or variations to these details are to be approved by the Engineer. Any types of failure not covered by these details shall be discussed with the Engineer who will then issue the necessary repair instructions.

(ii) Procedures (watermarked and slightly rotten members)

(1) Watermarked and slightly rotten members need not be replaced or repaired if the following test indicate these members to be satisfactorily:

Using a 3,5 mm nail, make scratch marks in all these members to expose good unaffected timber. If scratch depth is 2 mm or less, it is acceptable and these members need only to be treated as described in (2) below.

(2) The members shall be wire-brush cleaned, free of any loose or deleterious material, then treated with 1 coat of creosote, or similar approved. Apply by brush to affected areas and 200 mm beyond, all to the manufacturer's specifications. Safety precautions shall be taken against possible health or fire hazards as specified by manufacturer.

(iii) Procedures (cracked and failed members)

(1) All members that are cracked right through will be regarded as failed members. Members with minor longitudinal cracks shall be repaired, following procedure 5 on sheet R3.

(2) The Contractor must allow for propping and/or bracing at failed members to ensure complete structural stability during repairs.

(3) Failed members as indicated in details 1 to 4 on sheets R1 to R3 shall be realigned by means of clamping with temporary backing pieces, after which repairs can proceed.

(4) Members that are damaged too badly to effect repairs will have to be replaced or doubled up to suit the circumstances.

(5) Once all repair work has been completed the Contractor must clean out the ceiling void, free of all rubbish, excess building material and all other foreign matter and make good any damage caused to ceilings, etc.

(6) Any alternative repair proposal shall be submitted in writing to the Engineer.

BB 04 DETAIL OF REPAIR WORK

The detail of the work is described in the Schedule of Quantities.

BB 05 MAINTENANCE

This specification shall be read in conjunction with Additional Specification SA: General Maintenance and part 4.2 (Scope of Services, availability and performance and Matrix of Services).

All components forming part of this specification for carpentry and joinery for roofs and ceilings shall be maintained as part of the maintenance of installations as defined in Additional Specification SA: General Maintenance.

Maintenance shall include all repair work, replacing of components, routine inspections, fixing of defects or any other actions or rectifying measures necessary to maintain the perfect functional condition of carpentry and joinery for roofs according to the operation and maintenance manuals and as specified in this specification.

All timber trusses and members of timber roofs shall be preserved in a good condition, i.e. failure free, free from insect attack and decay due to exposure to moisture.

Maintenance on the carpentry and joinery for roofs shall also include all other actions related to (or resulting from) maintenance, such as:

- Cleaning of the site and ceiling voids of rubbish and dirt;
- replacing any element that has failed;
- tightening, fixing or replacing of loose fasteners, premature corrosion of galvanised items like screws, nail plates, etc.

Remuneration for maintenance of the complete carpentry and joinery for roofs shall be deemed included in the tendered monthly payment for maintenance of the applicable installation.

BB 06 MEASUREMENT AND PAYMENT

BB 06.01 MEASUREMENT AND RATES

BB 06.01.01 General inclusion of costs

Notes:

All material scheduled to be removed shall be deemed to be existing damaged materials in small or large sections. All such redundant material shall become the property of the Contractor and must be removed from site immediately.

All new material used for repair work shall be of approved equal quality, colours, profiles, thickness, etc and shall in all cases match the existing materials and shall be fixed (internally or externally) to existing material or surfaces.

All replacement, removal and repair work shall be done carefully as to not damage any adjacent or other material or work. Any damage to other or adjacent materials or areas caused by the negligence of the Contractor shall be repaired by him free of charge.

All work scheduled to be removed or taken out shall be deemed to include the cleaning and preparation of the remaining sections, areas, or work to receive the new material or work specified.

Repair work shall also include all cutting, grinding, cutting into, welding, bending, strengthening, drilling, etc to repair or to improve the items or areas as new and to match the existing.

Work scheduled to be realigned and refixed shall be deemed to include all necessary new additional materials, brackets, connector plates, bolts, pip rivets, nails, screws, spacer blocks, clamps, timber, and labour, etc to leave the items as new and totally functional.

All new work are measured net and shall include all cutting, lapping, waste, bending, fixing, corners, mitres, fixing screws, pip rivets, nails, adhesive, grout, putty, etc, as well as cleaning and preparation of surfaces not already prepared as part of removed items, etc.

Unless scheduled otherwise, new ceilings and ceilings in patchwork shall be fixed to existing brandering and the Contractor must take special care not to damage the existing brandering when removing damaged ceiling boards.

BB 06.02 SCHEDULED ITEMS

NEW WORK

BB.01 Structural timber:

(a) Plates (sizes indicated) ..... Unit: m

(b) Beams (sizes indicated) ..... Unit: m

(c) Joists (sizes indicated) ..... Unit: m

(d) Rafters (sizes indicated) ..... Unit: m

(e) Purlins (sizes indicated) ..... Unit: m

(f) Roof trusses complete (drawing number indicated) ..... Unit: number

(g) Etc

The unit of measurement shall be the metre of individual types of timber elements or number of complete trusses installed.

The tendered rates shall include full compensation for the supply of all materials, manufacture, cutting, waste, jointing, scaffolding, temporary supports, hoisting facilities and installation of the timber as specified, scheduled or shown on the Drawings.

BB.02 Ceilings:

(a) Ceiling boards, trapdoors, cornices, cover strips, etc (type and/or thickness indicated):

(i) Thickness, shape and description of applications ..... Unit: m^2, m, number

(ii) Etc for other thicknesses, shapes, etc

The unit of measurement shall be the number, metre or square metre of ceiling boards, trapdoors, cornices, etc installed complete as specified and scheduled.

The tendered rates shall also include full compensation for the construction of the ceilings, trapdoors, cornices, cover strips, etc including jointing strips, insulation blankets and brandering as specified.

BB.03 **Joinery:**

(a) Items measured by number:

(i) Doors, etc (type and size indicated) ..... Unit: number

(ii) Etc for other items measured by number

(b) Items measured by linear metre:

(i) Skirtings, rails, cover strips, quadrant beads, etc (size indicated) ..... Unit: m

(ii) Etc for other items measured by length

(c) Items measured by area:

(i) Eaves covering, etc (type and thickness indicated) ..... Unit: m^2

(ii) Etc, for other items measured by area

The units of measurement shall be the number, metre or square metre of each type and/or size of joinery item specified and installed complete.

The tendered rates shall include full compensation for the supply of all materials, manufacture, cutting, waste, fixing, scaffolding, temporary supports, hoisting facilities and installation of the joinery items.

Ironmongery to be included in the rates tendered for doors shall be as specified in the Technical Specification BD: Walls.

New joinery, will except where otherwise specified, be fixed or hung to existing material or surfaces.

ALTERATION WORK

BB.04 **Alterations and repairs to existing structures:**

(a) Indicate if repairs, alterations, removal or sealing, etc:

(i) Description of individual items to be repaired, replaced, altered, removed, sealed, etc ..... Unit: m^3, m^2, m, number

The unit of measurement for items repaired, replaced, altered, removed, sealed, etc shall be cubic metre, square metre, metre or number as scheduled. No distinction between sizes or profiles will be made for the removal of structural timber elements.

The tendered rates shall include full compensation for all costs to repair, refix, remove, cutting into, re-align, taking off, handling, temporary store, scaffolding, temporary supports, hoisting facilities and preparing existing remaining material or surfaces where applicable to receive new items as well as for credit for the redundant material becoming the property of the Contractor, etc as specified in the Standard and Technical Specifications and shall allow for all necessary labour, plant and new material needed for the repairs, replacement or alterations, etc to leave the scheduled items as new and to the approval of the Engineer. Refer also to the general inclusion of costs in BB.06.01.01."

BB.05 **Repairs to watermarked and slightly rotten timber roof members: Unit: m**

The unit of measurement shall be the linear metre of timber roof members repaired as specified. No distinction will be made for size, type of member or position.

The tendered rate shall include full compensation for the complete repair work, wire brushing, creosote, etc as specified by the Engineer.

BB.06 **Repairs to damaged masonry, plastering and surface finishes:**

(a) Items measured by number:

(i) Description of item Unit: No

(ii) Etc Unit: m

(b) Items measured by linear metre:

(i) Description of item Unit: No

(ii) Etc Unit: m

The unit of measurement shall be the number or metre as applicable to each item.

The tendered rates shall include full compensation for the making good of masonry (stock or face bricks), beam-filling, plastering, painting, closing ends to troughs of sheet metal roof sheeting, repairs to structure at ends of rafters and purlins, protruding through brick walls, etc.

The tendered rate shall also cover the cost of cutting, notching and waste and of all scaffolding, temporary supports, etc.

BB.07 **Painting to top cords of timber trusses in roof voids: Unit: m**

The unit of measurement shall be the metre.

The tendered rate shall include full compensation to prepare existing top cords (where applicable) to receive one coat creosote. No distinction will be made for size, type, new or existing members. The rate shall also cover the cost for waste, all scaffolding, etc.

BB.08 **Painting of existing members in overhangs: Unit: m**

The unit of measurement shall be the metre.

Separate items will be listed for paint and/or creosote as specified.

The tendered rate shall include full compensation to prepare existing overhangs to receive paint or creosote as specified. No distinction will be made for size of existing members. The rate shall also cover the cost for waste, all scaffolding, etc.

TECHNICAL SPECIFICATION

BD WALLS

CONTENTS

BD 01 SCOPE
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BD 04 DETAIL OF REPAIR WORK
BD 05 MAINTENANCE
BD 06 MEASUREMENT AND PAYMENT

BD 01 SCOPE

This specification covers the corrective maintenance repairs of existing interior and exterior walls including all related building elements such as plastering, partitioning, wall tiling, windows, doors, etc, which form an integral part of an installation.

In determining the remedy for any repair work, the Engineer must take the climatic conditions in which all building elements have to function into consideration. Allowance should be made accordingly for the strength and durability of all components in relation to their purpose and application.

This specification does not include any work related to paintwork as this is specified elsewhere.

The complete scope of repair work shall be in accordance with the section: Detail of repair work.

BD 02 STANDARD SPECIFICATIONS

BD 02.01 GENERAL STANDARD SPECIFICATIONS

The latest edition, including all amendments up to date of tender of the following specifications, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof. All other relevant and applicable SANS regulations are also to be considered as minimum requirements, and in particular SANS 10400: The Application of the National Building Regulations.

SANS	22	-	Glazed ceramic wall tiles and fittings
SANS	227	-	Burnt clay masonry units
SANS	545	-	Wooden doors
SANS	622	-	Gypsum cove cornice
SANC	680	-	Glazing putty for wood and steel sashes
SANS	727	-	Windows and doors made from rolled mill steel sections
SANS	10107	-	The fixing of glazed wall tiles
SANS	1236	-	Silvered glass mirrors for general use
SANS	1263	-	Safety and security glazing materials for buildings

BD 02.02 ADDITIONAL SPECIFICATIONS

Technical Specification BG: Metalwork
Technical Specification BH: Fittings
Technical Specification BJ: Paintwork

BD 02.03 OCCUPATIONAL HEALTH AND SAFETY

The Contractor shall be required to comply with the Occupational Health and Safety Act 85 of 1993, Construction Regulations 2014 and related regulations. Non-compliance with these regulations, in any way whatsoever, will be adequate reason for suspending the Works.

BD 03 VARIATIONS AND ADDITIONS TO STANDARD SPECIFICATIONS

BD 03.01 ADDITIONAL REQUIREMENTS FOR REPAIR OF PLASTERED AND UNPLASTERED WALL SURFACES

BD 03.01.01 Introduction

A detailed survey of all existing building elements may reveal the necessity for remedial work of varying degree. The Engineer shall make an assessment of all aspects that need to be addressed.

BD 03.01.02 Plastering: General

All plaster shall comply with the requirements of SANS Standard Specification 523. All plastering shall be painted in accordance with Technical Specification BJ: Paintwork, or tiled according to this specification BD.

The Engineer shall inspect the plaster surfaces and establish which wall plastering must be repaired. Reasons for replacing existing plastering will include, but not limited to the following:

(a) Excessive plaster cracking
(b) Loose (delaminated) and spalling plaster
(c) Dusting
(d) Scaling and flaking
(e) Defective plaster mix.

All chases shall be marked out in straight lines and neatly cut on either side of the recess for the pipe/conduit with an angle grinder. The width of the removed plastering must extend at least 30 mm beyond the edge of the chasing. Pipes or conduits shall be fixed before commencing grouting and plastering.

After the pipe has been put in place, the void shall be filled with a non-shrink cement grout of 60 MPa compressive strength at 28 days. The chases shall then be covered by fixing with shot-fired nails a weld mesh strip (30 mm longway x 10 mm shortway x 0,5 mm thick expanded metal lath) before applying the final plaster.

BD 03.01.03 Plastering: Walls of wet areas

Where necessary, hack off and remove existing internal plaster to walls. The substrates must be prepared to be sound, free from cement, grout, laitance, loose or segregated materials, voids or flaws and substances that could interfere with bonding of the new plaster. This preparation work can be done by means of clipping away with a chisel, steel-wire brush and angle grinders to the satisfaction of the Engineer. Smooth concrete must be chipped mechanically to prepare for bonding of new plaster. Before plastering commences, the substrates must be well wetted with clean water.

Only approved ready-mixed or pre-mixed bagged plaster mortar with 10 MPa compressive strength or equivalent may be used for plastering. Mix a liquid waterproofing admixture in a dilution of one part by volume with ten parts by volume of clean water. The diluted admixture is added to the appropriate dry cement/sand mixture. The mortar shall be produced in such quantities that will be used within one hour after mixing. The finished plasterwork shall be of an even and smooth towel surface finish.

When dry, apply two coats of an approved water dispersed epoxy resin coating to the plastered surfaces of the walls that are to be painted.

BD 03.01.04 External plastering

The Engineer shall mark out areas that need to be renovated. The Contractor shall neatly cut with an angle grinder in straight lines the edges of the poor patches of plaster that must be removed.

The substrate of the brick walls must be prepared to be sound, free from cement grout, laitance, loose or segregated material, voids or flaws and substances that might interfere with the bonding of the new plaster.

The surface must not be powdery or crumbly, and must exhibit adequate tensile strength. The preparation work can be done by means of chipping away with a chisel, steel-wire brush and angle grinders to the satisfaction of the Engineer.

Smooth surfaces must be chipped to provide mechanical bonding for new plaster. Before plastering commences the substrate must be well wetted with clean water.

Only approved ready-mixed or pre-mixed bagged plaster mortar with 5 MPa compressive strength or approved equivalent may be used for plastering. The Contractor shall submit the design mix with the volume of water to be added to the mortar mix for approval by the Engineer. An approved bonding agent must be added to the mortar mix.

The mortar shall be produced in quantities that will be used within one hour after mixing. Care shall be taken not to mix old mortar into any new batch.

The finished plasterwork shall be of an even and smooth wooden trowel (surface finish with rounded edges at sharp corners) to the satisfaction of the Engineer. The plasterwork shall be cured for seven days by any approved method to prevent loss of moisture.

Three (3) test cubes per sampling shall be taken at a frequency for every 15 m^2 plaster area. Cube moulds for nominal size 100 mm complying with the requirements of SANS Method 863 must be used. Final instructions for sampling, moulding, cutting and testing will be issued to the Contractor on site.

BD 03.01.05 Rough-cast plaster

Rough-cast plaster shall be applied in two coats. The undercoat shall be composed of one part cement and five parts sand finished with a wooden float. The finishing coat shall be composed of one part cement and three parts stone aggregate that will pass through a 4 mm sieve. The finishing coat shall be flicked on with a machine before the undercoat has set to obtain an even texture to match the existing rough-cast plaster.

Where the undercoat has already been plastered, the undercoat shall be prepared to receive the finishing coat. The surface of the undercoat plaster shall be chipped adequately to form a key and wetted before the finishing coat is applied.

BD 03.01.06 Fine rough-cast plaster

Fine rough-cast plaster shall be as for rough-cast plaster but the finishing coat shall be composed of one part cement and three parts coarse sand.

BD 03.01.07 Internal plastering

The surface of internal plaster shall be steel trowelled to a smooth, even and true finish. External plaster shall be finished to a true and even surface with a wood float. All plaster surfaces shall be free from blemishes, cracks, blisters or other defects.

Plaster shall return into reveals and soffits of openings, and all angles shall be true and straight with salient angles slightly rounded.

Plastering of a surface shall be executed in one operation, as no joint marks will be allowed. Plaster on walls shall not be less than 12 mm or more than 20 mm thick and plaster on concrete shall be not less than 10 mm or more than 15 mm thick, except where specifically specified otherwise.

Only approved ready-mixed or pre-mixed bagged plaster mortar with 5 MPa compressive strength or approved equivalent may be used for plastering. The Contractor must submit the design mix with the volume of water that will be added to the mortar mix to the Engineer for approval.

BD 03.02 PARTITIONS

All internal non-load-bearing walls shall be inspected and the Engineer shall determine whether partitioning such as laminated plastic particleboard, polyester painted steel, vinyl clad gypsum panels or any other demountable partitioning should be replaced.

Where partitioning must be relocated or replaced, such new partitioning shall be non-combustible, provide acoustical privacy and comply with SANS 10400.

All new partitions shall assemble into a rigid structure and all units shall be readily removable from either side without disturbing adjacent units.

All exposed trims for doorframes, glazing and skirting are to be of aluminium, or alternatively be painted in accordance with Technical Specification BJ: Paintwork.

The type of boarding and jointing or cover strips shall be in accordance with the Schedule of Quantities.

BD 03.03 WALL CRACKS

Wall cracks shall be evaluated to determine the nature and severity of the occurrence of the cracks. The Engineer shall inspect all plastered and unplastered walls and identify the underlying factors causing cracks. Repairs shall be carried out in accordance with the Particular Specifications.

BD 03.04 FACE BRICKS

Face bricks shall be inspected for dirt, efflorescence, staining, oil, paint, lichens and mosses, water, smoke and soot, rust, or damage caused by chemical reaction.

Where efflorescence appears, light brushing and hosing down with clean water is recommended for most cases. The brickwork must be saturated with clean water before applying any chemical and washed down with clean water afterwards. Cleaning can also be achieved with scrubbing, water jetting with cleaning agents and soaps, etc. Staining caused by non-water-soluble salts, such as vanadium, manganese and iron, shall be treated as follows:

(a) Remove vanadium staining by washing the wall with a solution of 100 g to 1 litre of water using caustic soda. (Use the corresponding secondary potassium salts where available, as these will be less likely to cause visible secondary efflorescence.) If secondary efflorescence occurs, wash it off with clean water.

(b) Manganese stains must be removed using proprietary brand chemical compounds based on hydrochloric acid with modifiers and sodium fluoride. These solutions should be applied using full strength as recommended by the manufacturer.

(c) Where rust/iron stains occur, wash the affected area with a solution of 50 g oxalic acid, 20 g sodium fluoride, 15 g citric acid in 1 litre of fresh, clean water. Apply the solution to a dry wall and leave it on the wall until the stain has dissolved. Wash down using a solution of 50 g bicarbonate of soda in one litre of water.

External environmental stains and smears caused by soot, smoke, industrial pollution and spillage of oil, paint and other compounds, including micro-organic growths such as fungi, lichens and mosses on brickwork, must be identified and dealt with in an appropriate and approved way.

Care shall be taken to test the effect of some of the chemicals and compounds for possible harmful effects on the colours of the brickwork and on adjacent materials, as well as for possible toxicity to human, animal and plant life. All cleaning procedures shall be carried out with full knowledge of all the potential dangers to human and animal health, and the appropriate safeguarding and precautionary measures shall be put in place.

BD03.04.01 APPLICATION OF SILANE / SILOXANE BASED WATER REPELLENT/IMPREGNATION

The surface to be treated shall be clean, sound and dry. It should be free from dust, dirt, loose particles and oily or greasy deposits.

The surface shall be dry to allow maximum penetration. No application shall be made for at least four days after rain.

In order to remove any loose particles, the walls shall be pressure-cleaned with water before application of the silane / siloxane based water repellent. After pressure cleaning of the walls, the walls shall be left to dry in sunny conditions for at least 4 days, and where dagha (cement) has come loose in the joints and left a void, dagha (cement) joint filling shall be prepared to match the existing colour and shall be replaced to match the existing. The Contractor shall submit a mix design of the dagha (cement) joint filling for approval before application.

The contractor shall arrange for walls to be inspected by the Engineer's Representative before application of the water repellent, but after pressure cleaning of the walls.

The water repellent should be applied by brush or through a low pressure knapsack sprayer. Application should commence from the highest point of the surface and work down the surface. Some run-down of the coating is permissible but should not exceed 250-300 mm. A second coat may be given but only after at least two hours drying time between coats.

Avoid working in full sunshine to achieve maximum penetration. Confine activities to the shadow side of the structures.

Application temperature shall be +/- 5o to +30o, and shall not be applied if rain is imminent.

The penetrating silane / siloxane based water repellent shall be applied to cover 3 – 5 m2 per litre per coat. The water repellent shall be applied in two coats.

The penetrating silane / siloxane based water repellent shall be applied in accordance with the instructions of the supplier.

BD 03.05 WALL TILING

BD 03.05.01 General

Tiling shall comply with the requirements of SANS Standard Specification 22. The code of practice for the fixing of glazed wall tiles, SANS 10107 and the recommendations of the South African Ceramic Tile Manufacturer's Association (SACTMA) must be adhered to.

All tiled areas must be checked for damaged surfaces or to determine where tile adhesion to subsurface proves to be of non-satisfactory standard. In cases where tiled surfaces need to be redone, proper care shall be taken in removing all damaged tiles, as well as any adhesive remains on the subsurface.

Matching of existing size and colour should be pursued wherever possible.

BD 03.05.02 Glazed wall tiling

White glazed tiles 150 x 150 x 5 mm thick, first grade, must be laid in a cement-based powder adhesive, strictly in accordance with the manufacturer's specification. Drying periods for backgrounds and substrates must be strictly adhered to. All tiles must be correctly bedded. This can be achieved by using a 6 mm square notched wall trowel to spread the fixative to the required thickness of 6 mm. Bed the tiles dry and move them firmly into position, ensuring that they are in proper overall contact with the bed and form an even surface.

A minimum of 2 mm grouting joints shall be allowed between tiles. Under no circumstances should the tiles be butt-jointed. Do not fill joints between tiles until at least 24 hours after the tiles have been bedded. Ensure that the joints are free of tile adhesive residue and any foreign matter. Fill joints with waterproofed white cement. Existing joints must be cleaned and refilled with new white cement.

BD 03.05.03 Ceramic wall tiling

Glazed ceramic wall tiles 230 x 115 x 11,5 mm thick, with grade 1 acid resisting quality finish are to be used. Apply an approved epoxy grout into the tile joints and finish off with a wetted nosing tool to a smooth glazed finish. Ceramic tiles include special tiles, such as bull nose and corner tiles. Repairs include replacing damaged tiles and pointing between tiles with an approved epoxy grout.

BD 03.05.04 Corner protectors

Install 75 x 75 x 5 mm thick aluminium angle corner protectors to external vertical wall corners for protection with 8 mm diameter impact nails x 80 mm long @ 300 mm c/c to a maximum height of 1,6 m. Seal the interface gap with approved silicone.

Install for abattoirs and dairies 75 x 75 x 3 mm thick stainless steel grade 304 angle corner protectors, polished to a No 2B finish with a grit 180, to external vertical wall corners. Fix the corner protectors with 8 mm diameter impact nails x 80 mm long @ 300 mm c/c to a height of 1,8 m. The interface gap must be sealed with an approved polyurethane sealant.

BD 03.05.05 Expansion joints

Expansion joints for glazed wall tiling shall be provided at 3,5 m centres maximum (vertically and horizontally). The joints shall be 5 mm wide. Prepare the joints by cleaning them thoroughly. The joints shall be primed and sealed with an approved one component 5 x 5 mm white polyurethane joint sealant.

Expansion joints for ceramic wall tiling shall be provided at 4 m centres maximum (vertically and horizontally). The joints shall be 10 mm wide maximum. Prepare the joints by cleaning them thoroughly. The joints shall be primed and sealed with approved one component 10 x 10 mm white polyurethane joint sealant.

BD 03.06 WINDOWS

BD 03.06.01 General

All windows shall be inspected to assess the level of workability, paying special attention to hinges, handles, stays, catches, etc. Should any window be found unsuitable due to damage to the frame, opening section or any other part thereof, such window shall be replaced.

The Engineer shall take great care to make sure that the appropriate waterproofing details are applied strictly to ensure adequate protection against any water penetration.

BD 03.06.02 Steel windows

The Engineer shall inspect for any deficiencies in residential and industrial type steel windows and cell windows. Where necessary, windows shall be serviced and repainted in accordance with Technical Specification BJ: Paintwork.

BD 03.06.03 Burglar bars to steel windows

Where manganese bars are incorporated in the fixed mullions of the windows, this shall be done in such a way that the bars are not wider apart than 15 cm/centre. The bars shall have at least a section of 30 x 16 mm, penetrating at least 100 mm in the lintels and sills. Heavy duty burglar bars shall be 15 mm diameter or 12 mm square. Loose burglar bars shall be site welded to the window frames.

BD 03.06.04 Timber windows

All wooden windows are to be inspected and treated according to the condition of the timber as stipulated in Technical Specification BJ: Paintwork.

BD 03.06.05 Aluminium windows

When working with mortar or plaster great care shall be taken to protect all aluminium sections from staining by applying a film protector or motor oil on the aluminium surface.

BD 03.07 GLAZING

BD 03.07.01 Glass

Cracked and broken glazing shall be replaced. The glazing and fixing of glass in buildings shall be carried out strictly in accordance with SANS Code of Practice 0137.

BD 03.07.02 Putty

Care shall be taken to remove all chipped, flaked or damaged putty. The Engineer shall indicate on site which putty must be replaced.

All new putty shall comply with the requirements of the SANS Standard Specification 680. The putty shall be delivered on the site in sealed containers marked with the SANS mark.

Type I putty as specified shall only be used for glazing in wood sashes and Type II only in steel sashes.

Paintwork on putty shall not commence until putty has properly dried out, which may necessitate the addition of an accelerating agent. The Contractor shall therefore take programming of trades in areas into consideration.

BD 03.08 DOORS

BD 03.08.01 General

All existing doors shall be inspected for the general condition and integrity of hinges, locking mechanisms, etc.

All steel doors shall comply with the requirements of SANS Standard Specifications 727 and 1129.

All new external doors are to be fitted with 1½ pair heavy duty hinges.

Door signage, such as door numbers, etc, shall be in accordance with Technical Specification BH: Fittings, and the Schedule of Quantities.

Special attention shall be given to the condition of striker plates and hinges that need to be replaced, or properly secured where possible. Doors shall be painted to the requirements of Technical Specification BJ: Paintwork.

BD 03.08.02 Doors, sidelights and fanlights

All wooden stock doors shall comply with the requirements of SANS Standard Specification 545.

BD 03.08.03 Flush doors

The Contractor shall inspect all doors, internal and external. Where any door needs to be replaced, such door shall be a 40 mm thick solid laminated door as specified for interior or exterior use and shall be capable of withstanding the raking, deflection, puncture and moisture resistance tests for the desired application.
Unless otherwise specified, face veneer shall be rotary cut, and shall be of the timber specified, or where doors are to be painted, shall be of timber suitable for painting. Painting shall be done in accordance with Technical Specification BJ: Paintwork, and the Schedule of Quantities.

Edge strips for concealing the vertical edges of doors shall be of the same timber as the face veneer and for single doors and hinge edges of double doors not be less than 10 mm thick, and for rebated meeting edges of double doors not less than 20 mm thick. The top and bottom edges of doors showing end grain shall be sealed with lacquer or other suitable material if the edges were disturbed in any way.

BD 03.08.04 Toilet doors in ablutions

Doors showing signs of erosion due to water penetration shall be either replaced or cut short 150 mm from finished floor level. If the existing semi-solid door panel is to be retained, it should be cut short 150 mm from the floor level. A 38 x 50 mm SAP insert must be glued and nailed in at the bottom edge. The steel frame must also be cut short and filled in with grout at the cut edges and fixed to the wall with 2 x 8 mm diameter heavy duty impact nails.

BD 03.09 IRONMONGERY

BD 03.09.01 General

All ironmongery shall be approved by the agent/representative before fixing. Articles shall be fixed with screws of similar metal and shall be eased, oiled, adjusted and left in perfect working order on completion.

All ironmongery shall be inspected to assess the level of workability, paying special attention to door handles, locks, door closers, door stops, door catches, fixing of these fittings, etc. Should any of these fittings be found unsuitable due to damage, corrosion, etc, they shall be replaced. Where existing holes in wood are worn out, these holes must be plugged with wood to receive the screws.

Toilet doors in ablutions must be fitted with approved D-type natural anodised aluminium pull handles and 150 x 150 mm plate. Install 15 mm diameter concealed steel roller ball catch with chromium-plated striker plate with circular hole for roller ball catch. Fix this plate to door frame with two aluminium pop rivets.

BD 03.09.02 Door locks

Each lock shall be provided with two keys and no key shall pass a second lock. All mortice locks, mortice latches and night latches, rim and cylinder rim night latches, and escutcheon for locks shall comply with the requirements of the SANS. The Contractor shall supply all screws, etc, required for completion of the work.

BD 03.09.03 Cupboard doors

Where required according to the Schedule of Quantities, built-in cupboard doors in sleeping quarters are to be provided with 2 x angle iron sections of 35 x 80 x 3 mm thick x 10 mm diameter hole for a padlock that must be fixed to the inside of the cupboard door.

Locker doors shall be provided with a 50 x 50 x 5 mm thick mild steel angle x 10 mm diameter hole for a padlock site welded to the locker.

BD 04 DETAIL OF REPAIR WORK

The detail of the work is described in the Schedule of Quantities.

BD 05 MAINTENANCE

No maintenance will be required for walls under this contract.

BD 06 MEASUREMENT AND PAYMENT

BD 06.01 MEASUREMENT AND RATES

BD 06.01.01 General inclusion of costs and specific specifications

Notes:

Where applicable, standard SANS 1200 measurement and payment items shall be used for Earthworks (Small Works) (1200 DA), Site Clearance (1200 C) and Concrete (Structural) (1200 G).

All material scheduled to be removed shall be deemed to be existing damaged materials in small or large sections. All such redundant material shall become the property of the Contractor and must be removed from site immediately.

All new material shall be deemed to be in patchwork and shall be of approved equal quality, colours, profiles, thickness, etc and shall in all cases match the existing materials and shall be fixed (internally or externally) to existing material, frames or surfaces.

All replacement, removal and repair work shall be done carefully as to not damage any adjacent or other material or work. Any damage to other or adjacent materials or areas caused by the negligence of the Contractor shall be repaired by him free of charge.

All work scheduled to be replaced shall be deemed to include for the careful removal of the damaged existing material as a whole or partly, as specified, for the cleaning and preparation of the remaining surface(s), frames, etc as well as for the new material scheduled or specified to replace the damaged material.

All work scheduled to be removed, hacked off, or taken out shall be deemed to include the cleaning and preparation of the remaining surfaces, areas where material were removed, or remaining work to receive new material or work specified.

Repair and service work shall also include all removing, cutting, grinding, cutting into, welding, bending, strengthening, drilling, tightening, fastening, oiling, greasing, adjusting and providing missing or damaged screws or bolts, etc to repair and service or to improve the items or areas as new and to match the existing. The servicing of windows will be measured in number irrespective of the type of window or the amount of opening sashes present in the overall window size. The rates tendered for servicing of windows or similar items shall be deemed to include for servicing all opening sashes and the total overall frame. The rates tendered for servicing of doors or gates shall include the service of all locks, handles etc.

Work scheduled to be realigned and refixed shall be deemed to include all necessary new additional materials, brackets, connector plates, bolts, pip rivets, nails, screws, spacer blocks, clamps, timber, and labour, etc to leave the items as new and totally functional.

All new work are measured net and shall include all cutting, lapping, waste, bending, fixing, corners, mitres, fixing screws, pip rivets, nails, adhesive, grout, putty, etc, as well as cleaning and preparation of surfaces not already prepared as part of removed items, etc. The supply and installation of new window handles, pegs, stays, etc as well as the service of windows shall include for sealing all bolts and screws of handles, stays, etc with epoxy after fixing or tightening into positions.

The removal of doors, gates or windows shall include for the removal of all existing locks, handles, striking plates, etc but exclude the hinges, etc, which shall be used for the new replaced items. All repair work (excluding paintwork) around and in the thresholds of new door frames, gates or windows build into existing brickwork in new or existing positions shall be deemed to be included in either the rates tendered for the new replacement item or the removal payment item of the frame, window, etc.

The new doors to toilets and wet areas as specified shall be fitted with rubber door stops, D-profiled pull handle and backplate sets, 15 mm roller ball catches with striking plates and all other ironmongery needed to install the doors complete. All new ironmongery shall be measured and paid for separately.

The new doors to offices, etc, as specified shall be fitted with rubber door stops, 4 lever mortice locksets with handle sets to match existing, striking plates and all other ironmongery needed to install the doors complete. All new ironmongery shall be measured and paid for separately.

All ironmongery installed on the project shall bear the SANS approved trademark and codes. Samples must be handed to the engineer for approval before ordering the material.

All brickwork shall include for damp proofing membranes, galvanized brickwork reinforcement to every third course, wire ties and wall anchors as needed.

Tile work to walls shall include all cutting, spacers, waste, jointing, mitres, corners, epoxy grout and joint filler.

Ordering of certain specified material ie NCI industrial type wall tiles needs special and urgent attendance and should be ordered timeously as to prevent any construction delays.

All new glass mirrors shall be silvered float glass copper backed mirrors with polished edges all round and shall, unless otherwise scheduled, be fixed to walls with chromium plated dome capped mirror screws with rubber buffers.

Specific specification : Repairs to galvanised IBR roofs

Repairs to the workshops and store room roofs will include the following work and all work must be carried out in accordance with the Technical Specification BA: Roof Coverings.

(a) Inspect the roof for defects.

(b) Fasten loose nuts on hook bolts.

(c) Replace damaged and/or severely corroded washers (allow for ± 30% of all washers to be replaced). The remainder of the existing washers must be painted with an approved rust converter and a grey colour pure acrylic paint system.

(d) Insert sealer strips on all loose side laps.

(e) Stitch side laps together with Leak Plugs for IBR roof cladding (2 between every hook bolt; purlins are spaced at approximately 1,86 m c/c).

(f) Install new 0,8 mm thick apex trim at the workshops for the length of each bay size 616 mm girth (286 + 300 vertical + 20 + 10 vertical) with Craft-Lock type apex trim fixing brackets. The apex trim 4 x bend (1 is a shallow bend) and fixed to roof sheeting with stitching screws and washers, and to 260 mm vertical x 140 mm (at slope) x 25 mm wide x 2,5 mm thick with 25 mm lip galvanised bracket. The galvanised bracket to be screwed and fixed to roof cladding in trough with 2 galvanised gutter bolts. The spacing of the brackets is 1029 mm. 150 mm overlap fixed and sealed with 2 rows of pop rivets and 2 rows of silicone. Bend up trough to form dam.

(g) Side wall flashings: Inspect existing flashings. All loose flashings must be sealed with two rows of silicone and stitched together with no.10 stitching screws. Counter flashing to be sealed with silicone in brick wall. Existing sealant to be removed. Prepare groove to manufacturer's specifications to receive new joint sealant.

(h) Ridge flashings: Inspect existing flashings. All loose flashings must be sealed with two rows of silicone and stitched together with no.10 stitching screws.

(i) Holes (small diameter) in cladding to be sealed with Leak King plugs.

(j) Replace existing galvanised gutters and down pipes with new 125 x 100 x 0,8 mm thick Chromadek gutters with 100 x 100 x 0,8 mm thick galvanized baked enamel rainwater down pipes spaced at approximately 6 to 7 m intervals.

Specific specification : Repairs to concrete gutter at workshops

(a) The existing ± 305 mm x 400 mm deep concrete box gutters must be waterproofed with a fully bonded waterproofing system to Technical Specification BC: Waterproofing. Prepare the existing cement screed surface by cleaning it and replacing decayed cement screed with new screed. The waterproofing membrane must be dressed over the top ends of the concrete upstand beams of the gutters and down into down pipes. All sharp concrete corners must be chamfered adequately to suit waterproofing membrane requirements.

(b) The existing expansion joints in the box gutter must be cleaned and prepared to receive joint sealant. The edges of the concrete must be chamfered to comply with waterproofing manufacturer's requirements. Insert 35 mm diameter low

density, non-cross-linked, closed cell, expanded poly-ethylene foam backing cord for 25 mm wide joint. Prime joint and seal joints with 25 mm wide x 15 mm thick approved poly-urethane joint sealant applied strictly according to manufacturer's specifications. The top surface of the joint sealant must be recessed adequately into joint to allow for a closed cell polyethylene foam strip that will accommodate movement of the waterproofing membrane.

Dressing to expansion joint will comprise of additional strips of reinforced waterproofing membranes that are lapped and sealed to manufacturer's specifications. The Contractor must submit detail for approval to the Engineer prior installation.

Specific specification : Repairs to roller shutter doors at workshops

(a) Replace the whole bottom T-bar including the bottom ± 17 galvanised slats of the existing roller shutter doors with a new galvanised T-bar (bottom rail) with neoprene weather strip. The Contractor must measure the width of the door (approximately 3000 mm) and the opening width of the wicket door prior ordering the new bottom T-bar and new galvanised slats (± 76 mm high x 1,2 mm thick). When the new bottom T-bar has arrived on site, the Contractor must remove the existing bottom T-bar and slats and slide in the new T-bar and slats.

(b) Provide and insert end locks on the ends of door curtains.

(c) Repairing shall include fixing of missing bracket bolts, screws and pins, brackets, fittings such as locks, loose rachet and pawls, and brackets. Loose bracket bolts that have broken out of walls shall be replaced with 175 mm long x 12 mm diameter threaded rods that must be anchored to the walls with an approved epoxy grout.

(d) Repairing bent and fixing of damaged steel plates of canopy covers.

(e) Repairing gearbox, gear handle, drive shaft, pinions and bevel gears.

Specific specification: Servicing and adjustments to roller shutter doors

(a) All other door components shall be serviced, adjusted, repaired and replaced, but not restricted to, for the full repair of the complete door installation to a smooth working condition. The door sizes is approximately 3000 mm wide x 3500 mm high. The existing interlocking slats are 76 mm wide.

(b) Servicing shall include cleaning and oiling of hinges, rollers, bearings, gears, channel guides and locks. Interlocking slats of the roller shutter curtains shall only be washed with a high-pressure water jet and detergent to remove all dirt, grease, etc.

(c) Adjusting, fixing and realigning of door guides. The existing channel guides, approximately 76 mm wide shall be bent straight to allow free and smooth movement of the roller shutter door slats. The Engineer shall give the necessary instructions where severely damaged channel guides must be replaced.

(d) Adjusting and balancing torsion springs, barrel collar and counter balance.

Specific specification : Welding of thin steel plates

Thin steel plates covering the external side of doors must be welded to the door frame members. The existing paint must be removed from the welding areas prior to site welding. A coded or experienced welder must submit the proposed welding procedure to the Engineer for approval. The aim of the site welding is two fold, viz to fix the steel plate to the frame and secondly, to prevent water ingress into the inside of

the door. The perimeter of the individual plate sections of the door must be sealed with continuous impervious welds.

Specific specification : Repairs and replacements to agricultural kraals

Replace diamond mesh fence:

Existing diamond mesh shall, where indicated by the Engineer, be removed and replaced with new diamond mesh fence. The new galvanized diamond mesh shall be stretched and properly tied to the fencing wire. The diamond mesh or wire netting shall be secured by means of soft binding wire at 1,2 m centres along the top and bottom straining wires and at 3 m centres along each of the other fencing wires unless otherwise specified.

Diamond mesh

(a) Diamond mesh (chain-link) fencing shall comply with the requirements of SANS 1373. The edge-finish shall be both sides clinched or barbed.
(b) The nominal diameter of the wire shall be 2,5 mm and the mesh size shall be 40 mm x 40 mm.

(c) The wire shall be fully galvanized

Tensioning fence wires:

All fencing wire shall be carefully strained and hung without sag, and with true alignment, care being exercised not to strain the wire so tightly that it will break, or that end, corner, straining or gate posts will be pulled up. Each strand of fencing wire shall be securely fastened in the correct position to each post with soft galvanised binding wire.

Smooth wire:

(a) Smooth wire shall comply with the requirements of SANS 675 and shall be of the types specified below:

(b) Straining wire shall be 4,0 mm diameter and fully galvanized.

(c) Fencing wire shall be high tensile grade, 2,24 mm diameter wire fully galvanized.

(d) Tying wire shall be 2,5 mm diameter, mild steel, galvanized wire for tying fencing wire to standards and droppers, and 1,6 mm diameter, mild steel, galvanized wire for tying netting and mesh wire to fencing wire.

BD 06.02 SCHEDULED ITEMS

NEW WORK

BD.01 Doors and windows:

(a) (Type of doors, windows, locks, etc and material indicated):

(i) Description of item..... Unit : number

The unit of measurement shall be the number of doors, windows, locks, etc installed complete as specified.

The tendered rates shall include full compensation for the manufacturing and installation of the steel or natural anodised aluminium doors, windows, locks, frames, etc complete with hinges, handles, locks, barrel bolts, retaining devices, door stops,

stays and any other work necessary to complete the work as specified, scheduled or as shown on the Drawings. The tendered rates for windows shall also include full compensation for glazing, window sills and damp-proof sheeting as specified or to match existing.

BD.02 **Wall panelling:**

(a) Description of material to be used:

(i) Description of item and/or position to be fixed ..... Unit m, m^2, number

The unit of measurement shall be the number, metre, etc for each item as scheduled.

The tendered rates shall include full compensation for all costs of material, waste, labour, plant, transport, delivery, access, scaffolding, fuel, etc to install the material as specified and to match the existing to the Engineer's approval.

BD.03 **Joinery:**

(a) Items measured by number:

(i) Doors, etc (type and size indicated).....Unit: number

(ii) Etc for other items measured by number

(b) Items measured by linear metre:

(i) Skirtings, etc (type and size indicated)..... Unit: m

(ii) Etc for other items measured by length

(c) Items measured by area:

(i) Eaves covering, etc (type and thickness indicated) .....Unit: m^2

(ii) Etc, for other items measured by area

The units of measurement shall be the number, metre or square metre of each type and/or size of joinery item specified.

The tendered rates shall include full compensation for the supply of all materials, manufacture, cutting, waste, fixing and installation of the joinery items.

BD.04 **Ironmongery, steelwork, glass, wall finishings, etc:**

(a) Measured by number:

(i) (Description of item) .....Unit: number

(ii) Etc

(b) Measured by linear metre:

(i) (Description of item) ..... Unit: m

(ii) Etc

(c) Measured by area:

(i) (Description of item) ..... Unit: m^2

(ii) Etc

The unit of measurement shall be the number, metre or square metre as applicable to each item.

The tendered rates shall include full compensation for manufacturing, providing and installing each item to new or existing steel, wood or plaster complete as per specifications, drawings, descriptions as scheduled or as the existing and shall include for all labour, material, waste, plant, transport, delivery, access, scaffolding, fuel, etc to the Engineer's approval.

ALTERATION WORK

BD.05 **Alterations and repairs to existing structures:**

(a) Indicate if repairs, replace, alterations, removal or sealing, etc:

(i) Description of individual items to be repaired, altered, removed, sealed, etc ..... Unit: m^3, m^2, m, number

The unit of measurement for items repaired, replaced, altered, removed, sealed, etc shall be the cubic metre, square metre, metre or number for each item as scheduled.

The tendered rates shall include full compensation for all costs to repair, replace, refix, remove, cutting into, re-align, taking off, temporary store, etc as specified in the Standard and Technical Specifications and shall allow for all necessary labour, plant and new material needed to do the specified work and to leave the scheduled items as new and to the approval of the Engineer. Refer also to the general inclusion of costs in BD 06.01.01.

TECHNICAL SPECIFICATION

BH FITTINGS

CONTENTS

BH 01 SCOPE
BH 02 STANDARD SPECIFICATIONS
BH 03 VARIATIONS AND ADDITIONS TO STANDARD SPECIFICATIONS
BH 04 DETAIL OF REPAIR WORK
BH 05 MAINTENANCE
BH 06 MEASUREMENT AND PAYMENT

BH 01 SCOPE

Fittings shall mean the scope of work to perform corrective maintenance repairs to materials and components related to cupboards, shelving, signage and counters.

The complete scope of repair work shall be as described in BH 04: Detail of repair work.

BH 02 STANDARD SPECIFICATIONS

BH 02.01 GENERAL STANDARD SPECIFICATIONS

The latest edition, including all amendments up to date of tender of the following specifications, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof:

SANS	929	-	Plywood and composite board
SANS	1099	-	Hardwood furniture timber
SANS	1783-3	-	Softwood timber for industrial use
SANS	1385	-	Kitchen cupboards of steel, composite board and timber

BH 02.02 ADDITIONAL SPECIFICATIONS

Technical Specification BD: Walls
Technical Specification BG: Metalwork
Technical Specification BJ: Paintwork

BH 02.03 OCCUPATIONAL HEALTH AND SAFETY

The Contractor shall be required to comply with the Occupational Health and Safety Act 85 of 1993, Construction Regulations 2014 and related regulations. Non-compliance with these regulations, in any way whatsoever, will be adequate reason for suspending the Works.

BH 03 VARIATIONS AND ADDITIONS TO STANDARD SPECIFICATIONS

BH 03.01 ADDITIONAL REQUIREMENTS FOR REPAIR OF FITTINGS

BH 03.01.01 Built-in cupboards

The Engineer shall inspect all cupboards for defects and shall establish which components are to be replaced or repaired. Reasons for replacement will include, but not be limited to:

(a) Severely chipped or damaged block board;
(b) Severely chipped or damaged decorative laminates;
(c) Inadequacy of design, eg strength of hinges, failure of door furniture, etc;
(d) Corroded steel elements.

Fixing of defects will include repairing or replacing damaged, corroded and worn-out fittings, eg door handles, knobs and hinges, door catches and holders, door locks,

cupboard door vents, drawer slide rails, drawer handles, knobs and locks. Moving parts shall be serviced by cleaning, oiling, tightening loose screws, reinstating missing screws or aluminium pop rivets, etc. Refer to BD 03.08 and BD 03.09 of Technical Specification BD: Walls, for repairs or replacements of cupboard doors and ironmongery.

BH 03.01.02 Kitchen cupboards

Kitchen cupboards shall be inspected for defects. Defects will include repairing or replacing damaged, corroded and worn-out fittings, eg door handles, knobs and hinges, door catches and holders, door locks, cupboard door vents, drawer slide rails, drawer handles, knobs and locks. Moving parts shall be serviced by cleaning, oiling, tightening loose screws, reinstating missing screws or aluminium pop rivets, etc. Where the baked enamel of steel cupboards is scratched and worn off, the steel surface shall be sanded and painted with an approved gloss epoxy paint to match the existing colour. Severely corroded or damaged steel cupboards shall be replaced with approved new steel cupboards complying with SANS 1385, with the baked enamel complying with SANS 783 Type II.

Damaged kitchen cupboards manufactured from composite board with laminated plastic covering shall be repaired where possible by gluing loose laminated plastic covering or replacing components with new similar matching finished elements.

Damaged kitchen cupboards manufactured from timber shall be repaired by replacing cracked and broken timber components. Painted surfaces shall be varnished with water-resistant varnish (with matching stain) or painted with approved polyurethane paint. Refer to Technical Specification BJ: Paintwork.

All cupboards shall be properly screwed and fixed to walls and floors with suitable corrosion resistant screws and plastic plugs, washers, etc.

Work tops and sinks against walls shall be sealed with an approved white one part polyurethane sealant. The sealant shall be applied strictly according to the manufacturer's specifications. Old worn-out and damaged sealant shall also be replaced. Drop-in sink bowls shall also be sealed with this approved polyurethane sealant. Where the possibility exists that water can penetrate composite board, these joints in the worktops shall also be sealed.

BH 03.01.03 Shelving

The stability of shelves must be checked to determine the occurrence of sagging. Where required, provide adequate support for the specific application, eg steel tubing struts, additional timber bearers, steel brackets, etc.

Broken timber shelving shall be replaced with approved wrought hardwood or solid laminated pine varnished or painted to specification. Composite board will not be permitted. Shelves shall be in single lengths. Heads of nails and brass countersunk screws in exposed faces of joinery shall be sunk and pelleted.

BH 03.01.04 Signage

Safety signs shall comply with the requirements of SANS 1186 (1997).
The Engineer shall survey all signage and list those items that prove to be illegible. Signs that need to be replaced shall be done in the same fashion and material as to match similar signs in the same application. The size of the signs shall be as shown on the schedules.

Where required proper and appropriate signage must be provided for door numbers, room size and room description. The size, colour, position on the door, wall, etc.,

height above floor level of the lettering shall be instructed by the Engineer on site or shown on the schedules. The lettering must be stencilled on to the doors and walls.

All other fire protection signage will be provided for hydrants, hose reels, etc, shall be provided under separate contract.

BH 03.01.05 Counters

The Engineer shall inspect all counters and counter tops for defects and shall establish which components are to be replaced or repaired. Special attention shall be given to the condition of hinges at service hatches.

All joinery liable to be damaged shall be covered with temporary coverings to the satisfaction of the Engineer and special care shall be taken to protect surfaces that are to be varnished.

Where necessary, timber counters shall be sanded down, uneven surface spots filled with an approved wood filler, all blemishes removed and then finished off in order to restore the wood to its original state.

Steel tops that have been damaged excessively shall be replaced.

BH 04 DETAIL OF REPAIR WORK

The detail of the scope of work is described in the Schedule of Quantities.

BH 05 MAINTENANCE

No maintenance will be required for fittings under this contract.

BH 06 MEASUREMENT AND PAYMENT

BH 06.01 MEASUREMENT AND RATES

BH 06.01.01 General inclusion of costs

Notes:

All material scheduled to be removed shall be deemed to be existing damaged materials in small or large sections. All such redundant material shall become the property of the Contractor and must be removed from site immediately.

All new material shall be deemed to be in patchwork and shall be of approved equal quality, colours, profiles, thickness, etc and shall in all cases match the existing materials and shall be fixed (internally or externally) to existing material or surfaces.

All replacement, removal and repair work shall be done carefully as to not damage any adjacent or other material or work. Any damage to other or adjacent materials or areas caused by the negligence of the Contractor shall be repaired by him free of charge.

All work scheduled to be removed or taken out shall be deemed to include the cleaning and preparation of the remaining sections, areas, or work to receive the new material or work specified.

Repair and service work shall also include all removing, cutting, grinding, cutting into, welding, bending, strengthening, drilling, tightening, fastening, oiling, greasing, adjusting, and providing missing or damaged screws or bolts, etc to repair or to improve the items or areas as new and to match the existing. The service of cupboard doors and drawers shall be deemed to include for servicing all locks, hinges, glides, tracks, etc.

Work scheduled to be realigned and refixed shall be deemed to include all necessary new additional materials, brackets, connector plates, bolts, pip rivets, nails, screws, spacer blocks, clamps, timber, and labour, etc to leave the items as new and totally functional.

All new work are measured net and shall include all cutting, lapping, waste, bending, fixing, corners, mitres, fixing screws, pip rivets, nails, adhesive, grout, putty, etc, as well as cleaning and preparation of surfaces not already prepared as part of removed items, etc.

The removal of doors, gates or windows shall include for the removal of all existing locks, handles, striking plates, etc but exclude the hinges, etc, which shall be used for the new replaced items. All repair work (excluding paintwork) around and in the thresholds of new door frames, gates or windows build into existing brickwork in new or existing positions shall be deemed to be included in either the rates tendered for the new replacement item or the removal payment item of the frame, window, etc.

The new doors to toilets and wet areas as specified shall be fitted with rubber door stops, D-profiled pull handle and backplate sets, 15 mm roller ball catches with striking plates and all other ironmongery needed to install the doors complete. All new ironmongery shall be measured and paid for separately.

The new doors to offices, etc, as specified shall be fitted with rubber door stops, 4 lever mortice locksets with handle sets to match existing, striking plates and all other ironmongery needed to install the doors complete. All new ironmongery shall be measured and paid for separately.

All ironmongery installed on the project shall bear the SANS approved trademark and codes.

BH 06.02 SCHEDULED ITEMS

NEW WORK

BH.01 Joinery:

(a) Items measured by number:

(i) Timber cupboard doors, shelves, complete cupboards, etc (type and size indicated) .....Unit: number

(ii) Etc for other items measured by number

(b) Items measured by linear metre:

(i) Timber rails, planks, frames, shelves, etc (size indicated) .....Unit: m

(ii) Etc for other items measured by length

(c) Items measured by area:

(i) Pinning boards, shelves, work tops, etc (type and thickness indicated) .....Unit: m^2

(ii) Etc, for other items measured by area

The units of measurement shall be the number, metre or square metre of each type and/or size of joinery item specified.

The tendered rates shall include full compensation for the manufacturing and supplying of all materials, for transport, scaffolding for working at heights, labour, cutting, waste, fixing, screws, bolts, clamps, etc and installation of the joinery items.

BH.02 **Steelwork:**

(a) Items measured by number:

(i) Steel cupboard or locker doors, shelves, complete cupboards, etc (type and size indicated).....Unit : number or units

(ii) Etc, for other items measured by number

(b) Items measured by linear metre:

(i) Steel rails, shelves, frames, etc (size indicated) ..... Unit : m

(ii) Etc, for other items measured by length

(c) Items measured by area:

(i) Shelves, plates, etc (type and thickness indicated) .....Unit : m^2

(ii) Etc, for other items measured by area

The unit of measurement shall be the number, metre or square metre of each type and/or size of steelwork item specified.

The tendered rates shall include full compensation for the manufacturing, supplying of all materials and transport, and for all labour, cutting, welding, waste, fixing, scaffolding for working at heights and installation of the steelwork items complete with a red oxide or equal approved steelwork primer or baked enamel paint finishing as specified.

ALTERATION WORK

BH.03 **Alterations and repairs to existing fittings:**

(a) Indicate if repairs, alterations, removal or sealing, etc:

(i) Description of individual items to be repaired, altered, removed, sealed, etc .....Unit: m^3, m^2, m, number

The unit of measurement for items repaired, altered, removed, sealed, etc shall be cubic metre, square metre, metre or number as scheduled.

The tendered rates shall include full compensation for all costs to repair, refix, remove, cutting into, realign, taking off, temporary store, etc as specified in the Standard and Technical Specifications and shall allow for all necessary labour, plant, scaffolding for working at heights and new material needed to leave the scheduled items as new and to the approval of the Engineer. Refer also to the general inclusion of costs in BH 06.01.01.

TECHNICAL SPECIFICATION

BJ PAINTWORK

CONTENTS

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BJ 02 STANDARD SPECIFICATIONS
BJ 03 VARIATIONS AND ADDITIONS TO STANDARD SPECIFICATIONS
BJ 04 DETAIL OF REPAIR WORK
BJ 05 MAINTENANCE
BJ 06 MEASUREMENT AND PAYMENT

BJ 01 SCOPE

This specification covers the painting/repainting and maintenance of new and existing building components and maintenance thereafter for various types of buildings and structures.

Paintwork shall mean the scope of work related to the preparation, painting and maintenance of new and existing building components. This specification does not include work related to galvanising of steelwork, which is specified elsewhere.

The complete scope of paintwork shall be as described in BJ 04: Detail of repair work.

BJ 02 STANDARD SPECIFICATIONS

BJ 02.01 GENERAL STANDARD SPECIFICATIONS

The latest edition, including all amendments up to date of tender of the following specifications, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof:

SANS 515 - Decorative paint with a non-aqueous solvent base for interior use
SANS 630 - Decorative high gloss enamel for interior and exterior
SANS 631 - Decorative oil gloss paint for interior and exterior use
SANS 633 - Emulsion paints for interior decorative purposes
SANS 634 - Emulsion paints for exterior use
SANS 678 - Primers for wood for interior and exterior use
SANS 681 - Undercoats for paints
SANS 683 - Roof paints (relevant sections)
SANS 723 - Wash primer (metal etch primer)
SANS 801 - Epoxy-tar paints
SANS 887 - Varnish for interior use
SANS 926 - Two-pack zinc-rich epoxy primer
SANS 1227 - Textured wall coatings, emulsion base, for interior and exterior use
SANS 1319 - Zinc phosphate primers for steel
SANS 10064 - Preparation of steel surfaces for coating

BJ 02.02 ADDITIONAL SPECIFICATIONS

Technical Specification BG: Metalwork
Paint manufacturers' specifications. These specifications shall take precedence over all others.

BJ 02.03 OCCUPATIONAL HEALTH AND SAFETY

The Contractor shall be required to comply with the Occupational Health and Safety Act 85 of 1993, Construction Regulations 2014 and related regulations. Non-compliance with these regulations, in any way whatsoever, will be adequate reason for suspending the Works.

BJ 03 VARIATIONS AND ADDITIONS TO STANDARD SPECIFICATIONS

BJ 03.01 ADDITIONAL REQUIREMENTS FOR PAINTWORK

BJ 03.01.01 General

a) Quality control

i) Application of all paints must be supported by the relevant paint manufacturer's technical quality control systems with regard to preparation, application, film thickness, colour/pigmentation, mixing, etc.
ii) The Contractor must submit his programme to the Engineer well in advance, particularly where high-risk surface applications (sheet metal roofs, etc) are concerned, in order to keep the manufacturer's technical personnel informed. Paint application may not commence until the manufacturer has inspected the surface preparation and given written approval thereof to the Engineer.

b) Paint systems

i) All paint shall be delivered to the site in the unopened containers on which the manufacturer's name and trademark appear.
ii) All materials for paintwork shall comply with the requirements for standards from the country from which it originated and shall be approved by the Engineer.
iii) The Contractor shall submit copies of the paint manufacturer's specifications, recommendations and datasheets to the Engineer for approval.
iv) The coating system shall be from one manufacturer unless otherwise specified. The paint manufacturer's instructions shall be strictly adhered to.
v) Paints, etc, shall be suitable for application on the surfaces on which they are to be applied and various coats must be compatible with each other. Those paints used externally shall be of exterior quality or suitable for exterior use.

c) Guarantee

i) The Contractor must give a 3 year written guarantee for the quality and workmanship of the paint work (fair wear and tear excepted). The Contractor shall be liable for any peeling or flaking paint applied by the Contractor and shall execute all such work of repair, rectification and making good of painted surfaces as may be ordered in writing by the Engineer. The manufacturer must carry out inspections at regular intervals during the construction period. The Manufacturer must issue a certificate of acceptance and compliance on completion to the client.

BJ 03.01.02 General preparation of new and existing work

All walls and ceilings, etc, shall be thoroughly cleaned prior to commencement of painting and the premises kept clean and free from dust during painting operations. Protect all surfaces not to be painted against spotting and spilling. Clean down and make good as necessary. Locks, door handles and similar fittings or fixtures shall be removed (or masked) and refitted on completion of painting.

(a) Plaster

(i) All surfaces, sills, ceilings, etc, shall be thoroughly dry before painting operations are started. Porous surfaces must be sealed with the appropriate sealer, thinned if necessary, before applying the paint system.

(ii) Exterior surfaces: Any cracks shall be scraped out and filled with an approved filler or patching plaster and rubbed down flush; the whole surface shall be well brushed down to remove all loose dust and powdery material before applying the first coat of the specified paint system.

(iii) Interior surfaces: All cracks, blow holes, etc, shall be filled with suitable stopping and rubbed down flush. The whole surface shall be smoothed to an even finish and dusted down. Any grease marks, crayon marks, etc, shall be cleaned off with sugar soap and thoroughly rinsed with clean water. The surface shall be thoroughly dry before painting operations are started.

(iv) Ceilings: Ceilings shall be brushed down and free of all dust and powdery materials. Cover strips and cornices shall be stopped where necessary and rubbed down smooth. All nail heads shall be primed, stopped and rubbed down flush. The surface shall then be wiped or brushed free of all loose or powdery materials before applying the recommended paint system.

(v) Fibre cement: Fibre cement surfaces shall be cleaned down and primed with an approved sealer and undercoat.

(b) Metalwork

(i) Iron and steel: New iron and steel metalwork shall be cleaned with an approved degreaser and the most effective method available (shot or sand blasting, mechanical wire brushing, hand wire brushing) used to remove all rust and millscale. Any salt deposits resulting from a marine or industrial environment shall be removed by washing with water prior to priming.

(ii) Galvanised surfaces: New galvanised surfaces shall be well cleaned to remove all traces of oil and dirt with galvanised iron cleaner and rinsed with clean water.

(c) Woodwork

New woodwork shall be brushed down and the surface prepared as follows: Knots shall be given a coat of an approved patented knotting. The surface shall be primed overall and all holes shall be filled. The surface shall then be rubbed down with glass paper until smooth and even. Woodwork that needs to be oiled, stained or varnished shall be free of all stains, pencil marks and other surface discolourations and blemishes and shall be stopped with tinted stopping and rubbed down.

(d) General

(i) Colours: All colours and tints are to be submitted to the Engineer for approval. Sample colours are to be prepared in all cases for the final coat and all work must be finished to colour approved by the Engineer. Where necessary, universal undercoat must be tinted to a shade lighter than the finishing coat.

(ii) Doors and windows: All doors and opening sections of windows must be left ajar after painting or varnishing until the paint is perfectly dry.

(iii) Protection and cleaning off: All necessary precautions are to be taken for the protection of all finished work and other trades during painting, and all ironmongery shall be removed where possible prior to the commencement of painting and re-fixed after completion. All paint spots, stains, etc, are to be cleaned off floors, walls, glass, etc, after completion.

BJ 03.01.03 Paint specifications for various components

(a) Fibre cement (ceilings)

(i) New work

(1) Interior

Ceilings to wet areas (ablutions, kitchens and laundries):

- Polyurethane alkyd enamel:
  Prepare and apply one coat synthetic copolymer primer. Stop with interior crack filler, seal crack filler with above primer. Apply two coats of polyurethane alkyd enamel interior quality paint.
- Universal fungicidal additive:
  To be added to above in proportions specified by the manufacturer. This additive will only be required in specific cases.

(2) Exterior

Preparation: Clean down to remove all dirt and grease, etc, fill nail-heads with exterior crack filler and sand down to a smooth and even surface.

Finishing coat (emulsion): Apply two coats of super acrylic copolymer PVA emulsion or polyurethane alkyd enamel.

(ii) Renovation (existing) work

(1) Interior

Ceilings previously painted, in good condition:

Preparation: Clean down to remove all dirt and grease, etc, fill nail-heads, cracks and defects with interior crack filler and sand down to a smooth and even surface.

Finishing coat (emulsion): Apply two coats of super acrylic copolymer PVA emulsion or polyurethane alkyd enamel.

Ceilings previously painted, in poor condition (to be finished in an emulsion system):

Preparation: Remove all loose and flaking paint, clean down to remove all dirt, grease, etc, prime nail-heads with zinc phosphate primer for steel. Apply one coat of primer to existing ceiling boards diluted with 20 % turpentine. Fill nail-heads, cracks and defects with interior crack filler and sand down to a smooth and even surface. Seal all repaired areas with above-mentioned primer.

Finishing coat: Apply two coats of super acrylic copolymer PVA.

Ceilings to wet areas:

Preparation as above, but to be followed by one coat synthetic copolymer primer and two final coats polyurethane alkyd enamel interior quality paint (with fungicidal additive, only if specified).

In cases where fungicidal attack is prevalent the prepared surface must be washed down with antiseptic solution, followed by sodium hyperchlorite and allowed to react for 15 minutes before washing down with water. Once dry, primer and finishing coats may be applied.

(2) Exterior

Not applicable.

(b) Woodwork truss/rafters (overhangs)

(i) New work

(1) Interior

Not applicable.

(2) Exterior

- Egg-shell/High-gloss enamel:
  Prepare and touch up knots with spirit soluble resin type knotting. Apply one coat of primer for wood. Stop with wood filler where necessary. Apply one coat of universal undercoat. Apply two coats of enamel.

- Creosote coating:
  Prepare surface to be clean, dry and sound Apply on coat of creosote wood treatment coating.

(ii) Renovation (existing) work

(1) Interior

Not applicable.

(2) Exterior

Woodwork truss/rafters (overhangs) previously painted, in good condition (to be painted in egg-shell/high-gloss enamel):

Preparation: Clean down and sand to a smooth finish. Spot prime where necessary with primer for wood. Allow 24 hours drying. Stop with wood filler.

Undercoat: Apply one coat of universal undercoat. Allow 24 hours drying.

Finishing coat: Apply two coats of enamel paint.

Woodwork truss/rafters (overhangs) previously painted, in poor condition (to be finished in egg-shell/high-gloss enamel):

Preparation: Remove existing paint and sand down thoroughly. Touch up knots and resinous areas with knotting.

Primer: Apply one coat of universal undercoat. Allow 24 hours drying. Stop with wood filler and sand to a smooth finish.

Undercoat: Apply one coat of universal undercoat. Allow 24 hours drying.

Finishing coat: Apply two coats of enamel paint.

Creosote coating:
Preparation: Prepare surface. Apply two coats creosote wood treatment coating.

(c) Metalwork - steelwork and miscellaneous metal work (including general pipework)

(i) New work

(1) Interior

Unpainted:

Prepare and apply one coat zinc phosphate primer for steel. Apply one coat of universal undercoat. Apply two coats of high gloss enamel paint.

Shop-primed:

Touch up damaged primer with zinc phosphate primer for steel. Apply one coat of universal undercoat. Apply two coats of high-gloss enamel paint.

Cast-iron waste pipes:

Prepare and remove as much bitumen as possible. Apply one coat of aluminium paint. Apply one coat of universal undercoat. Apply two coats of high-gloss enamel paint.

(2) Exterior

Unpainted:

Prepare and apply one coat zinc phosphate primer for steel. Apply one coat of universal undercoat. Apply two coats of high-gloss enamel or oleoresinous aluminium paint (where applicable).

Shop-primed:

Touch up damaged primer with zinc phosphate primer for steel. Apply one coat of universal undercoat. Apply two coats of high-gloss enamel or oleoresinous aluminium paint (where applicable).

Cast-iron waste pipes:

Prepare and remove as much bitumen as possible. Apply one coat of universal undercoat. Apply two coats of high gloss enamel or oleoresinous aluminium paint (where applicable).

(ii) Renovation (existing) work

(1) Interior

Previously painted metalwork, in good condition (steel windows, door frames, miscellaneous steelwork, etc):

Preparation: Wash down with sugar soap and rise with clean water. Sand lightly and apply one coat universal undercoat.

Finishing: Apply two coats high-gloss enamel.

Previously painted metalwork, in poor condition:

Preparation: Remove all existing paint by means of scraping or wire brushing and sanding. Tightly adhering paint that cannot be removed may remain and be overcoated. Remove all signs of rust back to bright

metal by sanding with emery cloth. Wash down with an approved degreaser, rinse with clean water to remove all traces thereof and allow to dry. Treat rusted areas with a water-based rust converter.

Primer: Apply one coat of zinc phosphate primer for steel. Allow overnight drying.

Undercoat: Apply one coat of universal undercoat. Allow overnight drying.

Finishing coat: Apply two coats high-gloss enamel. Allow overnight drying between coats.

Previously painted metalwork, to remove all previous paint to original surface:

Preparation: Remove all existing paint by means of scraping or wire Brushing, grinding and sanding Remove all signs of rust back to bright metal by sanding with emery cloth. Wash down with an approved degreaser, rinse with clean water to remove all traces thereof and allow to dry. Treat rusted areas with a water-based rust converter.

Primer: Apply one coat of zinc phosphate primer for steel. Allow overnight drying.

Undercoat: Apply one coat of universal undercoat. Allow overnight drying.

Finishing coat: Apply two coats high-gloss enamel. Allow overnight drying between coats.

(2) Exterior

Previously painted metalwork, in good condition:

Preparation: Wash down with sugar soap, followed by light sand-papering. Rinse with clean water.

Undercoat: Apply one coat of universal undercoat. Allow 24 hours for drying.

Finishing coat: Apply two coats of high-gloss enamel or oleoresinous aluminium paint (where applicable).

Previously painted metalwork, in poor condition:

Preparation: Remove all existing paint by means of scraping or wire brushing and sanding. Tightly adhering paint that cannot be removed may remain and be overcoated. Remove all signs of rust back to bright metal by sanding with emery cloth. Wash down with an approved degreaser, rinse with clean water to remove all traces thereof and allow to dry. Treat rusted areas with a water-based rust converter.

Primer: Apply one coat of zinc phosphate primer for steel. Allow for 24 hours drying.

Undercoat: Apply one coat of universal undercoat. Allow for 24 hours drying.

Finishing coat: Apply two coats of high-gloss enamel or oleoresinous aluminium paint (where applicable).

Previously painted metalwork, to remove all previous paint to original surface:

Preparation: Remove all existing paint by means of scraping or wire Brushing, grinding and sanding Remove all signs of rust back to bright metal by sanding with emery cloth. Wash down with an approved degreaser, rinse with clean water to remove all traces thereof and allow to dry. Treat rusted areas with a water-based rust converter.

Primer: Apply one coat of zinc phosphate primer for steel. Allow overnight drying.

Undercoat: Apply one coat of universal undercoat. Allow overnight drying.

Finishing coat: Apply two coats high-gloss enamel. Allow overnight drying between coats.

(3) Aggressive environments

Not applicable.

(d) Gypsum board (ceilings, etc)

(i) New work

(1) Interior (dry areas)

- Super acrylic PVA:
  Prepare and apply one coat synthetic copolymer primer for gypsum board diluted with 20 % turpentine. Stop with interior crack filler, seal crack filler with above-mentioned primer. Apply two coats of super acrylic copolymer PVA paint.

(2) Exterior (dry areas)

- Super acrylic PVA:
  Prepare and supply one coat of synthetic copolymer primer for gypsum board diluted with 20 % turpentine. Stop with interior crack filler, seal crack filler with above-mentioned primer. Apply two coats of super acrylic copolymer PVA paint.

(ii) Renovation (existing) work

(1) Interior

Previously painted gypsum board with PVA in good condition:

Preparation: Wash down with sugar soap to remove all dirt, grease, etc, and rinse off with clean water. When dry, make good all cracks and defects with interior crack filler and sand to a smooth and even surface.

Finishing coat: Apply two coats super acrylic copolymer PVA.

Previously painted gypsum board, in poor condition:

Preparation: Clean down. Remove all paint by sanding and scraping.

Primer: Allow overnight drying. Make good cracks and holes with crack filler. Seal crack filler with above primer and allow to dry.

Finishing coat (emulsion): Apply two coats of super acrylic copolymer PVA.

(2) Exterior

Not applicable.

(e) Cement plaster (walls) and concrete surfaces

(i) New work

(1) Interior

- Polyurethane alkyd enamel (in wet areas, kitchens, etc):
  Prepare and apply one coat bonding liquid, followed by one coat of synthetic copolymer primer for new plaster. Apply one coat of polyurethane alkyd enamel paint.

- Acrylic emulsion:
  Same as above, but apply acrylic emulsion with smooth velvet sheen interior quality paint.

- Gloss enamel:
  Same as for polyurethane alkyd enamel, but apply two coats high-gloss enamel.

- Super acrylic PVA:
  Prepare and apply one coat of synthetic copolymer primer. Apply two coats of super acrylic copolymer PVA.

- Semi-gloss pure acrylic finish:
  Prepare and apply one coat of synthetic copolymer primer. Apply one coat of pure acrylic paint.

(2) Exterior

- Pure acrylic:
  Prepare and apply one coat of alkali resistant synthetic resins bonding liquid. Stop with exterior crack filler. Apply one coat of copolymer primer. Apply one final coat of pure acrylic paint.

- Pure acrylic with Teflon:
  Preparation, priming and application as above.

- Super acrylic PVA:
  Prepare and apply one coat of synthetic copolymer primer. Apply two coats of super acrylic copolymer PVA.

- Acrylic emulsion (external textured):
  Preparation as above, followed by two coats textured exterior acrylic emulsion, allowing one hour drying time between coats.

(ii) Renovation (existing) work

(1) Interior

Previously distempered:

Preparation: Remove all distemper with a peeling agent. Rinse with clean water. Allow 48 hours to dry. Fill cracks and defects with interior crack filler. Sand down to a smooth and even surface.

Primer: Apply one coat of bonding liquid, allow a minimum of 24 hours and maximum of 72 hours for drying. Final primers as specified in BJ 03.01.03(e)(i).

Finishing coat: Apply similar paints to suit as specified in BJ 03.01.03(e)(i).

(2) Exterior

Previously painted cement plaster (walls) and surfaces, in good condition:

Preparation: Wash down thoroughly with sugar soap. Rinse with clean water. Fill with suitable exterior crack filler. Sand smooth.
Prime with one coat bonding liquid

Finishing coat: Apply similar paints to suit as specified in BJ 03.01.03(e)(i).

Previously painted cement plaster (walls) and surfaces, in poor condition (ie peeling, crazing, etc, not previously limewashed):

Preparation: Remove all paint and fill with suitable exterior crack filler.

Priming coat: Prime with one coat bonding liquid, allow to dry for a minimum of 24 hours and a maximum of 72 hours.

Finishing coat: Apply similar paints to suit as specified in BJ 03.01.03(e)(i).

(f) Fibre cement board (fascias and ceilings)

(i) New work

(1) Interior

New and wet asbestos sheets shall be allowed to dry out before painting is commenced.

Ceiling boards must be well primed on both sides with an approved sealer/undercoat before fixing.

- Super acrylic PVA:
  Prepare and apply one coat of sealer/undercoat. Prime nail heads with metal primer. Stop with filler. Apply two coats of super acrylic copolymer PVA.

(2) Exterior

New and wet asbestos sheets shall be allowed to dry out before painting is commenced.

Fascia boards and barge boards shall be well primed on both sides and edges painted with sealer/undercoat before fixing.

All sides of fascia boards must receive final coatings.

- Super acrylic PVA:
  Prepare and apply one coat sealer/undercoat. Prime nail heads with zinc phosphate metal primer. Stop with filler. Apply two coats of super acrylic copolymer PVA.

(ii) Renovation (existing) work

(1) Interior

Previously painted fibre cement board with emulsion paint, in good condition:

Preparation: Clean down thoroughly to remove any signs of dirt or grease. Fill all screw heads with a flexible resistant filler after screw heads have been primed.

Finishing: Apply two coats of super acrylic copolymer PVA paint.

Previously painted fibre cement board in poor condition:

Preparation: Remove previous paint coatings with super paint stripper. Thoroughly wash down with sugar soap and rinse with clean water. Prime nail and screw heads with zinc phosphate metal primer. Allow to dry.

Primer: Apply one coat of synthetic copolymer primer to all surfaces including back and edges, allow to dry. Fill all screw heads with weather resistant filler, allow to dry, sandpaper smooth and touch up with primer.

Finishing: Apply two coats of super acrylic copolymer PVA paint.

(2) Exterior

Previously painted fibre cement board with emulsion paint in good condition:

Preparation: Clean down thoroughly to remove any signs of dirt or grease. Fill all screw heads with a flexible weather resistant filler after screw heads have been primed.

Finishing: Apply two coats of super acrylic copolymer PVA paint.

Previously painted fibre cement board, in poor condition:

Preparation: Remove previous paint coatings with super paint stripper. Thoroughly wash down with sugar soap and rinse with clean water. Prime nail and screw heads with zinc phosphate metal primer. Allow to dry.

Primer: Apply one coat of sealer/undercoat to all surfaces including back and edges, allow to dry. Fill all screw heads with weather resistant filler. Allow to dry and sandpaper smooth. Touch up with primer.

Finishing: Apply two coats of super acrylic copolymer PVA paint.

(g) Galvanised iron roof (also gutters and rainwater pipes)

(i) New work

(1) Interior

Not applicable.

(2) Exterior

Galvanised iron - roofs: Water-based pure acrylic emulsion paint:

Scrub down thoroughly with degreaser, followed by a cleaner for galvanised iron. Rinse off thoroughly and ensure that all traces of cleaner have been removed and that the surfaces are free of any grease and oil. Apply one coat of galvanised metal primer. Allow to dry for 5 hours. (Must be overcoated within 24 hours maximum.) Apply one coat of water-based pure acrylic emulsion paint with non-fading pigment.

Galvanised iron - roofs: Mat acrylic roof paint:

Scrub down thoroughly with degreaser, followed by a cleaner for galvanised iron. Rinse off thoroughly and ensure that all traces of cleaner have been removed and that the surface is free of any grease and oil. Apply two coats of mat acrylic roof paint.

Galvanised iron - gutters and rainwater pipes: Gloss enamel:

Scrub down thoroughly with degreaser, followed by a cleaner for galvanised iron. Rinse off thoroughly and ensure that all traces of cleaner have been removed and that the surface is free of any grease and oil. Apply one coat of primer for galvanised iron. Allow to dry for 5 hours. (Must be overcoated within 24 hours maximum.) Apply two coats of gloss enamel paint with non-fading pigment.

(ii) Renovation (existing) work

(1) Interior

Not applicable.

(2) Exterior

Previously painted galvanised iron, in good condition:

Preparation: Thoroughly scrub down with fibre scrubbing brushes and sugar soap and rinse with clean water.

Finishing coat: Apply one coat water-based pure acrylic emulsion paint with non-fading pigment.

Unpainted or previously painted galvanised iron, in poor condition (ie flaking, peeling and rusting):

Preparation: Remove all previous paint coatings with steel wire brushes, plumber's egg-shaped lead scrapers, and coarse floor sandpaper. Remove all traces of rust with emery cloth back to bright metal and apply approved rust converter. Thoroughly scrub down using galvanised iron cleaner and rinse with clean water.

Primer: Apply one coat of galvanised metal primer. Allow a minimum of 5 hours and a maximum of 72 hours for drying.

Finishing coat: Apply one coat of water-based pure acrylic emulsion paint with non-fading pigment.

(h) Timber (doors, cornices, window frames, counters, skirtings, etc)

(i) New work

(1) Interior

- Polyurethane alkyd enamel (wet areas, kitchens, etc):
  Prepare knots with spirit soluble resin type knotting. Prime with primer (sanding sealer) for wood. Fill imperfections where necessary with wood filler. Apply one coat of universal undercoat. Apply two coats of polyurethane alkyd enamel.

- High-gloss/egg-shell enamel:
  Prepare knots with spirit soluble resin type knotting. Prime with primer (sanding sealer) for wood. Fill imperfections where necessary with wood filler. Apply one coat of universal undercoat. Apply two coats of enamel.

- Gloss/suede varnish (interior quality solvent based):
  Prepare knots with spirit soluble resin type knotting. Fill imperfections with wood filler. Sand surfaces to a smooth finish in grain direction and dust off.
  Thin first coat down in a ratio of 3 parts varnish to 1 part mineral turpentine and apply. Allow to dry for 24 hours. Apply two full-strength final coats with 24 hours drying time between applications.

(2) Exterior

- High-gloss/egg-shell enamel:
  Prepare with spirit soluble resin type knotting. Apply one coat of primer for wood. Fill where necessary with wood filler. Apply one coat of universal undercoat. Apply two coats of high gloss enamel.

- Gloss/suede varnish (exterior quality ultraviolet resistant solvent based):
  Prepare knots with spirit soluble resin type knotting. Fill imperfections with wood filler. Sand surfaces to a smooth finish in grain direction and dust off.
  Thin first coat down in a ratio of 3 parts varnish to 1 part mineral turpentine and apply. Allow to dry for 24 hours. Apply two full-strength final coats with 24 hours drying time between applications.

(ii) Renovation (existing) work

(1) Interior

Previously painted woodwork, in good condition (to be finished in polyurethane alkyd enamel):

Preparation: Wash sown with sugar soap to remove all dirt, grease, etc, then rinse off with clean water. Sand down to a smooth and mat surface. Make good cracks and defects with wood filler and after 24 hours drying, sand down again.

Finishing coat: Apply two coats of polyurethane alkyd enamel. Allow 24 hours for drying between coats.

Previously varnished woodwork in good condition (to be finished with interior quality varnish):

Repair defects with wood filler. Sand surfaces to a mat finish and apply two final coats varnish with 24 hours drying time between applications.

Previously painted woodwork in poor condition (to be finished with high-gloss/egg-shell enamel):

Preparation: Remove all paint, varnish and stain with super paint stripper. Wash down thoroughly with sugar soap and rinse with clean water. When surface is completely dry, sand down and apply one coat of spirit soluble resin type knotting to all knots. Fill all cracks and defects with wood filler and after 24 hours of drying, sand down to a smooth and even surface. Apply one coat oleoresinous wood primer. Apply one coat universal undercoat.

Finishing coat: Apply two final coats enamel.

Previously stained and varnished or painted woodwork in poor condition (to be finished in polyurethane alkyd enamel):

Preparation: Remove all paint, varnish and stain with super paint stripper. Wash down thoroughly with sugar soap and rinse with clean water. When surface is completely dry, sand down and apply one coat of spirit soluble resin type knotting to all knots. Fill all cracks and defects with wood filler and after 24 hours of drying, sand down to a smooth and even surface. Apply one coat oleoresinous wood primer.

Finishing coat: Apply one coat polyurethane alkyd enamel.
Previously varnished woodwork in poor condition (to be finished with interior quality varnish):

Remove all varnish with paint stripper. Wash down to dry completely. Further preparation and applications as for BJ 03.01.03(h)(i): New work - interior.

(2) Exterior

Previously painted woodwork, in good condition (to be repainted with high-gloss/egg-shell enamel):

Preparation: Clean down and sand to a smooth finish. Spot prime where necessary with oleoresinous wood primer. Allow 24 hours for drying. Stop defects with a flexible weather resistant wood filler.

Undercoat: Apply one coat of universal undercoat. Allow 24 hours drying.

Finishing coat: Apply two coats of enamel.

Previously varnished woodwork in good condition (to be finished with exterior quality ultraviolet resistant solvent based varnish):

Preparation and application as for similar interior item above.

Previously stained and varnished or painted woodwork, in poor condition (to be finished in high-gloss/egg-shell enamel):

Preparation: Remove all paint, varnish and stain with super paint stripper. Wash down thoroughly with sugar soap and rinse with clean water. When surface is completely dry, sand down and apply one coat of spirit soluble resin type knotting to all knots. Fill all cracks and defects with wood filler and after 24 hours drying, sand down to a smooth and even surface. Apply one coat oleoresinous wood primer. Apply one coat universal undercoat.

Finishing coat: Apply two final coats of enamel.

Previously stained and varnished or painted woodwork, in poor condition (to be finished in polyurethane alkyd enamel):

As for similar interior item above.

Previously varnished woodwork in poor condition (to be finished with exterior quality ultraviolet resistant solvent based varnish):

Preparation and application as for similar interior item above.

(i) Concrete and cement surfaces - floor paint

(i) New work

Exterior and interior

Preparation: Remove laitance, residual cement spillage, etc, by means of carborundum grinding and vacuum clean to remove all dust. Remove oil, grease or any other surface contaminants with degreaser and wash off with clean water. Allow to dry. The floor must have less than 5 % moisture content before painting may be done.

Finishing coats: Apply two coats of an alkali resistant solvent based stoep (modified alkyd) paint. The first coat may be thinned with 25 % mineral turpentine. Sixteen hours drying time must be allowed between coats.

(ii) Renovation (existing) work

Exterior and interior

Previously painted concrete and cement surfaces, in good condition:

Preparation: Remove any loose and flaking paint by means of carborundum grinding, back to firm feathered edges. Remove any polish, grease, oil and other contaminants with degreaser, wash clean and allow to dry. Sand old paint to a mat finish and vacuum clean to remove all dust.

Finishing coats: Apply two coats as for new work above.

Previously painted concrete and cement surfaces, in poor condition:

Strip completely by suitable means and treat as for new work above.

(j) Cement plaster or facebrick walls and concrete surfaces where damp penetration is evident

(i) Renovation

Exterior and interior

Preparation: Remove all damaged paintwork, efflorescence, loose friable material, etc, back to bare and sound substrate. Repair all damaged surfaces with suitable approved materials to match original surface.

Surfaces may remain damp and in some cases will require additional wetting, depending on the particular coating used.

Damp sealing coats: Apply two coats approved synthetic polymer modified water barrier coating in strict accordance with the particular product manufacturer's specifications. Allow 24 hours between coats unless otherwise specified.

Finishing coats: Apply decorative finishing coats to suit, as in BJ 03.01.03(e).

BJ 04 DETAIL OF REPAIR WORK

The detail of the scope of work is described in the Schedule of Quantities.

BJ 05 MAINTENANCE

No maintenance will be required for paintwork under this contract.

BJ 06 MEASUREMENT AND PAYMENT

BJ 06.01 MEASUREMENT AND RATES

BJ 06.01.01 General inclusion of costs and specific specifications

Notes:

All material scheduled to be removed shall be deemed to be existing damaged material. All such redundant material shall become the property of the Contractor and must be removed from site immediately.

All new material shall be deemed to be in patchwork and shall be of approved equal quality, colours, profiles, thickness, etc and shall in all cases match the existing materials and shall be applied (internally or externally) to existing material or surfaces.

All removal and repair work shall be done carefully as to not damage any adjacent or other material or work. Any damage to other or adjacent materials or areas caused by the negligence of the Contractor shall be repaired by him free of charge.

All work scheduled to be removed or taken out shall be deemed to include the cleaning and preparation of the remaining sections, areas, or work to receive the new material or work specified.

Repair work shall also include all cutting, grinding, cutting into, welding, bending, strengthening, drilling, etc to repair or to improve the items or areas as new and to match the existing.

Work scheduled to be realigned and refixed shall be deemed to include all necessary new additional materials, brackets, connector plates, bolts, pip rivets, nails, screws, spacer blocks, clamps, timber, and labour, etc to leave the items as new and totally functional.

All new work are measured net and shall include all cutting, lapping, waste, bending, fixing, corners, mitres, fixing screws, pip rivets, nails, adhesive, grout, putty, etc, as well as cleaning and preparation of surfaces not already prepared as part of removed items, etc.

All paintwork shall include for surface preparation, cleaning, primer(s), undercoat(s) and final coat(s) as specified by the manufacturers and in the Technical Specifications. Scheduled items in the Schedule of Quantities are mainly brief descriptions of the final coat(s) to identify the paint system as specified in the Specifications.

Most steel surfaces such as gratings, screens, gates, doors, mesh, louvres, burglar proofing, windows, etc are measured both sides on the net flat overall area of the item. Paint to roof covering and side cladding, etc are measured wet on the flat overall area of the items and not along the girth of the sheeting. All final re-measurements for payment purposes will be done on the same principles.

Rates tendered for paintwork shall be deemed to include for all "line cutting" between different colours of paint specified by the Engineer in dados, skirtings, etc.

Rates tendered for paintwork on ceilings and cornices shall be deemed to include for paint on cover and jointing strips.

Rates tendered for paintwork on ceilings, wall panelling, divisions, etc shall be deemed to include for timber door frames, jointing and cover strips, skirtings, cornices, quadrant beads, etc if painted with the same specified paint material and in the same colour schemes.

Where specified to be painted in contrasting colours, varnished or with a different paint material the paintwork on the door frames, skirtings, cornices, beads, cover strips, etc will be measured and paid for separately per linear metre.

Specific specification for floor paint

Preparation:

The concrete floor must have less than 3% moisture before painting is attempted. Remove laitance, residual cement spillage, etc by Carborandum grinding. Vacuum clean to remove all dust. Remove oil, grease, or any other surface contaminants with degreaser. Allow to dry thoroughly before painting.

Paint system:

Apply one coat of an alkali resistant solvent based stoep (modified alkyd) paint. The first coat may be thinned with approximately 25% mineral turpentine to aid penetration.

Apply one finishing coat of an alkali resistant solvent based stoep (modified alkyd) paint.

Protection of existing furniture, carpets, finishings, cupboards, etc during paint procedures

Protection, sheets and screens:

All existing finishings, carpets, floors, furniture, etc shall be carefully handled, moved when instructed within the specific room, building or area to be painted, covered with sheets, screens or other approved methods to protect the items or finishings against damage or spilled paint spots or stains. Any damage caused to the mentioned existing items shall be rectified or replaced by the Contractor without additional payment.

The costs of sheets, covers, screens and all labour to address the above shall be deemed to be included in the tendered rates for the individual payment items or in the general preliminary cost items. No claims by the Contractor in this regard will be entertained.

BJ 06.02 SCHEDULED ITEMS

NEW UNPAINTED SURFACES:

BJ.01 Paint to new unpainted surfaces:

(a) Description of surface:

(i) Brief description of final paint type:

(a) Description of application area or item to be painted ..... Unit: m^2, m, number

(b) Etc, for other areas or items

The unit of measurement shall be the number, metre or square metre as applicable to each item.

The tendered rates shall include full compensation for manufacturing, providing and applying each item complete as per specifications, drawings, descriptions as scheduled or as the existing and shall include for all labour, material, preparation work, waste, plant, transport, delivery, access, scaffolding, fuel, miscellaneous items and material, etc to the Engineer's approval.

PREVIOUSLY PAINTED SURFACES:

BJ.02 Paint to previously painted surfaces:

(a) Description of surface:

(i) Brief description of final paint type:

(a) Description of application area or item to be painted ..... Unit: m^2, m, number

(b) Etc, for other areas or items

The unit of measurement shall be the number, metre or square metre as applicable to each item.

The tendered rates shall include full compensation for manufacturing, providing and applying each item complete as per specifications, drawings, descriptions as scheduled or as the existing and shall include for all labour, material, preparation work, waste, plant, transport, delivery, access, scaffolding, fuel, miscellaneous items and material, etc to the Engineer's approval.

PREVIOUSLY PAINTED SURFACES IN POOR CONDITION:

BJ.03 **Paint to previously painted surfaces in poor condition:**

(a) Description of surface:

(i) Brief description of final paint type:

(a) Description of application area or item to be painted ..... Unit: m^2, m, number

(b) Etc, for other areas or items

The unit of measurement shall be the number, metre or square metre as applicable to each item.

The tendered rates shall include full compensation for manufacturing, providing and applying each item complete as per specifications, drawings, descriptions as scheduled or as the existing and shall include for all labour, material, preparation work, waste, plant, transport, delivery, access, scaffolding, fuel, miscellaneous items and material, etc to the Engineer's approval.

PREVIOUSLY PAINTED SURFACES TO REMOVE ALL PREVIOUS PAINT TO ORIGINAL SURFACE:

BJ.04 **Paint to previously painted surfaces to remove all previous paint to original surface**

(a) Description of surface:

(i) Brief description of final paint type:

(a) Description of application area or item to be painted ..... Unit: m^2, m, number

(c) Etc, for other areas or items

The unit of measurement shall be the number, metre or square metre as applicable to each item.

The tendered rates shall include full compensation for manufacturing, providing and applying each item complete as per specifications, drawings, descriptions as scheduled or as the existing and shall include for all labour, material, preparation work, waste, plant, transport, delivery, access, scaffolding, fuel, miscellaneous items and material, etc to the Engineer's approval.

TECHNICAL SPECIFICATION FOR CONCRETE CONSTRUCTION

BK STRUCTURAL CONCRETE

BK 01 SCOPE
BK 02 STANDARD SPECIFICATIONS
BK 03 PROJECT SPECIFICATION
BK 04 DETAIL OF REPAIR WORK
BK 05 EXTERNAL BONDING OF CARBON FIBRE
BK 06 MEASUREMENT AND PAYMENT

BK 01 SCOPE

This specification covers the repair of existing structural concrete elements and the supply, delivery and implementation of the repair procedures for the various types of structures.

Structural concrete shall mean the scope of work to repair all structural concrete components such as walls, columns, stairs and suspended slabs and floors. Joint repairs also form part of this specification. This specification does not include work related to metalwork and paintwork that are specified elsewhere.

BK 02 GENERAL STANDARD SPECIFICATIONS

The latest edition, including all amendments up to date of tender of the following specifications, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof:

SANS 1200 G	-	Concrete (structural)
SANS 1200 GA	-	Concrete (small works)
SANS 1200 GB	-	Concrete (ordinary buildings)
SANS 1200 GE	-	Precast concrete (structural)
SANS 1200 GF	-	Prestressed concrete
SANS 0100	-	Structural use of concrete
SANS 110	-	Sealing compounds for the building industry, two-component, polysulphide base
SANS 1077	-	Sealing compound for the building and construction industry, two-component, polyurethane-base
SANS 1254	-	Sealing compounds for the building industry, oleo-resinous base, for interior and exterior use
SANS 1305	-	Sealing compounds for the building industry, one-component, siliconed-rubber-base

BK 02.01 OCCUPATIONAL HEALTH AND SAFETY

The Contractor shall be required to comply with the Occupational Health and Safety Act 85 of 1993, Construction Regulations 2014 and related regulations. Non-compliance with these regulations, in any way whatsoever, will be adequate reason for suspending the Works.

BK 03 PROJECT SPECIFICATION

This Project Specification takes precedence over the Standard Specification, except in the case where an aspect is not covered by the Project Specification, in which case the Standard Specification will apply.

BK 03.01 CONCRETE MATERIALS

SANS standards: All concrete materials shall comply with the relevant SANS standards.

BK 03.01.01 Concrete mix designs

All mix designs for 20MPa and higher grades of concrete shall be tabled and approved by the Engineer in writing, before these mix designs may be used. Each mix design shall clearly state the type, origin and quantity per cubic metre of concrete for each constituent material. The mix

design and constituent materials shall be such so as to produce **low shrinkage, crack-free concrete**.

BK 03.01.02 Cement types

Only cements of type CEM I and CEM IIA as per SANS 50197-1 may be used. In addition, only cements of strength class 42,5MPa and higher may be used. Cement shall not be stored for more than 4 weeks before it is used.

BK 03.01.03 Cement extenders

Cement extenders such as fly-ash and slag may not be used in conjunction with CEM IIA. Should the Contractor wish to use cement extenders with CEM I, then he shall obtain the Engineer's prior approval.

BK 03.01.04 Minimum cement content

The minimum cement content of CEM I or CEM IIA cements are: 280 kg/m^3 for 25MPa, 300 kg/m^3 for exposed 25MPa, 310 kg/m^3 for 30MPa and 330 kg/m^3 for 35MPa concrete.

BK 03.01.05 Water

The maximum water / cement ratio is as follows: 0,67 for 25MPa, 0,60 for 30MPa and 0,53 for 35MPa concrete. Admixtures such as water-reducing agents or plasticizers may be used, but then only strictly according to the manufacturer's instructions.

BK 03.01.06 Aggregates

The coarse aggregate (stone) shall be 19mm natural stone unless otherwise specified. The total mass of coarse aggregate (stone) shall exceed the total mass of fine aggregate (sand) per cubic metre of concrete. Aggregates used in concrete for sewage treatment works, channels and tunnels shall be dolomitic aggregate. A non-dolomitic filler sand may be used.

BK 03.02 REINFORCING STEEL MATERIALS

SANS standards: All reinforcing steel shall comply with the relevant SANS standards.

BK 03.02.01 Steel types

Mild steel (R-steel) shall not be replaced by high tensile steel (Y-steel).

BK 03.02.02 Steel bar dimensions

Steel bars shall be cut and bent strictly to the dimensions and radii stipulated on the project's bending schedules.

BK 03.03 FORMWORK CONSTRUCTION

BK 03.03.01 Formwork design

a) All formwork shall be designed by a competent person or a competent company, and the requirements for continuous propping and / or multi-level propping shall be calculated to a theoretical model acceptable to the Engineer. Design loads will be supplied by the Engineer on request. The Contractor shall make provision for the continued support of slabs and beams while the formwork pans / panels are being removed. No back-propping is allowed.

b) Wall formwork ferrules: The lay-out and positioning of ferrules shall be approved by the Architect / Engineer. In the case of water-retaining structures ferrules shall be of a type which does not leave holes through the walls.

c) Formwork quality: All formwork shall be sturdy, leak-proof and lightly oiled.

d) Formwork finish: All formwork finishes shall be at least of class SMOOTH to Degree of Accuracy II, or class SPECIAL to Degree of Accuracy I when so specified on the concrete drawings. Top surfaces of wood- and steel-trowelled concrete floors are to be class SPECIAL.

e) Upward cambers: All beams, bands and slabs shall have the following upward cambers, unless otherwise indicated on the concrete drawings: Cantilever spans: span ÷ 200 and other spans: span ÷ 500.

f) Construction joints: Positions of construction joints in beams and slabs shall be discussed with, and approved by the Engineer, and shall be formed using planks or well-supported chicken wire.

g) Cast-in items: The Contractor shall ensure that all cast-in items, eg conduits, sleeves, pockets, etc, of all the various building disciplines are accurately placed and secured before concrete is cast.

BK 03.03.02 Removal of formwork

Formwork and props may only be removed after "n" 24h days:

Walls and columns:	2 (hot / normal)	3 (cold)
Slabs with props left underneath:	4	7
Beams with props left underneath:	7	12
Slab props:	10	17
Beam props:	14	21

BK 03.04 REINFORCING STEEL FIXING

a) Steel shall be fixed using the specific project's fixing plans and bending schedules.

b) Steel must be inspected and approved in writing by the Engineer before concrete may be cast. The Contractor shall give the Engineer at least 2 day's notice of inspections.

c) Steel must be properly fixed in position, and purpose-made plastic or concrete spacer blocks must be in position before inspections.

d) The concrete cover to reinforcing bars shall be as specified on the plans and schedules, but under no circumstances shall the cover be less than: 20mm for plastered and internal slabs and beams; 30mm for exposed concrete surfaces and concrete columns; 40mm in the case of water-retaining structures; 75mm for concrete cast against soil.

e) No welding of reinforcing steel bars is allowed.

BK 03.04 CONCRETE CONSTRUCTION

a) Concrete shall be discharged in the position needed and not moved sideways with vibrators.

b) Concrete shall be properly vibrated using an adequate number of mechanical vibrators.

c) Concrete may only be cast when the ambient temperature is between 5ºC and above 32ºC. No concrete may be cast during rain and hail, or shortly before a rain storm.

d) All concrete elements shall be cured with either, tight wrapping with plastic, a 50mm layer of wet sand or covered with wet underfelt and polythene sheeting, whichever appropriate, for the following durations: 5 days when hot / normal and 7 days when cold.

e) Other curing methods must be approved, subject to approval by the Engineer.

BK 03.05 CONSTRUCTION TOLERANCES

a) All concrete shall at least be constructed to Degree of Accuracy II (SMOOTH finish), and Degree of Accuracy I (SPECIAL finish) when so specified on the concrete drawings, as well as in the case of precast concrete elements.

b) Each permissible deviation is binding in itself, no cumulative effect will be allowed.

c) Permissible deviation (PD) of dimensions. Some selected values are:

PD:	DoA II:	DoA I:
Cross-section dimensions	-5 / +15 mm	-5 / +5 mm
Flatness of a plane surface	5 mm	3 mm
Abrupt change in continuous surface	5 mm	2 mm
Linear dimension (not cross-sections)	-20 / +20 mm	-10 / +10 mm
Verticality (per metre height)	5 mm	2 mm
Wood- / steel-trowelled top surfaces	-3 / + 3 mm	-3 / +3 mm

BK 03.06 CONCRETE TESTING

a) A set of concrete test cubes shall be made for every 50m^3 of concrete produced, and at least one set of each day's concrete produced. Cubes shall be made strictly according to the SABS prescribed method, and shall be cured and tested by an independent laboratory.

b) A set of test cubes comprises 6 cubes, 3 to be tested on 7 days, and 3 on 28 days.

c) When ready-mixed concrete is used, the Contractor must still make cubes on site. Process cube results from a ready-mix plant are not acceptable.

d) A set of 3 cubes tested at 28 days passes when the average strength is at least 2MPa higher than the specified strength, and when no single cube tests lower than 3MPa below the specified strength.

BK 03.07 CONCRETE SCREEDS

(a) General

Concrete screeds shall have a minimum thickness of at least 50 mm. The Engineer shall determine the areas of which the concrete screeds need to be replaced.
Only cements of type CEM I and CEM IIA as per SANS 50197-1 may be used. In addition, only cements of strength class 42,5MPa and higher may be used. Cement shall not be stored for more than 4 weeks before it is used.

Coarse aggregate maximum size:	10 mm
28-day cube strength:	30 MPa OR 35 MPa. (as specified)

The use of an approved plasticizer is recommended to reduce the water content of the mix to the absolute workable minimum.

The mix design must be submitted to the Engineer in advance for approval.

Refer to BK 02.06 for the testing requirements of concrete.

(b) Preparation

All laitance on the surface of the slabs must be removed, using mechanical equipment such as scabblers, so as to expose the coarse aggregate of the concrete.

Before commencement of the screed, remove all loose material and dust, and keep the slabs thoroughly wet for eight hours, before placement of the screed.

(c) Placement of the screed

Remove all surface water from the slab. Apply a grout to the slab surface, which consists of a 1:1 mix of cement and clean fine sand, with just enough water to provide the consistency of a slurry. Vigorously brush the grout into the scabbled surface of the slabs using brooms. Strike off all surplus grout, leaving a thin layer of grout.

Place the screed concrete in one layer, in a checker board pattern, while the grout layer is still visibly wet. Compact the concrete very well using small mechanical vibrators.

(d) Finishing

The surface finish shall be SPECIAL as per SABS 1200G attained by steel trowelling.

Power floating should not commence until such time as the concrete surface, has lost its sheen and barely shows footprints.

All laitance on the surface of the fresh concrete screed resulting from the compaction of concrete, must be struck off prior to mechanical trowelling. Over-trowelling, causing excessive cement-water paste to come to the surface, must be strictly avoided.

(e) Joints

The screed shall have construction joints and expansion joints, in all the exact same positions as the underlying concrete slab.

In addition the screed shall be divided into panels of no larger than 3 x 3m. The length to width ratio of these panels shall not exceed 1.5.

All joints shall be formed with side formwork. An expansion joint former specifically developed for the intended applications must be used as specified by the Engineer.

Joints must be sealed with an approved 1-part polyurethane joint sealer for the intended purpose according to the Engineer's specification.

(f) Curing

Curing of the screed concrete shall commence directly after the finishing operation stops, and shall continue for 7 days. The method of curing shall be by means of well held down plastic sheeting and with the daily adding of water.

BK 03.08 MOVEMENT JOINTS

BK 03.08.01 Joint Former

Ensure all concrete surfaces are free from base grit and dust. Apply glue in vertical strips ± 100 mm wide and 25 mm from the top to avoid the tear-off strip from sticking to the concrete face.

Allow the glue to dry (according to manufacturer's instructions) and then stick the joint former onto the glued concrete face.

Cast the next section of concrete as required. Take care not to let the wet concrete get behind joint former as this will result in a wavy joint.

When the joint sealant is about to be applied, simply peel the tear-off strip out of the formed joint, leaving an even groove of uniform depth for filling with sealant.

BK 03.08.02 Joint Sealant

Joints < 10 mm are normally designed for crack control and therefore they are not movement / expansion joints. The joint width to depth ratio is important at the time of the application of the sealant (guide value of +10°C).

BK 03.08.03 Application Method /Tools

After suitable joint and substrate preparation, insert Backing Rod to required depth and apply primer if necessary. Insert cartridge into sealant gun and firmly extrude joint sealant into joint, making sure that it is full contact with the side of the joint. Fill the joint, avoiding air entrapment. The joint sealant must be tooled firmly against joint sides to ensure good adhesion.

Masking tape must be used where sharp exact joint lines or exceptionally neat lines are required. Remove the tape whilst the sealant is still soft. Sleek joint with smoothing liquid for a perfect sealant surface.

BK 03.09 REQUIREMENTS FOR REPAIR OF STRUCTURAL CONCRETE

BK 03.09.01 Concrete repair

All existing structural concrete to be inspected to determine the extent of damage and repair work required. All remedial concrete work to be classified into the following categories by the Engineer's representative:

- Surface concrete repair

  Cosmetic repair of concrete surfaces where no reinforcing is exposed, where cover to reinforcement is not a problem (non-aggressive environment) and for non-structural repairs.

- Mild to moderate concrete repair

  When the reinforcing is exposed and the extent thereof is small compared to the size of the element under consideration.

- Severe concrete repair

  Where the front of the reinforcing is exposed in large areas or reinforcing is exposed totally. Generally when the defective areas have adverse structural implications.

The above categories do not apply to off-shutter concrete, which will be treated on merit.

Any structural concrete elements that are damaged to such an extent that they cannot be classified under severe concrete repair, will be treated on merit. Detailed instructions will be issued during repair for the rehabilitation of such structural concrete elements.

BK 03.09.02 Surface concrete repair procedure

The following procedure, or similar approved by the Engineer's representative to be used:

- Remove all loose and defective material and clean around affected area to expose aggregate.

- Saw-cut 10 mm vertically around edges of repair area and break out concrete within to avoid tapered feathering.

- Wet area well, approximately 30 minutes before commencement of repair.

- Apply an approved shrinkage compensated pre-mixed ready to use single-component polymer modified, cementitious repair mortar in strict accordance with the manufacturer's specifications.

- The repaired surface to be cured by covering with plastic sheeting and keeping wet for 48 hours or as otherwise specified.

BK 03.09.03 Mild to moderate concrete repair procedure

The following procedure, or similar approved by the Engineer/Department's representative to be used:

- Remove all loose and defective material and break out to a minimum depth of 10 mm.

- Saw-cut 10 mm vertically around edges of repair area and break out concrete within, to avoid tapered feathering.

- Ensure that concrete is free from laitance, oil, grease, etc, and is sound, firm and clean.

- Exposed reinforcing to be wire brushed clean and free of all rust and then coated with an approved single component epoxy zinc primer.

- The concrete to be thoroughly wetted and kept wet for a minimum of 12 hours before applying remedial product, loose standing water to be removed prior to application of repair mortar.

- Apply an approved shrinkage compensated pre-mixed ready to use single-component polymer modified, cementitious repair mortar in strict accordance with the manufacturer's specifications.

- The repaired surface to be cured by covering with plastic sheeting and keeping wet for 48 hours or as otherwise specified.

BK 03.09.04 **Severe concrete repair procedure**

The following procedure or similar approved by the Engineer's representative to be used:

- Propping of structure may be necessary during repair period.

- Chop around defective area removing all loose and suspect material taking care not to damage the existing reinforcing.

- Exposed reinforcing to be wire brushed clean and free of all rust and then coated with an approved single component epoxy zinc primer.

- The damaged area to be chopped rectangular in shape to expose the sound aggregate, and feathered edges to be saw-cut vertically and broken out to a minimum depth of 10 mm.

- Ensure that the cavity is clean, dry and free of any debris.

- Apply an approved epoxy resin repair compound strictly in accordance with the manufacturer's specifications.

- Apply an approved shrinkage compensated pre-mixed ready to use single-component polymer modified, cementitious repair mortar in strict accordance with the manufacturer's specifications.

BK 03.10. **EXPANSION JOINT REMEDIAL PROCEDURE**

The following procedure to be used for remedial work to expansion joints.

- Remove all damaged sealant from expansion joint.

- Joint former/filler must be removed.

- Remove all loose materials mechanically to ensure a sound, clean and dry concrete surface.

- Where required, the sides of the concrete joint to be cut smooth and straight with an angle grinder or diamond saw.

- Where required, the edges of the expansion joints to be provided with a fillet. Engineer/Department's representative to determine on site.
- Install a non-bituminous, non-extruding resilient joint filler where existing joint former/filler was removed.

- Install a closed cell resilient foam cord or release film or bond breaking tape before applying sealant.

- A primer coat to be applied to all surfaces, brushed well into the faces of the joint.

- Install a single component fast curing polyurethane joint sealer strictly according to the manufacturers specifications.

- All materials to be submitted to the Engineer/Department's representative for approval prior to installation.

BK 03.11. CONCRETE CRACKS

All existing concrete to be inspected to determine the extent and damage due to cracking of concrete. The cause of cracking is to be established to determine the correct remedial action to be taken. The Engineer's representative will determine the extent of repair work required, which will in most cases, require individual specifications to suit.

BK 03.11.01 Concrete crack repair procedure

(Generally used where cracking could adversely affect the structure)

The following procedure, or similar approved by the Engineer's representative to be used:

- The surface over the entire length of the crack should be wire brushed to remove laitance or any other deleterious materials from the concrete.
- If the surface of the concrete is unsound, chase/grind a vee cut into the crack.
- All debris to be removed.
- Drill holes into the crack. The size, depth and centres etc. as specified for the crack injection product to be used. Blow out holes free of drill dust.
- Install injection nipples into the holes as specified. Allow for air release holes.
- Seal the face/s with an approved epoxy.
- Pump in approved epoxy liquid to suit crack size/width.
- The above repair system to be done strictly in accordance with the manufacturers specifications and requirements and must be carried out by approved specialists or suitably trained persons.

BK 03.11.02 Concrete crack repair procedure
(Generally used for small cracks and where cracking could cause leaking thought the concrete)

The following procedure, or similar approved by the Engineer/Department's representative to be used:

- The surface over the entire length of the crack should be wire brushed to remove laitance or any other deleterious materials from the concrete.
- If the surface of the concrete is unsound, chase/grind a vee cut into the crack.
- All debris to be removed.
- Inject in an approved polyurethane 1-part joint sealant to suit crack size/width. The width of the crack must be 1.25 times the depth of the crack or in accordance with the manufacturer’s specification.
- The above repair system to be done strictly in accordance with the manufacturers specifications and requirements and must be carried out by approved specialists or suitably trained persons.

BK 03.12. SPALLED CONCRETE REPAIR

BK 03.12.01 Clean area

- The area to be repaired should first be cleaned to remove any bond breaker agents present. Pressure washing might be necessary to properly clean the area.

BK 03.12.02 Remove loose concrete

- Any loose or broken concrete must be removed. Grinding or shot blasting maybe required for proper surface preparation.
- The area surrounding the spalled concrete should also be checked for possible deterioration by tapping.
- Dust and debris should also be removed from this area.

BK 03.12.03 Clean and coat rebar

- Corrosion should be cleaned from rebar and a protective coating should be applied to avoid further corrosion.
- Any rebar in the immediate vicinity should also be checked for corrosion.

BK 03.12.04 Apply repair material

- If spalling is shallow enough it may only require a surface repair. However, for deep repair a durable and robust Sika product or admixture may be required. Steel reinforcing or dowels may be required to provide the full restoration.
- The area should also be roughened, and a suitable admixture applied.
- Once completely set a waterproofing agent or paint may need to be applied to prevent the re-occurrence of spalling.

BK 03.13. APPLICATION OF WATERPROOF COATINGS TO CONCRETE AND MASONRY SURFACES

The following procedure applies to section of concrete element or masonry walls requiring application of a waterproofing coating.

- Remove all loose and damaged concrete / masonry from the surface to receive the coating.
- Undertake any concrete / masonry repairs required on the element, as per the requirements of BK 03.09. Allow repairs to cure completely prior to commencing coating procedures.
- Remove all laitance and surface contaminants from the surface to be repaired using mechanical methods (Wire brushing or similar).
- Prepare and apply the specified coating in strict accordance with the manufacturer's specifications.
- Cure as recommended in the manufacturer's specifications.

BK 04 DETAIL OF REPAIR WORK

The Schedule of Quantities shows approximate quantities of work. Detailed instructions will be issued during construction.

BK 05 EXTERNAL BONDING OF CARBON FIBRE

BK 05.01. MATERIALS

BK 05.01.01 Adhesive

The adhesive shall be a cured epoxy resin complying with EN1504-4. The adhesive shall be a thixotropic paste, specifically designed as part of a compatible load transferring bonded system. The adhesive shall be a solvent-free, two-part epoxy. The epoxy shall have high resistance to moisture and low creep values under sustained loads.

The adhesive components shall be supplied in liquid form and in separate sealed containers. Each component shall have a different identifiable colour, which results in a distinctive homogenous colour when thoroughly mixed.

The adhesive shall mix readily to a smooth paste-like (thixotropic) consistency and it shall be suitable for spreading on surfaces ranging from horizontal to vertical and on inverted overhead surfaces.

The mixed adhesive shall be free of lumps and the components shall not separate or settle out during the workable life of the adhesive.

The toxicity of the chemicals in the components shall be low enough to enable safe usage on the construction site and in a normal workshop environment. If special ventilation is necessary, such requirements shall be clearly stated on the containers.

The adhesive shall be suitable for application to prepared steel, carbon fibre and concrete surfaces in a layer thickness of between 1,0 mm and 20 mm.

The bond stress to concrete surfaces shall exceed 3,5 MPa with failure through the concrete. Workable life shall not be less than 20 minutes at temperatures up to 20°C.

The storage life (shelf life) in the original sealed containers of both the resin and hardener shall not be less than 6 months at temperatures between 5° and 25°C.

The adhesives shall be capable of curing to the required strength at temperatures between 10°C and 30°C in relative humidities of up to 95 %. The adhesive shall cure sufficiently within three days to confer the specified mechanical properties at 20°C and shall undergo a negligible shrinkage on curing (maximum linear shrinkage of 0,1 %).

The adhesive shall be formulated to minimize moisture transport through the adhesive itself. Water absorption shall not exceed 2 % by mass after immersion for 24 hours in distilled water at 20°C.

BK 05.01.02. Carbon Fibre Plate

The carbon fibre Plate shall have the following properties:

- A volumetric fibre fraction of no less than 70 %
- A modulus of elasticity for design of no less than 205 GPa
- An ultimate tensile strength of no less than 2400 MPa
- A tensile strength at 0,8% elongation of no less than 1600 kN
- Manufactured to an ISO quality standard

BK 05.02. EXECUTION OF THE WORKS

BK 05.02.01 Preparation of concrete surfaces

The outline positions of the steel or carbon fibre plates shall be clearly marked on the receiving concrete surface. For beams narrower than 450mm, the entire beam soffit is to receive the preparation treatment.

Any cracks wider than 0,3 mm shall be pressure injected using a low viscosity epoxy resin system in accordance with the procedures specified in Section BK 03.11.

The marked concrete areas to be plated shall be wire brushed to remove all concrete laitance, surface coatings and impregnants, organic growth, bituminous residues, oil, dirt and any other surface contamination. The surface shall be sound and shall exhibit the coarse sand and aggregate texture to present a rough key to the adhesive.

The prepared surface profile shall be checked using a 1,0 m long profile edge and any areas deviating by more than 4,0 mm from the profile edge shall be marked.
Any high areas shall be removed with light scabbling or grinding equipment and low areas can be filled with the adhesive to be used for the plate bonding. Normal preparation shall not remove more than 1,0 mm of the concrete surface.

The Engineer will inspect the prepared surface to identify areas that are defective or substandard which may require additional preparation or remedial work. Repairs shall not weaken the load transfer to the concrete.

BK 05.02.02 Application of adhesive to bond surfaces

Immediately before the application of the adhesive to the prepared concrete surface, the receiving surface shall be vacuum-cleaned to remove all dust, debris, etc.

The mixed adhesive shall be trowelled onto the receiving concrete surface using plastering techniques. The adhesive shall be well worked into the grit-blasted surface to a layer thickness of approximately 2,0 mm. Skilled operators are essential due to the speed and care demanded by this phase of the work.

The adhesive shall be applied to the steel or carbon fibre bonding plates preferably with a specially profiled trowel to ensure a uniform thickness and profile across the plate width. The profile shall be such that when the plate is pushed into contact with the concrete surface the adhesive is squeezed out towards the free edges to reduce the risk of air entrapment. The minimum thickness of adhesive applied to the plate shall be 1,0 mm at the edges while the average thickness shall be 3,0 mm.

The actual thickness applied to the plate and concrete surface shall be carefully controlled to ensure that sufficient quantity is used to achieve the required final layer thickness with minimal wastage.

In order to ensure a uniform adhesive layer thickness, suitable 3,0 mm thick inert spacers may be placed along the plate at regular intervals suited to the plate stiffness.

For carbon fibre plates: Apply the carbon fibre plate and, using a roller, exert a constant pressure by moving the tool both ways in the direction of the fibres. The pressure applied shall be sufficient to just squeeze out the adhesive along the full plate perimeter. Care shall be taken to apply the pressure evenly without distortion of the plate.

Once the plate is in position, the edges must be neatly finished with a fillet of adhesive to protect the interface of the plate, the adhesive layer, the edge of the plate and the concrete against the ingress of moisture.

The support system shall be left undisturbed for a minimum period of 24 hours and the temperature variation shall be monitored during this period. Where low temperatures have resulted in insufficient strength gain, this period shall be extended.

BK 05.02.03 Finishing

Excess hardened adhesive shall be carefully ground away to the required surface profile. After installation, the entire beam (soffit and sides, where plaster has been removed) is to be replastered as follows.

- Any laitance on the beam is to be removed using wire brush techniques. All dust, loose material and other contaminants are to be removed and the surface pre-wetted using clean water. The surface shall not be allowed to dry before application of the bonding agent.
- Apply bonding agent as specified to the entire surface to be plastered. Application rates as specified by the manufacturer.
- Distribute clean sand on the tacky surface of the bonding agent in order to improve the mechanical bond between the beam and the plaster.
- Plaster and paint beam in accordance with the requirements of Project Specifications BD – Walls and BJ - Paintwork.

BK 06 MEASUREMENT AND PAYMENT

BK 06.01 MEASUREMENT AND RATES

BK 06.01.01 General inclusion of costs and specific specifications

Notes:

Where applicable, standard SANS 1200 measurement and payment items shall be used for Concrete (Structural) (1200 G).

All material scheduled to be removed shall be deemed to be existing damaged materials in small or large sections. All such redundant material shall become the property of the Contractor and must be removed from site immediately.

All new material shall be deemed to be in patchwork and shall be of approved equal quality, colours, profiles, thickness, etc and shall in all cases match the existing materials and shall be fixed (internally or externally) to existing material, frames or surfaces.

All replacement, removal and repair work shall be done carefully as to not damage any adjacent or other material or work. Any damage to other or adjacent materials or areas caused by the negligence of the Contractor shall be repaired by him free of charge.

All work scheduled to be replaced shall be deemed to include for the careful removal of the damaged existing material as a whole or partly, as specified, for the cleaning and preparation of the remaining surface(s), frames, etc as well as for the new material scheduled or specified to replace the damaged material.

All work scheduled to be removed, hacked off, or taken out shall be deemed to include the cleaning and preparation of the remaining surfaces, areas where material were removed, or remaining work to receive new material or work specified.

BK 06.02 SCHEDULED ITEMS

BK 06.02.01 Crack Injection

(a) Establishment on site for crack injection ..... Sum

The unit of measurement shall be the lump sum.

The tendered sum shall include full compensation for the establishment on site and the subsequent removal of all special plant and equipment required for the pressure injection of

epoxy resin into cracks and any additional plant, specialist access structures and work platforms required for the execution of the work.

The lump sum shall be paid as follows:

i. 75 % when all equipment is established on site and the first crack injection work has been satisfactorily completed according to the approved method statement, and
ii. 25 % after all crack injection work has been satisfactorily completed and the equipment is removed from site.

(b) Preparation of cracks for crack injection ..... m

The unit of measurement shall be the metre (m) of crack prepared for crack injection by pressure or gravity means.

The tendered rate shall include full compensation for all labour, materials, equipment and plant as well as for all work and incidentals required to prepare, clean and prime all surfaces, seal and cure the designated cracks (including for wastage), and install and operate injection ports, all in accordance with the project specification and the repair material manufacturer's instructions.

(c) Crack injection with epoxy resin (Details to be specified).....litres

The unit of measurement shall be the litre of adhesive used as approved by the Engineer. The volume shall be determined from the dimensions indicated on the drawings or as authorized by the Engineer following the detailed inspection if the prepared surfaces. Any overcut or excessive preparation resulting in additional adhesive quantities shall not be measured.

The tendered rate shall include full compensation for all labour, materials, equipment, plant and incidentals required for the supply, mixing and application of the adhesive to the prepared concrete surface. It shall also include the certification testing and quality assurance monitoring and testing by the Contractor, as well as any wastage of the mixed or spilled materials and the disposal thereof. The tendered rate shall also include all costs arising from any clean-up and finishing actions required due to spillage or poor workmanship.

(d) Site and core tests ..... Provisional Sum

The stated provisional sum for site and core testing shall be employed to cover the cost of specific tests to be carried out as ordered by the Engineer.

BK 06.02.02 **<u>External bonding of carbon fibre plates</u>**

(a) Establishment on site for carbon fibre strengthening.....Sum

The unit of measurement shall be the lump sum.

The tendered sum shall include full compensation for the establishment on site and the subsequent removal of all special plant and equipment required for the external bonding of carbon fibre plates and any additional plant, specialist access structures and work platforms required for the execution of the work.

(b) Preparation of concrete surfaces for plate bonding ..... m^2

The unit of measurement shall be the square metre of concrete surface prepared.

The tendered rate shall include full compensation for all labour, materials, plant and equipment required for the measurement, recording and working on the concrete member, the surface preparation of the concrete surface and cutting of slots if required.

(c) Adhesive (Type to be specified).....litre

The unit of measurement shall be the litre of adhesive used as approved by the Engineer. The volume shall be determined from the dimensions indicated on the detail drawings or as authorized by the Engineer following the detailed inspection of the prepared surfaces. Any

overcut or excessive preparation resulting in additional adhesive quantities shall not be measured.

The tendered rate shall include full compensation for all labour, material, equipment, etc., required for the supply, mixing and application of the adhesive to the prepared concrete and carbon fibre surfaces. It shall also include the certification testing and quality assurance monitoring and testing by the Contractor, as well as any wastage of mixed or spilled materials and the disposal thereof.

The rate shall also include all costs arising from any clean-up and finishing actions required due to spillage or poor workmanship. The tendered rate shall include full compensation for all labour, materials, plant and equipment required for the measurement, recording and working on the concrete member, the surface preparation of the concrete surface.

(d) Plates (Type to be specified)..... m

The unit of measurement shall be the metre of carbon fibre plates bonded to the concrete member.

The tendered rate shall include full compensation for all labour, materials, plant, equipment etc., required for the fabrication and supply of the carbon fibre plates on site, the placing and fixing of the carbon fibre plates into position including all ties, fasteners, waste, etc. complete as per details on the drawings.

It shall also include all costs arising from the surface preparation, carbon fibre bonding surface, as well as temporary support required during installation.

(e) Apply bonding agent (Type to be specified) to (member to be specified) ..... m^2

The unit of measurement shall be the lump sum.

The unit of measurement shall be the square metre of surface area covered by the bonding agent measured in place.

The tendered rate shall include full compensation for all labour, materials, plant and equipment required to prepare the surfaces and to supply and apply the bonding agent to the required film thickness.

BK 06.02.03 **<u>Spall Repairs</u>**

(a) Preparation for and repair of spalled and damaged concrete using cementitious repair mortar

(i) Mortar type to be specified.....litre

The unit of measurement shall be the litre of mortar measured in place, of specified class, used for the repair of specified concrete defects..

The tendered rate shall include full compensation for all labour, materials, equipment and plant as well as for all work and incidentals required to break out, prepare, prime all surfaces, apply repair mortars and cure the designated areas (include for wastage) all in accordance with the project specification and the repair material manufacture’s procedures, methods and specifications.

In addition, the tendered rates shall make full provision for all efforts to remove existing concrete behind the reinforcement with inadequate cover, and to force the reinforcement deeper into the existing member. The tendered rates shall cover all the cleaning and preparation of all surfaces in accordance with the supplier specifications, inclusive of the cleaning and treatment of existing reinforcement steel.

BK 06.02.04 Application of waterproofing to concrete and masonry elements

(a) Preparation for and application of waterproofing coating

(i) Coating type to be specified..... m^2

The unit of measurement shall be the square metre of coating measured in place, of specified type, used for the coating of concrete and masonry surfaces.

The tendered rate shall include full compensation for all labour, materials, equipment and plant as well as for all work and incidentals required to prepare all surfaces, apply coatings and cure the designated areas (include for wastage) all in accordance with the project specification and the repair material manufacture's procedures, methods and specifications.

TECHNICAL SPECIFICATION

CC FENCING AND GATES

CONTENTS

CC 01 SCOPE
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CC 01 SCOPE

This specification covers the repair and maintenance of fencing and gates.

This specification shall form an integral part of the maintenance contract document and shall be read in conjunction with portion 3: Additional Specifications included in this document.

Where a particular specification has been included in the documents to supplement Technical Specification CC: Fencing and gates, this technical specification shall act as a guideline to the Particular Specification and, in the event of any discrepancies between the Technical Specification and the Particular Specification, the latter shall take precedence. The Contractor shall at all times adhere to this technical specification, unless otherwise specified in the applicable Particular Specification.

CC 02 STANDARD SPECIFICATIONS

CC 02.01 GENERAL STANDARD SPECIFICATIONS, REGULATIONS AND CODES

The latest edition, including all amendments up to date of tender, of the following specifications, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof:

SANS 935	-	Hot-dip (galvanised) zink coatings (other than on continuously zinc-coated sheet and wire) (1988)
SANS 675	-	Zinc-coated fencing wires (plain and barbed) (1993)
SANS 1373	-	Chain-link fencing and its wire accessories (1983)

CC 02.02 OCCUPATIONAL HEALTH AND SAFETY

The Contractor shall be required to comply with the Occupational Health and Safety Act 85 of 1993, Construction Regulations 2014 and related regulations. Non-compliance with these regulations, in any way whatsoever, will be adequate reason for suspending the Works.

CC 02.03 MANUFACTURERS' SPECIFICATIONS, CODES OF PRACTICE AND INSTALLATION INSTRUCTIONS

All equipment and materials shall be installed, serviced and repaired strictly in accordance with the manufacturers' specifications, instructions and codes of practice.

CC 02.04 MUNICIPAL REGULATIONS, LAWS AND BY-LAWS

All municipal regulations laws, by-laws and special requirements of the Local Authority shall be adhered to unless otherwise specified.

CC 03 OPERATING AND MAINTENANCE MANUALS

No operating and maintenance manuals will be developed for this section.

The Contractor shall use the Maintenance Control Plan (see SA Maintenance) to schedule routine preventative maintenance activities.

CC 04 EXECUTION OF WORK

The Contractor shall investigate and inspect all areas of the installation to confirm the extent of the repair work required and shall report to the Engineer. The Engineer will thereafter demarcate any areas to be repaired and shall instruct the Contractor with regard to the repair work to be done.

Any fencing work identified either by the Contractor or during inspection by the Engineer shall be carried out on the instruction of the Engineer.

The Contractor shall ensure that the necessary materials, skilled personnel, tools and equipment are available at all times to maintain the fences in a state of good repair.

The Engineer shall indicate where existing fences are to be moved to new locations, where new fences are to be erected, or where other repairs are necessary.

Whenever a part of the fence is taken down to repair/replace it, it will be replaced on the same day it has been taken down.

Unless otherwise instructed by the Engineer, similar type fencing material to that in the existing fence line shall be used where fences are to be repaired.

CC 04.01 SCOPE OF WORK

The scope of work has been divided into the following sections:

(a) Perimeter fences at the various sites;
(b) Residential fences of the residential areas, and
(c) Other internal fences at the various sites..

CC 04.02 CLEARING THE FENCE ROUTE

The fence route shall be cleared over a width of at least 0,5 m on each side of the centre line of the fence and surface irregularities shall be levelled so that the fence will follow the general contour of the ground.

The bottom of the fence shall be located at a uniform distance above the ground line, but no more than 50 mm.

CC 04.03 INSTALLATION OF POSTS AND STANDARDS

Posts shall be accurately set in holes and be provided with concrete bases to the dimensions specified.

Holes shall be dug to their full specified depth.

Posts shall be firmly planted into the ground at the same spacing as the existing posts or as instructed by the Engineer. The spacing of posts between any two straining posts shall be uniform.

CC 04.04 ERECTING FENCE WIRES

All fencing wire shall be wired to the sides of posts in order to prevent the wires from being displaced or becoming loose. The wire shall be carefully strained and hung without sag, and with true alignment, care being exercised not to strain the wire so tightly that it will break or that end, corner, straining or gate posts will be pulled up.

Each strand of fencing wire shall be securely fastened in the correct position to each post with soft galvanised binding wire.

Splices in the fencing wire shall be permitted if made in the following manner using a splice tool. The end of each wire at the splice shall be carried at least 75 mm past the splice tool and wrapped snugly around the other wire for not less than six complete turns, the two separate wire ends being turned in opposite directions. After the splice tool is removed, the space left by it in the splice wire shall be closed by pulling the wire ends together. The unused ends of wire shall be cut close so as to leave a neat splice.

CC 04.05 ERECTING DIAMOND MESH OR WIRE NETTING

Wire netting or diamond mesh shall be stretched against the fence and properly secured to the fencing wire. The diamond mesh or wire netting shall be secured by means of soft binding wire at 1,2 m centres along the top and bottom wires and at 3 m centres along each of the other fencing wires unless otherwise specified.

CC 04.06 CLOSING OPENINGS UNDER FENCES

At ditches, drainage channels or other hollows where it is not possible to erect the fence so that it follows the general contour of the ground, the Contractor shall cover the openings with wire netting or diamond mesh fixed to the fence.

CC 04.07 EXISTING FENCES

Where a new fence joins an existing fence, whether in line or at an angle, the new fence shall be erected with a new straining post positioned at the terminal of the existing fence.

Existing fences that require to be taken down or moved to a new location shall be dismantled. Material not required for re-erection or declared unsuitable for re-use shall be neatly stacked at approved locations in accordance with the Engineer's instructions.

CC 04.08 GATES

Gates shall be hung on gate fittings in accordance with the requirements specified. The gates shall be so erected that they swing in a horizontal plane at right angles to the gateposts, clear of the ground in all positions.

Double swing gates shall not leave a gap of more than 25 mm between them when closed and other gates shall not be further than 25 mm from the gatepost when closed. The clearance below the gates shall not exceed 75 mm with the gates closed.

CC 04.09 REPAIRS TO FENCES

In the case of fences that require repairing, the Contractor shall use new material as may be required to re-erect the fence to the standard specified.

CC 04.10 ERECTING NEW FENCING MATERIAL

All new material used to replace old material shall be similar to the old material replaced unless new material is specified by the Engineer.

CC 05 QUALITY STANDARD

The completed fences shall be plumb, taut, true to line and ground contour, with all posts, standard and stays firmly set.

The Contractor shall, on completion of each section of fence, remove all cut-offs and other loose wire or netting so as not to create a hazard to grazing animals or a nuisance to the owners of the ground.

CC 06 MATERIALS

CC 06.01 POSTS

CC 06.01.01 Steel posts

New posts or posts that need to be replaced shall be of the same type and size as the existing posts. Tubular posts shall be galvanised in accordance with SANS 763 for Class B1 articles .

Tubular stays shall have a minimal bore of at least 60 mm and a wall thickness of at least 2,95 mm. These stays shall be galvanised as specified In SANS 763 .

CC 06.01.02 Wooden posts

New posts or posts that need to be replaced shall be of the same type and size as the existing posts. Wooden posts shall be treated in accordance with SANS 457 (Hazard class H4 articles), or as specified and shall have a minimum diameter of 50 mm.

CC 06.02 WIRE

CC 06.02.01 Barbed wire

Barbed wire shall comply with the requirements of SANS 675 and shall be one or more of the following types:

(a) High-tensile grade, oval shaped, single-strand wire, 3,15 mm x 2,50 mm (2,81 mm equivalent diameter), and fully galvanised;

(b) High-tensile grade, oval shaped, single-strand wire, 2,80 mm x 1,90 mm (2,31 mm equivalent diameter), fully galvanised (first class coating). This wire shall not be used less than 500 mm above ground where there is danger of grass fires;

(c) Mild-steel grade, double strand, unidirectional twist wire, each strand 2,50 mm diameter, for use at any height above ground. The wire shall be fully galvanised;

(d) Barbs shall be manufactured from 2,0 mm galvanised wire and shall be spaced at not more than 152 mm.

CC 06.02.02 Barbed tape coil

The product shall be fully galvanised and of high-tensile grade.

CC 06.02.03 Smooth wire

Smooth wire shall comply with the requirements of SANS 675 and shall be of the types specified below:

(a) Straining wire shall be 4,0 mm diameter and fully galvanised.

(b) Fencing wire shall be high-tensile grade, 2,24 mm diameter wire fully galvanised.

(c) Tying wire shall be 2,50 mm diameter, mild steel, galvanised wire for tying fencing wire to standards and droppers, and 1,60 mm diameter, mild steel, galvanised wire for tying netting and mesh wire to fencing wire.

CC 06.03 DIAMOND MESH

(a) Diamond mesh (chain-link) fencing shall comply with the requirements of SANS 1373. The edge finish shall be both sides clinched or barbed.

(b) The nominal diameter of the wire shall be 2,5 mm and the mesh size shall be 64 x 64 mm.

(c) The wire shall be fully galvanised.

CC 06.04 WELDED MESH

Wire netting shall be fully galvanised with mild steel wire with a minimum diameter of 1, 8 mm and 75 mm mesh.

CC 06.05 RAZOR MESH

Razor mesh shall be welded with reinforcing shoulders and blade strips 8 mm wide galvanised steel, on 2.5 mm dia. galvanised wire.

Standard diamond aperture size shall be 150 mm x 300 mm centre to centre.

High density diamond aperture size shall be 75 mm x 150 mm centre to centre.

Standard panel length shall be 6 m.

CC 06.06 MANUFACTURING TOLERANCES FOR WIRE

The actual diameter of wire supplied shall nowhere be less than the specified diameter by more than the following tolerances:

Specified diameter	Tolerance
1,00 - 1,8 mm	0,05 mm
2,00 - 2,8 mm	0,08 mm
3,15 - 4,0 mm	0,10 mm

CC 06.07 GATES

New gates or gates that need to be replaced shall be the same type and size as existing gates. Gates shall be galvanised in accordance with SANS 763 for class B1 articles.

CC 07 MAINTENANCE

This specification must be read in conjunction with Additional Specification: General Maintenance.

CC 08 MEASUREMENT AND PAYMENT

CC.01 CLEARING THE FENCE ROUTE:

CC.01.01 1 m wide strip ..... Unit: metre (m)

CC.01.01 5 m wide strip ..... Unit: metre (m)

The unit of measurement for the clearing of the fence route shall be the metre of fence line measured along each fence line.

The tendered rate shall include full compensation for the clearing of the fence line as specified, including the removal of trees, stones, growth in the fences itself and other obstructions in the fence route and the disposal as directed of all material resulting from clearing operations.

CC.01.02 Extra over CC.01.01 for cleaning the area between double fences and road shoulders in residential areas (up to 2.5 m wide) Unit: square metre (m^2)

The unit of measurement shall be the square metre of the area cleared between the two parallel fences of a double fence line, or between the edge of the road and the fence in residential areas. The measured area shall not include the 0,5m strips on the inside of each fence line of the double fence measured as part of CC.01.01

The tendered rate shall include full compensation for the clearing of the area as specified, including the removal of trees, stones and other obstructions and the disposal as directed of all material resulting from the clearing operations.

CC.02 SUPPLY AND ERECTION OF NEW FENCING MATERIAL TO REPLACE OLD MATERIAL:

(a) Barbed wire ..... Unit: metre (m)

(b) Smooth wire ..... Unit: metre (m)

(c) Diamond mesh ..... Unit: square metre (m^2)

(d) Barbed tape coil ..... Unit: metre (m)

(e) Posts ..... Unit: number

(f) Gates ..... Unit: number

(g) Y-standards ..... Unit: number

The quantity of material used shall be determined by measuring the quantities of individual items of material installed in the completed fence. No linear measure of completed fence shall be applicable. Clearing of the fence line will be paid for under item CC.01.

The payment for the installation of the fencing material shall include for the removal of the existing fencing material including removal of concrete footings for fence posts.

The applicable units of measurement are as follows:

(a) Fencing wire

The unit of measurement shall be the metre of each type of fencing wire measured in place and between end posts. Binding wire and wire used for bracing and anchoring of posts shall not be measured for payment.

(b) Diamond mesh

The unit of measurement shall be the linear metre of diamond mesh replaced and the quantity shall be calculated using the prescribed length between straining posts or gate posts, or the length of strips for covering openings under fences, or the length used for the covering of gates.

(c) Posts

The unit of measurement shall be the number of posts, as follows:

All straining posts erected in accordance with the maximum specified spacing or such lesser spacing as authorised by the Engineer, all corner and gateposts authorised by the Engineer and all end posts. Gateposts for new gates shall not be measured for payment.

(d) Gates

The unit of measurement shall be the number of each type of gate repaired or replaced.

CC.03 **REPAIR OF FENCES**..... Unit: metre (m)

The unit of measurement shall be the metre of each type of existing fence repaired as instructed by the Engineer.

The tendered rate shall include full compensation for all overheads and transporting all labour, tools and materials from the Contractor's base to the point of repair.

The tendered rate shall also include full compensation for all labour, tools, binding and tying wire for repairing the fence.

The cost for procurement of materials needed shall be paid for under item CC.02.

CC.04 **REDRESS, TREAT AND PAINTING OF FENCE**..... Unit: metre (m)

The unit of measurement for the redressing, treating and painting the fence line shall be the metre of fence line measured along each fence line.

The tendered rate shall include full compensation for performing minor repairs, treating the existing fence with an approved rust remover/inhibitor and then applying cold galvanising as specified by the Engineer.

CC.05 **TREATING AND PAINTING OF POSTS AND STANDARDS** ..... Unit: Number

The unit of measurement shall be the number of posts and standards treated and painted along the fence line.

The tendered rate shall include full compensation for predetermining minor repairs, including sanding, treating the existing posts and standards with an approved rust remover/inhibited and then applying cold galvanising as specified by the Engineer.

CC.06 **REPAIR, RE-FIXING AND ALIGNING OF GATES**.....Unit: number

The unit of measurement shall be the number of each type of existing gate repaired as instructed by the Engineer.

The tendered rate shall include full compensation for all overheads and transporting all

labour, tools and materials from the Contractor’s base to the point of repair.

The tendered rate shall also include full compensation for all labour, tools, binding and tying wire for repairing the fence.
The tendered rate shall also include full compensation replacement of hinges, bolts, catches, wheels and all other fixtures necessary to repair and refix gates into the original position including aligning the gate to ensure proper opening and closing of the gate.

PARTICULAR SPECIFICATION

PFC HOT-WATER GENERATING INSTALLATION

CONTENTS

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PFC 04	STATUS OF EXISTING INSTALLATION
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PFC 01 SCOPE

(a) This specification covers the particulars of the repair and maintenance work to the hot-water generating installation at the Caledon Correctional Centre. This Particular Specification shall be read in conjunction with the Technical Specification FC: Hot-water Generating Installations and all additional and technical specifications compiled as part of this document, in particular the following Additional Specifications:

SB: Operating and Maintenance Manuals
SC: General Decommissioning, Testing and Commissioning Procedures
SD: General Training

The intended repair work to this installation will restore the existing installation to a safe, efficiently functional system that complies with all statutory regulations and applicable standards, in the process repairing all defects and shortfalls.

(b) This installation to be repaired and replaced under this Contract includes the following systems and equipment and is referred to as Hot water generating installation:

(i) Removal of old geysers and replacement with heat-pumps and hot-water circulating pump sets;

(ii) Installation of new geysers as backup system;

(iii) Pressure regulating valves, balancing valves, thermostatic mixing valves, in-line strainers, check valve and shut-off valves

(iv) Electrical control equipment, wiring, cabling, panels and instrumentation associated with each installation.

PFC 02 GENERAL DESCRIPTION OF EXISTING INSTALLATION

The existing hot-water generating installations consists between a mix of geysers and heat pumps.

PFC 03 TECHNICAL DETAILS OF EXISTING INSTALLATION

At the time of compilation of this document the existing installation consisted of the equipment and plant listed below with their relevant technical details.

PFC 03.01 TECHNICAL DETAILS: GEYSERS

PFC 03.01.01 Geyser installations

1.	Storage capacity	100 x1, 1000 x2 litre/vessel
2.	Number of vessels	3
3.	Manufacturing date	Various
4	Water pressure	TBC

PFC 04 STATUS OF EXISTING INSTALLATION

At the time of compilation of this document the status of the existing installations was noted as follows:

(i) Shortage of hot-water supply to certain points,

(ii) The geysers are in working order

PFC 05 DETAILS OF REPAIR WORK

The following work shall form part of the intended repair work to the hot-water generating installations. This work shall be done in accordance with the relevant regulations, codes, specifications and Technical Specification FC: Hot-water Generating Installations, as set out in this document.

PFC 05.01 GENERAL

PFC 05.01.01 The Contractor shall at the start of the Repair Contract inspect the items, systems, equipment, components and installations listed below. This inspection shall include the establishing of any defects, leaks, conditions, damages, shortfalls, structural soundness, repairs required, details of existing equipment, suitability of equipment for the purpose they serve, etc. The Contractor shall report to the Engineer in writing on all the above and the following items. No repair work shall commence prior to approval by the Engineer:

(a) Hot-water piped installation, including fittings, valves, strainers, lagging and cladding, non-return valves, safety valves, etc;

(b) Bracketing system;

(c) Hot-water piped installation, including fittings, valves, strainers, lagging and cladding, non-return valves, safety valves, etc;

(d) Heating control equipment and instrumentation;

(e) Hot-water circulating pump sets if any;

(f) Electrical control panel and wiring.

PFC 05.01.02 The general scope of work at the time of going on tender is defined as follows:

(a) Construction of facilities for Heat Pumps in the locations to be identified;

(b) The repair, servicing and testing or replacement of all existing hot-water supply pipework;

(c) Supply and installation of two 1000L hot water vessels, sizes as specified

(d) Supply and installation of one 100L hot water vessels, sizes as specified

(e) All domestic water installations to the new heatpump installations.

(f) Installation of new valves, fittings to the geysers;

(g) Lagging and cladding of exposed pipework;

(h) Wiring and controls;

(i) Handing over of complete systems, to the satisfaction of the Engineer, on completion of the repair work on which the maintenance period shall commence;

(j) Testing and Commissioning of the completed installation;

(k) The testing, adjusting and commissioning of all systems;

(l) The introduction of a maintenance control plan, including logging, recording and control procedures.

PFC 05.02 **DETAILED SPECIFICATION FOR REPAIR WORK: INSTALLATION OF HEATPUMPS AND CONTROLS**

DESIGN CRITERIA:

Altitude above sea level: 1200m
Average water temperature in winter: 8 degrees Celsius

Average (daylight) weather temperature ranges from 16 to 26 degrees Celsius. The temperature during June to August drops to -2 degrees Celsius during the night.

APPLICABLE STANDARDS

The hot water generation installation in general shall be in accordance with:

SANS 10142-1-2003: The wiring of premises Part 1: Low-voltage installations

PFC 05.02.01 **Heatpumps and associated equipment**

.01 Heat pumps performance specifications

Heatpumps shall be locally (South African) produced and suitable for local conditions. The system shall have a manufacturer's warranty of at least 12 months.

Heat pump capacity in ℓ/hr. to convert water from 14 °C to 60 °C.	Quantity of heat pumps
150 ℓ/hr. per heat-pump (7 kW output minimum)	4

Heat pumps shall be selected to supply hot water at the rate specified and at the site conditions given. Heat pumps shall be de-rated for 5 site conditions.

All switches, control lights and monitoring points shall be installed in one box in each machine.

The water temperature leaving the heat pump shall be constant and shall be controlled at 60 °C with a fluctuation tolerance of plus / minus 1 °C. The refrigerant shall be R22 and the maximum condensing temperature of the compressor shall not exceed 55 °C.

Compressors shall be of the Maneurop hermetic or equally approved type. Motors should be gas cooled and windings shall be suitable for the high temperature encountered in this type of application.

Heat pumps shall be coupled in such a way that they shall not stop and start intermittently and shall not run for less than 30 minutes at time. A time delay relay shall be incorporated in the control system to prevent simultaneous start up.

Each heat pump shall be fitted with automatic evaporator defrost controls which shall be automatically controlled based on ambient temperature or ice formation as opposed to time clock operation. A manual reset head pressure control shall be fitted. Each heat pump shall be protected against loss of refrigerant and subsequent damage.

Each heat pump shall provide a 220V set of contacts in the event of any fault occurring internally.

The unit shall be constructed in stainless steel 316 or 304. Condensers shall be constructed from copper or equal considering the operating conditions.

Condensers shall be performance guaranteed against scaling for ten (10) years. Where tube-in-tube condensers are offered, the water must flow in the inner tube and the hot gas in the annular space.

Heat pumps are expected to operate down to 2 °C ambient temperatures. Ambient temperatures of up to 50 °C shall not adversely affect heat pump operation.

An external bulkhead alarm light shall be fitted and shall be operated from the heat pump.

Only machines having a 60 °C hot water COP of at least 3.6 at 15 WB ambient will be considered.

Condensate pipes shall be suitably insulated so as not to allow moisture formation, plastic piping will be permissible.

Heat pumps shall have integral water circulation pumps.

.02 Piping

All piping shall be copper Class 2 to SABS 460 with capillary fittings.

Piping shall be supported to the manufacturer's specifications and provision shall be made for expansion and contraction by installing suitable expansion loops. Pipe brackets shall be as approved by the Engineer.

Suitable provision shall be made for air venting, vacuum breaking and draining of hot-water piping.

Full bore isolating ball valves, flow control valves, non-return valves, pressure gauges and thermometers shall be installed where indicated on the drawings. All valves and fittings shall be brass or other material as approved by the Engineer.

Thermometers shall be of the dial type with diameter 100mm face and range 0 – 100 °C. Pressure gauges shall be of the dial type with diameter 100mm face and range 0 – 1 000kPa.

Dielectric couplings shall be installed between dissimilar materials to prevent galvanic corrosion.

Pipe supports shall be to the approval of the Engineer.

.03 Thermostatically control valve

Adjustable thermostatically controlled mixing valves shall be installed where indicated on the drawings.

The valves shall be of the brass bodied "COBRA" or equal type and shall function mechanically to control outlet water temperature to 1 °C accuracy. Wax operated control shall not be accepted.

.04 Control of system

The heat pumps shall be complete with its own control panel, but remote indication shall be allowed for.

Heat pumps are started and stopped by means of thermostats as indicated on the drawings. Control shall generally be as follows:

T2 reaches 45 °C : First heat pump (rotational basis) shall start and shall produce
hot water at 60°C until T1 reaches 60 °C

T2 reaches 35 °C .: All heat pumps shall start (time delay between starts) and shall
produce hot water at 60 °C until T1 reaches 60 °C

Heat pumps shall be set to produce hot water at 60 °C C

.05 Ducting / Sheetmetal work

A Separator Panel (1200 mm wide X 1200 high), manufactured from stainless steel material mounted to a corrosion protected tubular frame (40mm X 40mm x 2mm thk), shall be placed between the heat pumps to prevent exhaust air short circuiting back into the system.

.06 Dielectric coupling

The main cold water supply is galvanized steel piping while all the piping installed as part of this hot water generation installation is copper. Where copper piping connects to galvanized steel piping, suitable dielectric couplings shall be installed to protect the entire system from galvanic corrosion.

.07 Solenoid valve

An electrical operated solenoid valve with adjustable electronic timers shall be installed in the plant-room in order to shutdown the hot water supply to the building. The return water pump shall switch off when the solenoid valve is in the closed position.

The valve and timer shall be of reputable make and shall be correctly sized for the application.

PFC 05.02.02 Electrical installations for hot water generating plant:

The general electrical installations and mechanical control panels and distribution boards shall be specified under this section of the project specification.

.01 General

The services of qualified electrical contractor shall be employed by the mechanical sub contractor, who shall be responsible for the design engineering, documentation, supply, installation and commissioning of the electrical system for the hot water generation installation. The electrical system shall be designed, installed and tested in accordance with the criteria laid down in the Standard Regulations for the wiring of premises, SABS 0142-1 latest Edition. An electrical certificate of compliance shall be issued by the mechanical contractor after completion of the installation.

Distribution boards shall have all the necessary main switchgear and instrumentation and other mechanical equipment where indicated on the drawings fully wired and connected.

The distribution boards shall be totally enclosed, vermin and insect proof, drip proof, dustproof to class IP 55 of I.E.C 144. The mechanical contractor shall ascertain the positions of the distribution boards timeously and ensure that provision is made in the structure for sleeves, pipes, access holes, etc. as required.

Before commencing manufacture of the distribution boards/control panels, shop drawings shall be submitted to the Engineer for approval. The distribution board shall be thoroughly tested before leaving the factory and copies of the manufacturers test certificate shall be submitted to the Engineer for approval before installation.

The electrical contractor shall supply main supply cables to the position of the main distribution boards. The supply cables shall be connected to the heat pumps by the mechanical contractor.

The mechanical contractor shall supply and install all cables and galvanized conduit from the distribution boards to all the heat pumps. The connecting of cables in the distribution boards shall be executed by the mechanical contractor.

Labeling of the electrical system shall be of engraved laminated plastic with 4mm high white lettering on black background or equal. Labels shall be securely fitted, and labels glued into position shall not be acceptable.

.02 Distribution Boards and Control Panels

The distribution boards and control panel/s shall be of the wall-mounted type, robustly fabricated of 16 S.W.G galvanized mild steel sheet, with fascia plates behind lockable doors.

All metalwork shall be suitably treated against corrosion and shall be coated with a self-etching primer, tow coats of metal primer, and finished, internally one coat, externally two coats, with a good quality hard gloss enamel of an approved colour. The final coat colour shall be a standard B.S. colour readily matchable. No hammer tone or similar.

All control equipment is to be chassis mounted behind a hinged fascia plate through which only circuit breaker toggles, reset buttons, etc, protrude. Equipment shall not be fixed to the fascia plate. Alarm pilot lights, timing units and ammeters shall be mounted on the doors, all other equipment being behind the doors. The control panels shall be complete with main isolator/s that can be operated without opening the doors. Access to equipment and wiring shall not be possible without switching off the main isolator.

The cable boxes to terminate the incoming cable will be mounted by others but supports for this box are to be provided. Where PVC insulated cable is indicated, a gland plate is only required.

Busbars are to be located in a separate chamber. The busbars shall be of solid copper, rated at 155amps per square centimeter, and shall be spaced and mounted to withstand the short circuit current, equal to the rating of the main isolator. All busbars and conductors shall be fully insulated in the respective phase colours. Each board is to be provided with neutral and bare earth busbar, with one way for each circuit and for each conductor.

Internal busbars, wiring and terminals shall be of suitable size and rating. Terminals shall be of brass and comply with sections 5.14.2 and 5.14.4 of SABS 152-1951. Wiring shall be neatly bunched and run in PVC wiring channels.

The electrical equipment to be provided on the switchboard shall comply with the detailed requirements.

Each control panel shall have red alarm pilot lights to indicate any malfunction or operation of any safety device. Normal running conditions of fans, pumps, etc, shall be indicated with green pilot lights. All pilot lights shall have a “lamp test” facility. This can be done either collectively or singly by means of a push button switch.

All exposed equipment and pilot lights are to be clearly labeled by means of plastic engraved labels, mounted on the fascia panels by means of screws or channeling. Each item of equipment in the board is to be labeled to correspond to its reference number on the wiring diagram. All wiring connections to equipment are to carry numbered ferrules correspondence to the connection number on the wiring diagram. All wiring to external equipment is to terminate in a numbered terminal block, to which the external wiring is to be connected. The terminals are to be of suitable rating for each circuit. No deviation from these requirements will be permitted.

The grouping of equipment on panels will be logical and neat and shall be done on the following basis:

i) Main incoming breaker, main metering, and incoming cable access;
ii) Each motor circuit with sub main breakers, starters, and contactors;
iii) Plant room auxiliaries and general control circuits.

A detailed drawing of the control panels, as well as an electrical component and connection diagram shall be submitted for approval before manufacture commences. A wiring diagram of each control panel is to be laminated and installed inside the panel with clips or hooks.

.03 Motors

Motors shall comply with B.S 2613 : 1957 and dimensioned to B.S>S 2960 as amended and be suitable for 380/220 volt, 3 phase, 50 cycle A.C. supply, unless otherwise specified and shall be continuously rated for operation at the required attitude and ambient conditions.

The motors shall be suitable insulated to a minimum of class E, the speed not to exceed 1500 r.p.m and should suit the speed of the plant offered.

The motors shall be of the approved squirrel cage type with a low starting current.

Frames shall generally be of the standard protected type, but in dirty and damp installations they shall be totally enclosed, fan cooled. Where operating in moist air conditions, motor windings shall be specially treated.

The motors shall be protected against overheating by three temperature sensing devices incorporated in the stator windings. The devices shall be connected and wired in such a manner that the power supply to the motor will be interrupted when the temperature in the windings exceeds the manufacturers rating.

Motors shall be able to start satisfactorily at a voltage of 10% below nominal voltage, as measured immediately after the starter is switched on. Motors shall be run up to full speed in the time given in Appendix E of B.S.S 587. : 1957 with the voltage reduced by 10% as above. Acceleration shall be smooth throughout the starting period with no signs of hesitation or “crawling”.

Motors shall have a rated brake horsepower at least 15 per cent in excess of the maximum horsepower required to drive the unit when working under normal maximum load.

The motors shall be provided with approved watertight cable glands to accommodate that cables to be supplied with the equipment.

On completion at the manufacturer's works all motors all motors shall be subjected to routine and type tests in accordance with B. S. 2613 : 1957, and test certificates shall be submitted for approval before delivery to site is undertaken.

Tenderers shall supply wiring diagrams and efficiency, power factor and starting current curves of the motors at the time of tendering.

Where any motor is remote from / or obscured from view, from the panel, a separate isolator shall be provided for it. In the case of equipment, which is located out of doors, weatherproof lockable isolators are to be supplied. Alternatively, lockable type isolators shall be provided at the control panel.

.04 Starters

The starters or switches for starting the electric motors shall be so designed, to limit the amount of current when starting and accelerating, to the current values set out below: -

1,5 kW to 3,7 kW four times full load current
4,5 kW to 11,0 kW twice full load current
11,5 kW to 18, 5 kW one and three quarters full load current.
Over 18,6 kW one and half times full load current
Starters are to be of the same manufacture.

Starters are to be of the magnetically operated type, preferably with thermal overload protection in each phase. For motors above 37kW thermal overloads are to be of the bi-metal indirectly heated type. Either type of starter is to be such that with correct overload settings, the starter will trip within 45 seconds when the motor is single phasing. Where this latter requirement cannot be met, separate single phasing preventers are to be fitted on all 3 phase motors.

On starters for motors above 75 kW, protective relays shall be installed for overload under and over voltage, negative phase current, phase imbalance etc.

After commissioning, the full load current of each circuit is to be measured and the overloads set to suit this loading.

All starters are to be suitable for a minimum of 15 operations per hour.

All starters are to incorporate at least two auxiliary contacts that can be arranged as either normally open or closed and shall be suitable for adding further contacts if required.

They shall be suitable for both local and automatic operation.

In the case of star delta or reversing starters, only units comprising both electrical and mechanical interlocks will be accepted.

Where starting resistors are used these shall be mounted above or remote from the control panel, or starter enclosure in the case of large drives, to all for adequate heat dissipation. The resistance banks shall be protected against overheating by thermal sensors.

The starters shall be automatic and have "START" and "STOP" push buttons and shall be provided with reset buttons for the overload and over temperature trips.

The starters shall be fitted with approved terminal boxes and glands of ample dimensions to suit the cables to be supplied with this equipment. Provisions shall be made for easy access by means of doors to the starters for maintenance purposes.

An approved earth terminal shall be provided on the frame of each starter housing gear and provision shall be made for earthing each starter in accordance with the requirements of local regulations.

On completion at the manufacturers works, the starters shall be subjected to the routine and type tests in accordance with clause 83-93 of B.S. 587: 1957 and test certificates should be submitted for approval before delivery to site is undertaken.

.05 Contactors

All contactors shall be of highest quality and shall have easily removable contact and coils, such as Sprecher Shuh, Cutler Hammer or other approved.

All contactors shall have adequately rated contacts and continuously rated coils with a drop off value of not more then 80% of rated voltage.

.06 Switchgear

All switchgear shall be rated for the anticipated load and the maximum rupturing capacity of the particular system.

i) Main isolators

All control panels shall be provided with a suitably rated Min isolator, which is to be of the “on-load” type and can be operated without opening the door. This isolator shall be mechanically interlocked so that no live components are exposed without the isolator being in the off position.

ii) Miniature and moulded case circuit breakers

Heinemann circuit breaker to SABS 155 shall be used with magnetic inverse time over current tripping and in addition with magnetic instantaneous tripping on excessive overcurrents or short circuit, of 250 volt rating for single and double pole and 380 volt rating for three pole and shall be of the ampere rating and class of breaking capacity specified or shown on drawings. Where not otherwise specified or shown on drawings the breaking capacity shall be class C.

iii) Miniature isolators

Miniature isolators shall be micro-gap type manually operated air break switches suitable for flush mounting and shall be to SABS 152. Where individually mounted they shall be in galvanized steel boxes with brass dished cover plates finished to match switch cover plates.

iv) Fused switches

The fuse –switch units shall be of the three phase and neutral arrangement having double break moving contacts supporting H.R.C fuses, all housed in a robust metal toggle mechanism .Interlocks shall be provided to ensure that the cover cannot be opened when the switch is in the closed position.

The fuses shall be of the H.R.C type and shall comply fully with B.S. 88 / 1947 category of duty A.C.4

One set of spare fuses of each rating used in the switchboards shall be supplied and handed to the representative at the site.

.07 Cable

Cable shall be 600-volt grade polyvinyl chloride (PVC) insulated steel wire armoured to SABS 150 – 1957 general purpose grade.

Tenderers are required to state in the schedule of prices the size of the cable between the various units to be supplied under this contract. The current ratings of PVC cables shall be in accordance with the standard wiring regulations.

The Contractor will be responsible for measuring on his final layout plan for the plant room, the lengths of the different cables required. The tender price must include for the supply and installations of all the necessary cables.

No cable joints will be permissible within any plant room.

.08 Earthing

All motors, starters, switchboards and cable armouring are to be connected to earth by means of separate PVC covered stranded copper conductor the same size as the cable conductors, run alongside cables and strapped thereto. Earthing conductors shall be fitted with sweated lugs at ends and are to be solidly bonded to each other, to the electrical plant and equipment and to earth.

The Contractor shall provide and install a suitable earth mat which must be connected to the switchboard and shall be responsible for the supply of all material for earthing the electrical gear to be supplied and installed under this contract.

.09 Radio and TV interference

An electrical installation shall comply with Government and Local Government Laws and Regulations in respect of radio and television interference suppression. Interference suppression components shall not be used in any part of the circuiting such a way that their failure might cause an unsafe condition.

.10 Earth Leakage Protection

All general-purpose power outlets and switched socket outlets shall be protected by an earth leakage unit.

Earth leakage protection shall be of the current-balance type. A static tripping arrangement, either a magnetic or a solid-state amplifier of simple design, shall be used.

The relay shall have sensitivity, such that immediate tripping will result from a total leakage of between 15m A and 20m A.

The relay shall have an integral tripping facility and shall also be temperature compensated.

The relay shall stand up to high values of earth-fault current without damage to the tripping arrangement.

The relay shall be of an approved type to SABS 767 /1964 and shall bear the mark.

.11 Testing

The following tests will be carried out on the installation in the presence of the Engineer or his representative.

i) Insulation resistance test using 500-volt insulation tester (Megoh meter)
ii) Earth continuity test;
iii) Test for correct direction applied to every motor;
iv) Earth resistance test;
v) Prove the correct connection and rotation of any energy meters;
vi) Settings of all overload and other adjustable protective devices shall be set to the requirements of the equipment.

.12 Drawings and instruction books

The Contractor shall supply the following information:

i) Plant room layout drawings showing the main items of equipment as well as all cable and wiring runs;
ii) Switchboard and control board outline and equipment layout drawings and details of manufacturing;
iii) Single line and wiring diagrams detailing all control, metering and indication circuits;
iv) Instruction and maintenance books for all major items or equipment

.13 Electrical supply

The electricity supply shall be 400/231 50 Hertz 3 phase plus neutral and all equipment shall be selected to operate at the appropriate 3 phase or single-phase voltages.

The electricity supply shall be installed by others up to a point indicated on the project drawings and shall terminate in an open slush mounted draw box over which the Contractor shall mount the distribution board for the plant room.

PFC 06 DETAILS OF MAINTENANCE WORK

The contractor shall price for Servicing and Support during the twelve (12) months defects liability period.

PFC 07 MEASUREMENT AND PAYMENT

PFC.01 **DISMANTLING, ISOLATION, DRAINING, STRIPPING, CLEANING OUT, DESCALING AND INSPECTION OF STORAGE CALORIFIERS**….....……...Unit: number, metre

The unit of measurement shall be the number of each hot water storage vessel and ancillary equipment dismantled, stripped, descaled and inspected including fixtures and fittings in accordance with specification FC.

The tendered rates shall include full compensation for the isolation, stripping, dismantling, cleaning out, descaling and inspection of the hot water storage tanks as well as the removal of irreparably damaged, broken and/or corroded fittings, including shut-off valves, non-return valves, strainers, pressure-reducing valves, vacuum breakers, air release valves, safety valves, etc..

The tendered rate shall also include full compensation for the removal off site and/or to storage of all removed items as mentioned above.

PFC.02 **SUPPLY AND INSTALLATION OF LAGGING AND CLADDING MATERIAL** .....……..……....Unit: metre

The unit of measurement shall be the metre of each type of piping in the installation lagged and cladded, including all fixtures and fittings.

The tendered rates shall include full compensation for the supply, delivery, installation, testing, cleaning, commissioning and handover of new lagged and cladded piping.

The tendered rates shall also include full compensation for the necessary scaffolding, hoisting, temporary supports and safety precautions.

PFC.03 **SUPPLY AND INSTALLATION OF HEAT PUMPS**….....……..Unit: number

The unit of measurement shall be the number of each heat pump supplied and installed as per specification PFC 05.02, including all associated pipe work and fittings.

The tendered rates shall include full compensation for the supply and installation of the heat pump including all ancillary fittings, shut-off valves, non-return valves, strainers, pressure-reducing valves, vacuum breakers, air release valves, safety valves, etc, as well as connection to existing piping and electrical connection.

PFC.04 **SUPPLY AND INSTALLATION OF PARTS AND ANCILIARY EQUIPMENT** ….....……..……Unit: metre, number

The unit of measurement shall be the number or metre of each item of ancillary equipment or part supplied and installed, including all associated pipe work and fittings.

The tendered rate shall include full compensation for the supply, delivery, positioning, installation, testing, cleaning, commissioning and hand-over of the parts or ancillary equipment

TECHNICAL SPECIFICATIONS

FD HEATING VENTILATION AND AIRCONDITIONING SYSTEMS

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FD 01 SCOPE

This specification covers the general repair and maintenance of heating, ventilation and air-conditioning systems, which include the following:

(a) Room air-conditioning units with air cooled condensers
(b) Refrigeration pipework
(c) Fans and attenuators
(d) Electric motors
(e) Air filters
(f) Duct work
(g) Air terminals
(h) Noise and vibration
(i) Painting and cleaning
(k) Labelling and identification.

This specification shall form an integral part of the repair and maintenance contract document, and shall be read in conjunction with the additional and particular specifications compiled as part of this document.

This specification shall act as a guideline to the Particular Specification and, in the event of any discrepancies between the Technical Specification and the Particular Specification, the latter shall take precedence.

The Contractor shall at all times adhere to this specification, unless otherwise specified in the Particular Specification.

FD 02 STANDARD SPECIFICATIONS

FD 02.01 GENERAL STANDARD SPECIFICATIONS, REGULATIONS AND CODES

The latest edition, including all amendments up to date of tender of the following specifications, publications and codes of practice shall be read in conjunction with this specification and shall deemed to form part thereof:

FD 02.01.01 SANS and other specifications and codes

SANS 046	-	Copper tube manufacturing code of practice
SANS 10400	-	The applications of building regulations
SANS 10103	-	The measurement and rating of environmental noise with respect to annoyance and speech communication
SANS 10139	-	The prevention, automatic detection and extinguishing of fire in buildings
SANS 10140	-	Identification colour marketing
SANS 10142	-	Code of practice for the wiring of premises
SANS 10147	-	Refrigerating systems, including plants associated with air-conditioning systems
SANS 10173	-	Installation, testing and balancing of duct work
SANS 630	-	Decorative high-gloss enamel paint for interior and exterior
SANS 763	-	General coating thickness
SANS 1238	-	HVAC duct construction standards
Act 103	-	National Building Regulations and Building Standard Act, 1977 (Act No 103 of 1977) as amended

FD 02.01.03 Occupational Health and Safety Act of 1993

All regulations and statutory requirements as laid down in the latest edition of the Occupational Health and Safety Act of 1993: Construction Regulations, 2003 as promulgated in Government Gazette No 25207 and Regulation Gazette No 7721 of 18 July 2003 shall be adhered to.

FD 02.01.04 Manufacturers' specifications, codes of practice and installation instructions

All equipment and materials shall be installed, serviced and repaired strictly in accordance with the manufacturers' specifications, instructions and codes of practice.

FD 02.01.05 Municipal regulations, laws and by-laws

All municipal regulations, laws, by-laws and special requirements of the Local Authority shall be adhered to unless otherwise specified.

FD 03 VARIATIONS AND ADDITIONS TO STANDARD SPECIFICATIONS

The following additional general specifications and requirements shall be read in conjunction with this specification and shall be adhered to unless otherwise specified in the Particular Specification.

FD 03.01 GENERAL REPAIR AND INSTALLATION REQUIREMENTS

(a) All materials and equipment supplied and installed shall be of new high quality, design and manufactured to the relevant specifications, suitable for providing efficient, reliable and trouble-free service.

(b) All work shall be executed in a first-class workman-like manner by qualified tradesmen.

(c) All equipment, component parts, fittings and materials supplied and/or installed, shall conform in respect of quality, manufacture, test and performance to the requirements of the applicable current SANS specifications and codes, except where otherwise specified or approved by the Engineer in writing.

(d) All materials and workmanship which, in the opinion of the Engineer, is inferior to that specified for the work will be condemned. All condemned material and workmanship shall be replaced or rectified as directed and approved by the Engineer.

(e) The Contractor shall submit a detailed list of the equipment and material to be used to the Engineer for approval before placing orders or commencing installation.

(f) All new equipment, materials and systems shall be installed and positioned such as to not impede on access routes, entrances and other services. The Contractor shall coordinate these items taking other services and equipment into account.

(g) All control equipment and serviceable items shall be installed and positioned such that they will be accessible and maintainable.

(h) The Contractor shall make sure that all safety regulations and measures are applied and enforced during the repair and construction periods to ensure the safety of the public and User Client.

(i) Repair work shall be programmed in accordance with Additional Specification SC: General Decommissioning, Testing and Commissioning Procedures, to ensure the shortest possible down-time of any service and the least inconvenience to the User Client and public. The Contractor shall make sure that the necessary notifications and notices are timeously put into place for these activities.

FD 03.02 TESTING OF REFRIGERATION PIPING AND EQUIPMENT

(a) All new refrigerant pipe installations shall be thoroughly tested to be sure that they are absolutely tight. Nitrogen must be used to pressure test the system at 1,5 times the working pressure. A pressure-reducing valve must be used to set the test pressure. A leak test must be carried out on the entire system.

(b) All new refrigerant pipe installations shall be vacuum pumped by means of a suitable vacuum pump. An absolute pressure of 2500 micron must be reached. Allow the system to stand under vacuum for a minimum of 12 hours. If no noticeable rise in pressure has taken place after 12 hours, the system may be charged.

(c) The dryness of the refrigeration system shall be indicated by an approved moisture indicator.

(d) Should moisture be present, the system shall be leak tested and the leak repaired. Should no leak be present, the system shall be flushed with dry nitrogen and vacuum pumped again as described above.

(e) If the completed system complies with all the Specifications and passes the test and inspection, it can be approved and the Contractor may be instructed to recharge the system with the correct refrigerant and refrigerant charge.

(f) Under no circumstances shall the refrigerant piping/installation be purged.

FD 03.03 REFRIGERANTS

(a) No CFC refrigerant shall be used in new installations.

(b) Equipment still running on CFC shall be maintained until such time that a leak occurs or the system has to be decanted. The system shall then be converted to a compatible HCFC or HFC as described in the Montreal Protocol and recommended by the compressor manufacturer.

(c) Any CFC refrigerant that has to be discharged, shall be decanted by means of an approved reclaiming system, and not discharged to the atmosphere. Should the Contractor not comply with this requirement, full action shall be taken contractually and statutory against him.

(d) Any refrigeration system not supplied with three-way service valves, shall be provided with Schreuder type service valves. These valves shall be installed on both suction and discharge lines of the compressors. Tap-o-line valves shall not be fitted or used on the systems.

(e) In the event of an electrical motor burn-out in a hermetic or semi-hermetic compressor, a burn-out drier shall be used. Purging only is prohibited. The burn-out drier shall be installed and removed as per the manufacturer's instructions.

(f) No synthetic components or solutions shall be used to repair leaks in refrigeration piping, on coils or evaporators. Only approved gas welding shall be used. Should the leak be of such nature that repair is not possible, the item should be replaced.

FD 03.04 FANS AND ATTENUATORS

FD 03.04.01 General

(a) Requirements under this heading apply to fans that are not integral parts of complete units supplied by recognised suppliers. Selected fans shall be such that the operating point is as close as possible to maximum efficiency.

(b) Fan motors selected must be capable of supplying not less that 10 % above the specified air quantity without overloading.

(c) The system resistance must be calculated and the fan selected to meet the required static pressure, taking into consideration the site altitude, system air temperature and air density at which the system duty shall be met. The selection must be submitted to the Engineer for approval before ordering the equipment.

(d) Belt drives shall be designed for a minimum overload of 25 % and not less than two matched belts may be used. Belts shall be selected and installed according to BS 790.

(e) Pulleys shall be of the adjustable speed taper-lock type and shall be accurately keyed to the shafts and aligned before the system is put into operation.

(f) Belt guards shall be supplied in accordance with Occupational Health and Safety Act, No 85 of 1993. The guards shall have an expanded metal front and shall allow oiling and the use of a tachometer without removal of the guard.

(g) Bearings shall be selected for a minimum life expectancy of 200 000 hours at the given duty.

(h) Lubrication points shall be readily accessible and shall be extended to the outside to permit lubrication without removal of the fan. Fan shafts shall be suitably protected from rust and corrosion.

FD 03.04.02 Axial flow fans

(a) Axial flow fans shall be in-line direct-driven type with the motor mounted inside the fan housing.

(b) Fans shall be of the multi-bladed aerofoil type of a non-ferrous construction. The number of blades vary according to the application. The fans shall be provided with adjustable blade pitch indexed to permit field adjustment.

(c) Fan casings shall be constructed of hot-dip galvanized mild steel with a minimum thickness of 3 mm and mild steel galvanized flanges on each side drilled for connections to matching flanges on ducting.

FD 03.04.03 Sound attenuators

(a) Sound attenuators shall be installed in the positions indicated on the drawings and shall be selected to provide the noise criteria levels as specified. All sound attenuators shall be products of an accredited manufacturer who publishes selection data on these products. Data shall be submitted to the Engineer for approval before ordering.

(b) Metalwork shall be galvanized steel and acoustic insulation shall be non-combustible material, properly bonded and covered so as not to permit particles to be eroded by air moving over it.

(c) Sound absorbing lining material shall have a density not less than 48 kg/m^3 and thickness of not less than 50 mm.

FD 03.05 CANOPIES AND GREASE ELIMINATORS

(a) Kitchen canopies shall be connected to the extract fan by means of cuts of which the joints and seams are of the welded or soldered construction and shall be watertight. Cleaning openings shall be provided at such intervals on the ducting that the inside of the ducting can be reached for cleaning purposes. The fan shall be provided with a cleaning access door, as well as a drain point at the bottom.

(b) Fire dampers, operated with fusible links, shall be provided in each air outlet connection and shall form an integral part of the canopy construction.

(c) Lights shall be fitted into the canopy by the manufacturer. Access to the tube for tube replacement shall be through the face of the fittings without the use of tools.

(d) Grease filters shall contain a series of vertical baffles to change the direction of the air flow and efficiently divert grease particles out of the air stream by centrifugal action. Each filter bank shall contain a condensate trough and removable grease storage container.

FD 03.06 ELECTRIC MOTORS

(a) All electric motors shall be of one make, unless integral with the equipment, and shall not operate in excess of 1500 r/min unless previously approved by the Engineer for specific reasons. Motors, unless otherwise specified, shall be 380 volt, three-phase, 50 hertz for all sizes from and including 0,37 kW upwards. Smaller motors may be 220 volt, single-phase, 50 hertz.

(b) All motors shall be totally enclosed, fan-cooled and have metric frame dimensions. Motors shall be quiet in operation to the full acceptance of the Engineer.

(c) Three-phase motors shall all be squirrel cage induction type, special high torque motors being used on high inertia loads such as centrifugal fans, where otherwise excessively large motors, necessary to overcome driven equipment inertia, cause operation BHP to be less than 70 % of motor nameplate kW.

(d) Starting methods for three-phase motors shall be as follows:

Motors up to 5,5 kW	-	DOL
Above 5,5 kW	-	Star-delta started, provided that the starting current does not exceed three times the full load amps.

(e) Single-phase motors shall be capacitor started, induction run type with built-in manual reset overload protection.

(f) Nameplate rating of electric motors shall be at least 15 % larger than the required driven equipment brake drive losses duly accounted for, on motors below 15 kW. On larger motors a 10 % margin shall suffice.

(g) All switch panels shall have a phase failure and low voltage protection with automatic reset adjustable to a maximum period of 10 minutes.

FD 03.07 DUCT WORK

(a) This specification covers the air distribution system as shown on the drawings. Duct work shall be manufactured in accordance with the standard specification for air-conditioning duct work, SANS 1238. Duct work shall be erected in accordance with the code of practice for the installation, testing and balancing of duct work, SANS 0173.

(b) Fittings such as elbows, parallel flow branches, branch connections, off-sets and transitions shall be manufactured and installed in accordance with the SMACNA standards.

(c) All ducting shall be sufficiently airtight to ensure economical and quiet performance of the system, and joints shall be suitably sealed in accordance with the relevant SMACNA standard with suitable non-combustible filler compound.

(d) The Contractor shall provide all hangers and supports which are to be hot-dip galvanized after fabrication to SANS 193. No explosive fasteners to the building structure shall be allowed, only approved expanding bolts or clamps are permissible.

(e) The duct work shall be connected to the air terminals by means of flexible ducting. Flexible ducting shall be coated fibreglass fabric with a mineral base. Flexible ducting shall be installed with "easy" bends of not less than one duct diameter centre line and shall be supported to SMACNA specification to ensure that the ducting does not kink. The length of the flexible duct shall be kept to a minimum and shall not exceed lengths of 1200 mm.

FD 03.08 AIR TERMINALS

(a) Air distribution shall be effected by means of the supply air grilles as indicated on the drawing. The finish of the grilles shall be epoxy powder-coated, the colour of which shall be advised and approved by the Engineer. Supply air grilles shall be of the double defection type, consisting of two rows of individually adjustable aerofoil section vanes, front vanes horizontal rear vanes vertical, all vanes housed in a surrounding fixing flange with neat mitred joints in the corner.

(b) Supply air grilles shall be of steel construction and shall be provided with burglar bars. The inner section will be only accessible from above and the face plate of the grille is fixed from above. No screws or fixing devices are accessible from below.

(c) Supply grilles are supplied with a plenum box with spigot and connected to the spigot on the ducting by means of flexible ducting.

(d) Transfer grilles shall be of steel construction and be provided with burglar bars. Standard door grilles may be installed with a burglar bar assembly in between.

FD 03.09 AIR FILTERS

FD 03.09.01 General

(a) Provide and install air filters in the positions as indicated on the drawings.

(b) Filters shall be standard products of a reputable manufacturer regularly engaged in the manufacture of the particular filter. The manufacturer shall submit evidence to the satisfaction of the Engineer that the filters have been tested by an independent authority and that they meet the minimum arrestance, efficiency and dust holding capacity.

(c) Filters shall be tested in accordance with ASHRAE test standard 52 - 76.

(d) A Megnahelic gauge calibrated from zero to 500 Pa shall be installed, connected with copper tubing to static pressure tips complete with isolating valves.

FD 03.09.02 Primary filters

(a) Primary filters shall, unless otherwise stated, be washable on woven polyester material, pleated to provide an extended surface with a dust spot efficiency of minimum 40 % and an arrestance of 85 %.

(b) Media shall be firmly held in place by rustproof wire screens to maintain pleat strength and spacing.

(c) Media and support screens shall be continuously bonded into aluminium support.

(d) Frames shall be folded to form a robust media support frame. The bonding between media and frame shall be continuous to prevent leakage.

(e) Each filter shall be provided with a factory made holding frame, constructed of not less than 1,0 mm thick galvanized mild steel provided with suitable seals and quick release spring type clips to securely hold the filter cell in place without permitting leakage of air.

(f) The holding frames of multiple cell filter banks shall be suitably joined and sealed so as to prevent leakage of air between the frames.

FD 03.10 LABELLING AND IDENTIFICATION

All equipment shall be labelled and identified using black Traffolite labels with 10 mm high white lettering on the labels. Labels will be secured using epoxy base glue.

The identification number used on these labels shall correspond with the equipment number on the complete inventory list.

FD 03.11 NOISE AND VIBRATION

(a) Particular care shall be taken in the selection, application and installation of all equipment used to ensure that the equipment will operate below the required noise level for public areas of NC 35 and with the least vibration possible, all to the satisfaction of the Engineer.

(b) Equipment shall be mounted on vibration isolators of the correct type and selection depending on deflection requirement and vibrating frequency.

(c) Anti-vibration connections shall be used on duct work where it joins vibrating equipment such as fans and air-conditioning units.

(d) Suitable sound attenuating devices shall be incorporated within the duct work to reduce airborne noise to acceptable levels as specified.

(e) The subcontractor shall provide sound level data to the Engineer on the completion of the installation detailing the noise levels in NC level for each separate area. No measurement shall be taken closer than 1 metre from any outlet.

FD 03.12 PAINTING AND CLEANING

(a) No untreated metal surfaces shall be allowed on the project. Items which are not galvanized or similarly protected against rust and corrosion shall be painted as detailed below. No equipment, hangers, brackets, etc, shall be delivered to site in unprotected condition; they shall be factory coated with an approved zinc-rich prime coat before being despatched.

(b) Painting shall comprise the following consecutive processes. Thoroughly clean, descale and degrease all surfaces, apply one coat of approved zinc-rich primer and one coat of universal undercoat, and finish off with two coats of quality high-gloss enamel. Final finish shall be to the full approval of the Engineer.

(c) Items with galvanized finish, such as cable trays, need not be painted but shall be properly cleaned with suitable galvanized iron cleaning fluid. Where galvanized finish is painted, it shall be primed with a calcium plumbate primer.

(d) It is not a requirement to paint duct work, conduits or pipework installed in roof voids and shafts, where they are not visible, if they are galvanized. Items as mentioned above shall be properly cleaned and painted as specified above.

(e) Visible sections of the inside of ducting through grilles shall be painted matt black after degreasing and priming as specified above.

(f) Plant and equipment shall be painted with the relevant colour in accordance with SANS.

FD 03.13 SELF-CONTAINED AIR-CONDITIONING UNITS

(a) The self-contained packaged unit shall be a fully catalogued product and documentation shall include performance curves and selection tables.

(b) Self-contained room air-conditioning units consist of unit casing, compressor, evaporator and fan, condenser and fan, refrigerant pipework with expansion device and the relevant controls. The condenser unit shall form an integral part of the unit or be separate for split applications.

(c) Unit casings shall be of sheet metal construction with a baked enamel finish to give a corrosion resistance. Units shall be suitably insulated to ensure quiet operation.

(d) Evaporator fans shall be of the double inlet centrifugal type with integral motor or belt-driven. The fan assembly shall be isolated from the unit by means of rubber mounts and the unit shall operate without vibration.

(e) Condensate trays shall be manufactured of non-corrosive materials and shall be insulated and condensate shall be piped to the nearest drain point.

(f) Washable WP 77 filters shall be provided and installed behind the inlet grille and shall be easily removable.

(g) Compressors shall be of the hermetically sealed dome type with crankcase heaters and suitable vibration isolators.

(h) Condenser coils shall be copper tubes with aluminium fins for inland use. Condenser fans shall be propeller fans or of the centrifugal type.

(i) Refrigerant piping shall be installed and repaired as specified in FD 03.

FD 04 AS-BUILT INFORMATION AND OPERATING AND MAINTENANCE MANUALS

The Contractor shall be responsible for the compilation of an inventory list and operating and maintenance manuals and system data sheets.

This shall be done in accordance with Additional Specification SB: Operating and Maintenance Manuals.

The Contractor shall allow for the required equipment and facilities to establish the correct as-built information.

All information shall be recorded and reproduced in electronic format, as well as three sets of hard copies to be supplied to the Department.

Over and above what is specified in Additional Specification SB: Operating and Maintenance Manuals, the operating and maintenance manual to be compiled shall be structured to include at least the following:

(a) System description

Complete system description and the working of the plant.

(b) Commissioning data

Complete commissioning, test and inspection data of plant.

(c) Operating data

(i) Plant running check list and frequency of servicing required;
(ii) Safety precautions to be implemented;
(iii) Manual and automatic operation;
(iv) Maintenance duties and logging required;
(v) Lubricating oils and service instructions;
(vi) Pre-start checklist for each system;

(vii) Starting and stopping procedures.

(d) Mechanical equipment

(i) Description of all major items with the make, model number, names, addresses and telephone numbers of the suppliers, manufacturers or their agents;
(ii) Design capacities of all equipment, including selection parameters, selection curves, capacity tables, etc;
(iii) Manufacturers' brochures and pamphlets;
(iv) Schedule of spares with part numbers recommended to be held as stock.

(e) Maintenance instructions

(i) Schedule of maintenance particulars, frequency of services and replacements;
(ii) Trouble-shooting guide;
(iii) Part number of all replacement items and spares;
(iv) Capacity curves of pumps, fans and compressors;
(v) Serial numbers of all items of equipment.

(f) Electrical equipment

(i) Schedule of equipment, indicating manufacturer, type, model number, capacity and addresses and telephone numbers of suppliers;
(ii) Maintenance instructions;
(iii) Manufacturers' brochures and pamphlets;
(iv) Complete as-built circuit diagrams and diagrammatic representation of interconnections of all electrical equipment.

(g) Instrumentation and control

(i) Description of each control system;
(ii) Schedule of control equipment indicating manufacturer, type, model number, capacity and addresses and telephone numbers of suppliers;
(iii) Maintenance instructions;
(iv) Manufacturers' brochures and pamphlets.

(h) Drawings

(i) Paper prints of all as-built mechanical and electrical drawings;
(ii) Wiring diagrams framed behind glass shall be mounted adjacent to each relevant control panel.

FD 05 LOGGING AND RECORDING PROCEDURES

The Contractor shall under this repair and maintenance contract institute a logging and recording system as part of his maintenance control plan as defined in Additional Specification SA: General Maintenance. This shall consist of a log and record book which shall be utilised to log and record all operations, faults, system checks, breakdowns, maintenance visits, inspections, etc.

The logbook shall be kept in a safe place at the maintenance section and shall only be utilised by the boiler house supervisor, the Contractor and the Engineer. A copy of the monthly entries and recordings into this logbook shall be submitted by the Contractor together with this monthly report to the Engineer.

The logbook shall be structured to include at least the following:

(i) Daily inspection and maintenance actions;
(ii) Monthly inspection and maintenance actions;
(iii) Six-monthly inspection and maintenance actions;
(iv) Breakdown reports.

The Contractor shall also institute an attendance register, which shall be kept in a safe place at the maintenance section. This register shall be completed by all persons visiting the relevant plants, including:

(a) Contractor and maintenance personnel;
(b) Inspectors;
(c) User Client and associates;
(d) Engineer.

This register shall state the date, time-in, time-out, name, company and reason for visit. A copy of the register shall be submitted by the Contractor together with his monthly report.

On completion of repair work and/or the installation of new equipment the plant and equipment shall be put into operation after all tests and adjustments have been carried out to the satisfaction of the Engineer. Where new plant is installed the Contractor shall run and operate the system for a period of time specified by the Engineer and train the staff of the User Client to operate and maintain the system. This operation shall be done strictly in accordance with Clause SC 11 of the Additional Specification SC: General Decommissioning, Testing and Commissioning Procedures.

Logging of the operation of the installations shall commence immediately upon start-up.

The Contractor shall submit a full commissioning report as per attached commissioning data sheet.

FD 06 TESTS AND INSPECTIONS ON COMPLETION OF REPAIR WORK

On completion of repair work the Contractor shall prior to recommissioning test the plant and its equipment. This operation shall be done strictly in accordance with Clause SC 08 of Additional Specification SC: General Decommissioning, Testing and Commissioning Procedures.

Except where otherwise provided in the Contract, the Contractor shall provide labour, materials, power, fuel, accessories and properly calibrated and certified instruments necessary for carrying out such tests. Arrangements for these tests shall be made by the Contractor and he shall give at least 72 hours written notice to the Engineer before commencing the test.
In the event of the plant or installation not passing the test, the Employer shall be at liberty to deduct from the Contract amount all reasonable expenses incurred by the Employer or the Engineer attending the repeated test.

Whenever any installation or equipment is to be operated for testing or adjusting as provided for above, the Contractor shall operate the entire system for as long a period as may be required to prove satisfactory performance at all times in the occupies space served by that system for up to twenty-four hours a day continuously until the certificate of practical completion of repair work is handed over.

The Contractor shall provide all labour and supervision required for such operation and the Department may assign staff as observers, but such observation time shall not be counted as instruction time.

After complete installation of the system all equipment shall be tested, adjusted and readjusted until it operates to the satisfaction and approval of the Engineer.

The Contractor shall submit certificates of tests carried out to prove the performance of all equipment, as well as certificates obtained from all the relevant authorities and statutory bodies, etc.

The Contractor shall only utilise Departmental approved inspection authorities for all inspections and tests to be conducted. This will be done and approved in writing among the relevant parties.

FD 07 QUALITY ASSURANCE SYSTEM

The Contractor shall institute an approved quality assurance (QA) system, which shall be submitted to the Engineer for his approval. The records of this QA system shall be kept throughout the duration of the Contract and be submitted to the Engineer at regular intervals as required.

FD 08 COMMISSIONING AND RECOMMISSIONING OF PLANT AND INSTALLATION

FD 08.01 GENERAL

On completion of repair work and/or the installation of new equipment the plant and equipment shall be put into operation after all tests and adjustments have been carried out to the satisfaction of the Engineer. Where new plant is installed the Contractor shall run and operate the system for a period of time as specified by the Engineer and train the staff of the User Client to operate and maintain the system. This operation shall be done strictly in accordance with Clause SC 11 of Additional Specification SC: General Decommissioning, Testing and Commissioning Procedures.

Logging of the operation of the installations shall commence immediately upon start-up.

The Contractor shall submit a full commissioning report as per attached commissioning data sheet.

FD 08.02 RECOMMISSIONING OF PLANT AND ANCILLARY EQUIPMENT

On completion of repair work the Contractor shall recommission the plant and its equipment. This operation shall be done strictly in accordance with Clause SC 11 of Additional Specification SC: General Decommissioning, Testing and Commissioning Procedures. This operation shall also be carried out strictly in accordance with the manufacturer's specification and shall be witnessed by the Engineer.

Recommissioning checks to be carried out shall be categorised under the following headings:

(a) Mechanical checks
(b) Electrical and control checks.

On completion of repair work the Contractor shall recommission the plant and its ancillary equipment. This operation shall be done strictly in accordance with the manufacturer's specification and shall be witnessed by the Engineer. This shall include but not be limited to the following:

(a) All required recommissioning mechanical checks

(i) Check system for leaks;
(ii) Check rotation of all fans;
(iii) Check mountings of all equipment.

(b) All required recommissioning electrical and control checks

(i) Check all wiring connections for tightness and repair any hot connections.
(ii) Check that all electrical equipment have been properly reconnected in accordance with the manufacturer's specification.

(iii) Perform and record all required electrical insulation tests on equipment.

(iv) Check and test all controls with main circuits isolated.

(v) Check all motor-driven equipment for correct rotational directions.

(vi) Check and test the operation of all indication and warning lights.

(vii) Check, set, record and readjust all equipment control and set points in accordance with manufacturer's specification.

(viii) Run all motor-driven equipment for a period to ensure free movement and correct operation, feed pumps only to be operated for a short interval to check rotation.

FD 08.03 COMMISSIONING AND COMPLETION OF REPAIRS

On completion of the recommissioning checks the Contractor shall proceed with the commissioning. This operation shall be done strictly in accordance with Clause SC 11.02 of Additional Specification SC: General Decommissioning, Testing and Commissioning Procedures. This operation shall also be carried out in accordance with the manufacturer's specification and shall include but not be limited to the following for the different types of equipment:

FD 08.03.01 Self-contained air-conditioning unit

(a) Check evaporator and condenser pressures and superheat.
(b) If the unit needs charging, find leak, decant, repair leak and recharge unit.

(c) Check fans, fan speed control and fan motors.

(d) Check entering and leaving air temperatures over evaporator coil.

(e) Check operation of all safeties:

(i) LP cut-out pressure
(ii) HP cut-out pressure
(iii) Low on-coil thermostat
(iv) Set point of oil pressure safety
(v) Oil pressure trip.

(f) Check anti-recycle timer.

(g) Check all running amps of fans and compressors.

(h) Check compressor unloading mechanism if applicable.

(i) Complete commissioning data sheet.

FD 09 GUARANTEE OF INSTALLATION AND EQUIPMENT

The Contractor shall provide and obtain guarantees from the manufacturer(s) and/or supplier(s) to the effect that each piece of new equipment, supplied and installed under the repair contract, will comply with the required performance and will function as part of the complete system.

All new equipment, including the complete new installations and the systems as a whole, shall be guaranteed for a period of 12 (twelve) months commencing on the day of issue of a certificate of completion for repair work of the installation.

FD 10 REPAIR WORK TO INSTALLATION SYSTEMS AND EQUIPMENT

FD 10.01 GENERAL

At the start of the repair and maintenance contract all the systems, installations and equipment shall be repaired as specified in the Particular Specification. This repair work shall include but not be limited to the specified Particular Specification details.

All repair work shall be executed using approved materials and equipment suitable to the systems and/or installations they serve. The said repair work shall be executed in accordance with the relevant codes of practice, standard, regulations, municipal laws and by-laws, manufacturer's specifications and codes of practice and all additional and particular specifications included in this document.

The repair work items shall be listed in tabular form in the Particular Specification with all relevant details, such as capacity, size, manufacturer, model number, etc.

All repair work shall be executed within the approved period for repairs to be agreed at the start of the Contract period. All new equipment, materials and systems shall be furnished with a written guarantee of a defects liability period of 12 months from date of issue of a certificate for completion of the repair work. On completion of the required and specified repair work the systems, installations and equipment shall be commissioned and handed over to the satisfaction of the Engineer.

Repair work items shall be categorised for the following installations:

(a) Self-contained air-conditioning units.

FD 10.02 SELF-CONTAINED AIR-CONDITIONING UNITS

(a) Clean air intake screen.
(b) Replace filters.
(c) De-rust, neutralise and touch up paintwork.
(d) Replace canvas collars.
(e) Clean housing, ensure all panels are properly secured and door panels close properly.
(f) Check setting and operation of all pressure switches, reset if required.
(g) Check setting and operation of all safety switches, ie LP and HP switches, oil pressure switch.
(h) Check setting and operation of thermostats.
(i) Check timers and reset if required.
(j) Check operation of seven-day timer.
(k) Check running current of fans and compressor and settings and operation of overloads.
(l) Check tightness of all electrical terminals.
(m) Ensure operation of local and remote isolators.
(n) Check condition of all cables and whether cables are neatly strapped and reposition and strap if required.
(o) Ensure correct operation of emergency stop.
(p) Carry out a leak test on all refrigeration piping and components inclusive of evaporator and condenser.
(q) All leaks shall be repaired. Should a leak on a component be of such a nature that it cannot be repaired, the component shall be replaced. The procedure to follow is as set out in FD 03.
(r) The superheat setting of the thermostatic expansion valve shall be checked and adjusted if required (setting approximately 8 °C).
(s) The filter dryer shall be replaced.

(t) Check compressor vibration mounts.
(u) Test oil acidity.
(v) Check refrigerant charge sight glass being clear or flashing.
(w) Check moisture indication being dry.
(x) Clean condensate tray and test drainage operation.
(y) Clean evaporator and condenser blades and check unbalance.
(z) Replace suction line insulation.
(aa) Check all service valves for full operation, replace caps if missing.

FD 11 MAINTENANCE TO INSTALATION AND EQUIPMENT

FD 11.01 GENERAL

Monthly maintenance responsibilities for each installation including all units and components as specified, shall commence with commencement of the Contract. A difference shall be made in payment for the maintenance prior to and after practical completion of repair work.

Maintenance responsibilities of the completed installation shall commence upon the issue of a certificate of practical completion for repair work, and shall continue for the remainder of the 36-month contract period.

This part of the Contract shall include:

(a) Routine preventative maintenance;
(b) Corrective maintenance; and
(c) Breakdown maintenance;
(d) Cleaning of filters,

as defined in Additional Specification SA: General Maintenance, for the specified installations described under FD 01 of this specification.

The maintenance work to be performed and executed shall be done strictly in accordance with Additional Specification SA: General Maintenance, and as specified in Particular Specification PFD and this specification.

The said maintenance work shall be executed in accordance with the relevant codes of practice, statutory regulations, standards, regulations, municipal laws and by-laws and the manufacturers' specifications and codes of practice.

The maintenance schedules and frequency shall be developed under the maintenance control plan to be instituted by the Contractor, as specified in Additional Specification SA: General Maintenance.

All new equipment, components and materials supplied and installed under the maintenance contract shall be furnished with prescribed manufacturer's guarantees.

The maintenance work and items are to be categorised by the Contractor for each maintenance activity under the following headings:

(a) Self-contained air-conditioning units.

The Contractor shall be remunerated monthly, based on his performance, for maintaining the complete installation in a perfect functional condition.

FD 11.02 DEFINITION AND QUALIFICATION OF ACTIONS

FD 11.02.01 Daily maintenance actions

Daily actions are the responsibility of the User Client. These checks are to be performed by staff responsible of the facility. The self-contained air-conditioning units and ventilation systems should run during working hours and/or continuously. The status of these systems can thus be monitored by observation on a daily routine.

(a) Self-contained air-conditioning units:

-Does the unit perform and maintain temperature?
-Is the temperature in the areas concerned satisfactory?
Is the condensate drain working properly?

These daily checks shall be logged at the facility, ie by the kitchen manager and the maintenance personnel.

FD 11.02.02 Monthly maintenance actions

TABLE FD 11.02.02/1: SELF-CONTAINED AIR-CONDITIONING UNIT

REFERENCE NUMBER	ACTION
S-1	Clean filters, replace if required
S-2	Inspect air intake and discharge for blockages
S-3	Check all refrigerant, drainage pipes for damaged and leaks
S-4	Check sightglass: clear or flash gas
S-5	Carry out visual inspection of condenser coil for blockages and correct operation of fans
S-6	Carry out visual inspection of evaporator coil for blockages and correct operation of supply fan
S-7	Check enclosure for damages
S-8	Check electric motor running temperatures
S-9	Check electric connections for tightness
S-10	Test thermostat and control operation
S-11	Clean condensate tray and test drainage for proper operation
S-12	Check cooling and heating cycle

Note: The monthly actions shall include the activities of the daily maintenance actions.

FD 11.02.03 Biannual maintenance actions

TABLE FD 11.02.03/1: SELF-CONTAINED AIR-CONDITIONING UNITS

REFERENCE NUMBER	ACTION
S-1	Clean filters, replace if required
S-2	Inspect air intake and discharge for blockages
S-3	Check all refrigerant, drainage pipes for damages and leaks

S-4	Check sight-glass: clear or flash gas
S-5	Carry out visual inspection of condenser coil for blockages and correct operation of fans
S-6	Carry out visual inspection of evaporator coil for blockages and correct operation of supply fan
S-7	Check enclosure for damages
S-8	Check electric motor running temperatures
S-9	Check electric connections for tightness
S-10	Test thermostat and control operation
S-11	Clean condensate tray and test drainage for proper operation
S-12	Check filter/dryer
S-13	Check superheat and functioning of expansion valve
S-14	Check operation of HP and LP switch
S-15	Check operation of controllers
S-16	De-rust, neutralise and touch up paint work
S-17	Check cooling and heating cycle
S-18	Clean evaporator and condenser coil chemically
S-19	Clean all filter frames and seals
S-20	Check fan motor and compressor current
S-21	Check and test overload settings
S-22	Lubricate all bearings

Note: The above biannual actions include the activities of the monthly maintenance actions.

TECHNICAL SPECIFICATION

FN CLEAR-WATER PUMP SYSTEMS

CONTENTS

FN 01 SCOPE
FN 02 STANDARD SPECIFICATIONS
FN 03 AS-BUILT INFORMATION AND OPERATING AND MAINTENANCE MANUALS
FN 04 PUMP DESIGN AND REQUIREMENTS
FN 05 MOTOR DESIGN AND REQUIREMENTS
FN 06 WORKING VOLTAGE AND SUPPLY SYSTEMS
FN 07 PROTECTION AND CONTROL DEVICES
FN 08 DETAIL OF WORK
FN 09 TESTING AND COMMISSIONING
FN 10 MAINTENANCE
FN 11 MEASUREMENT AND PAYMENT

FN 01 SCOPE

This specification covers the decommissioning, removal, repair and reconditioning, installation, testing, commissioning and maintenance of pumping equipment, motor control devices and low-voltage cables. The function of clear-water pump systems shall be the delivery of water at a specified flow rate and head to the required location.

This specification shall form an integral part of the repair and maintenance contract document and shall be read in conjunction with portion 3: Additional Specifications included in this document.

This specification shall act as a guideline to the Particular Specification and, in the event of any discrepancies between the Technical Specification and the Particular Specification, the latter shall take precedence.

FN 02 STANDARD SPECIFICATIONS

FN 02.01 GENERAL STANDARD SPECIFICATIONS, REGULATIONS AND CODES

The latest edition, including all amendments up to date of tender, of the following specifications, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof:

BS 5316, Part 1	-	Acceptance tests for centrifugal, mixed flow and axial pumps
SABS 948	-	Three-phase induction motors
SANS 1222	-	Enclosures for electrical equipment (classified according to the degree of protection that the enclosure provides)
BS 4999	-	General requirements for rotating electrical machines
BS 1486, Part 2	-	Heavy duty lubrication nipples
ISO 281/1	-	Rolling bearings – dynamic load ratings and rating life

FN 02.02 OCCUPATIONAL HEALTH AND SAFETY ACT OF 1993

All regulations and statutory requirements as laid down in the latest edition of the Occupational Health and Safety Act of 1993: Construction Regulations, 2003 as promulgated in Government Gazette No 25207 and Regulation Gazette No 7721 of 18 July 2003 shall be adhered to.

FN 02.03 MANUFACTURERS' SPECIFICATIONS, CODES OF PRACTICE AND INSTALLATION INSTRUCTIONS

All equipment and materials shall be installed, serviced and repaired strictly in accordance with the manufacturers' specifications, instructions and codes of practice.

FN 02.04 MUNICIPAL REGULATIONS, LAWS AND BY-LAWS

All municipal regulations laws, by-laws and special requirements of the Local Authority shall be adhered to unless otherwise specified.

FN 03 AS-BUILT INFORMATION AND OPERATING AND MAINTENANCE MANUALS

The Contractor shall at the start of the Contract be given all available as-built information and operating and maintenance manuals.

The Contractor shall be responsible for the compilation of an inventory list and operating and maintenance manuals.

This shall be done in accordance with Additional Specification SB: Operating and Maintenance Manuals.

FN 04 PUMP DESIGN AND REQUIREMENTS

(a) The pump shaft shall be manufactured from stainless steel and shall be sealed where it enters the casing with double mechanical face seals.

(b) The impeller shall be suitable for pumping the type of clear water as specified in Clause FN 08 (Detail of work) of this specification.

(c) The impeller shall be manufactured from stainless steel or, in the case of other materials, it shall be coated with an approved material resistant to abrasion and corrosion prevalent to the conditions under which the impeller shall operate. For pumps rated below 2 kW non-metallic impellers may be utilised.

(d) The impeller shall be statically, dynamically and hydraulically balanced. No holes may be drilled in the impeller to balance it with regard to mass distribution.

(e) Only permanently sealed ball or roller bearings shall be installed.

(f) Bearings shall have a B-10 life rating of 100 000 hours.

(g) The pump shall be a currently catalogued product.

(h) Performance curves shall be based on a reproducible and certified test carried out in an approved testing facility, such as the SABS.

(i) The flow rate at break-off point of the curve for the impeller selected shall be at least 1,5 times that of the maximum flow rate specified.

(j) The head at zero delivery of the curve of the impeller selected shall be at least 1,2 times the maximum head in the pump's operational range.

(k) Each pump shall be clearly labelled. The label shall be a 0,5 mm thick stainless steel plate of dimensions 100 mm x 50 mm. The label shall be fixed to the pump exterior with an approved adhesive or other method after the completion of corrosion protection on the pump. It may be bent to follow the shape of the pump exterior but shall not be bent to accommodate sharp folds. Under no circumstances shall the stainless steel plate of the label influence, damage or otherwise have a detrimental effect on the corrosion protection system. The label shall include the following information:

- pump rates
- pump head
- power required
- NPSH (r) rotational speed
- impeller detail.

(l) All new submersible pumps shall be supplied with a length of power cable to suit the installation shown on the drawings.

(m) All new pumps shall be fitted with double flush mechanical seals, which shall be included in the cost of the pumps. The pump shafts shall be hardened and accurately ground where the seal bears on the shaft. The rotating seal face shall be mounted on a flexible member, sealing on the shaft as well. The flexible member shall be manufactured from rubber, PTFE or equivalent material suitable for the operating environment.

(n) Centrifugal pumps shall comply with relevant and applicable items under the clause on technical requirements regarding all pump types, as well as the following:

(i) Preference shall be given to pumps of the self-regulating type and where the power consumption characteristic is such that the power consumption decreases with an increase in delivery to beyond a certain limit, thus ensuring that the motor is not overloaded in the event of a large reduction in pumping head.

(ii) The casing for centrifugal pumps shall be horizontally or vertically split to allow removal of parts.

(iii) The efficiency of the pump shall not be less than 95 % of its maximum efficiency at the selected operating point, where the latter shall not be less than 80 %.

FN 05 MOTOR DESIGN AND REQUIREMENTS

(a) Electric motors shall comply with the requirements of SABS 948

(b) Imported motors forming an integral part of the pump shall be submitted to the South African Bureau of Standards to be tested in accordance with the requirements of SABS 948.

(c) All motors shall be standard catalogue models and shall be readily available.

(d) All motors shall, where possible, be from the same manufacturer and shall have the same interchangeable frames. Variations in type and size shall, where possible, be limited to make stocking a variety of special spares unnecessary.

(e) All motors shall have dynamically balanced rotors supported by maintenance-free, sealed-for-life ball bearings.

(f) All motors shall be suitably coated to ensure the satisfactory operation of the motor under the specified class of service.

(g) All terminal boxes shall be waterproof and suited for submersion up to the depth as specified for the pumps.

(h) An adequate length of waterproof cable, purpose-made for submerging, shall be supplied with each submersible motor. The coupling of this cable to the normal power-distribution cable, which usually is of the PVC type with steel-wire armour, shall be placed at least 1,0 m above the maximum water level by means of a purpose-made, weatherproof, outdoor junction box. The submerged cable shall be supported to minimise any movement of the cable, which result from turbulence caused by the operation of the equipment or the flow of the water.

(i) Thermistor protection or Klixon type temperature switches shall be provided for submersible motors.

(j) Seal monitors shall be provided for submersible motors, together with the required seal monitor relays. The cost for the seal monitor relays shall be deemed to be included in the rates tendered for the equipment.

FN 06 WORKING VOLTAGE AND SUPPLY SYSTEMS

The motors shall be capable of operating within ± 10 % of the nominal supply voltage without risk of damage. All motors shall be suitable for operating continuously at the specified three-phase voltage system under actual service conditions, including the ± 10 % voltage tolerance, without exceeding the specified temperature rise determined by the resistance on a basic full load heat run.

All motors shall be capable of operating continuously under actual service conditions at any supply frequency between 48 and 51 Hz together with any voltage between ± 5 % of the nominal supply voltage.

The slip-in speed of any motor at 80 % of the nominal voltage at 50 Hz shall not exceed a percentage agreed on by the Engineer, and the motors shall be capable of operating at this voltage for a period of five minutes without deleterious heating.

FN 07 PROTECTION AND CONTROL DEVICES

Submersible pumping equipment shall have float switches to switch the pump motor on and off, according to the level of the liquid. Switches shall operate freely and not be hindered by cables or other switches and shall switch off at a level where no damage to the pump or motor will occur.

Three level switches shall operate a pump control system:

(a) Level switch one shall switch off pumps at low level;

(b) Level switch two shall switch on one pump at an intermediate level, to draw the liquid down to level 1. When the level again rises to where level switch two was switched on, the pump duty shall rotate and start the motor parallel to the one which ran the first time;

(c) Level switch three shall switch on both pumps to run in parallel at a high level.

In the event of a pump failing to start, the other pump must automatically be restarted.

Pumps shall be operated in both manual and automatic modes.

FN 08 DETAIL OF WORK

FN 08.01 GENERAL

The Contractor shall investigate and inspect all areas of the installation to confirm the extent of the repair work required and shall report to the Engineer. The Engineer will thereafter demarcate any areas to be repaired and shall instruct the Contractor with regard to the repair work to be done.

FN 08.02 TESTING EQUIPMENT

All electrical and mechanical equipment shall be checked at the start of the Contract to establish which items need to be repaired, reconditioned or replaced.

FN 08.03 PUMPING EQUIPMENT

If no detail of the existing pumps is available, such detail shall be determined by removing the pumps.

Reconditioning or repair of pumping equipment shall be carried out if necessary.

FN 08.04 MOTOR CONTROL CENTRE

(a) The inside and outside of all surfaces of the motor control centre must be thoroughly cleaned and metal surfaces treated for rust and corrosion and repainted to specification.

(b) Float switches for level sensing shall be checked. Missing, damaged or faulty switches shall be replaced with new switches of similar and equal type. The switches must be installed and supported on suitable brackets to prevent the cables and switches from tangling, due to the inflow of the sewage water.

(c) Check and tighten all terminations of all equipment.

(d) Clean out all switchgear and equipment properly to remove dust and spider webs.

(e) Dismantle and clean all moving parts and contacts of magnetic contactors and starters, reassemble, check overload trip units and adjust correctly. Test for correct functioning on completion of repair work.

(f) Replace any damaged ammeters, switches and lamps on the control with parts similar and equal to the existing types on the panel.

(g) Wiring diagrams of all electrical panels and MCC panels shall be compiled.

FN 09 TESTING AND COMMISSIONING

FN 09.01 TEST TO BE PERFORMED

(a) All pumping equipment shall be subject to the commissioning tests as described in the applicable specification.

(b) At least one of each type or size of pump supplied, repaired or reconditioned, shall be subject to a delivery flow rate test. The Contractor shall supply flow rate or volumetric flow testing facilities.

(c) The operating point of each pump shall be determined.

(d) Efficiency tests shall be performed.

(e) NPSH tests shall be performed.

FN 09.02 PUMP OPERATING POINT

During the day 1 commissioning tests the pump operating point shall be determined by observing the following:

(a) pump delivery and suction pressures, and
(b) electric motor power consumption.

If no efficiency tests are required, then the motor power consumption shall be calculated from the voltage and current measurements obtained during the commissioning test.

The Contractor shall supply the necessary adaptors, fittings and pressures gauges to measure the suction and delivery pressures. If no gauge fittings exist on the suction side, then the suction pressure conditions will be calculated from the system properties.

FN 09.03 FLOW RATE (DELIVERY), EFFICIENCY AND NPSH TESTS

(a) Testing shall be done in accordance with BS 5316 Part 1, class C tests.

(b) Power consumption of electric motors shall be as determined by the three-wattmeter method where efficiency tests are required in the detail specification.

FN 09.04 TEST CONDITIONS

(a) All tests shall be performed in situ.

(b) The pumped medium or liquid shall be water.

FN 09.05 ADDITIONAL TESTS

Additional tests may be specified in the detail of work.

FN 10 MAINTENANCE

FN 10.01 GENERAL

All pumping equipment and systems shall be serviced and repaired, following practical completion of the installation of which it forms part, to maintain it in perfect functional condition.

Maintenance shall be carried out and shall include routine preventative maintenance according to the manufacturer's specification to be set out in the operating and maintenance manual, as well as unforeseen repairwork or replacement.

The remuneration for monthly maintenance of pumping equipment and systems shall be deemed included in the tendered rate for 10 points of the installation of which the system forms part. Installations are specified in Additional Specification SA: General Maintenance, and illustrated in detail on the mechanical flow diagram.

FN 10.02 ROUTINE PREVENTATIVE MAINTENANCE

The routine preventative maintenance work to be carried out shall include but not be limited to the items listed in table FN 10.2/1 below.

These actions and findings shall be logged and reported on the relevant approved schedules and reports.

TABLE FN 10.02/1

NO	ROUTINE PREVENTATIVE MAINTENANCE OF CLEAR-WATER PUMP SYSTEMS	MAINTENANCE FREQUENCY
1	Swimming pool: Supply and addition of chemicals to maintain water quality clear, blue, without any organic growth and within the norm. Mechanical cleaning of the swimming pool to maintain the surface without any floating objects, and maintain the pool bottom and walls without any sediment or organic growth. Operating and maintenance of the strainer and sand filter, as specified by the supplier.	Weekly
2	Visually inspect and report on complete systems	Monthly
3	Check, service, repair and clean all pumps	Six-monthly
7	Check, service, repair and clean all motor control centres and level censing devices.	Six-monthly
4	Corrosion protect pumps, motors and surface piping	As required
5	Check, inspect, report and repair all leaks	Monthly
6	Check and lubricate moving parts	Six-monthly

FN 11 MEASUREMENT AND PAYMENT

FN.01 **SUPPLY AND DELIVERY OF PUMPING EQUIPMENT** .....Unit: number

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

The tendered rates shall include full compensation for the design, manufacture, corrosion protection, patent rights, pre-delivery testing and test certificates, transport for delivery to site and off-loading, including all handling of the equipment. The equipment shall include the following:

(a) The pump and motor as an integrated unit
(b) Electrical power cable.

Separate items will be listed in the Schedule of Quantities for different types and sizes of equipment.

FN.02 **INSTALLATION, TESTING AND COMMISSIONING OF PUMPING EQUIPMENT**.....Unit: number

The unit of measurement shall be the number of pumping equipment units tested and commissioned.

The tendered rates shall include full compensation for the site handling and positioning of the pumping equipment, including the fastening of the equipment in its designated position. The following shall also be included in the tendered rates:

(a) Installation of the guide rails and sealing frame;
(b) Coupling of all required pipes flanges, including all required gaskets, nuts, bolts and washers;
(c) Routing and fastening of the power cable up to the isolator box;
(d) All required installation materials, labour and consumables to render a complete and working installation.

The tendered rates shall also include full compensation for all preliminary tests, delivery and efficiency tests if required and commissioning tests. Commissioning tests shall comply with the section dealing with testing and commissioning.
Separate items will be listed in the Schedule of Quantities for different types and sizes of equipment.

FN.03 **DECOMMISSIONING AND REMOVAL OF PUMPING EQUIPMENT**.....Unit: number

The unit of measurement shall be the number of pumping equipment units decommissioned and removed.

The tendered rates shall include full compensation for all labour, machinery, tools, transport and site handling necessary for the decommissioning and removal of pumping equipment.

Separate items will be listed in the Schedule of Quantities for different types and sizes of equipment.

FN.04 **RECONDITIONING OF PUMPING EQUIPMENT**.....Unit: number

The unit of measurement shall be the number of pumps and motors reconditioned.

The tendered rates shall include full compensation for replacement of components and materials, and for tools, transport, site handling and labour necessary for the complete reconditioning of pumping equipment to conform to all the specifications in Clauses FN 04: Pump design and requirements, and FN 05: Motor design and requirements.

Separate items will be listed in the Schedule of Quantities for different types and sizes of equipment.

FN.05 **REPAIR OF PUMPING EQUIPMENT**.....Unit: number

The unit of measurement shall be the number of pumps and motors repaired.

The tendered rate shall include full compensation for supply of an identification label, resetting the spacer between impeller and back plate and ensuring that impeller rotates freely, as well as cleaning and corrosion protection and installing a new hoisting chain.

Separate items will be listed in the Schedule of Quantities for different types and sizes of equipment.

FN.06 **SUPPLY OR RECONDITIONING OF MCC BOARDS OR OTHER ELECTRICITY BOARDS**.....Unit: number

The unit of measurement shall be the number of MCC boards or other electricity boards supplied of existing boards reconditioned.

The tendered rates shall include full compensation for supply and replacement of components and materials and for tools, transport, site handling and labour necessary for the complete reconditioning of all components of the board or supply of all components to provide a fully functional MCC board.

Separate items will be listed in the Schedule of Quantities for different types and sizes of equipment.

FN.07 **COMPILATION OF WIRING DIAGRAMS** .....Unit: number

The unit of measurement shall be the number of wiring diagrams compiled.

The tendered rates shall include full compensation for drawing, printing, computer time and any other associated costs necessary for the compilation of a wiring diagram.

TECHNICAL SPECIFICATION

GF ELECTRIC MOTORS

CONTENTS

GF 01 SCOPE, REFERENCE SPECIFICATIONS, STANDARDS AND CODES
GF 02 GENERAL REQUIREMENTS
GF 03 WORKING VOLTAGE AND SUPPLY SYSTEMS
GF 04 TEMPERATURE RISE
GF 05 EFFICIENCY AND POWER FACTOR
GF 06 VIBRATION
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GF 17 ADDITIONAL REQUIREMENTS
GF 18 TECHNICAL DATA SHEETS
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GF 01 SCOPE, REFERENCE SPECIFICATIONS, STANDARDS AND CODES

This is a particular specification and covers all aspects related to electric motors that may be incorporated in any of the items of equipment to be supplied under the Contract. The applicable reference specifications, standards and codes are:

(a) SABS 948 - Three-phase induction motors

(b) BS 4999 - General requirements for rotating electrical machines.

GF 02 GENERAL REQUIREMENTS

(a) Electric motors shall be manufactured in South Africa and shall comply with the requirements of SABS 948.

(b) Where imported motors are offered they shall be submitted to the South African Bureau of Standards to be tested in accordance with the requirements of SABS 948 and the Engineer shall be provided, prior to the installation of the motors, with the appropriate certificate obtained from the South African Bureau of Standards stating that such motors do comply. However, where tests reveal that motors do not comply, it shall be the responsibility of the Contractor to supply alternative motors which comply with the requirements of SABS 948 and which are acceptable to the Engineer. Where imported motors are not normally kept in stock in South Africa, written proof of the availability of replacement parts shall be provided, as well as the delivery period of the parts after placing the orders.

(c) All motors shall be standard catalogue models and shall be readily available.

(d) All motors shall, where possible, be from the same manufacturer and shall have the same interchangeable frames. Variations in type and size shall, where possible, be limited to prevent stocking a variety of special spares.

GF 03 WORKING VOLTAGE AND SUPPLY SYSTEMS

(a) The motors shall be capable of operating within ± 10% of the nominal voltage supply without risk of damage. All motors shall be suitable for operating continuously at the specified 3-phase voltage under actual service conditions, including the ± 10% system voltage tolerance, without exceeding the specified temperature rise determined by the resistance on a basic full load heat run.

(b) All motors shall be capable of operating continuously under actual service conditions at any supply frequency between 48 Hz and 51 Hz together with any voltage between plus and minus 5 per cent of the nominal supply voltage.

(c) The slip-in speed of any motor at 80 per cent of the nominal voltage at 50 Hz shall not exceed a percentage agreed on by the Engineer, and the motors shall be capable of operating at this voltage for a period of five minutes without deleterious heating.

GF 04 TEMPERATURE RISE

The temperature rise of all motors, as determined by resistance, shall not exceed the following derated values:

Insulation class	E	B	F	H
Temperature rise (K)	50	60	80	100

GF 05 EFFICIENCY AND POWER FACTOR

(a) The efficiency of all motors shall be guaranteed by the Contractor. Deviations from the guaranteed efficiency shall be within the limits specified in SABS 948.

(b) The guaranteed efficiency of each size and rating of motor shall be as determined in accordance with BS 4999: Part 102. A basic test certificate of efficiency will be accepted for a motor of identical size and rating or a basic test of efficiency shall be conducted if no certificate is available.

(c) The power factor of motors with a capacity of 20 kW or more shall not be less than 0,9 under all operating conditions.

GF 06 VIBRATION

(a) Motors shall be statically and dynamically balanced.

(b) All motors shall be checked for vibration without load and at full rated voltage at the manufacturer's works, and the vibration amplitude as measured shall be in accordance with BS 4999: Part 142, quality grade 'Normal'.

(c) The ratio of axial to radial vibration shall not exceed 0,5.

GF 07 NOISE LEVEL

Unless otherwise specified motors shall be of 'normal sound power', in compliance with BS 4999.

GF 08 ENCLOSURE AND FRAME

(a) Each motor shall be protected to the degree required by its application, and its enclosure shall be designed for the system of cooling associated therewith.

(b) Notwithstanding the requirements of subclause 08(a) above, the minimum degree of protection shall be IP55 to SABS 1222 and, unless otherwise required, motors shall preferably be of the totally enclosed fan-cooled (TEFC) type.

(c) All motors of the vertical-spindle type and exposed to the weather, shall be provided with a robust canopy of approved design.

(d) Medium-length motors are preferred but short-length motors may be accepted where space is limited and written permission has been granted by the Engineer.

GF 09 MOTOR TYPE

Motors shall be of the squirrel-cage induction motor type. Slip-ring induction motors or other approved types will be considered if the Contractor is of the opinion that better results could be obtained by using such motors. Full electrical and mechanical details of each alternative shall be submitted with the tender documents.

GF 10 RATING AND STARTING REQUIREMENTS

(a) Motors shall be adequately rated for the service for which they are intended, and due allowance shall be made for the temperature, altitude, climatic conditions and variations in the supply voltage. Motors shall, however, not exceed 120% of the required capacity without prior approval having been obtained from the Engineer.

(b) Not only shall motors be based on the full load requirements, but the motor capacity and starting characteristics shall be compatible with the requirements of the driven equipment.

(c) Where motors are required to drive high inertia loads, the starting torque of the motor and the torque curve of the driven load shall be submitted to the Engineer for approval prior to manufacture. Such motors shall be capable of three starts per hour, with two consecutive starts from normal operating temperature, or more frequently if required by the Engineer.

(d) Motors shall be of the continuously running duty class S1 unless otherwise specified in the detailed specification or if a more onerous duty is dictated by the drive requirement.

(e) All squirrel-cage induction motors shall be suitable for direct-on-line starting at full voltage. Single-speed motors shall conform to BS 4999: Part 41, Design B characteristics unless otherwise approved by or dictated by the drive requirements.

(f) All motors shall be capable of starting its associated load with a minimum accelerating torque of not less than 5 per cent of full-load torque when the voltage at the motor terminals during starting is reduced to 80 per cent of the nominal value.

(g) Unless otherwise approved, the -15 per cent tolerance on locked-rotor torque permitted by BS 4999: Part 69 will not be accepted and shall be limited to -10 per cent.

(h) Documentation shall include performance curves to suit the expected working conditions.

GF 11 BEARINGS

(a) All motors shall, wherever possible, be provided with prelubricated sealed bearings.

(b) Regreasable bearings shall require only one lubrication per year. Grease lubrication of ball or roller bearings, where approved, shall be by means of hexagonal button-type grease nipples to BS 1486: Part 2, Nos. 21A or 21B (industrial type).

(c) Grease-lubricated bearings shall have relief holes to ensure that the bearings have been correctly packed, which holes shall be positioned so that the excess grease can be easily removed. Cups shall be fitted to contain excess grease.

(d) Bearings shall be protected against eddy currents and shall be capable of withstanding vibrations caused by unbalanced loads.

(e) All bearings shall be designed for a life of 100 000 hours at B10 rating.

GF 12 EARTHING

All motors shall be provided with a machined or spot-faced boss tapped to receive a bolt of not less than 10 mm in diameter for earthing purposes, which is located on one side between the mounting feet.

GF 13 HEATERS AND DRAINAGE

Non-submersible motors which will be located out of doors or in a damp location such as in a drainage sump, shall be provided with suitable means of drainage to prevent the accumulation of water due to condensation. They shall also be fitted with anti-condensation heaters suitable for a 220V AC supply if considered advisable by the manufacturer.

Where specified in the project specifications, motors shall be supplied with anti-condensation heaters to keep the motor temperature at 23 °C when the motor is not operational to prevent moisture from condensing in the motor.

Heater terminal boxes shall be fitted on the motor frame and shall be of robust design, liberally sized and complete with suitable terminal block and mechanical cable gland or conduit entry.

GF 14 TERMINAL ARRANGEMENTS

(a) The line connections of each motor shall be brought out to a terminal box located in an approved position. In the case of two-speed motors, separate terminal boxes shall be provided for each speed.

(b) Terminal boxes shall be of the totally enclosed type designed to exclude the ingress of dust and moisture and sealed from the internal circuit of the motor, and shall be manufactured from sand-cast metal. The wall thickness of the terminal boxes and the dimension of the cable inlet shall be as specified in SABS 948. The terminal box shall be so designed that the cable entry may be made in any one of four positions placed at right angles to one another.

(c) Terminal boxes shall be of ample size to allow the cable to be terminated in the box. Under no circumstances will the cable be allowed to be in contact with the inside of the box or lid.

(d) Terminals shall be of a substantial design and shall be suited to receive cable lugs. Pinch-screw connections will not be accepted.

(e) The terminal arrangement shall permit the motor to be disconnected from its supply cable without damaging the cable tails and shall allow the supply cable and motor windings to be tested separately.

(f) The electrical clearance and creepage distances, with the correct cable terminations in position, shall comply with the requirements of BS 4999.

(g) Terminal markings shall be clear and permanent and shall comply with BS 4999. Irrespective of the direction of rotation required on the site, the connections shall be such that, when the supply leads L1-L2-L3 are connected to the motor terminals U-V-W respectively, the motor shall rotate in a clockwise direction when viewed from the driving end.

(h) Motors suited for only one-directional rotation, shall be clearly marked as such by an arrow fixed to the motor frame at the driving end.

GF 15 MOTOR/LOAD COUPLING

(a) Motors shall be coupled direct to the equipment to be driven, by means of approved couplings. Vee-belt and chain drives shall be considered only if direct coupling of the motor to the equipment is impossible or impracticable. Motors driving Vee-belt or chain drives shall be fitted with heavy-duty bearings suited to the full side thrust at 120% of full load torque and short-term overloads of up to 250% of the full load torques during starting. The stiffness of the rotor shaft shall be checked to ensure that resonance and fatigue do not occur.

(b) Where applicable, the flanges of the motors and equipment shall be identical.

(c) The precision tolerance class shall apply to all flange-mounted motors with regard to concentricity, perpendicularity and shaft run-out.

GF 16 SUBMERSIBLE MOTORS

The following additional requirements apply specifically to all submersible motors:

(a) All submersible motors shall be suited for submersion up to a depth of 1,5 times the depth of submersion shown on the drawings for each application, or as specified in the Project Specifications.

(b) All submersible motors shall have dynamically balanced rotors supported by maintenance-free, sealed-for-life ball bearings.

(c) All motors shall be suitably coated to ensure the satisfactory operation of the motor under the specified class of service.

(d) All terminal boxes shall be waterproof and suited for submersion up to the depth as specified for the motors.

(e) An adequate length of waterproof cable, purpose-made for submerging, shall be supplied with each submersible motor. The coupling of this cable to the normal power-distribution cable, which usually is of the PVC type with steel-wire armour, shall be placed at least 1,0 m above the maximum water level by means of a purpose-made, weatherproof, outdoor junction box. The submerged cable shall be supported to minimize any movement of the cable which result from turbulence caused by the operation of the equipment or the flow of the water.

(f) Thermistor protection shall be provided for submersible motors.

GF 17 ADDITIONAL REQUIREMENTS

(a) The rotation speed of motors shall not exceed 1 500 r/m unless approved otherwise by the Engineer.

(b) Thermistor protection shall be provided for each winding of each motor.

(c) The preferred class of insulation is Class F, derated in accordance with clause 04 above.

GF 18 TECHNICAL DATA SHEETS

Details of all individual electric machines and equipment requiring electrical energy shall be indicated on the 380 V motor and equipment schedule included in the technical data sheets.

GF 19 MEASUREMENT AND PAYMENT

No separate payment will be made for electric motors for equipment. All direct and indirect costs associated with such motors shall be deemed to be included in the rates tendered for the equipment.

TECHNICAL SPECIFICATION

LL _____ CORROSION PROTECTION

CONTENTS

LL 01 SCOPE
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LL 01 SCOPE

This part of the Specification provides the general and detail requirements for corrosion protection and shall apply wherever this document refers to the standard specification on Corrosion Protection.

All the equipment supplied under this Contract shall be corrosion protected according to the following specifications:

LL 02 GENERAL REQUIREMENTS

(a) All paints in a paint system shall be purchased from one paint manufacturer. Identical paints used at one time or on one item shall be of the same batch number.

(b) When stainless steel nuts, bolts and washers are to be used on mild steel or cast iron equipment, suitable electrical insulation shall be fitted between stainless steel and mild steel or cast iron.

(c) Strict attention shall be paid to fettling of surfaces by the fabricator prior to coating. Surface preparation requirements, and the need for strict cleanliness and adherence to the specification requirements are emphasised.

(d) Areas which are or potentially may be inaccessible after assembly shall be prepared and fully coated with the specified system and to the specified requirements before assembly. The coating shall be fully hard dry before assembly.

(e) Mating surfaces shall be coated with primer or first coat only. The coating shall be uniform in thickness and shall not interfere with the mechanical tolerances. After assembly the outside surface of the joint shall be fully coated and sealed where necessary in accordance with the relevant specification.

LL 03 DESIGN

(a) General

All items shall be so designed to minimize corrosion in outdoor environments, under immersion conditions and in interior aggressive situations.

(b) Water retention areas

Avoid water retention areas wherever possible. For example, angle or U - section steel shall be used with the toes pointing downwards and the concrete base of columns shall be sloped away from the steel. Where water retention cannot be avoided, drain holes, suitably radiused, shall be fitted at the lowest point.

(c) Crevices

Accelerated corrosion results from crevices when water is present. Crevices may be avoided by using:

(i) continuous welding, not spaced welding

(ii) mastics or sealants to seal unavoidable crevices such as bolted connections

(iii) insertion rubber or suitable plastic between mating surfaces.

(d) Bimetallic couples

Electrical contact between dissimilar metals gives rise to a corrosion cell when an electrolyte such as water is present. Joints between dissimilar metals shall be suitably insulated, or effectively sealed to prevent the ingress of water.

(e) Accessibility

Whenever possible, the surfaces of corrodible materials such as mild steel shall be accessible for maintenance. The use of angles, back to back, partially open box sections or inaccessible stiffeners shall be avoided.

(f) Sharp edges, weld spatter and weld slag

The designer shall specify that all sharp edges shall be ground to a radius not less than 2 mm and that all weld spatter and weld slag shall be removed by the fabricator.

g) Cathodic protection

Cathodic protection is described separately under Technical Specification LL Cathodic Protection.

LL 04 COATING MATERIALS

(a) No variation in materials to be used shall be permitted without the approval of the Engineer in writing.

(b) All coating materials shall be delivered in the manufacturer's original sealed containers, clearly marked with the following:

(i) Manufacturer's name

(ii) Product brand name and reference number

(iii) Batch number which may incorporate the date of manufacture

(iv) Date of manufacture, unless already incorporated in the batch number

(v) Abbreviated instructions for storage and use of the material, which shall include mixing ratios of components of multi-component materials, hard dry times, the minimum and maximum temperature of application, the method of application and overcoating times

(vi) The SABS mark, where applicable.

(c) Coating materials shall be kept in a store approved by the engineer, which shall be dry and enclosed and in which the temperature is unlikely to exceed 40°C or drop below -5°C.

(d) Usage of materials shall be on a first in, first out basis and no materials may be used which have exceeded the shelf life for that material that is recommended by the manufacturer.

LL 05 FETTLING OR DRESSING BY THE FABRICATOR

(a) Before any surface preparation or painting is carried out, dressing shall be carried out to remove projections, sharp edges, weld slag and spatter that will interfere with the corrosion protection.

(b) Remove all weld flux and weld spatter. Flux is best removed by washing with clean water whilst weld spatter is normally removed by grinding to a smooth finish.

(c) Sharp edges shall be ground to a radius not less than 2 mm.

(d) Welds shall be continuous and shall have a smooth contour. Rough welds shall be ground where necessary to achieve the required smooth profile. Undercuts shall not be permitted. Discontinuous welds shall be permitted except by written approval of the engineer.

(e) Articles for hot dip galvanizing shall not have any overlapping joints. Closed sections shall be suitably vented.

LL 06 SURFACE PREPARATION FOR PAINTING

(a) Mild steel, minimum 2 mm thickness

Oil and grease contamination, when present, shall be removed by degreasing before blast cleaning.

Mild steel shall be blast cleaned in accordance with Section 4.3 of SABS 064. An additional requirement is that water soluble salts present in the steel after blast cleaning shall not exceed the values given in Table 2.1. Should these values be exceeded, the steel shall be cleaned by washing with clean potable water or by water shrouded or water

injected blast cleaning until the soluble salts are within the limits specified in Table 2.1. The steel shall then be allowed to dry, after which it shall be flash blast cleaned to achieve the required degree of cleanliness.

The required standard of blast cleaning is given in Table 2.1.

TABLE 2.1 - STANDARDS FOR BLAST CLEANING

PROPERTY	ABOVE-WATER SURFACES	IMMERSED SURFACES	TAPE WRAPPING	INORGANIC ZINC
Cleanliness to ISO 8501-1 (min)	Sa22	Sa3	Sa2	Sa2½
Residual dust and debris (SABS Method 769) (max)	0,5%	0,3%	0,5%	0,3%
Oil grease and perspiration	Nil	Nil	Nil	Nil
Surface profile min, micrometres max, micrometres	25 50	50 100	-	50 100
Water soluble iron salts - maximum at any point	500 mg/m^2	100 mg/m^2	500 mg/m^2	500 mg/m^2
Average of any test area 250 cm^2	100 mg/m^2	10 mg/m^2	100 mg/m^2	100 mg/m^2

The time interval between blast cleaning and application of the first coat of paint shall not exceed that given in Table 2.2.

TABLE 2.2 - MAXIMUM TIME INTERVALS

AMBIENT RELATIVE HUMIDITY (RH)	MAXIMUM TIME (HOURS)
Below 50% 50-70% 70 - 85% Over 85%	8 4 2 Coating not permitted - reblast and coat when RH below 85%

(b) Mild steel, less than 2 mm thickness

Mild steel less than 2 mm thickness may distort when blast cleaned. Such steel shall be cleaned by degreasing, pickling and phosphating in accordance with SABS 064, Section 5, or by a proprietary process approved by the Engineer. The specified primer shall be applied immediately after completion of phosphating, rinsing and drying (see Table 2.2).

(c) Cast iron and cast alloys

Cast surfaces shall be blast cleaned with iron slag, copper slag, or platinum slag abrasives designed for blast cleaning. The abrasive shall not be recycled or re-used. Cast iron shall be blast cleaned until all sand particles, residual burnt on sand and casting skin have been completely removed. When castings are required to be painted, especially for immersion applications, all blowholes and omegas shall be opened up and filled with a suitable solvent free epoxy filler or putty, finished level and smooth with, or proud of the surrounding surface. Proud putty, after curing, shall be abraded to be flush with the surrounding surface.

(d) Painted surfaces

(i) Fully painted surfaces to be repaired or overcoated

Exposed metal shall be cleaned with abrasive paper not coarser than 220 mesh to a bright metal surface. The surrounding paint, which must be intact, shall be feathered for a distance of 20 mm beyond the damaged area. Dust and debris shall be removed by the use of a clean rag dampened with water or clean solvent that will not attack the coating. Damaged areas shall be allowed to dry, after which spot repairs shall be carried out with all the coats previously applied and shall overlap the undamaged area by 20 mm. The requirements of the spot repair shall be not less than that specified for the undamaged coating.

Where additional coats are required over the entire surface, the entire surface shall be abraded to a uniform matt finish, the dust and debris removed, and the surface allowed to dry. All further coats shall then be applied as specified to give a uniform finish

(ii) Shop applied primers to be overpainted

Primers shall be thoroughly sanded with fine abrasive paper to achieve a uniform matt surface, then scrubbed with a solution of suitable water based detergent-degreaser using a bristle brush, followed by clean water rinses to remove all grease and water soluble matter. The surface shall be allowed to dry completely before application of the specified coating system over the whole surface.

LL O7 THE APPLICATION OF PAINTS

(a) Environmental conditions

Paint shall not be applied in dusty conditions, nor when the steel surface temperature is less than 3°C above dew point, nor higher than that advised by the paint manufacturer, nor when humidity is greater than 85%, nor when the ambient temperature is less than the minimum or greater than the maximum specified by the manufacturer of the coating material.

All coating materials shall be very thoroughly mixed until they are completely

homogeneous. In the case of two-pack materials, each component containing pigments shall be thoroughly mixed. The two components shall then be mixed together in the proportions supplied by the manufacturer until the mixture is completely homogeneous. In the case of solvent based epoxy materials, it is recommended that the mixed material be allowed to stand for an induction period of 20 to 30 minutes before use.

For two pack materials, the use of part of the contents (split packs) is strictly forbidden.

(b) Method of application

Application shall be by brush, roller, airless spray, or other suitable equipment as appropriate for the surfaces to be coated and in accordance with the recommendations of the manufacturer. Application equipment shall be maintained in clean condition and in good working order. The use of equipment not maintained in good clean condition may lead to rejection of the coating.

(c) Overcoating

Overcoating times shall be not less than the minimum nor greater than the maximum specified by the manufacturer relevant to the ambient temperature. Strict adherence to overcoating times is particularly important for coatings which are subsequently immersed. The Contractor will be held responsible for blistering of paint coatings on immersed surfaces.

All coats shall be clean and free from dust, oil, moisture and perspiration before overcoating. Operatives handling blast cleaned or partially painted surfaces shall wear clean gloves to avoid contamination of the surfaces

(d) Permissible variations of film thickness

Minimum film thickness: Not more than 10% of readings shall be less than the minimum specified and no reading shall be less than 90% of the specified minimum.

Maximum film thickness: Unless otherwise agreed by the Engineer, no reading shall exceed the mean specified thickness by more than 50%.

(e) Handling

Coated components shall not be handled earlier than the hard dry time recommended by the manufacturer, relevant to the ambient temperature. Coated components shall be handled with broad band slings and suitable packing to minimise damage to the coating. All damage caused in handling, transportation, and erection, shall be repaired to the satisfaction of the engineer and at no extra cost.

LL 08 COATING SYSTEMS

(a) System A - alkvd systems

(i) General

Alkyd systems are intended for use in environments of low corrosivity, where a good decorative finish is required. Materials shall therefore be applied with due cognizance of appearance and protection. Defects such as runs, sags, curtaining, shriveling or wrinkling will not be permitted.

(ii) System A3 - Factory finished components

(1) The Contractor shall ensure that the existing coating is compatible with the system to be applied.

(2) Prepare the surface as specified in the relevant clause.

(3) On interior non aggressive surfaces apply one coat alkyd enamel complying with SABS 630 Type 1, in the color specified by the Engineer, to give an applied dry film thickness of not less than 25 micrometres. Total dry film thickness to be not less than 75 micrometres.

(4) On exterior surfaces, apply two coats alkyd enamel complying with SABS 630 Type 2, to give an applied dry film thickness not less than 50 micrometres. Total thickness shall not be less than 100 micrometres.

(5) If the total dry film thickness is less than the appropriate value given above, apply a further coat of alkyd enamel.

(iii) Site repair of Alkvd systems

(1) It is anticipated that alkyd systems will generally be applied on site, either on to bare steel (see System A1), or on to prepared and primed steel (see System A2), or on to fully coated components (see System A3), or on to galvanized steel (see System A4), or on to plastic surfaces for the purpose of color coding (see System A5).

(2) Any site repair required by the engineer shall be carried out in accordance with surface preparation method given in the relevant clause followed by all the coats required to restore the damaged area to the original system requirements.

(3) Since patch application of the final coat rarely gives an acceptable uniform finish, the whole area in which damage has occurred shall be cleaned, abraded with fine wet or dry abrasive paper (not coarser than 200 mesh) and given one coat of enamel all over, unless otherwise accepted by the engineer.

(b) System B - Two pack epoxy systems for pipework and valves

(i) General

Two pack epoxy - polyamide materials in System B1, contain solvent. It is important to note that this solvent must be allowed to escape and the chemical reaction to complete fully before being subjected to water immersion.

For these reasons it is imperative that the applicator does not exceed the maximum film thickness per coat applied, nor must overcoating be carried out earlier than the minimum time specified by the manufacturer. Since overcoating times are frequently quoted at 20 °C or 25 °C, longer overcoating times shall be allowed at lower temperatures. As a rough guide, increase time by 50% for a 5° decrease (or by 100% for a 10° decrease) in the ambient temperature below the temperature quoted in the data sheet.

These materials shall not be applied when the ambient temperature is below 10 °C.

All solvent based epoxy resin based materials shall be allowed 28 days to cure before immersion. At temperatures below 20 °C longer periods shall be allowed, as in the case of overcoating times.

Since solvent free epoxies do not have to allow solvent to escape, the overcoating and immersion time intervals are shorter than those quoted for System B1. As a guide, the period between completion of coating and immersion in water can be as short as 7 days.

However, solvent free epoxy materials require special equipment for application. Only experienced applicators may be used.

(ii) System B1 - On, bare steel or cast iron surfaces

(1) Material used shall be based on epoxy-polyamide resins arid shall comply with the performance requirements of SABS 1217 Type 1A - solvent borne chemically cured coating material.

(2) Prepare the surface as specified in the relevant clause.

(3) Apply three or four coats of the epoxy polyamide material, mixed as recommended by the manufacturer and as required to give a total dry film thickness not less than 250 micrometres.

(4) Each coat shall differ in color from the preceding and succeeding coats in order to identify the number of coats applied.

(5) Each coat shall be applied to a thickness not less than the minimum nor greater than the maximum recommended by the manufacturer.

(6) The time interval between coats shall be not less than the minimum time nor greater than the maximum recommended by the manufacturer for the prevailing ambient temperature. This requirement is very important to avoid solvent entrapment. Solvent entrapment may give rise to blistering, corrosion and poor adhesion on immersion.

(iii) Requirements of the finished system

(1) The coating system shall be smooth, glossy and free from orange peel effect, or bubbling or excessive runs and sags.

(2) The total dry film thickness shall be minimum 250 micrometres, maximum 400 micrometres.

(3) The coating shall be free from electrical insulation defects when tested with a wet sponge detector set to operate at 90 Volts, 2 Megohms. Repair of defects is permissible provided that the repaired area complies with all the requirements of this specification.

(iv) Repair of epoxy systems

Fully cured epoxy coatings are more difficult to repair due to chemical cure of the coating. Careful attention to the following repair procedure is therefore necessary to ensure adequate adhesion of the material used for repair.

Prepare the surface by abrasion as specified in the relevant clause, wiping the surface with methyl ethyl ketone solvent, to give a contact time of approximately 30 seconds. Wipe off any surplus solvent with a clean rag, then apply as many coats of repair material as are necessary to achieve the specified film thickness. When using solvent borne materials, note the need for adequate time between coats as specified under System B1.

(c) System F - Powder coating

(i) General

Design is important when items are to be protected by powder coatings. Corners are difficult to coat and sharp edges shall be avoided. Powder coatings generally have very high cohesive properties and tend to suffer from undercreep starting at any weak spots such as sharp edges.

The designer should aim at attaining a cocoon effect[1] which encapsulates the item in coating of an even thickness. Items to be coated by fluidized-bed techniques shall be designed so as not to trap a build up of powder on horizontal surfaces and at corners.

For powder coating, a very wide range of materials may be utilized, which may be broadly classified as follows:

THERMOPLASTIC, such as PVC, polyethylene, ethylene vinyl acetate, nylon, etc.

THERMOSET, such as epoxy, polyurethane or epoxy polyester.

The thermoplastic materials are generally applied in thicker coats than the thermoset and have relatively poor adhesion properties, hence they are used primarily for articles which can be fully encapsulated.

The thermoset materials are harder and more resistant to higher temperatures, but correct application is essential to ensure full cure. Repair of thermoset materials is more difficult than with thermoplastics.

Incorrect curing temperatures are responsible for most defects in powder coating. High-mass articles, such as castings, are particularly susceptible, and the surface temperature of the article to be coated shall always be determined and controlled. Improper curing will show up as pinholes and bubbles in the coating, or it may not be visually detectable but results in poor performance. The improper curing of thermoset materials may be detected by sophisticated laboratory testing procedures applied to flakes of coating.

Polyurethane powders are preferred for exterior use. Epoxy powders are preferred for optimum water and chemical resistance.

Ethylene vinyl acetate (E.V.A.) has a good exterior exposure resistance and especially when it is applied by the fluidized bed technique, it is excellent for immersion use. It is, however, more expensive as it is generally applied in thicker coats and the material is imported. A new product in South Africa is a thermoplastic polyamide supplied under the trade name RILSAN, which may be used when approved by the Engineer.

(ii) System F1 - Polyurethane powder coating on primed mild steel for exterior exposure.

(1) General

The primer used shall be a solvent-based polyamide cured epoxy material containing strontium chromate as an anti-corrosive pigment designed for use as a primer for polyurethane powder coating, and which will withstand the maximum stoving cycle associated with the process.

The powder coating shall be a thermosetting polyurethane based material suitable for constant exterior exposure. The product shall comply with the requirements of SABS 1274 Type 6. The powder coating shall be suitable for application over the primer specified above.

(2) Pre-treatment prior to powder coating

Fettling and dressing by the fabricator shall be in accordance with the requirements of the relevant clause.

Surface preparation shall be in accordance with the relevant section as well as the following:

A recognized chemical pre-treatment shall be carried out on the steel just prior to powder coating. (See SABS 064 Section 5.) A cold phosphating process such as the following is acceptable.

The chemical pre-treatment shall consist typically of a seven stage zinc (preferable) or an iron phosphate process comprising:

(i) an alkaline degreaser
(ii) water rinse A
(iii) an acid pickle and derust
(iv) water rinse B (back rinse first to water rinse A)
(v) zinc or iron phosphate
(vi) water rinse
(vii) chromate passivation (hot).

The process shall result in the complete removal of all foreign matter, e.g. scale, grease, cutting oil, soil, weld flux, rust, etc. The pre-treatment shall impart a uniform texture to the surface so as to render it suitable for the coating which is to be applied.

A fine grained crystalline zinc phosphate is recommended at a coating mass of 1,5 - 4,5 g/m^2, or iron phosphate at a coating mass of 0,2 -1,5 g/m^2.

Great care shall be taken with water rinsing so as not to contaminate the next cleaning process.

After phosphating the articles shall be primed as soon as possible after drying. In any event this time shall not be longer than 16 hours if the phosphated items are kept under dry cover. Clean cotton gloves shall be used for any handling prior to coating.

The primer as described above shall, in accordance with the manufacturer's instructions, be applied by spray to a dry film thickness of 40 micrometres to 70 micrometres.

(3) Curing time for primer

The primer shall be left for a period of four (4) days (at 25 °C and 50% RH) prior to the powder coating being applied to ensure that all solvents have evaporated from the paint film so as to prevent the solvent from bubbling when the items are exposed to the high stoving temperatures.

This period of time shall be increased for lower temperatures or higher relative humidity, or it shall be decreased for higher temperatures and lower relative humidity, in accordance with the manufacturer's recommendations.

(4) Application of Powder Coating

All dust shall be removed.
The primer shall be cured as set out above.
The powder coating shall be applied by the electrostatic spray application method to a dry film thickness of 40 micrometres to 70 micrometres.

(5) Stoving

The powder coated items shall be exposed to a minimum stoving schedule equivalent to 10 minutes at 200 °C and a maximum of 15 minutes at 200 °C. The oven conveyor speeds or oven temperatures shall be adjusted to accommodate various metal thicknesses to ensure that every part is ultimately exposed to the minimum stoving schedule. To check the curing of the stoved coatings, sample chips of the coating shall, if necessary, be subjected to a differential scanning calorimetry (DSC) test.

(6) Handling of Powder Coated Items

Powder coated items shall be packed and handled so as to prevent damage before installation.

(iii) Requirements of the finished system

(1) The coating shall be smooth, glossy and free from excessive orange peel, bubbling, runs or sags, and shall comply with the requirements of SABS 1274, Type 6, table 7, in all respects.

(2) The dry film thickness shall not be less than 80 nor more than 140 micrometres.

(iv) Repair of polyurethane powder coating

(1) Any chipped or damaged areas of the coating shall be repaired as follows:

The area shall be abraded to white metal or to a uniform matt finish of the powder by using a 350 = 220 grit waterproof paper and xylol as a lubricant. Dry the area with a clean cloth. Apply by brush or spray the epoxy-polyamide primer recommended by the manufacturer of the powder to a dry film thickness of minimum of 40 micrometres, maximum 70 micrometres to the abraded area. After the recommended minimum and before the recommended maximum overcoating time, apply a top coat of polyurethane acrylic, as recommended by the powder manufacturer and tinted to the same color as the powder coating. Care shall be taken not to overlap the abraded area by more than 10 mm.

(2) The aesthetic appearance of the patch shall be subject to approval by the Engineer. If not approved, the whole item shall be returned to the manufacturer for stripping and recoating.

LL 09 DETAIL CORROSION PROTECTION REQUIREMENTS

a) All the pumps and electric motors shall be corrosion protected in accordance with the requirements for a System A3 - alkyd system.

b) All the pipework, valves and fittings where applicable and the pump base frames shall be corrosion protected in accordance with the requirements for a System B1 - two pack epoxy system.

c) The motor control centre and stop/start stations and all other electrical equipment to which it applies shall be corrosion protected in accordance with the requirements for a System F1 - polyurethane powder coating.

LL 10 MAINTENANCE

Maintenance of corrosion protected surfaces shall be the responsibility of the Contractor. All corrosion protected surfaces shall be maintained according to this specification.

The remuneration for maintenance of corrosion protected surfaces shall be deemed included in the tendered monthly scoring for maintenance.

LL 11 MEASUREMENT AND PAYMENT

Full compensation for the Contractor's obligations regarding all corrosion protection as described in this section will be deemed to be included in the rates tendered for the relevant items of equipment specified in other sections of these Specifications and which are protected against corrosion.

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HEALTH & SAFETY SPECIFICATIONS FOR MINOR CONTRUCTION WORK ACTITIVITES AT SANBI PREMISES.

1. PURPOSE

The objective of the Health and Safety Specifications is to provide guidelines to the principal contractor for complying with the requirements of the Occupational Health and Safety Act (OHSA), Act 85 of 1993 and its regulations.

The Health and Safety Specifications do not replace the OHSA and relevant regulations, but is a supplementary document to the requirements of the relevant legislation and the conditions of the contract agreement between SANBI and the Principal Contractor.

It does not imply that sections of legislation not referred to in full in this document are of less importance and/or not relevant. The Contractor remains responsible to comply with the Act, its regulations and the contracting company's own health and safety plan.

In terms of Section 37 of the Occupational Health and Safety Act (1993), SANBI is required to control persons/organisations conducting activities for or on their behalf (Mandatories). The Construction Regulations promulgated under the Occupational Health and Safety Act (Act no. 85 of 1993), is requiring SANBI to compile an occupational health and safety specification for any intended project classified as construction work and to provide the specification to prospective tenderers/mandatories. The dual objective of this specification is to ensure that the mandatories and service providers entering into a contractual agreement/relationship with SANBI achieves and maintains an acceptable level of occupational health, safety and environmental performance whilst conducting activities while performing the contract work.

2. Scope of Occupational Health, Safety and Environmental (SHE) Specification

The scope of this Occupational Health, Safety and Environmental (SHE) Specification is to address the reasonable and foreseeable aspects of occupational health, safety and environmental management, which will be affected by the contract work and it covers any of the following activities:

Alterations and renovations to existing buildings
Demolition work (portion of buildings)
Altering and opening of existing walls
Dismantling, storage and disposal of material
Removal of a canopy fixed to façade
Breaking up of mass concrete/brick paved areas and/or brick work
Removal of all sanitary fittings
Preparatory work to existing surfaces
Work conducted inside existing buildings
Earth works/open face excavations/trenches/backfilling

Concrete work, formwork and/or reinforcing
Concrete in foundations – superstructure
Rough formwork
Steel reinforcement
Masonry work/water proofing of roof coverings
Carpentry and joining
Ceilings installation, partitioning/access flooring
Iron monger work
Installation of bathroom fittings
Structural steelwork/metal work
General plastering work
Tiling work
Paint work on new work (external plastered walls)
External works – preparation of soil for paving
Removal of existing work
Building up of openings
Re-fixing of existing palisade fencing
Earth works and filling (import material)
Soil poisoning (Submit Medical Safety Data Sheets (MSDS))
Concrete formwork and reinforcement
Formwork to soffits of solid slab, sides of bases
Reinforced concrete casts – strip footings and bases
Masonry work for new work
General brick work (one and two brick walls)
Building of superstructure
Installation of concrete lintels
Waterproofing (damp proofing of walls/floors/roofs)
Installation of roof coverings (galvanized steel)
Installation of roof insulation
Carpentry and joining work (new work scope)
Installation of ceilings/partitions and access flooring
Installation of electrical light fittings
Installation of suspended ceilings
Ironmongery work
Installation of bathroom fittings
Metal work including door frame installations, gates and screens
External/internal plastering work (New work scope)
Tiling, including wall tiling/floor tiling
Plumbing and drainage work (New work scope)
Disinfection of water pipe work (requires MSDS of disinfectant)

Soil drainage (Sewer, pipe and drain fittings)
Water supply provision
Installation of fire appliances
Boundary and yard walls/palisade fencing
Aprons, compaction of surfaces
Construction of generator plinth
Signage installation
Installation of electrical fencing
Construction and installation of steel canopies with roof coverings
Internal electrical installations
Site electrical reticulation
Electronic installations to existing buildings

3. Health and safety risks(as baseline assessment)

The following are potential risks associated with the above work activities:

• Falling from height
• Exposure to electricity (Overhead and underground cables)
• Proximity to flammable or combustible materials causing injury
• Climbing steps and working on platforms
• Risk of vehicles overturning
• Risk of eye injury from flying particles and dust
• Cancer risk from exposure to asbestos
• Slips, trips and falls due to untidy work area
• Manual handling activity injuries
• Risk of using various types of machinery and tools
• Contact with moulds, fungi and bacteria
• Contracting dermatitis
• Exposure to cuts and abrasions
• Being struck by machinery
• Loss of fingers/limbs
• Risk of pain or injury from performing repetitive tasks
• Exposure to noise
• Being struck by falling objects
• Risk of eye injury from solvent splashes or vapour
• Contracting vibration white finger
• Exposure to hand and foot injury
• Sun exposure

4. SITE SPECIFIC HEALTH AND SAFETY REQUIREMENTS BASED ON PROJECT SCOPE

1. The principal contractor and all appointed sub-contractors shall be registered with the Department of Labour Compensation Commissioner or an appropriate similar private insurer and have available a valid Letter of Good Standing at all times from such.
2. Ensure a SHE file is submitted before work commences to SANBIs Occupational Health and Safety department of the Corporate Services Division for evaluation.
3. Ensure all employees undergo medical examination and are declared fit for the job they are employed for by a registered medical practitioner.
4. Ensure all employees under their control undergo company specific induction and SANBI site specific induction.
5. Ensure before work commences that employees are trained in the health and safety risks associated with the work they are conducting.
6. Ensure employees are trained in company procedures, policies, method statements and informed of SHE requirements as per the specification.
7. Ensure legislative requirements are complied with for the duration of the contract and ensure that its employees comply.
8. Ensure that the 37 (2) Agreement has been signed before any work commences and that a copy is kept on the SHE file.
9. Ensure that a 37(2) Agreement(s) is signed between the company and any other sub-contractor which may be appointed.
10. Ensure that sub-contractors have valid Letter of Good Standing from the Department of Labour Compensation Commissioner or a registered private compensation insurer.
11. Prevent any employee or visitor who is under the influence of any alcohol or drugs (in a state of intoxication) on site.
12. Ensure the safety of employees who are taking legal medication.
13. Hand over a consolidated SHE file at the end of the contract to SANBI.
14. Stop employees who are conducting unsafe acts and/or creating an unsafe environment from doing so.
15. Report and all reportable incidents to SANBI and ensure that they are investigated.
16. Ensure work is supervised by competent personnel and that work is done by competent employees.
17. Ensure pre-task risk assessments are done by a competent person and that employees are informed of the risks and the risk control measures in place.
18. Conduct tool box talks to communicate SHE issues in connection with the work being done and any other aspects thereof.
19. Ensue that the appointed personnel as per the SHE file are executing their duties as per the legal appointment made.
20. Ensure a first aid kit is made available in case of any emergency and that a trained certified first aider is available per shift.
21. Ensure that good housekeeping is maintained and that materials are store/stacked properly in designated areas.
22. Make provision for sufficient waste receptacles and ensure that the correct disposal of the different waste materials takes place.

23. Stop any work from being executed that are not in accordance with the rules for the site or which poses a threat to the health and safety of the people.
24. Service provider will be required to provide a signed (by Managing Director/Chief Executive Officer) copy of the Company's health and safety policy to the SHE file.
25. The principal contractor is responsible for the investigation of all accidents and/or incidents where employees and non-employees were injured to the extent that they had to receive medical treatment other than first aid.
26. No fires or open flames are allowed on site unless directly used for construction purposes, e.g. acetylene blowtorch for welding. All available precautions will be taken to prevent the spread of a fire.
27. The Principal Contractor will establish a Personal Protective Equipment Policy and a Personal Protective Equipment study will be conducted to determine the types of Personal Protective Equipment (PPE) to be supplied related to the hazards and risks emanating from the tasks to be performed by its employees and those of sub-contractors.
28. All employees must be provided with PPEs relevant to the hazard associated with the task at hand.
29. All employees shall, as a minimum, be required to wear the following personal protective equipment for the duration of the contract on any of SANBI projects:
    - Protective overalls;
    - Protective hand and footwear;
    - Protective headwear; and
    - Eye, face and ear protection.
30. A pre-emptive risk assessment will be required for any work to be carried out above **two meter** from the ground or any floor level. This work will be classified as "work in elevated positions".
31. As far as is practicable, any person working in an elevated position will work from a platform, ladder or other device that is at least as safe as if working at ground level.
32. Prohibition signage must be displayed where work is performed.

5. WASTE MANAGEMENT

The following requirements shall be incorporated into the waste management plan to be submitted

Solid Waste:

- Littering on site and the surrounding areas is prohibited.
- Clearly marked litterbins must be provided on site. The Contractor must monitor the presence of litter on the work sites as well as the construction campsite.
- All bins must be cleaned of litter regularly.
- All waste removed from site must be disposed at a municipal/permitted waste disposal site.
- Excess concrete, building rubble or other material must be disposed of in areas designated specifically for this purpose and not indiscriminately over the construction site.
- The entire work area and all construction sites must be swept of all pieces of wire, metal, wood or other material foreign to the natural environment.

- Contaminated soil must be treated and disposed of at a permitted waste disposal site or be removed and the area rehabilitated immediately.
- Waste must be recycled wherever and whenever possible.

Hazardous Waste:

- No hazardous materials must be disposed of in the veld or anyplace other than a registered landfill for hazardous material. Hazardous waste must be stored in containers with tight lids that must be sealed and must be disposed of at an appropriately permitted hazardous waste disposal site. Such containers must not be used for purposes other than those originally designed for. The service provider must maintain a hazardous material register.

7. **General competence requirement**

The service provider shall ensure that its personnel and sub-contractors' personnel are trained and competent to carry out work safely and without risk to health (Training to be completed before work commences). The service provider shall ensure that follow-up and refresher training is conducted as the work progresses and whenever the scope or nature of the work changes

Prepared by: OHS Department
15 September 2018

SECTION 37(2) MEMORANDUM OF AGREEMENT

Between

SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE

(Hereinafter referred to as SANBI)

And

…….....

Company registration number: ……

(Hereinafter referred to as **"the Contractor"**)

In terms of Section 37(2) of the Occupational Health and Safety Act 85 of 1993 and its regulations, henceforth referred to as the OHS Act, the provision of Section 37(1) of the same act apply to …… henceforth referred to as the contractor, in as far as, SANBI shall not be responsible or liable for the actions or inaction's whatsoever in contravention of the OHS Act taken by the employees of the contractor, in the fulfillment of the contract undertaken by the contractor.

As an **employer in your own right**, you, the contractor are obliged to comply with all the provisions of the OHS Act while on the premises of SANBI, you shall also be required to comply with the conditions and safety procedures of SANBI.

SANBI hereby reserves the right to cause all work undertaken by the contractor, that is in contravention of the OHS Act and that has come to the attention of SANBI to cease, until satisfied that such contravention has been rectified. Noncompliance to SANBI arrangements and procedures will adversely affect future contracts, while serious noncompliance may lead to immediate expulsion from the premises.

2. REQUIREMENTS, ARRANGEMENTS AND PROCEDURES FOR CONTRACTORS

2.1 It is a condition of this contract that your employees, and any sub-contractors, be covered in terms of the Compensation for Occupational Injuries and diseases Act 130 of 1993 as amended. A copy of good standing with the Compensation Commissioner shall be attached to the signed copy of this legal document. Furthermore, the contractor or sub-contractor certifies that such cover will not expire during the execution of the task nor will the contractor become in arrears with any payment due to the Commissioner or any other documentation required by the Commissioner.

2.2 The contractor furthermore agrees to the following health and safety rules of SANBI:

2.2.1 The contractor shall have available a copy of the OHS Act on request.

2.2.2 Any contractor with more than five employees at any time on the premises shall have available a first aid box for prompt first aid.

2.2.3 Any contractor with five or more employees shall have at least one competent and valid first aider on the premises at their workplace. Should there be fifty or more employees on the premises a further first aider for every fifty employees or part thereof shall be available.

2.2.4 Any contractor with less than five employees on the premises shall ensure that such employees are made conversant with the first aider at their workplace.

2.2.5 The contractor shall keep up to date and available for inspection all applicable legally required registers.

2.2.6 The contractor shall make himself and his employees conversant with SANBI emergency and evacuation procedures.

2.2.7 The contractor shall not misuse anything, which is supplied in the interest of health and safety.

2.2.8 The contractor shall adhere to all SANBI safe working procedures.

2.2.9 The contractor shall be subject to the health and safety and security rules of SANBI.

2.2.10 No intoxicating drugs or liquor will be consumed on or brought onto the premises and no person under the influence or who appears to be under the influence will be permitted to come onto or remain on the premises or at a workplace.

3. INDEMNIFICATION

3.1 The contractor hereby certifies that all contracting workmen recognize the inherent hazards that exist on the premises of SANBI and that the Contractor:

3.1.1 Enters the property entirely at his/her own risk and therefore the Contractor waives any claim of whatsoever nature against SANBI, its employees, agents and/or mandataries in respect of any loss, damage and/or injury whether same is the result of any negligent act or omission on the part of SANBI, its employees, agents and/or mandataries or other independent contractors or by a third person or by way of defective equipment or materials supplied by the company, and further the Contractor;

3.1.2 Hereby indemnifies SANBI, its employees, agents and/or mandataries against any claims from the Contractor's employees and/or from any other person, arising and being caused in the manner set out above.

4. ACCEPTANCE

4.1 I, ……..the Contractor, do hereby declare that my company…… ……acknowledge having read and understood the conditions contained in this legal document and furthermore, our employees agree to abide by these conditions.

CONTRACTOR	**DATE**
SANBI PROJECT MANAGER	**DATE**
WITNESS 1	**DATE**
WITNESS 2	**DATE**

APPENDIX B: DRAWINGS

DRAWING TITLE	DRAWING NUMBER
SITE PLAN LAYOUT	0533 - PH2-01
SITE PLAN LAYOUT	0533 - PH2-01.01
BUILDING 2 LAYOUT	0533 - PH2-02
BUILDING 3 LAYOUT	0533 - PH2-03
BUILDING 4 LAYOUT	0533 - PH2-04
BUILDING 5 LAYOUT	0533 - PH2-05
BUILDING 6 LAYOUT	0533 - PH2-06
BUILDING 7 LAYOUT	0533 - PH2-07
BUILDING 8 LAYOUT	0533 - PH2-08
BUILDING 6.1 LAYOUT	0533 - PH2-09
BUILDING 9 LAYOUT	0533 - PH2-10
BUILDING 12 LAYOUT	0533 - PH2-11
BUILDING 13 LAYOUT	0533 - PH2-12
BUILDING 14 LAYOUT	0533 - PH2-13
BUILDING 15 LAYOUT	0533 - PH2-14
BUILDING 17 LAYOUT	0533 - PH2-15
BUILDING 18 LAYOUT	0533 - PH2-16
BUILDING 16 LAYOUT	0533 - PH2-17
BUILDING 19 LAYOUT	0533 - PH2-18
BUILDING 6.2 LAYOUT	0533 - PH2-19
BUILDING 10 LAYOUT	0533 - PH2-20
BUILDING ROOF STRUCTURE LAYOUT	0533 - PH2-21
ELECTRICAL CLIMATE CONTROL SYSTEM	0533 – PH2-22

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South African National Biodiversity Institute
Biodiversity for Life

consultant

VIRTUAL
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P O BOX 323
GROENKLOOF
0027

discipline: STRUCTURAL

service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

project number: 0533

drawing title: SANBI KIRSTENBOSCH: SITE PLAN LAYOUT 2 (SOUTHERN)

ref.no. --

designed R ISHMAIL

scale 1:250

drawn K JURIES

date FEB 25

checked S ISHMAIL

drawing number: 0533-PH2-01.1

revision: T0

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service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

project number: 0533

drawing title: SANBI KIRSTENBOSCH: SITE PLAN LAYOUT 1 (NORTHERN)

ref.no. --

scale 1:500

date FEB'25

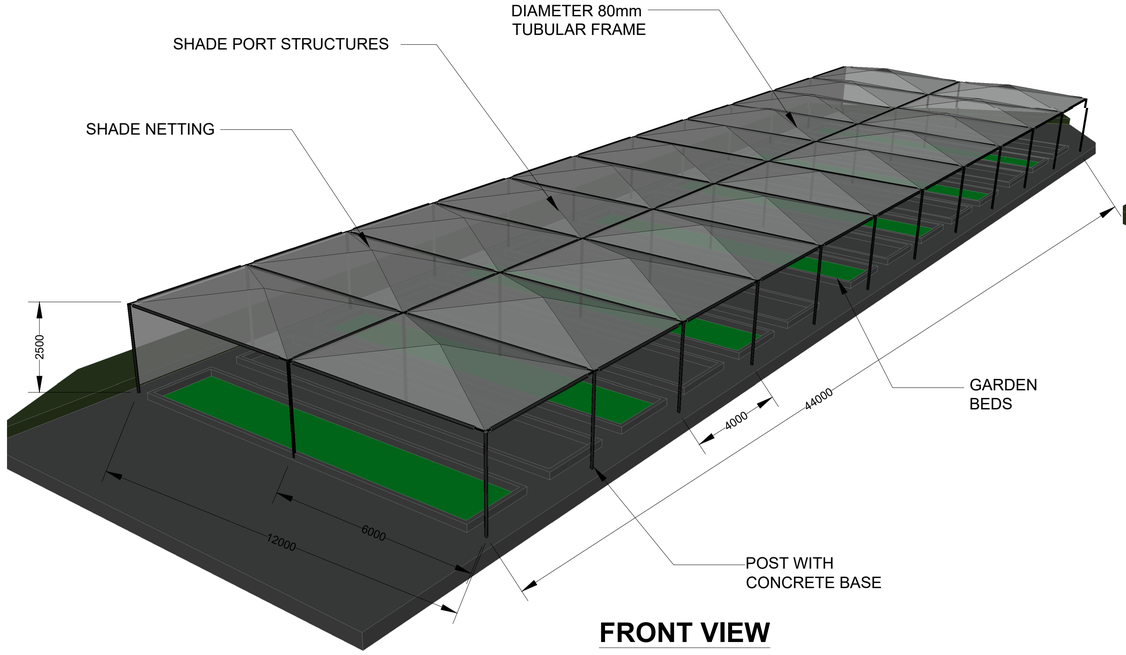
designed R ISHMAIL

drawn K JURIES

checked S ISHMAIL

drawing number: 0533-PH2-01

revision: T0



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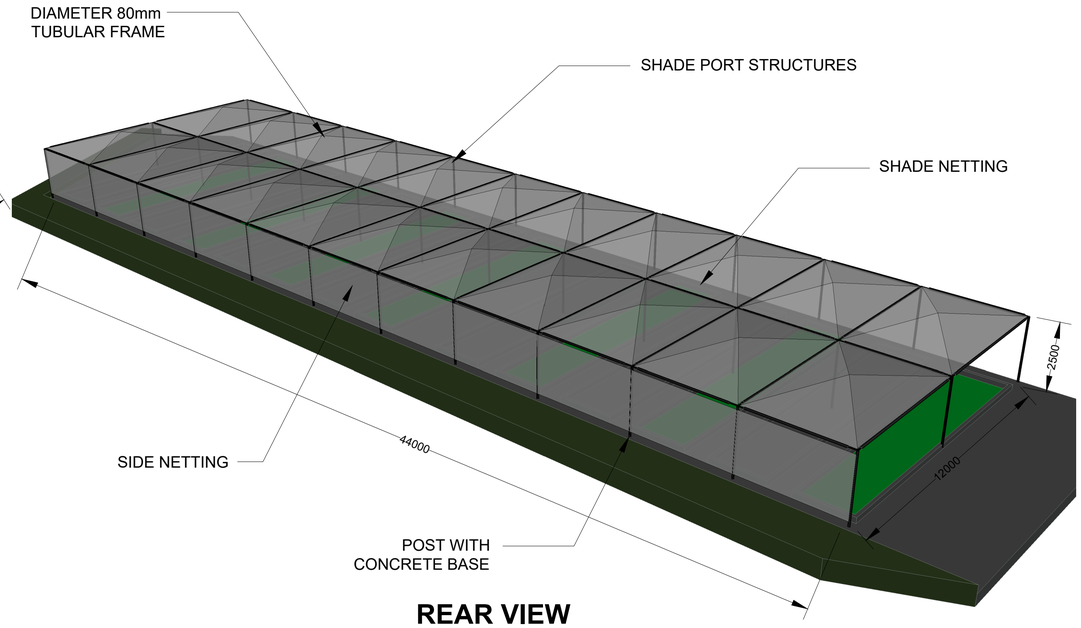

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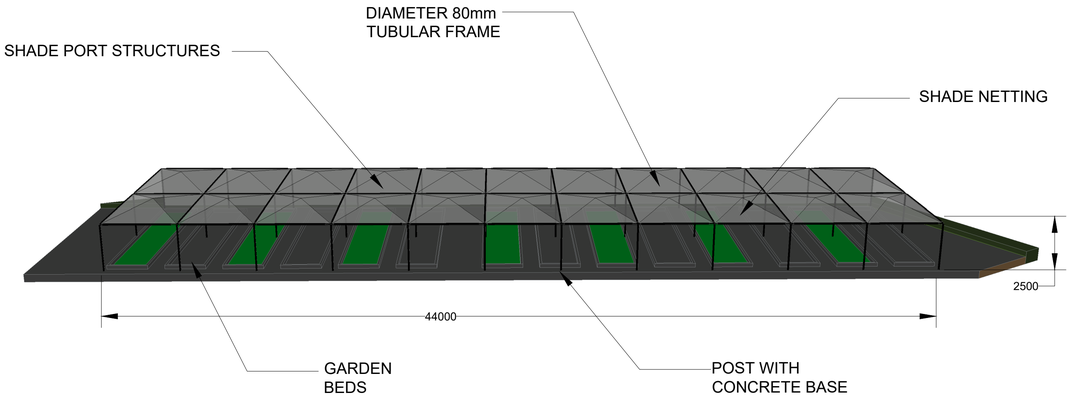

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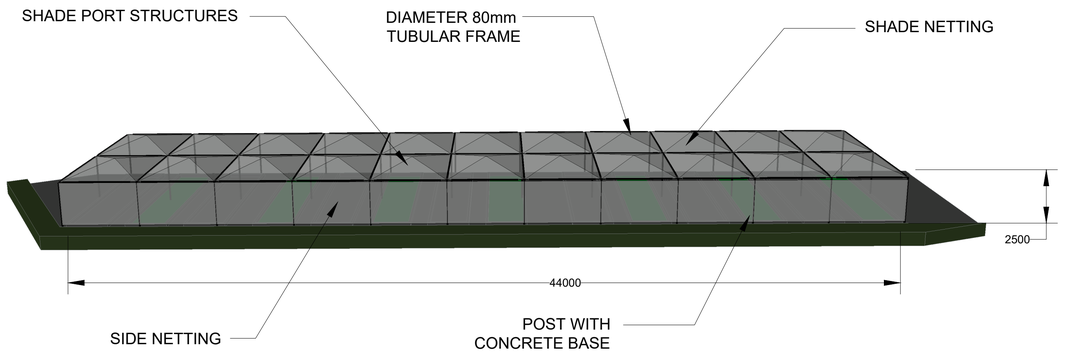

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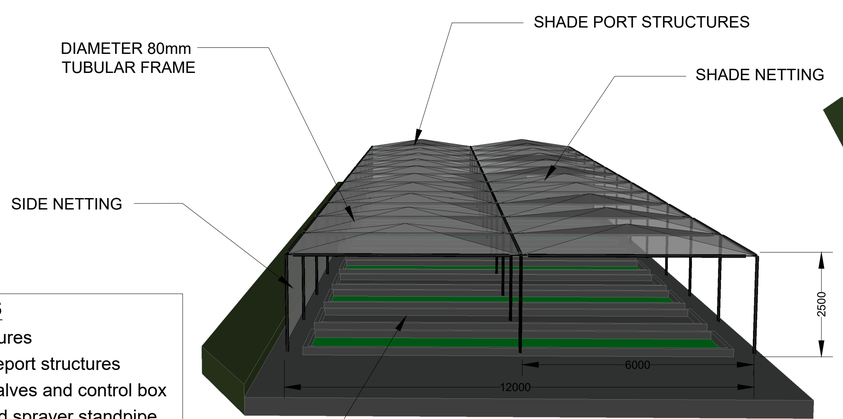

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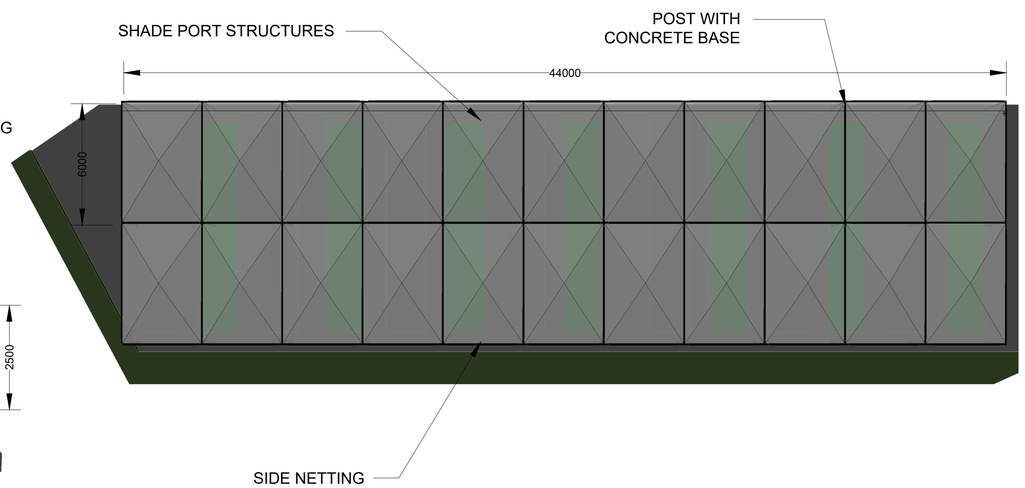

PLAN VIEW

BUILDING 2: SCOPE OF WORKS

1. Removal of existing shade port structures
2. Supply and install shaded steel shadeport structures
3. Refurbishment of Irrigation system, valves and control box
4. Supply and Install Irrigation piping and sprayer standpipe nozzles
5. Supply and installation of programmable irrigation controller

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service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

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drawing title: SANBI KIRSTENBOSCH: BUILDING 2

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checked R ISHMAIL

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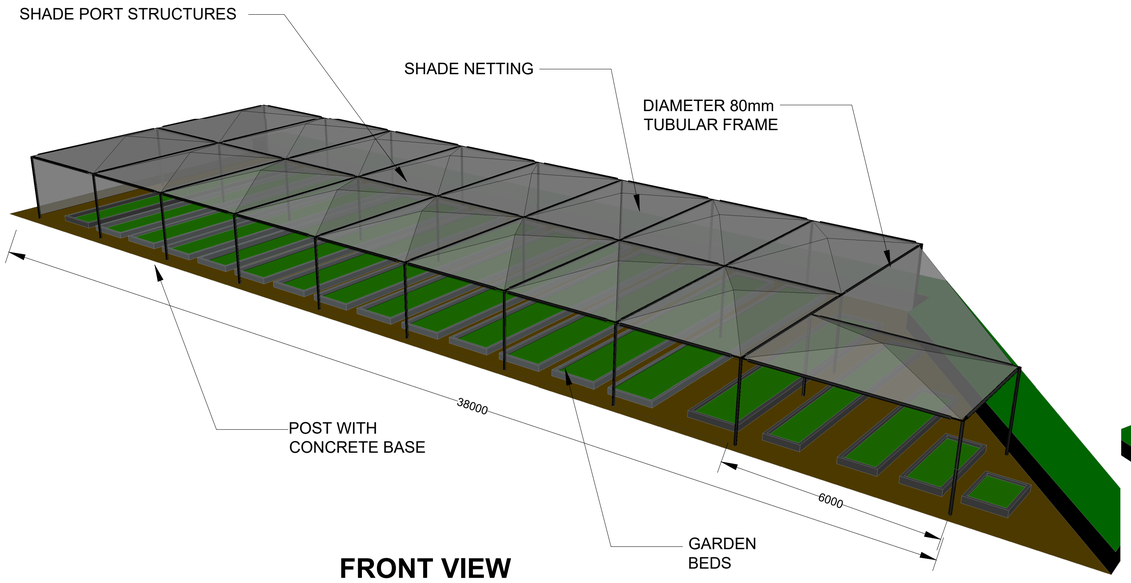
revision: T0



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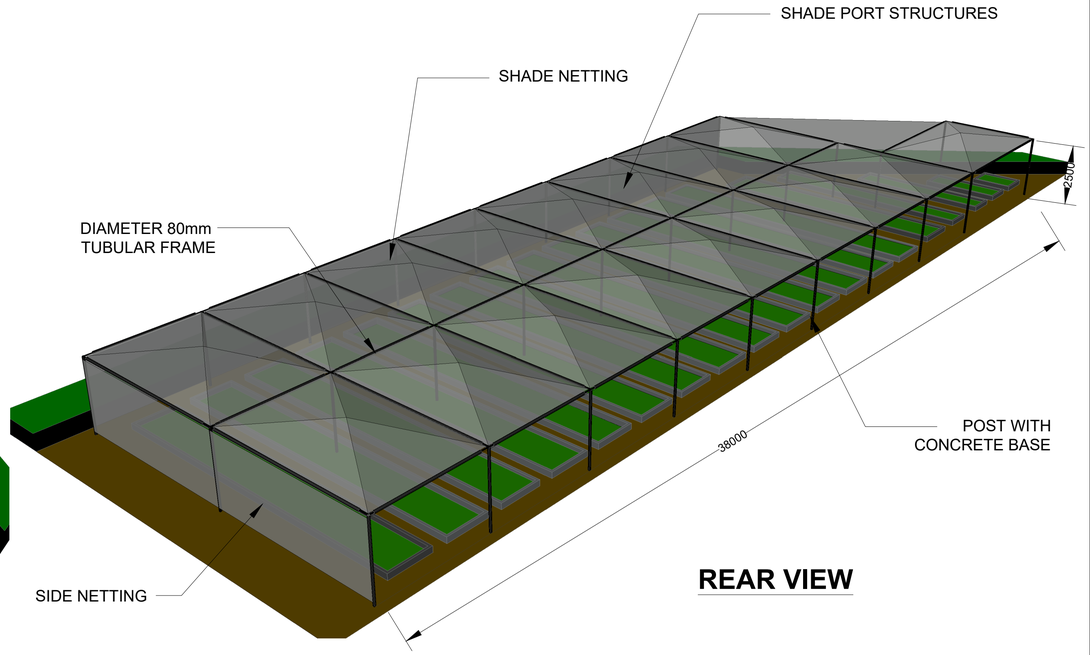

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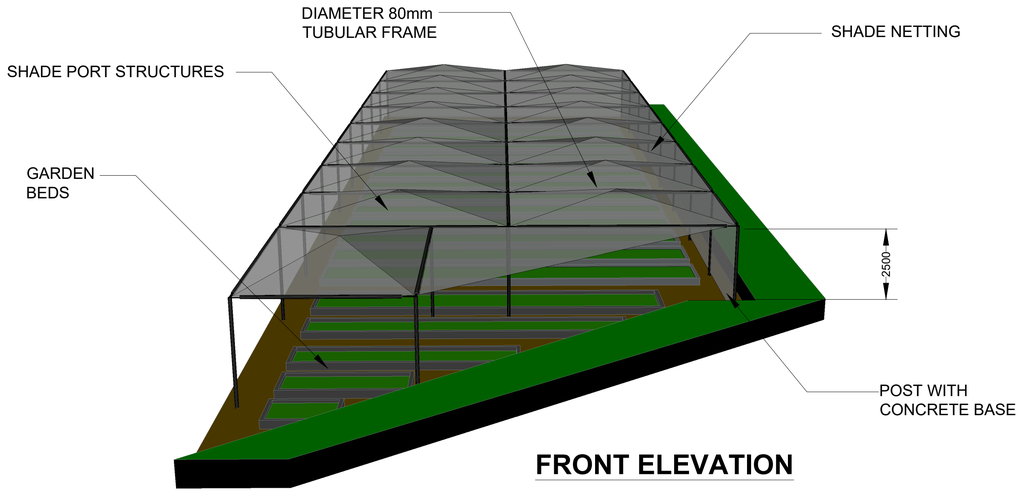

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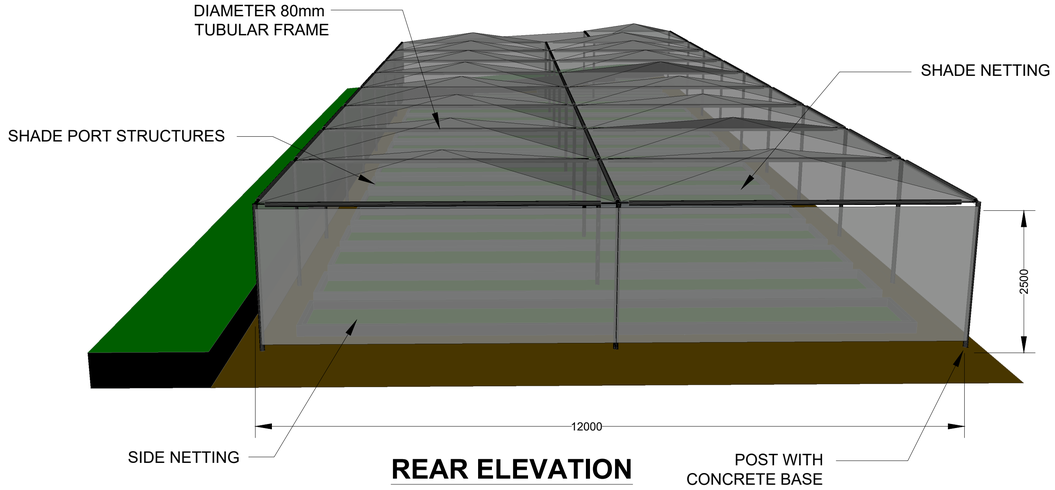

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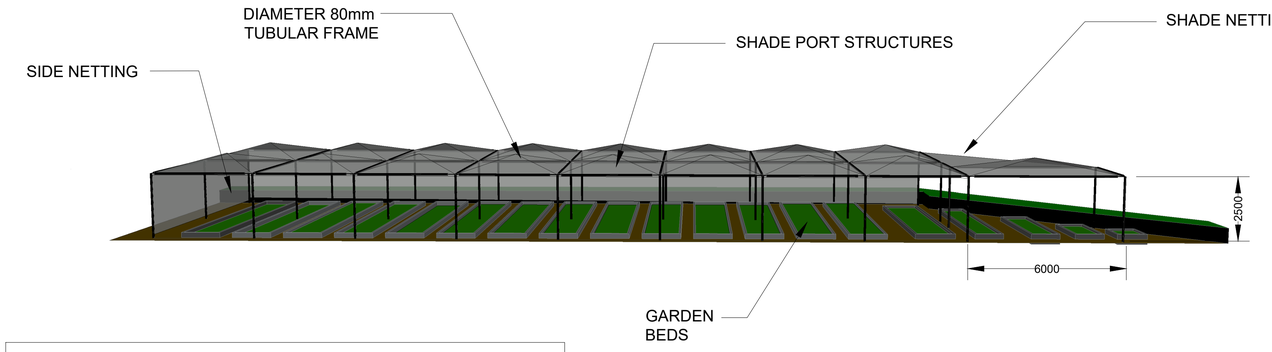

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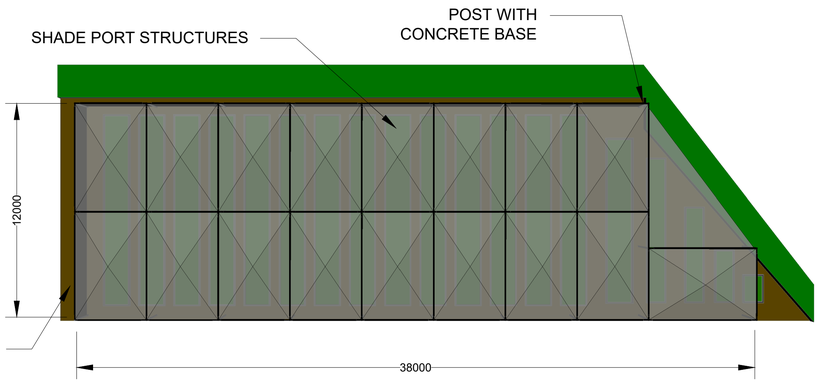

PLAN VIEW

BUILDING 3: SCOPE OF WORKS

1. Removal of existing shade port structures
2. Supply and Install Shaded steel shadeport structures
3. Refurbishment of Irrigation system, valves and control box
4. Supply and installation of programmable irrigation controller
5. Supply and install Irrigation piping and sprayer standpipe nozzles

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project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 3

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date FEB 25'

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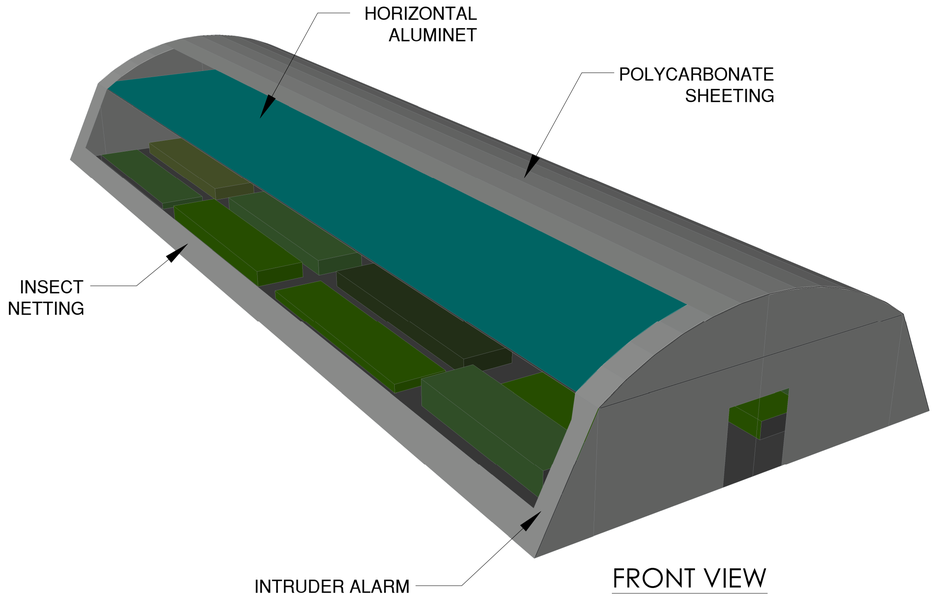
drawing number: 0533-PH2-03

revision: T0



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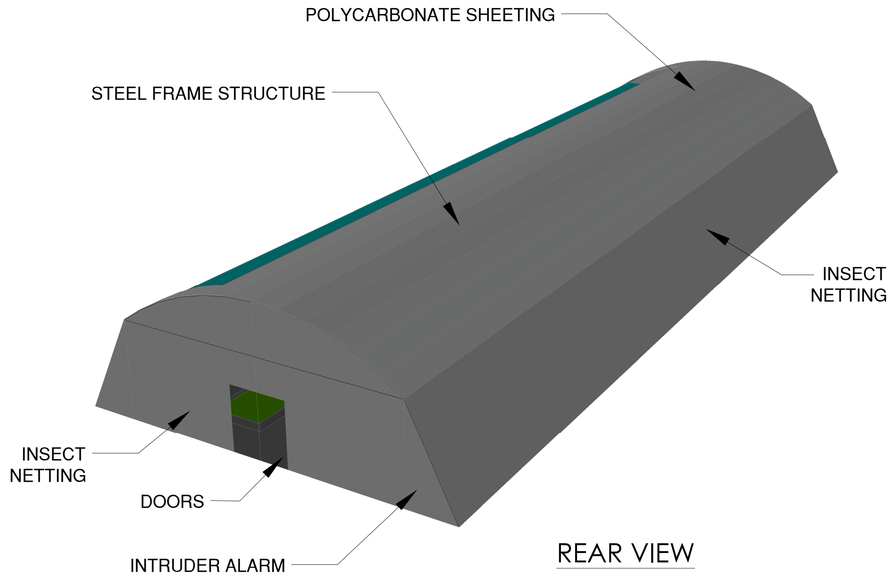

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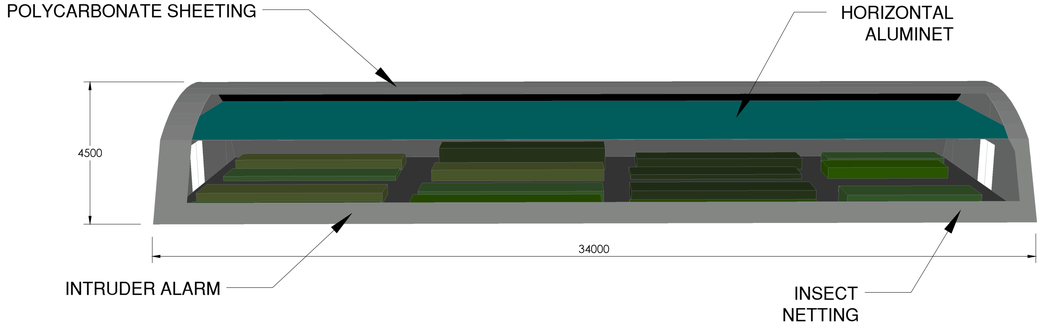

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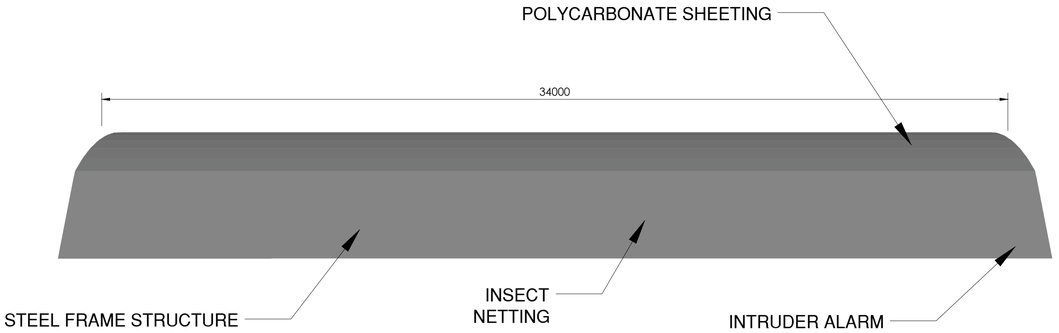
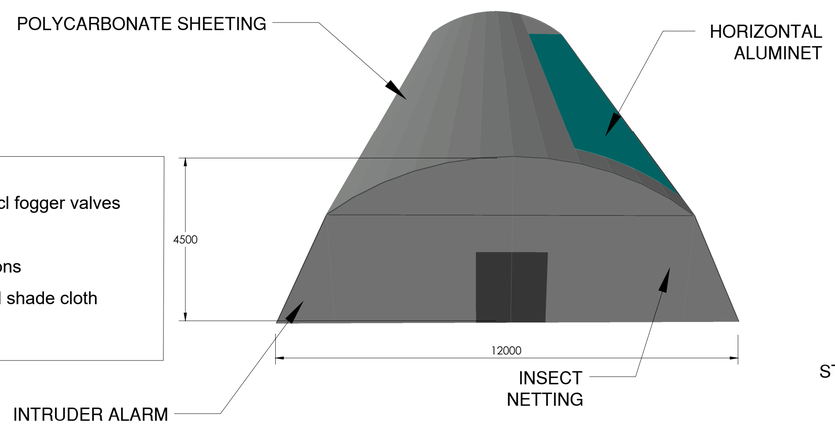


SIDE 2 ELEVATION

BUILDING 4: SCOPE OF WORKS

1. Refurbishment of Irrigation systems incl fogger valves
2. Replacement of doors as required
3. Replacement of insect netting in sections
4. Refurbishment of aluminet system and shade cloth
   (New aluminet to be installed)



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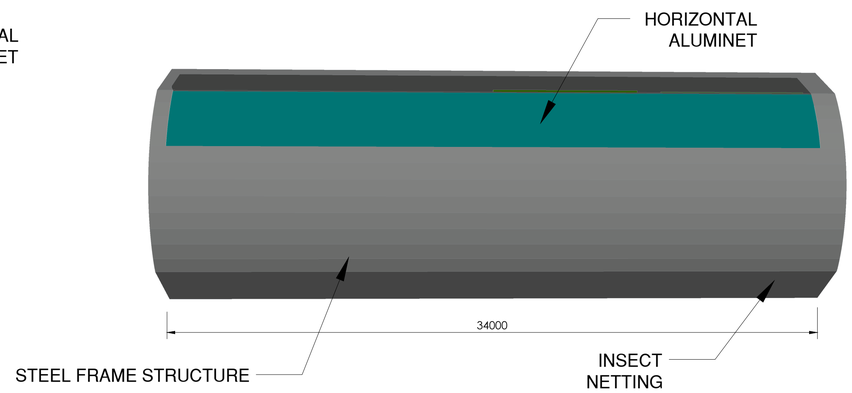

PLAN VIEW

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page type: A1

client: SANBI
South African National Biodiversity Institute
Biodiversity for Life

consultant
VIRTUAL
CONSULTING ENGINEERS
P O BOX 323
GROENKLOOF
0027

discipline: STRUCTURAL

service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 4

ref.no. --

designed K JURIES

scale N.T.S

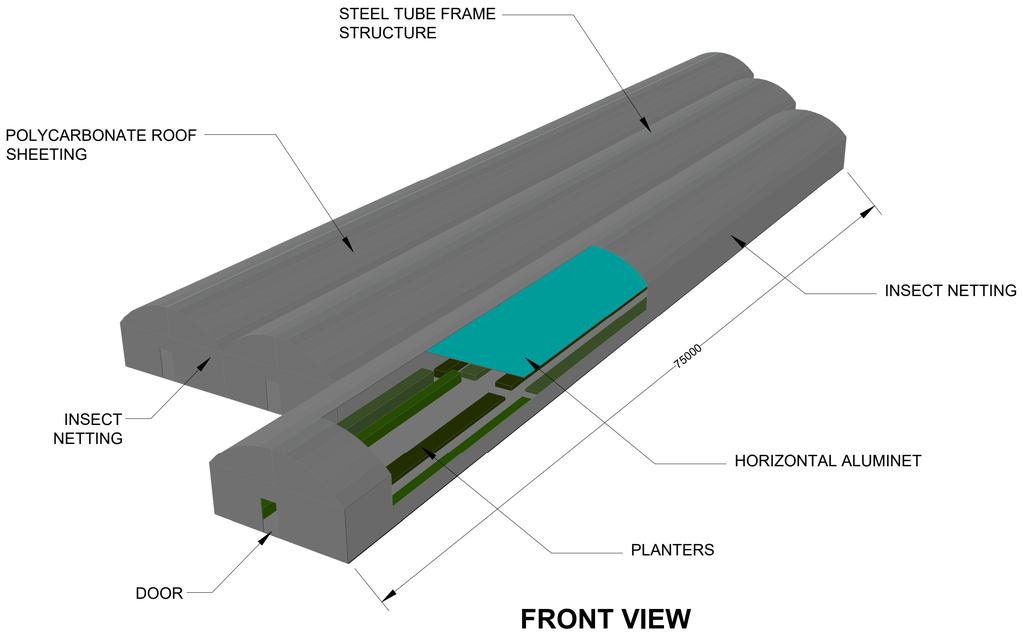
drawn T NIEFTAGODIEN

date FEB 25'

checked R ISHMAIL

drawing number: 0533-PH2 -04

revision: T0



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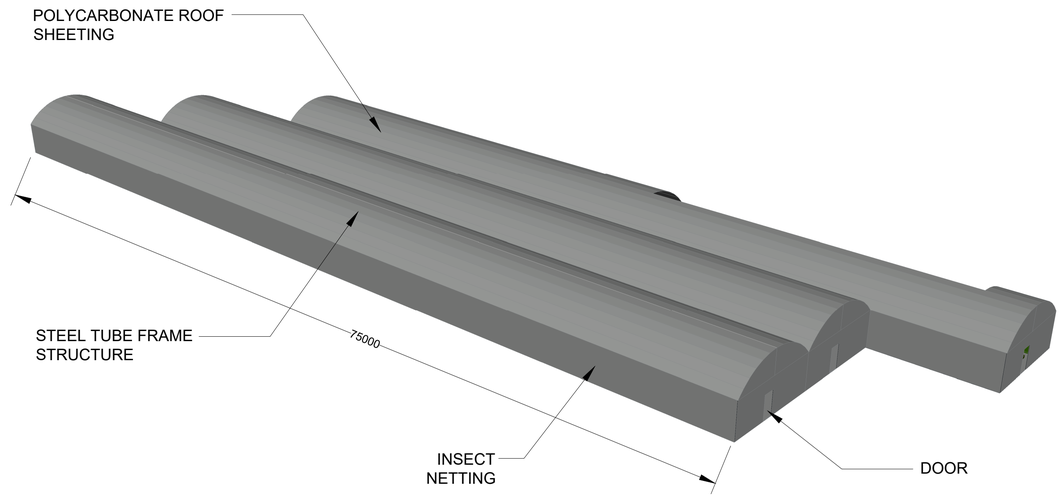

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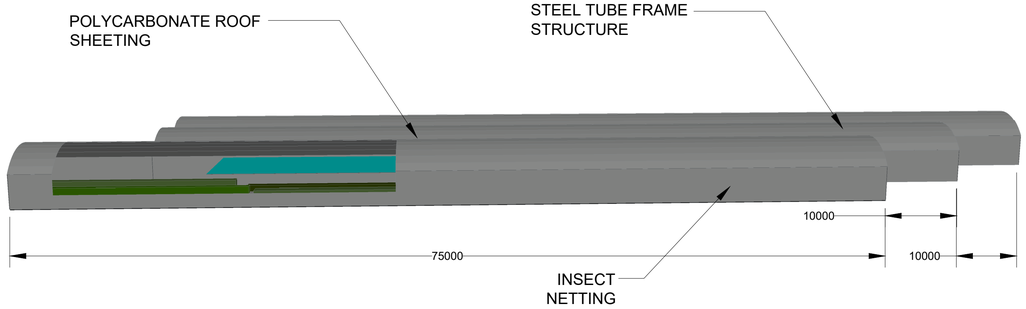

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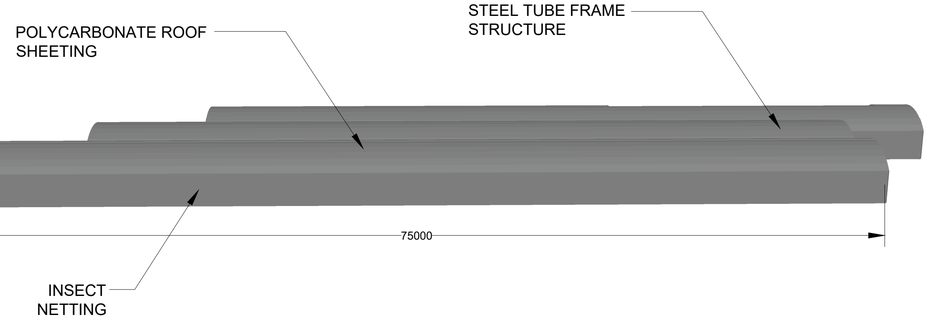

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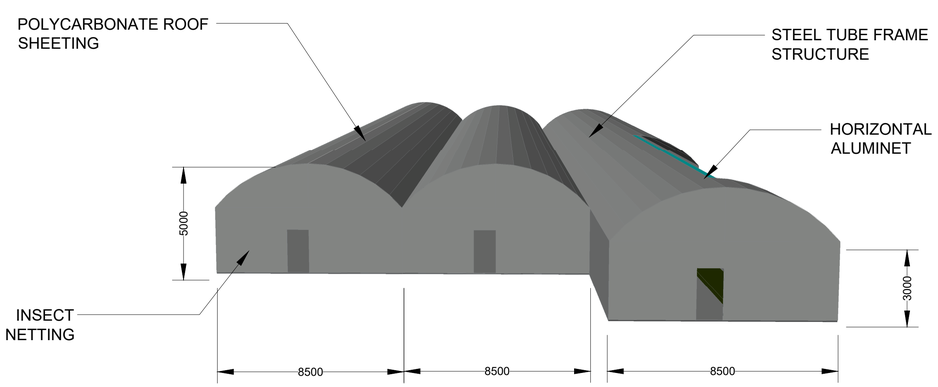
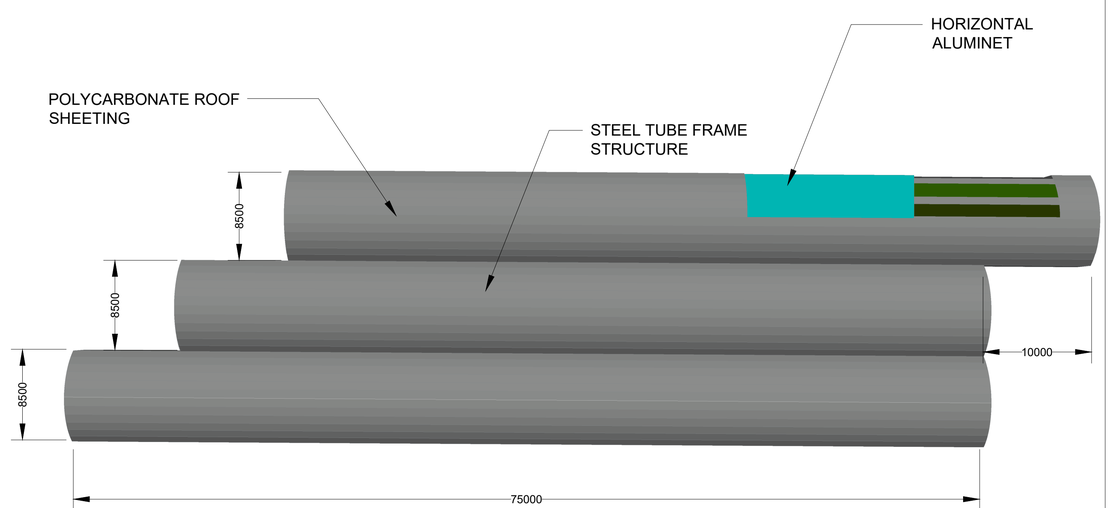


REAR ELEVATION

BUILDING 5: SCOPE OF WORKS

1. Replace worn/damaged insect netting in sections
2. Replace worn/damaged aluminet
3. Replacement of doors as required



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P O BOX 323
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0027

discipline: STRUCTURAL

service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 5

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scale N.T.S

date FEB 25'

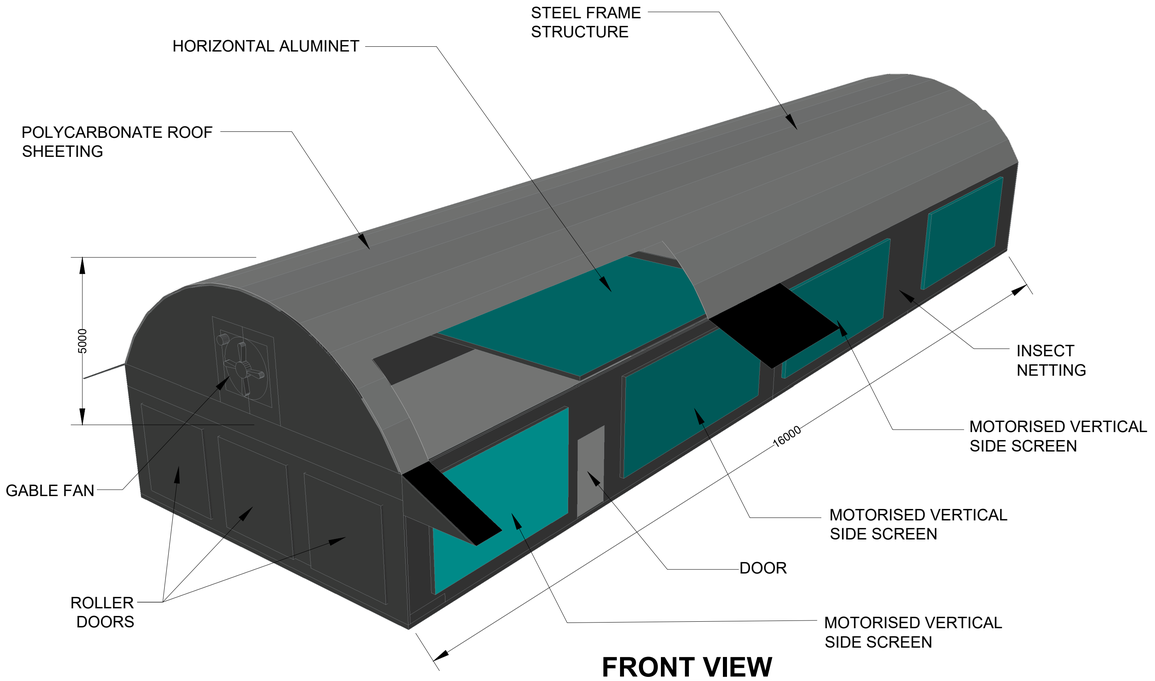
designed K JURIES

drawn T NIEFTAGODIEN

checked R ISHMAIL

drawing number: 0533-PH2-05

revision: T0



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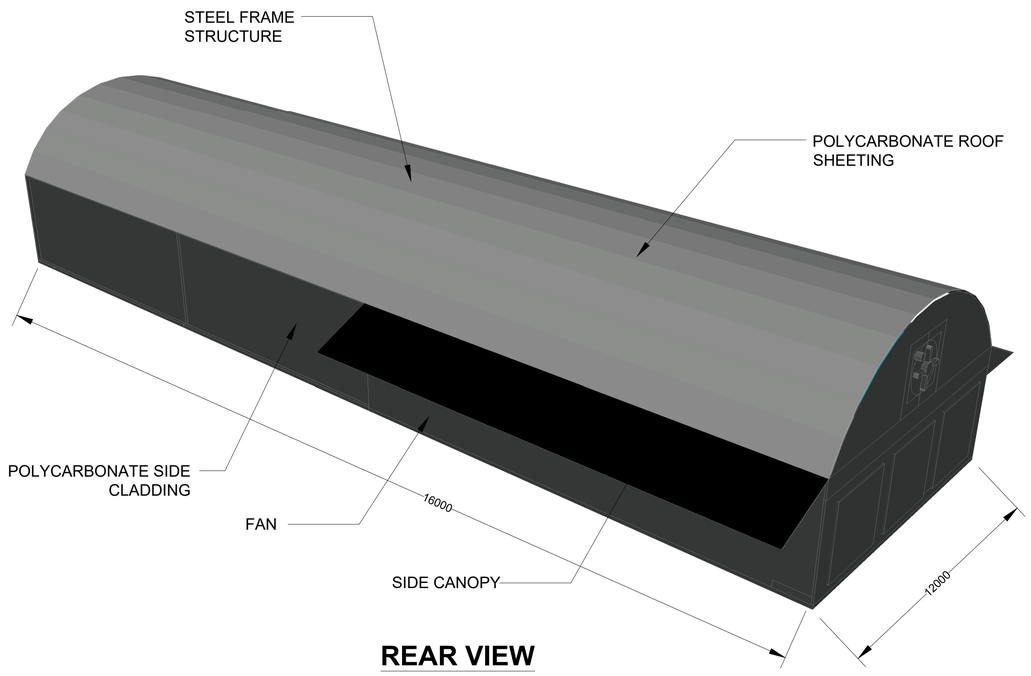

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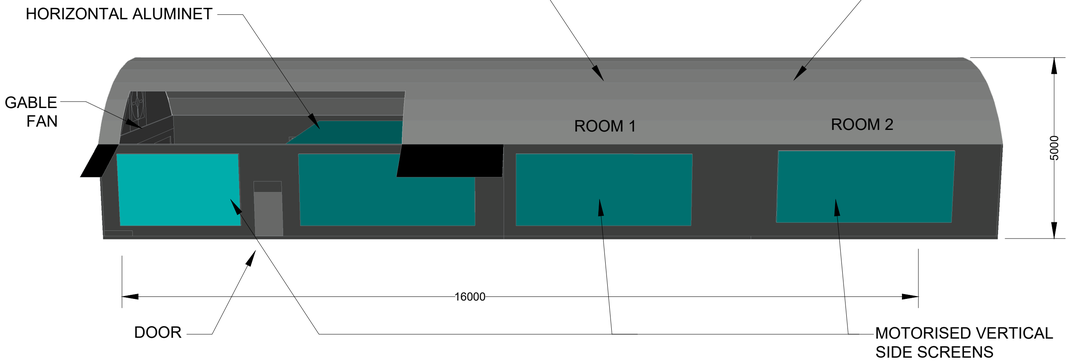

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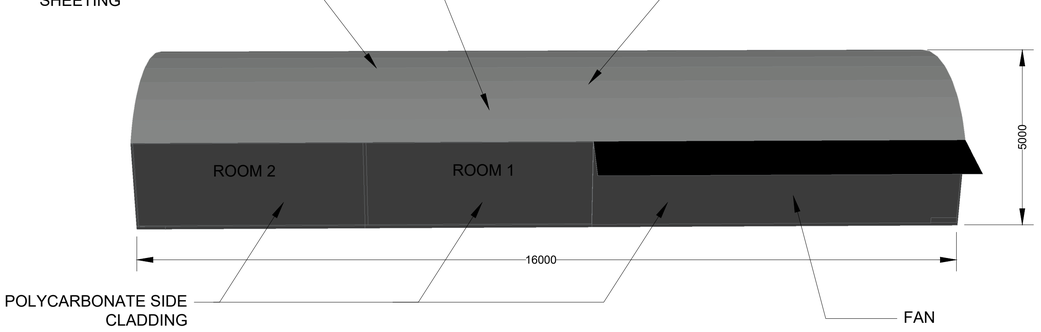
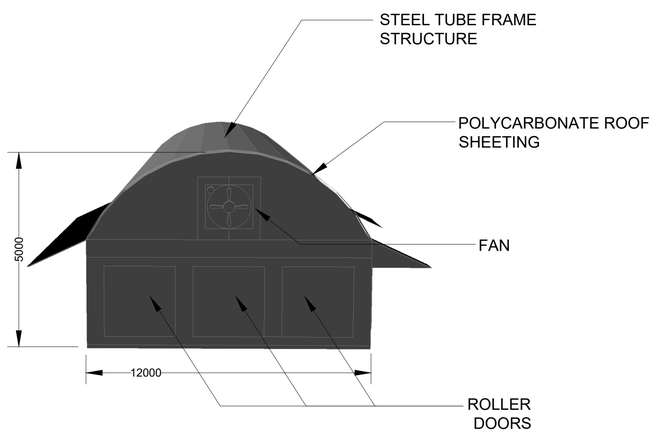


SIDE 2 ELEVATION

BUILDING 6: SCOPE OF WORKS

1. Service and refurbish aluminet cable mechanisms and clips
2. Remove and install new polycarbonate sheeting
3. Remove and install new insect netting in sections
4. Remove and install new aluminet material
5. Reinstate fogger and suspended sprayer systems
6. Supply and install spray heads
7. Repair and Service existing Extract Ventilation Fans x4
8. Supply and install new External Vertical Shade motor
9. Reinstate External vertical shade mechanisms
10. Service thermostatic valves
11. Supply, install and connect PIR Intruder sensor
12. Supply and install new motors for aluminet system and vertical system
13. Supply and Install Climate Control System



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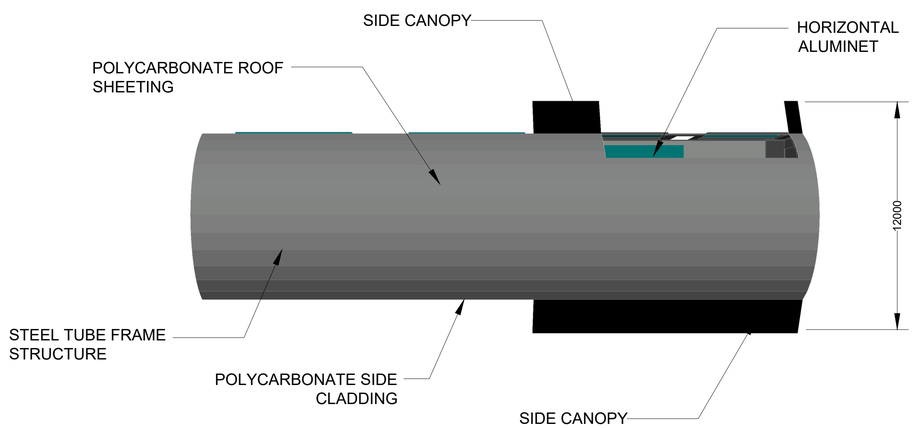

PLAN VIEW

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consultant
VIRTUAL CONSULTING ENGINEERS
P O BOX 323
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0027

discipline: STRUCTURAL

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project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 6

ref.no. --

designed K JURIES

scale N.T.S

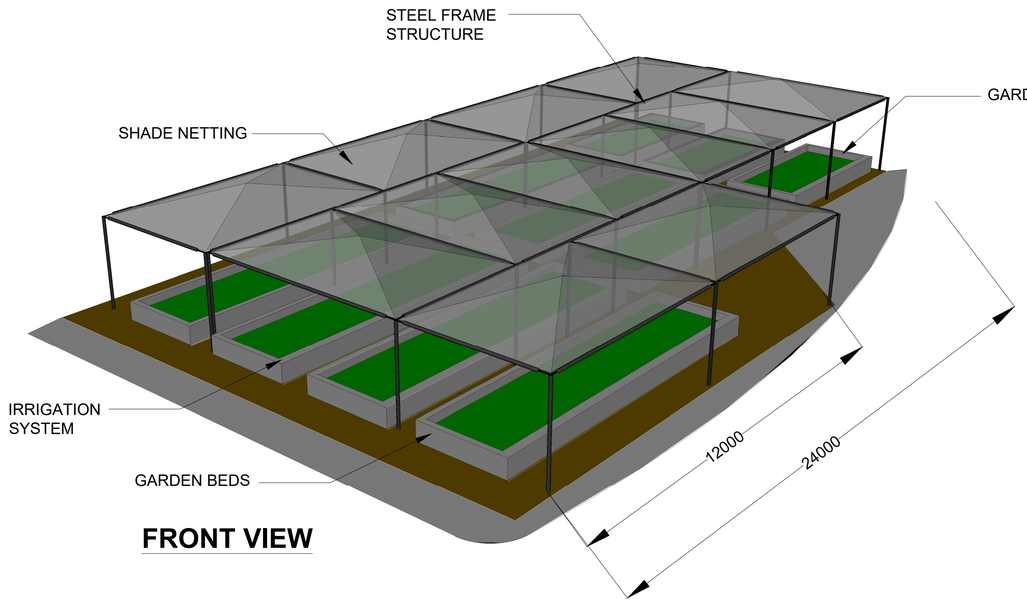
drawn T NIEFTAGODIEN

date FEB 25'

checked R ISHMAIL

drawing number: 0533-PH2-06

revision: T0



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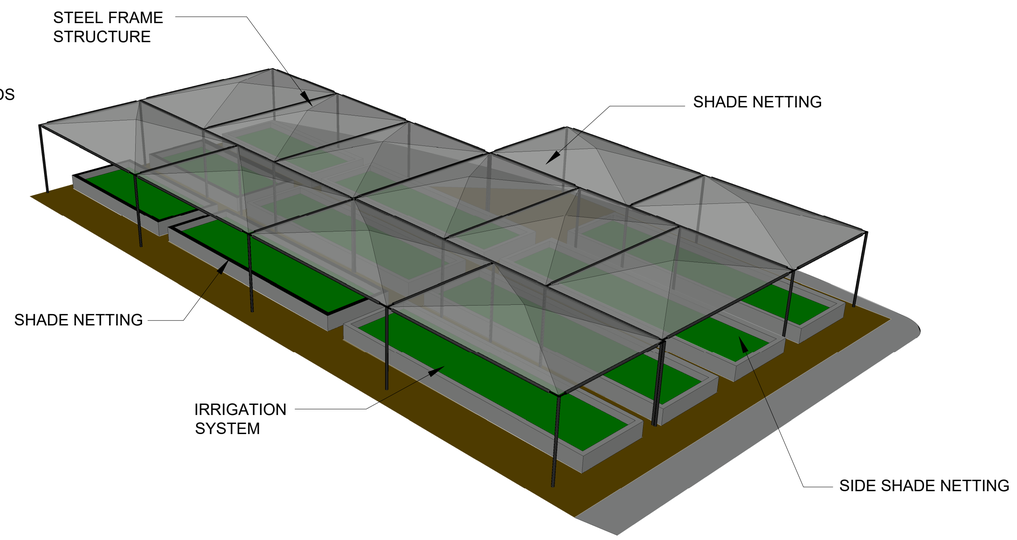

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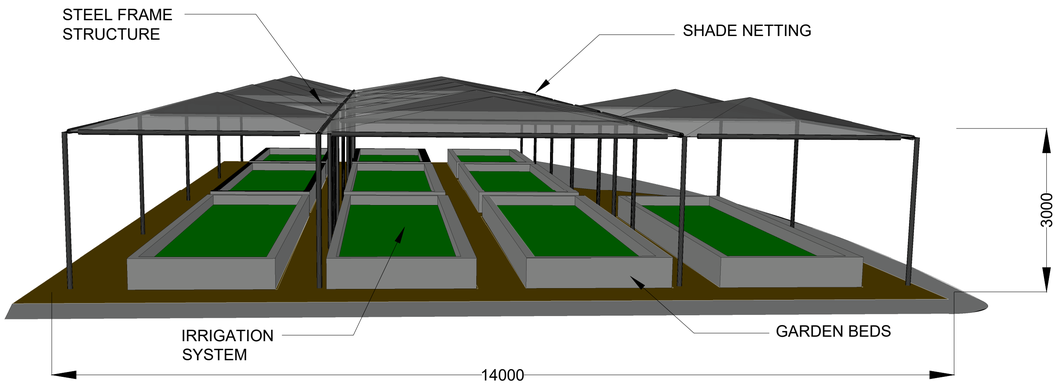

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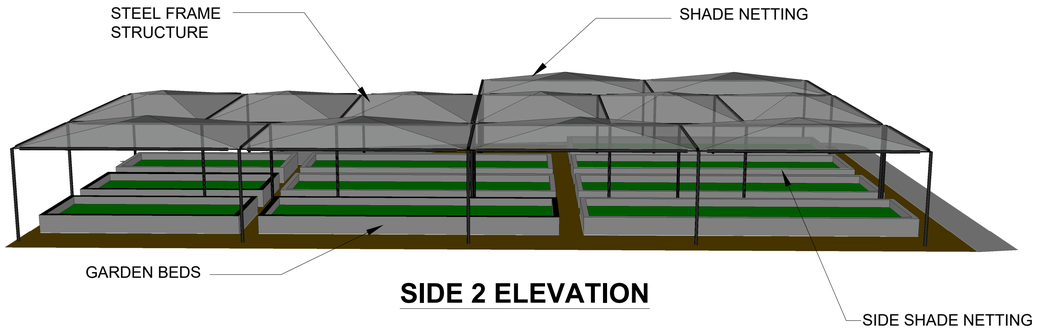

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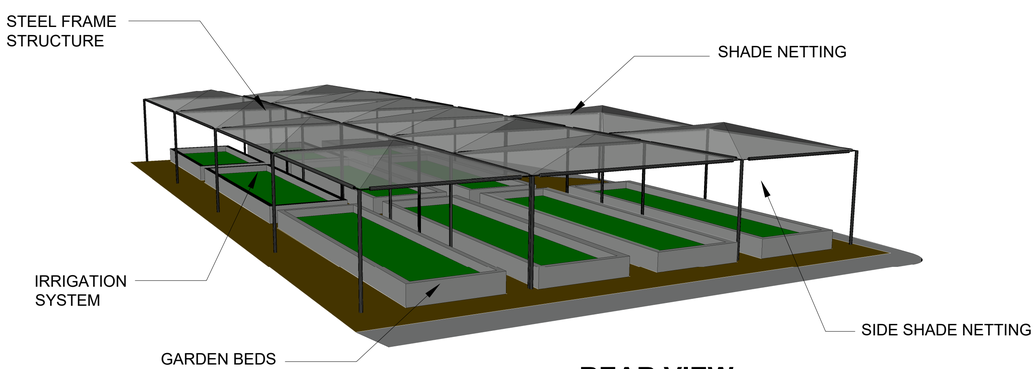

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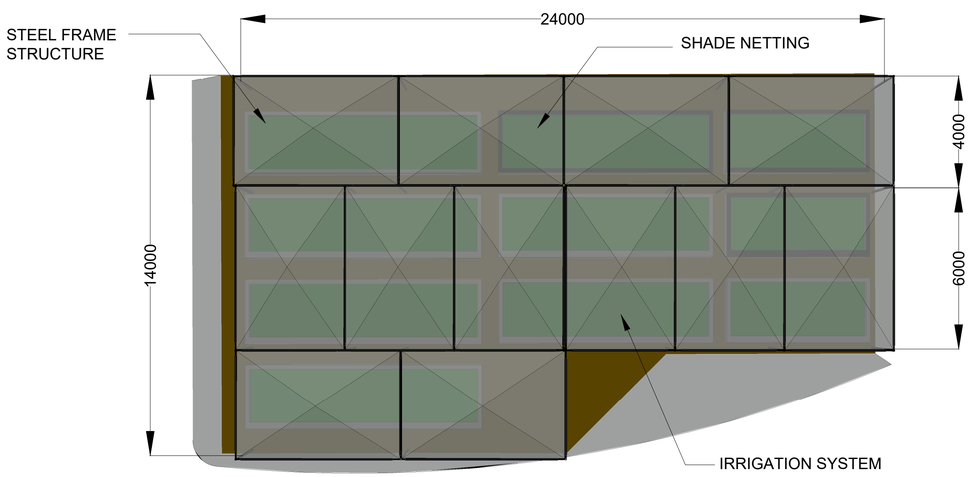

PLAN VIEW

BUILDING 7 : SCOPE OF WORKS

1. Remove timber frame structures with shade netting
2. Install steel shade port structures including side netting
3. Install hangers and reinstate irrigation system

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page type: A1

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0027

discipline: STRUCTURAL

service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 7

ref.no. --

scale N.T.S

date FEB 25'

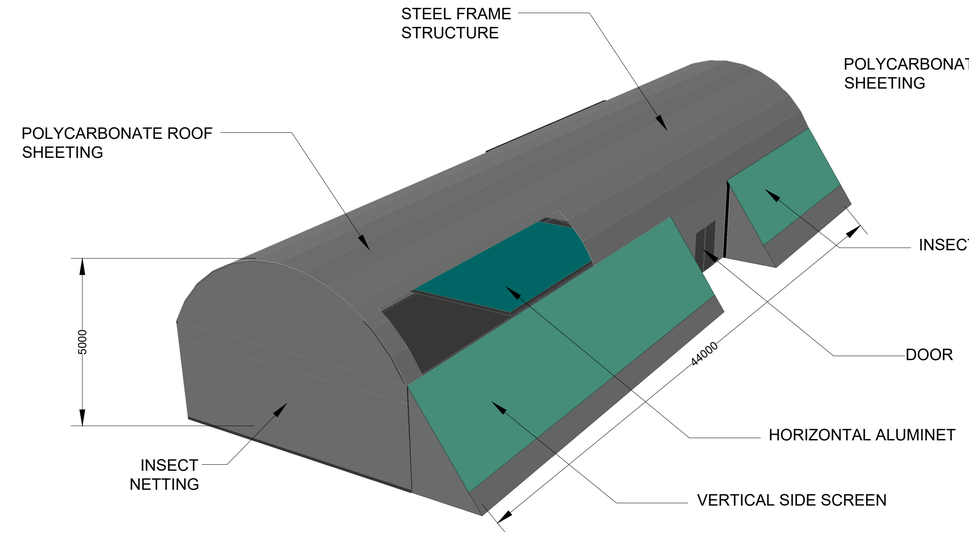
designed K JURIES

drawn T NIEFTAGODIEN

checked R ISHMAIL

drawing number: 0533-PH2-07

revision: T0



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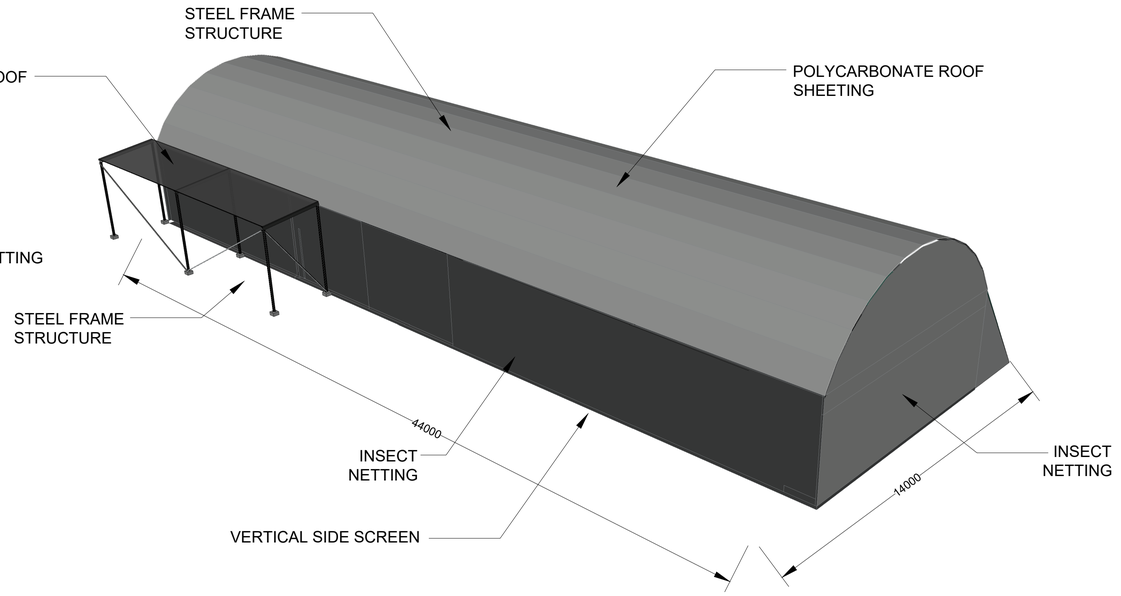

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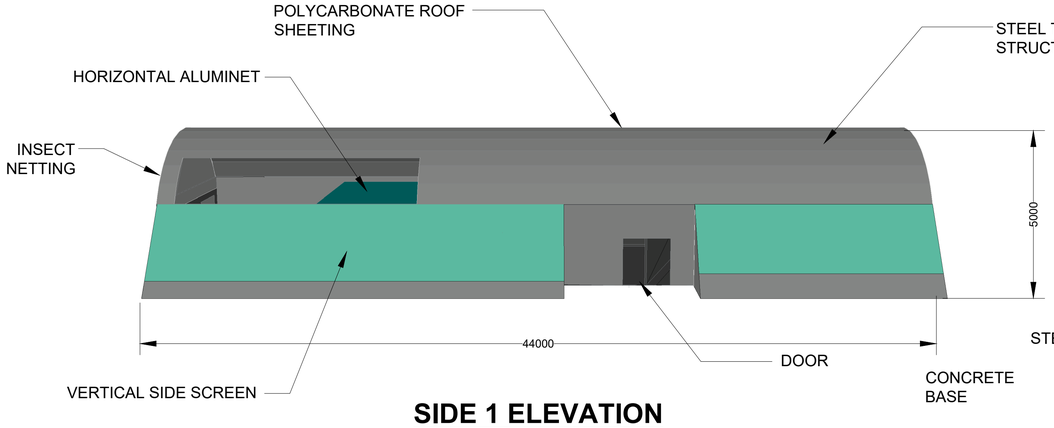

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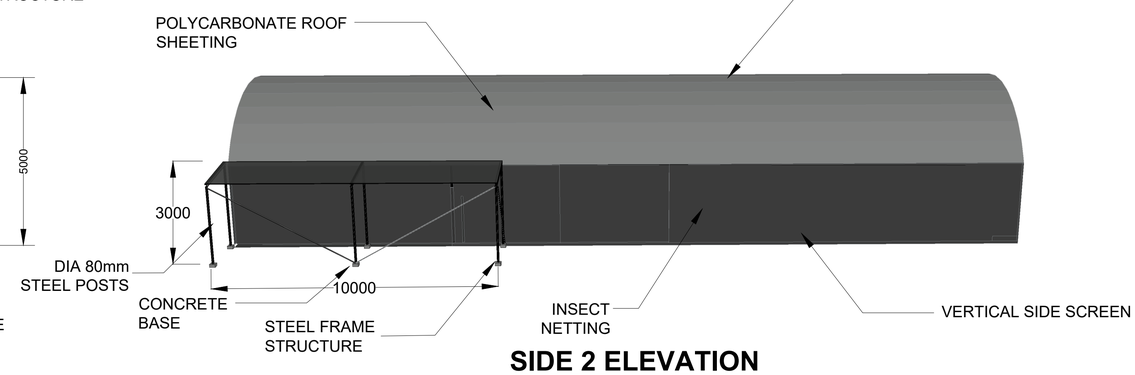
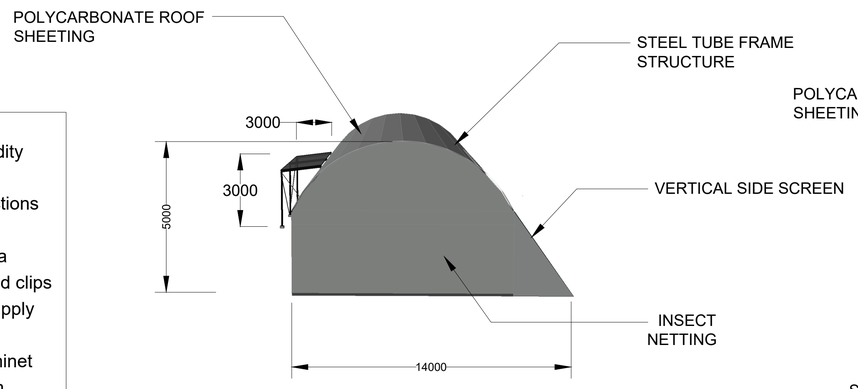


SIDE 2 ELEVATION

BUILDING 8: SCOPE OF WORKS

1. Supply and Install temperature and humidity sensors
2. Remove and replace insect netting in sections
3. Replace doors including locksets
4. Supply and install windows at potting area
5. Refurbish aluminet cable mechanisms and clips
6. Steel frame side structure with canopy supply and installation
7. Servicing and refurbish of horizontal aluminet
8. Supply and install Climate Control system



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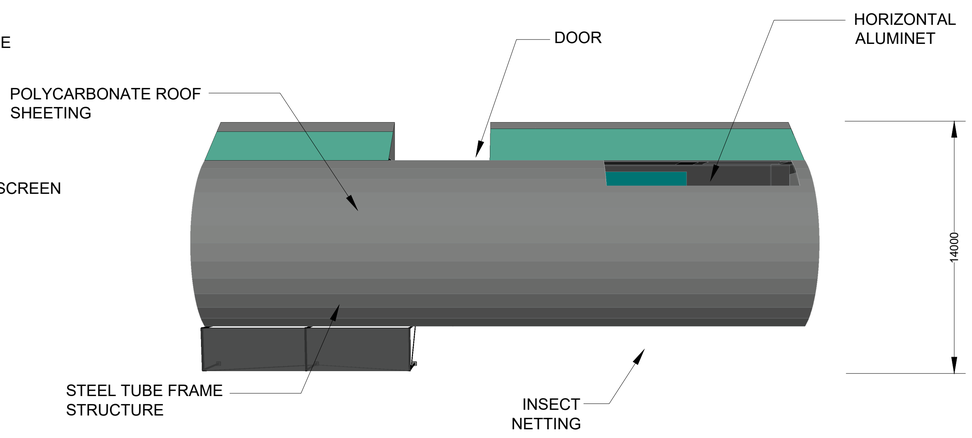

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consultant: VIRTUAL CONSULTING ENGINEERS
P O BOX 323
GROENKLOOF
0027

discipline: STRUCTURAL

service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 8

ref.no. --

designed K JURIES

scale N.T.S

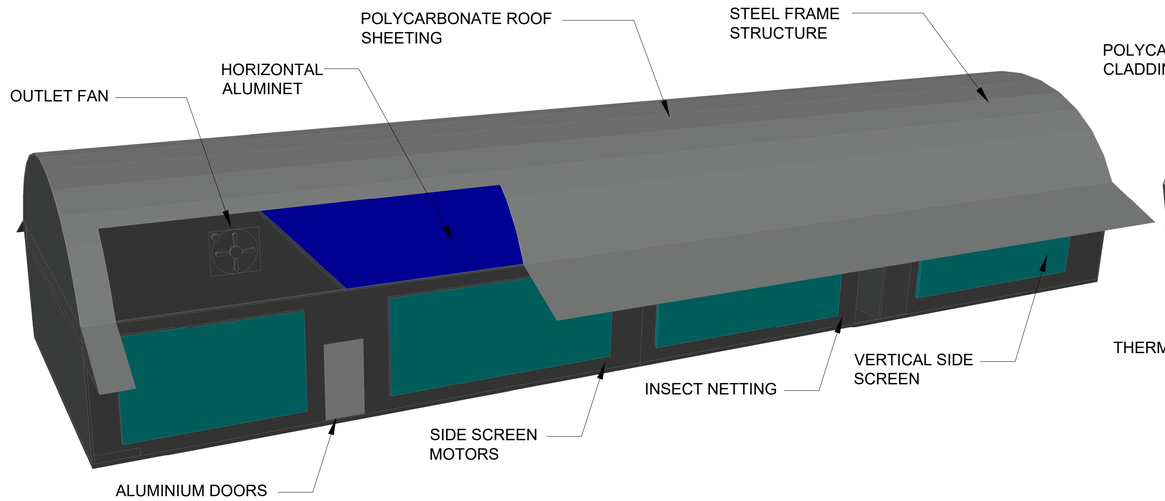
drawn T NIEFTAGODIEN

date FEB 2025'

checked R ISHMAIL

drawing number: 0533-PH2-08

revision: T0



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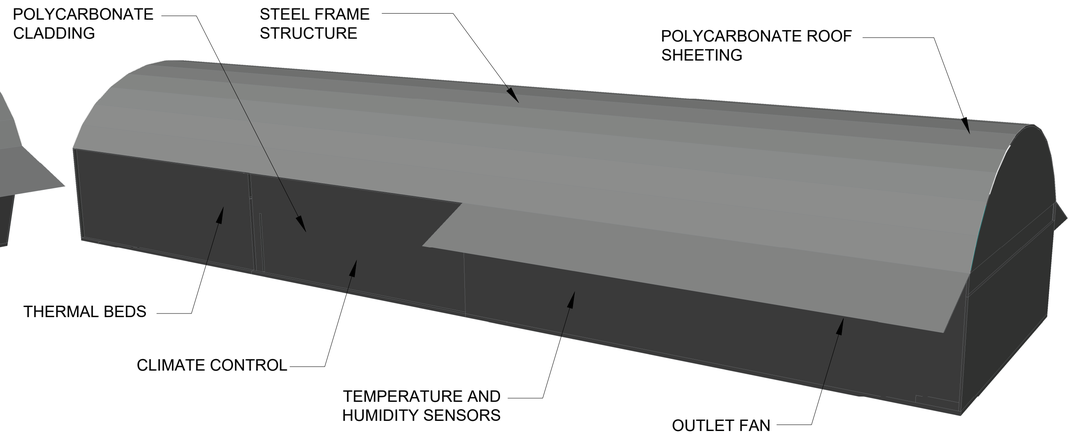

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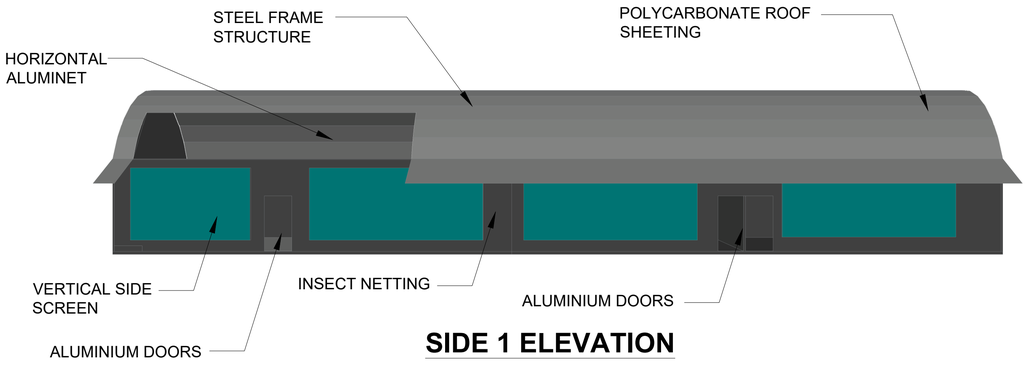

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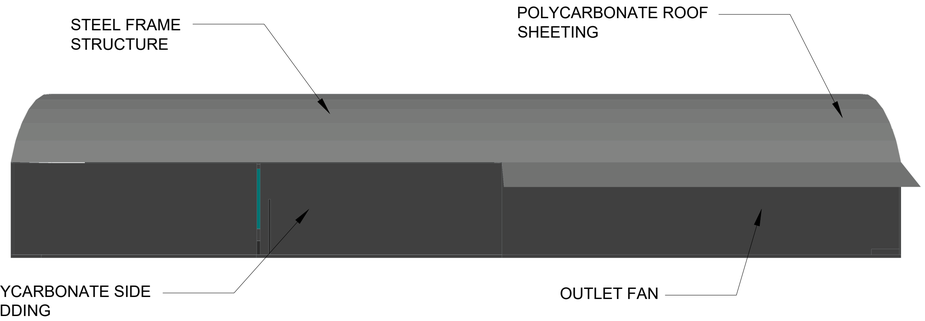
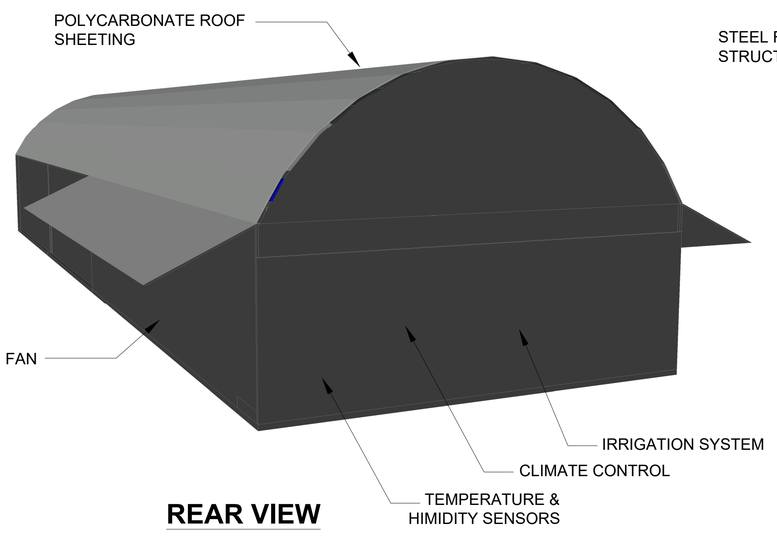


SIDE 2 ELEVATION

STEEL FRAME STRUCTURE

BUILDING 6.1: SCOPE OF WORKS

1. Repair external shade net rollers
2. Supply and install new motor for external shade roller
3. Reinstate fogger sprayer system
4. Supply and install spray heads
5. Repair and Service existing Extract Ventilation Fans x6
6. Supply, install and connect PIR Intruder sensor x4
7. Reinstate water wall
8. Supply and install new water wall pump
9. Supply and install new 0,5kW motor for aluminet system x4
10. Remove and install new polycarbonate cladding
11. Remove and install new insect netting in sections
12. Remove and install new aluminet material
13. Service and repair ventilation fans
14. Service hot bed thermal valves
15. Supply and install of temperature and humidity sensors
16. Supply and install mist nozzles
17. Supply and install of PIR intruder sensors
18. Supply and install circulation pumps
19. Repair external shade net rollers
20. Repair motor arms and stabilise support system
21. Servicing and refurbish horizontal aluminet
22. Refurbishment of water wall and replacement of pump
23. Supply and install of Climate Control System



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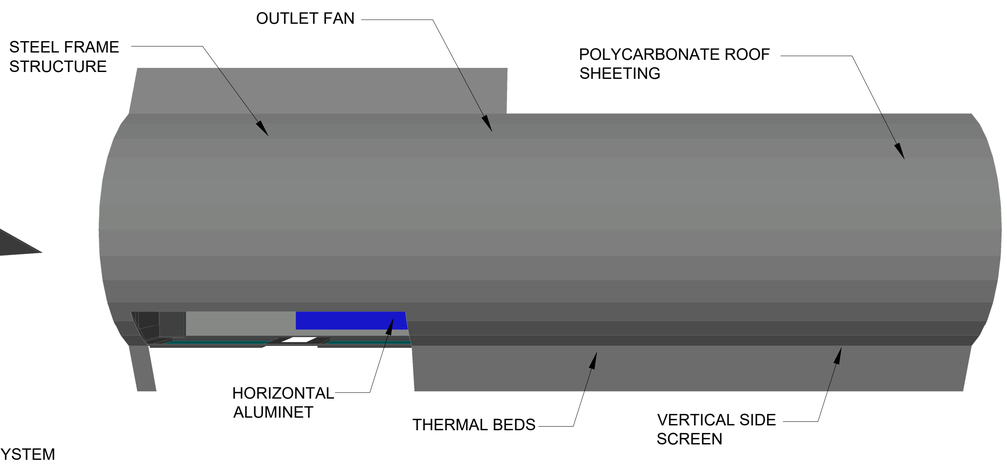

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P O BOX 323
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0027

discipline: STRUCTURAL

service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 6.1

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designed K JURIES

scale N.T.S

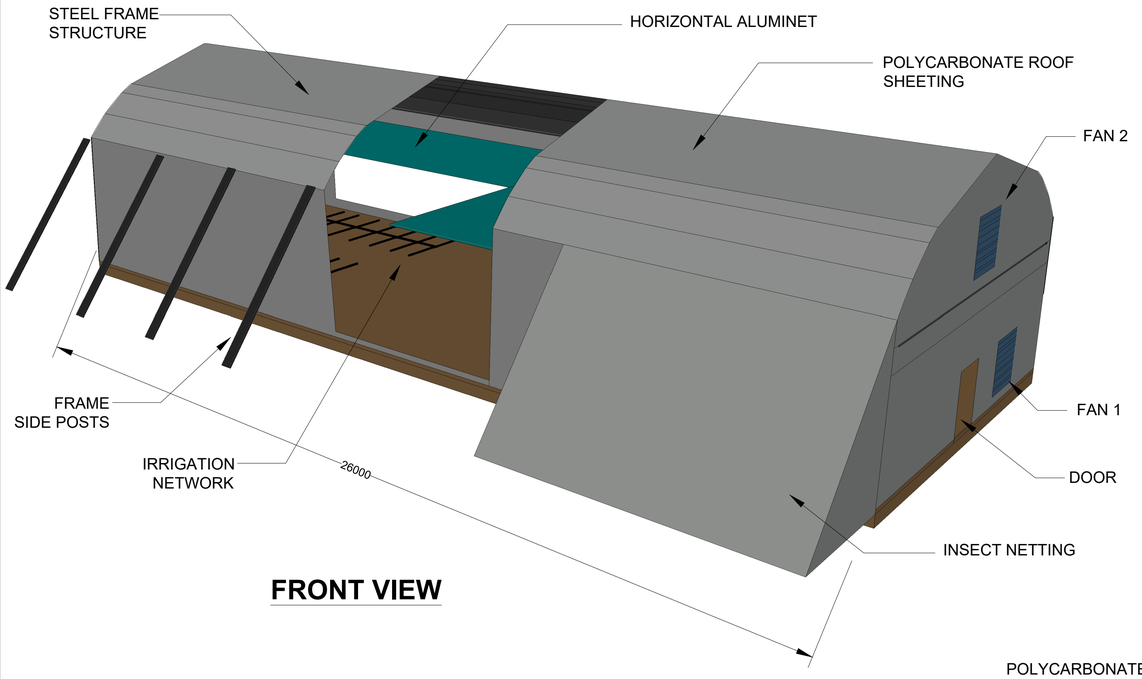
drawn T NIEFTAGODIEN

date FEB 25'

checked R ISHMAIL

drawing number: 0533-PH2-09

revision: T0



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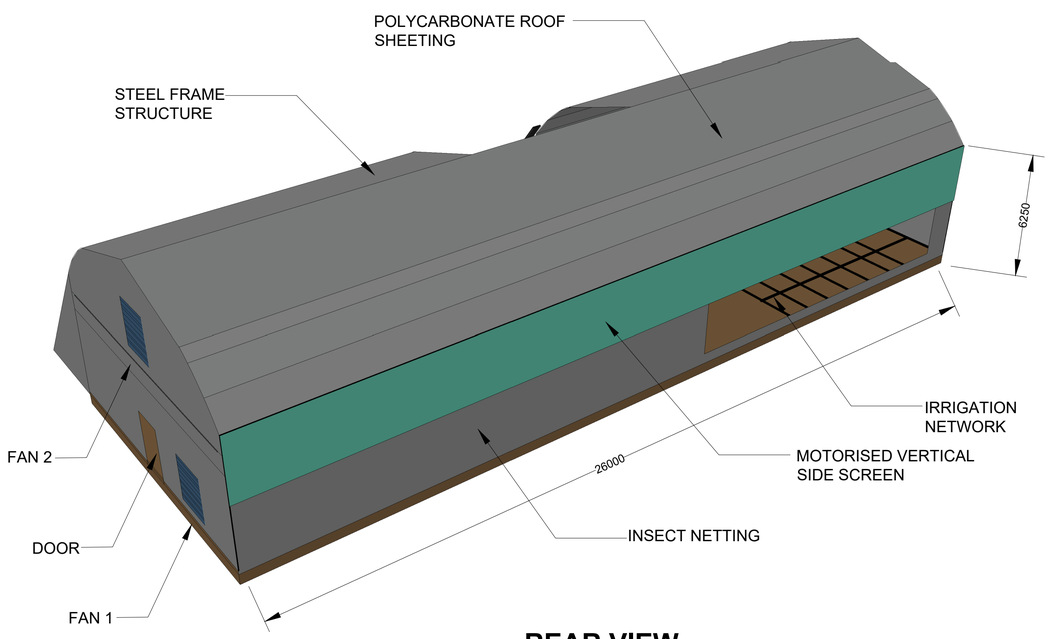

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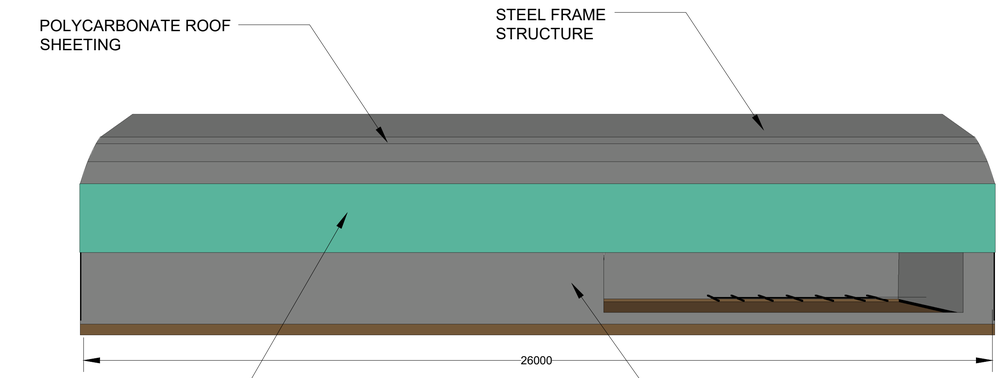

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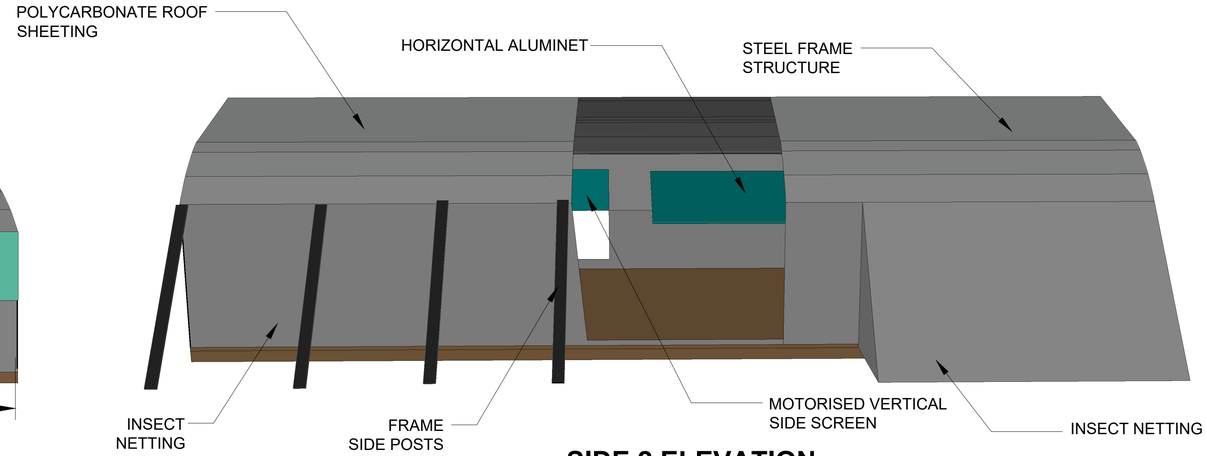
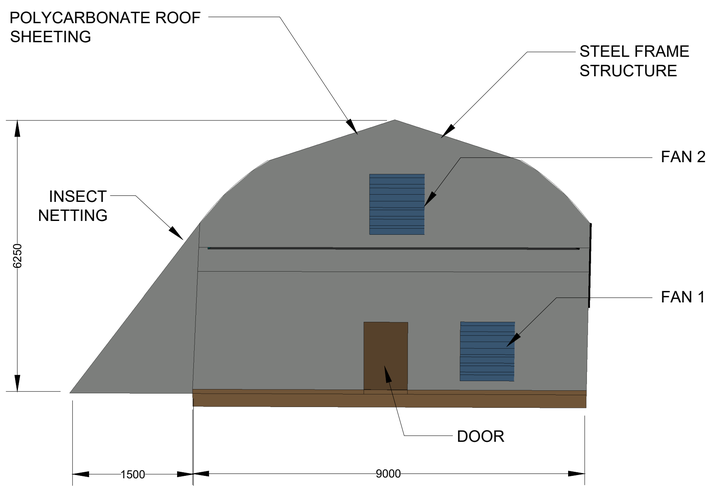


SIDE 2 ELEVATION

BUILDING 9: SCOPE OF WORKS

1. Replace doors incl lock sets
2. Remove and install insect netting in sections
3. Repair external horizontal screen
4. Supply, Install, new motors for shade roller net x4
5. Supply and install new Extract Ventilation Fans
6. Supply and install aluminium ventilation fan dampers
7. Reinstate irrigations system:
    a. Supply and install irrigation piping
    b. Ø25 HDPE piping
    c. Ø25 HDPE elbows
    d. Ø25 HDPE tees
    e. Ø25 HDPE spray nozzles
8. Supply and install of PIR Intruder sensor
9. Supply and install of Motor switch gear and PLC timers
10. Supply and install of Climate Control System



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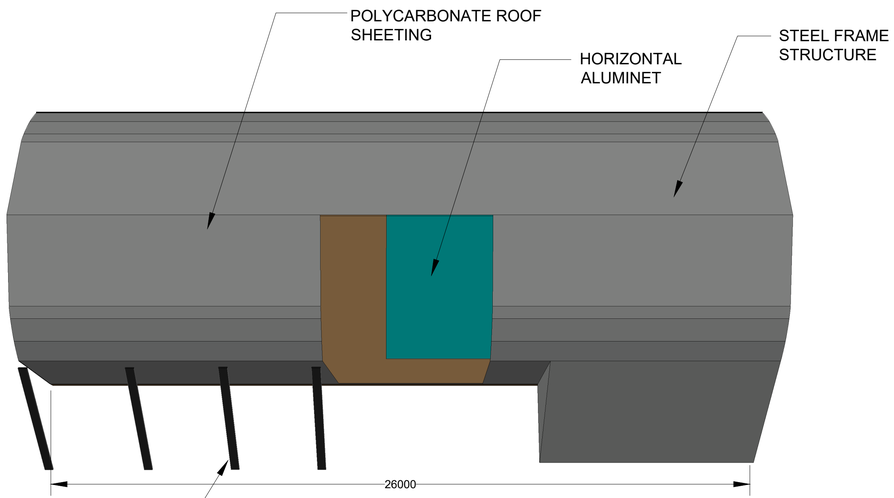

PLAN VIEW

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cad file name: 0533-PH2-10

page type: A1

client: SANBI South African National Biodiversity Institute — Biodiversity for Life

consultant: VIRTUAL CONSULTING ENGINEERS
P O BOX 323
GROENKLOOF
0027

discipline: STRUCTURAL

service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 9

ref.no. --

scale N.T.S

date FEB 25'

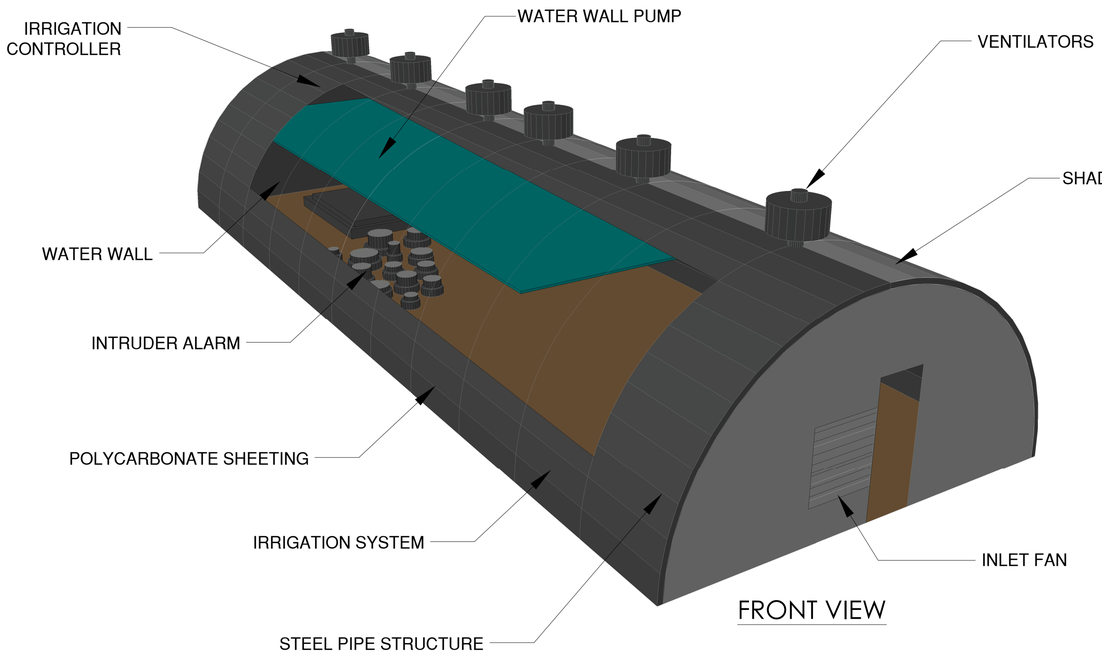
designed K JURIES

drawn T NIEFTAGODIEN

checked R ISHMAIL

drawing number: 0533-PH2-10

revision: T0



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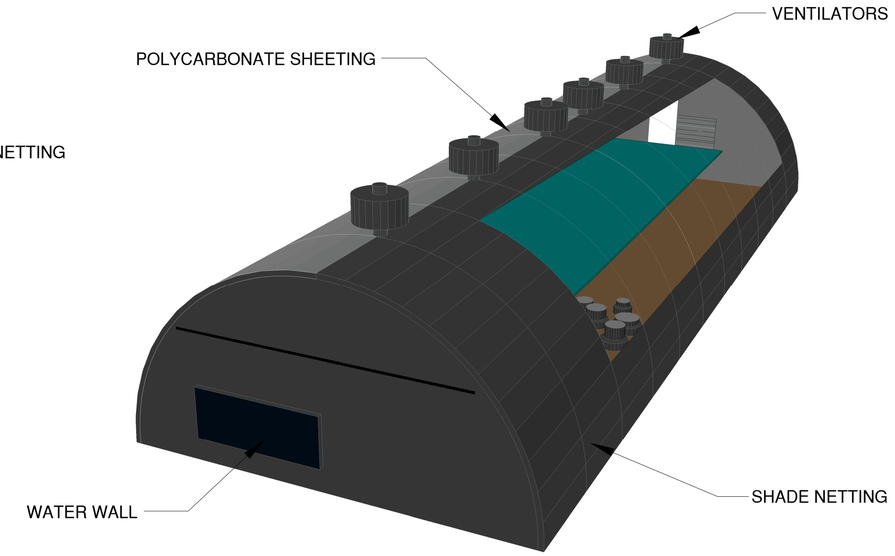

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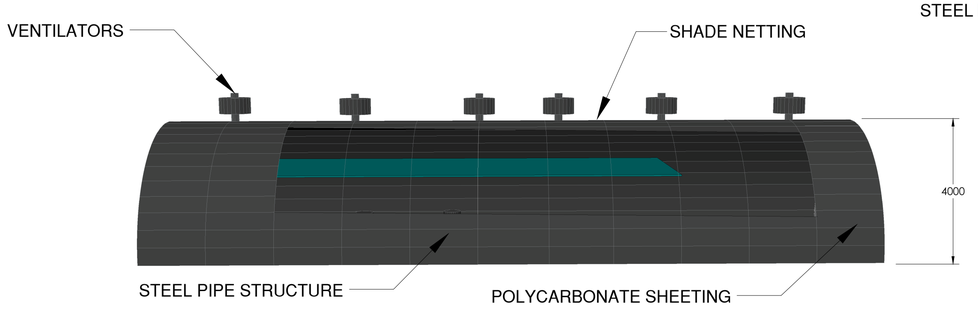

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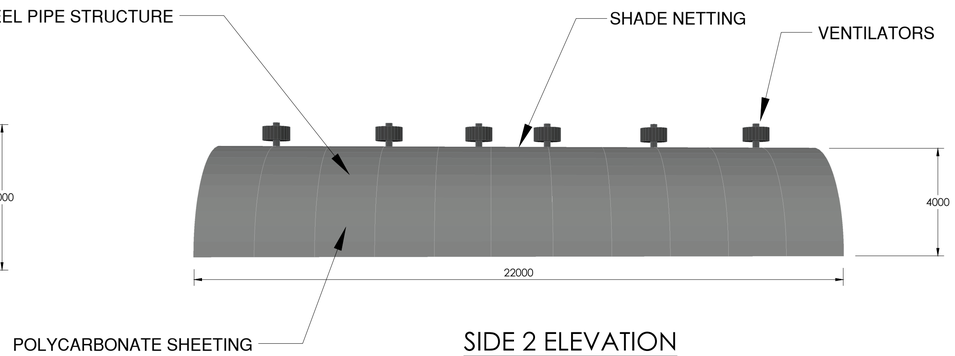
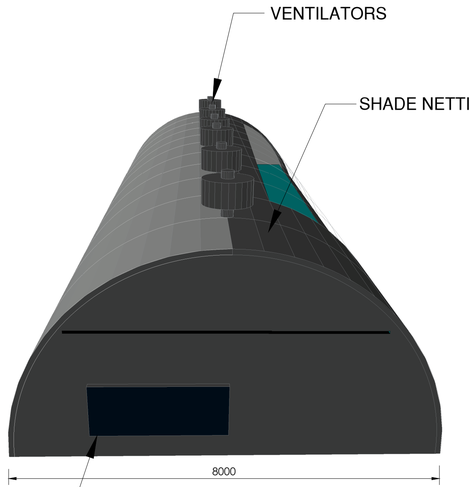


SIDE 2 ELEVATION

BUILDING 12: SCOPE OF WORKS

1. Remove and install all polycarbonate sheeting
2. Remove and re install tie-down netting incl brackets
3. Supply and install tie-down netting incl brackets
4. Supply and install new Extract Ventilation Fan
5. Supply and install water wall medium
6. Reinstate irrigations system:
   a. Supply and install irrigation piping
   b. Ø25 HDPE piping
   c. Ø25 HDPE elbows
   d. Ø25 HDPE tees
   e. Ø25 HDPE spray nozzles
7. Supply and install new solenoid valves
8. Supply and install new irrigation pump
9. Supply, install and connect PIR Intruder sensor
10. Supply and Install water wall pump
11. Supply and install back draught dampers on Whirly Birds
12. Supply and install of Climate Control System



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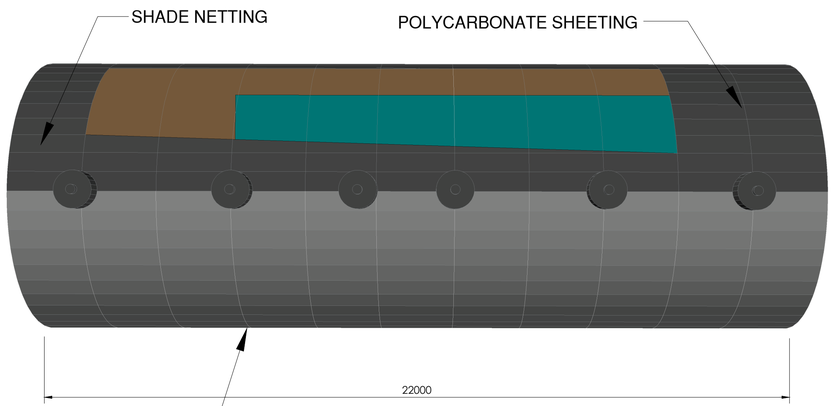

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client: SANBI
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Biodiversity for Life

consultant
VIRTUAL
CONSULTING ENGINEERS
P O BOX 323
GROENKLOOF
0027

discipline: STRUCTURAL

service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 12

ref.no. --

designed K JURIES

scale N.T.S

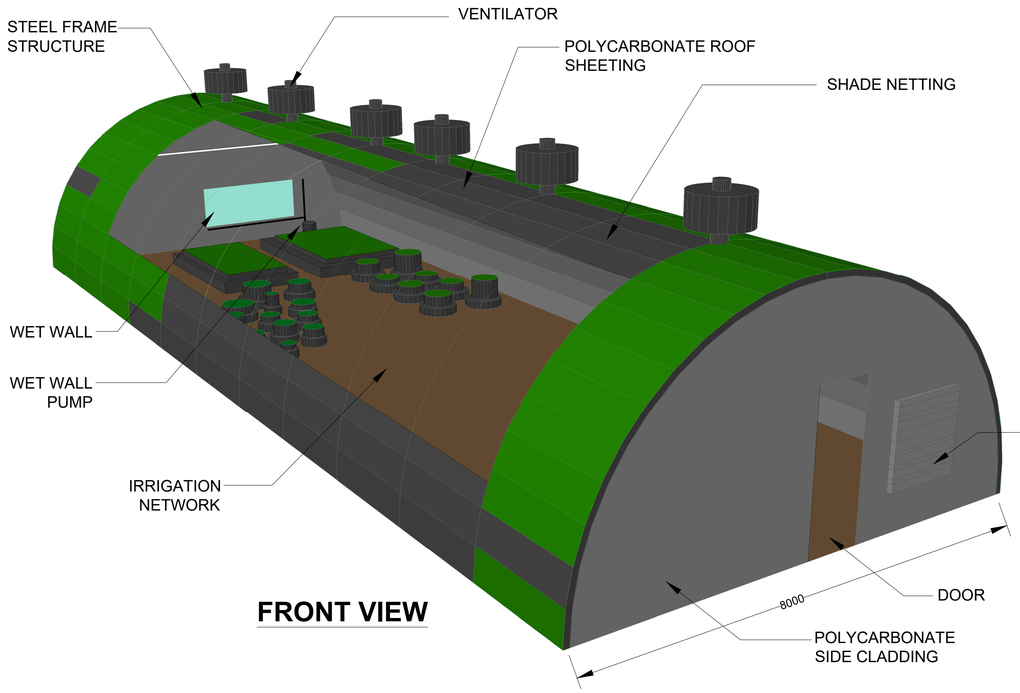
drawn T NIEFTAGODIEN

date FEB 25'

checked R ISHMAIL

drawing number: 0533-PH2 -11

revision: T0



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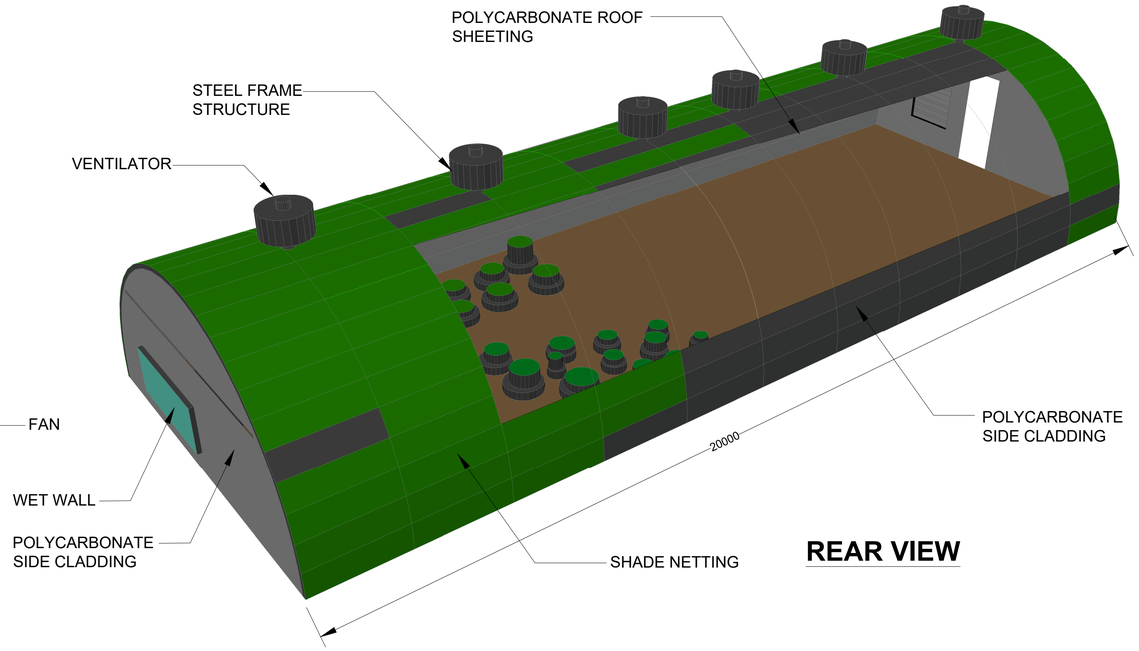

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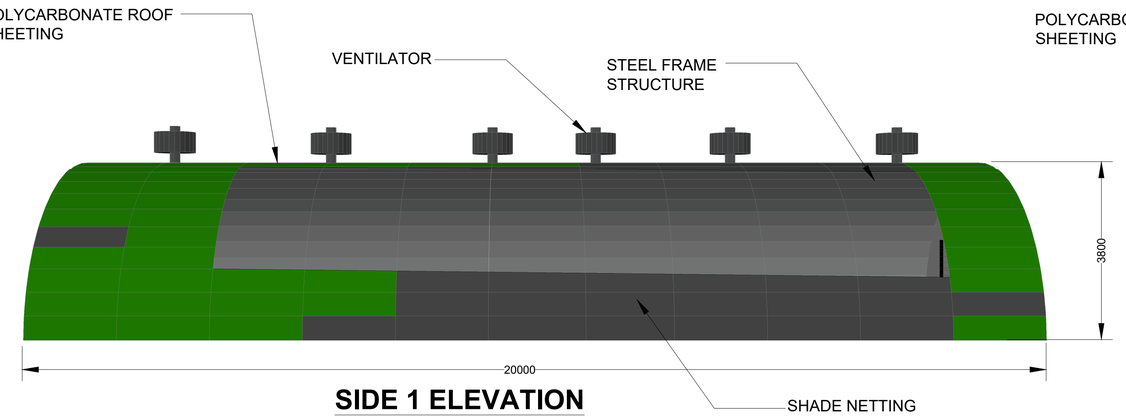

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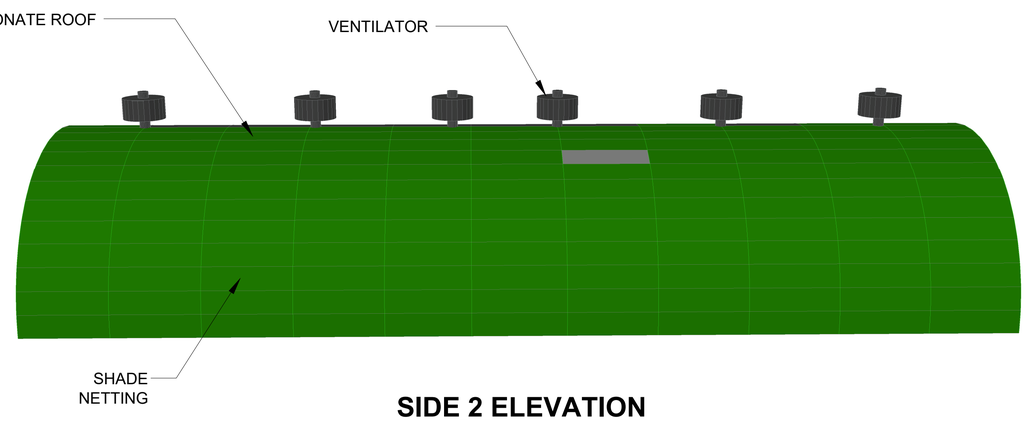
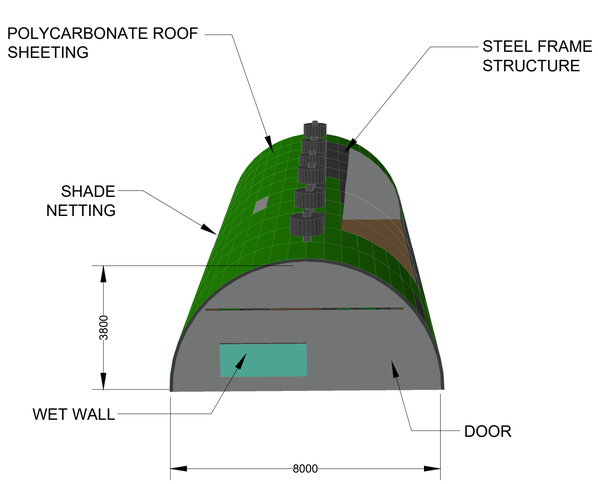


SIDE 2 ELEVATION

BUILDING 13: SCOPE OF WORKS

1. Remove and install new polycarbonate sheeting
2. Alarm system is to be installed for temperature alerts
3. Supply and install new Extract Ventilation Fan
4. Supply and install water wall medium
5. Reinstate Irrigations System:
   a. Supply and install irrigation piping
   b. Ø25 HDPE piping
   c. Ø25 HDPE elbows
   d. Ø25 HDPE tees
   e. Ø25 HDPE spray nozzles
6. Supply and install new solenoid valves
7. Supply and install new irrigation pump
8. Supply, install and connect PIR Intruder sensor
9. Supply and Install water wall pump
10. Supply and install back draught dampers on Whirly Birds
11. Supply and install of Climate Control System



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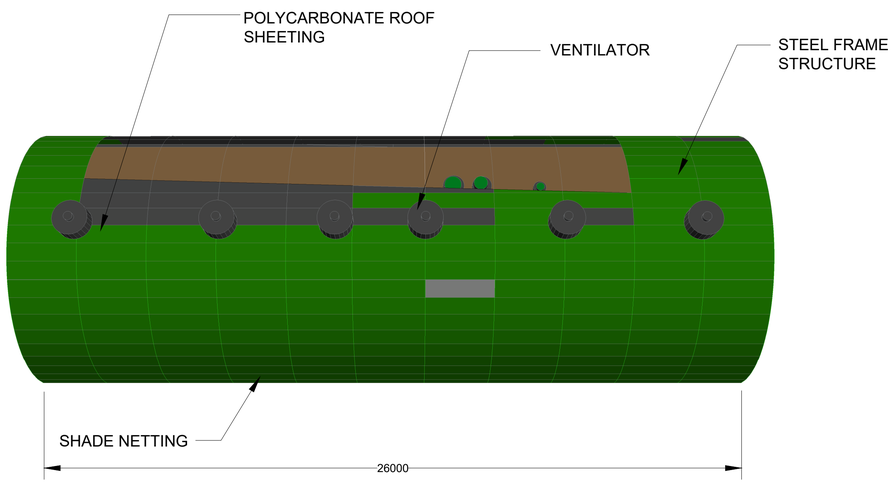

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client

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P O BOX 323
GROENKLOOF
0027

discipline: STRUCTURAL

service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 13

ref.no. --

scale N.T.S

date FEB 25'

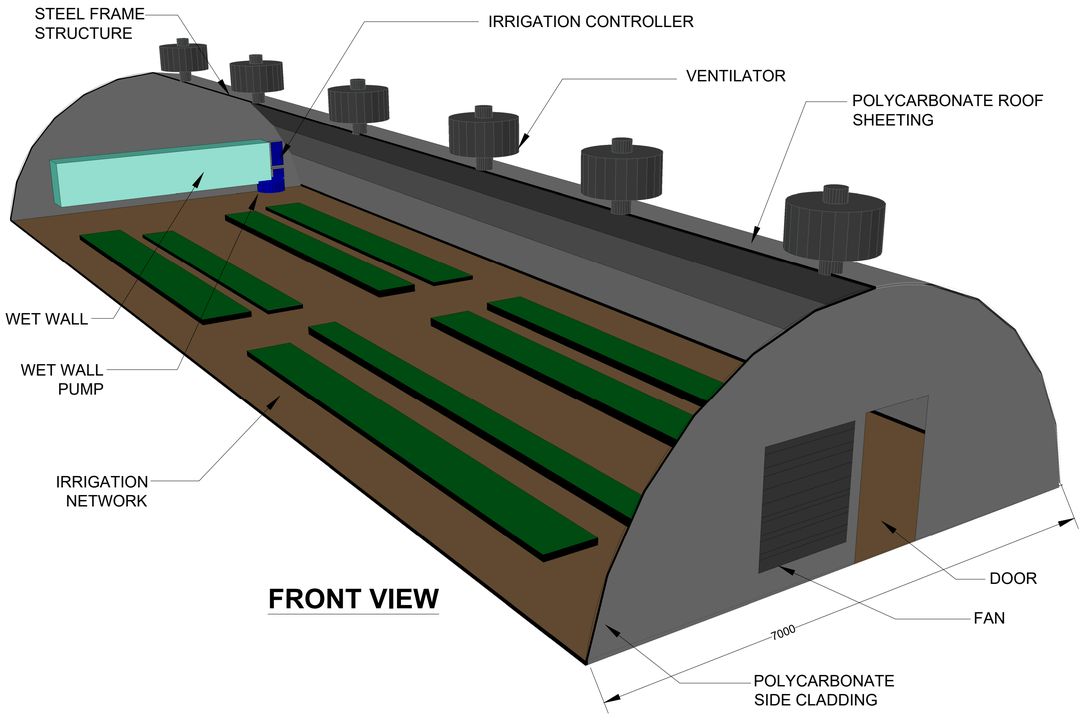
designed K JURIES

drawn T NIEFTAGODIEN

checked R ISHMAIL

drawing number: 0533-PH2-12

revision: T0



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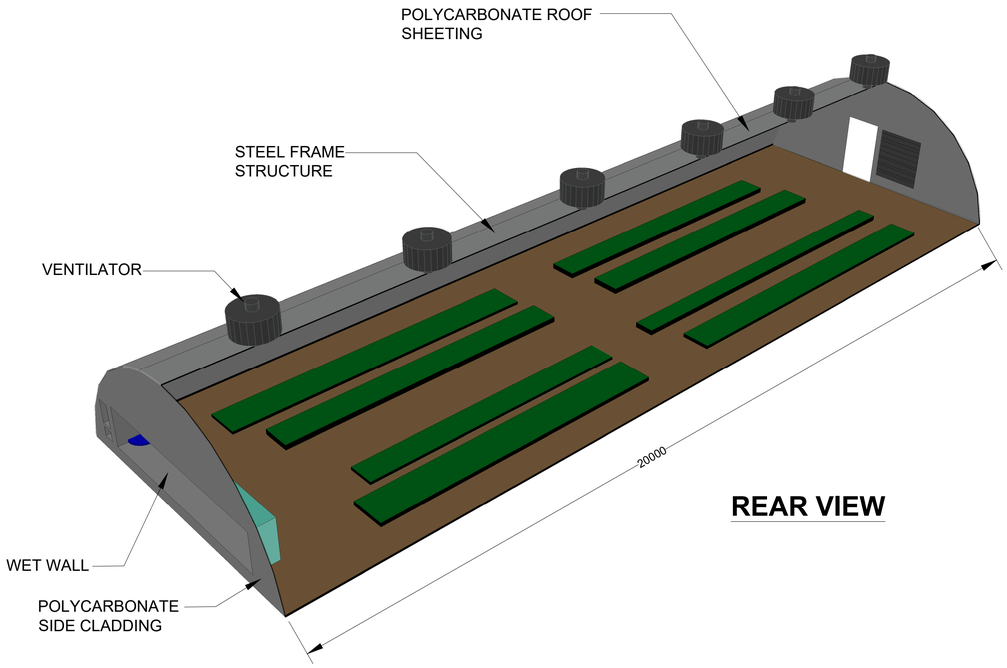

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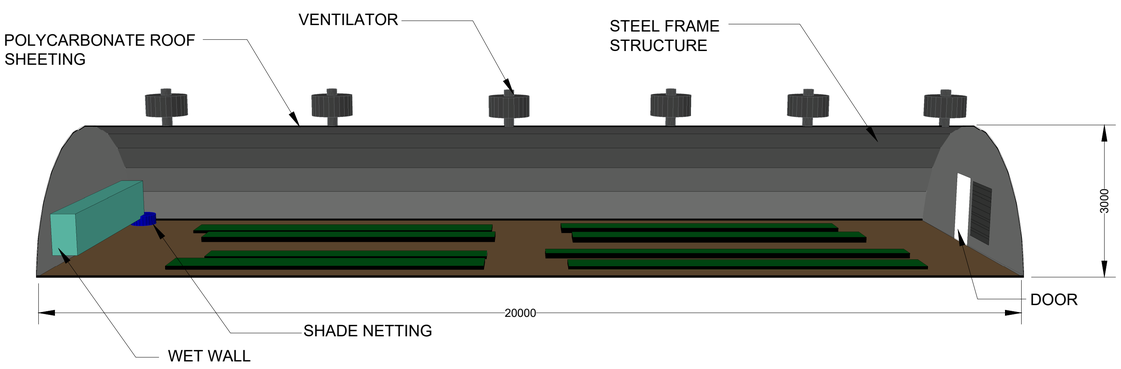

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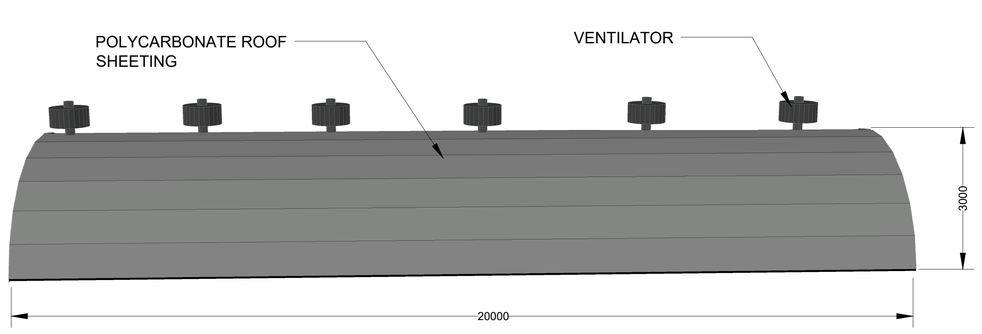

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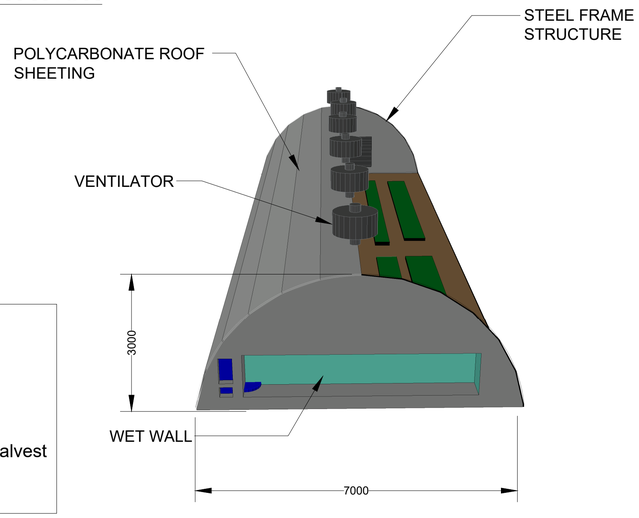

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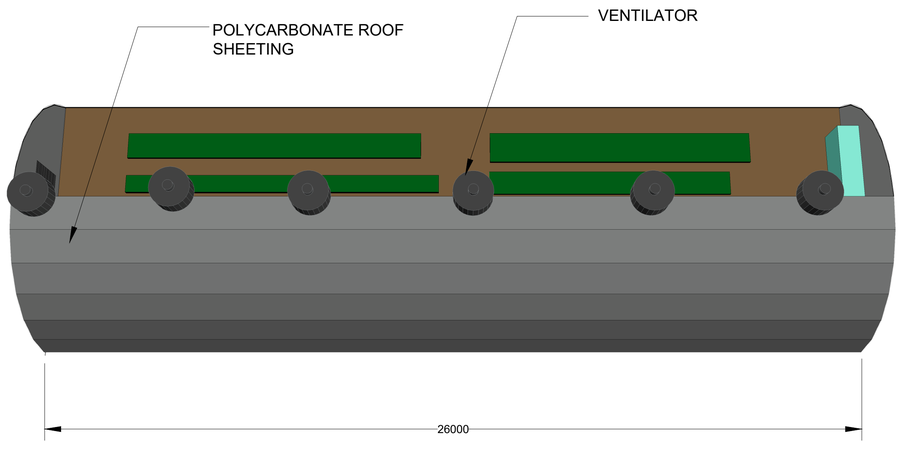

PLAN VIEW

BUILDING 14: SCOPE OF WORKS

1. Remove and install polycarbonate sheeting of nursery tunnel
2. Supply and install new Extract Ventilation Fan
3. Supply and install water wall medium
4. Supply and install water wall pump
5. Reinstate Irrigation Systems: Ø25 HDPE piping and solenoid valvest
6. Supply and install Ø25 HDPE spray stand pipe and nozzles

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consultant: VIRTUAL CONSULTING ENGINEERS
P O BOX 323
GROENKLOOF
0027

discipline: STRUCTURAL

service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 14

ref.no. --

designed K JURIES

scale N.T.S

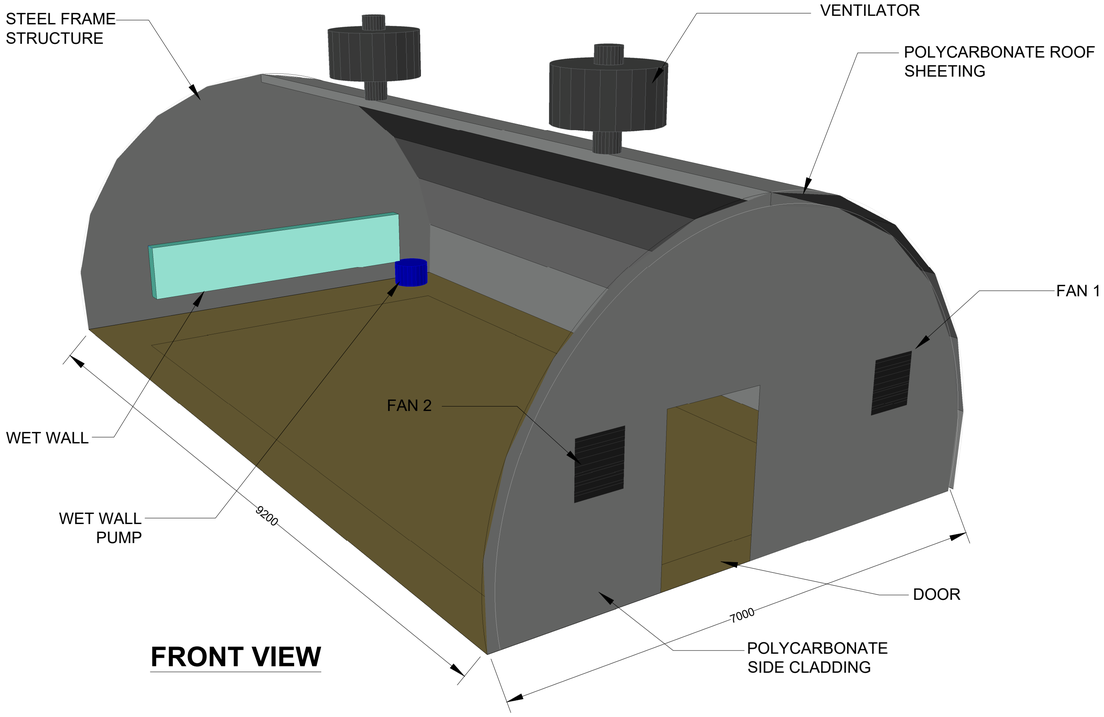
drawn T NIEFTAGODIEN

date FEB 25'

checked R ISHMAIL

drawing number: 0533-PH2-13

revision: T0



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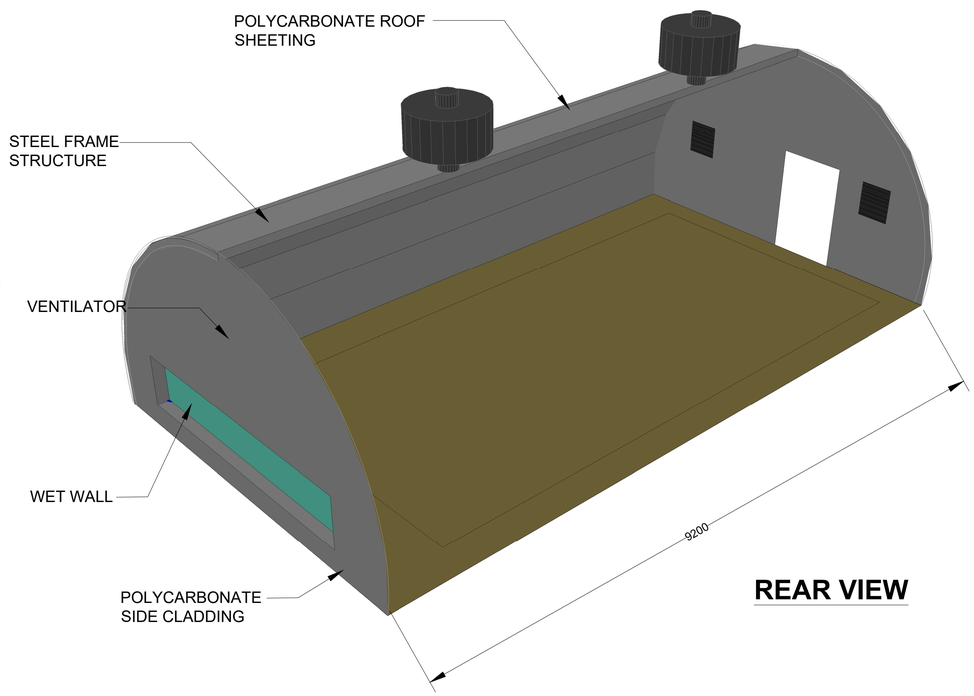

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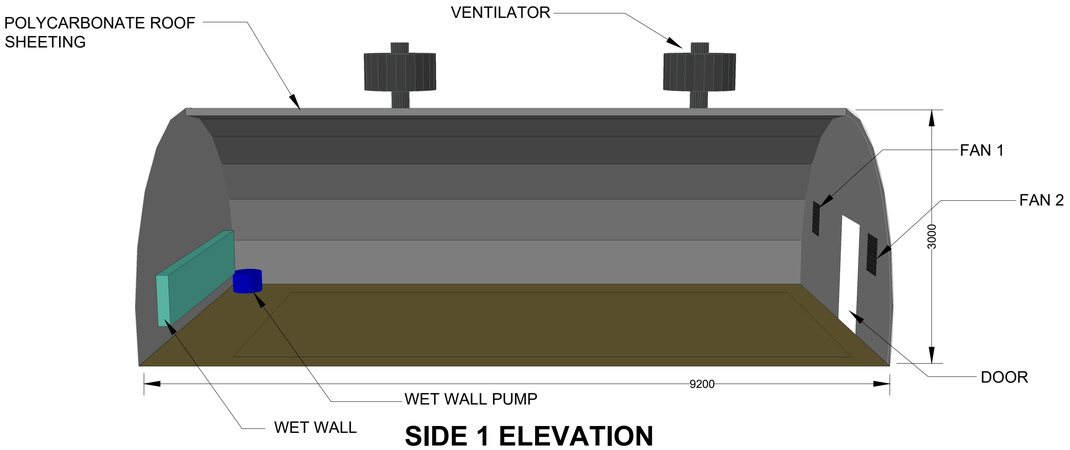

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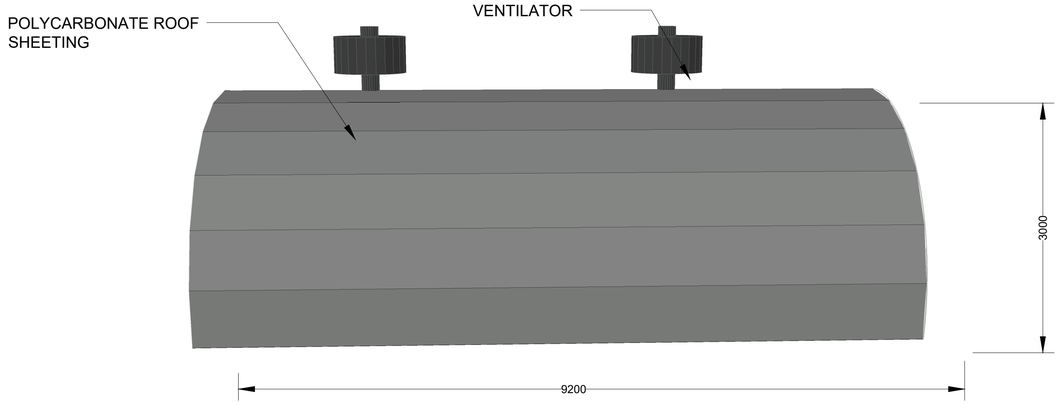

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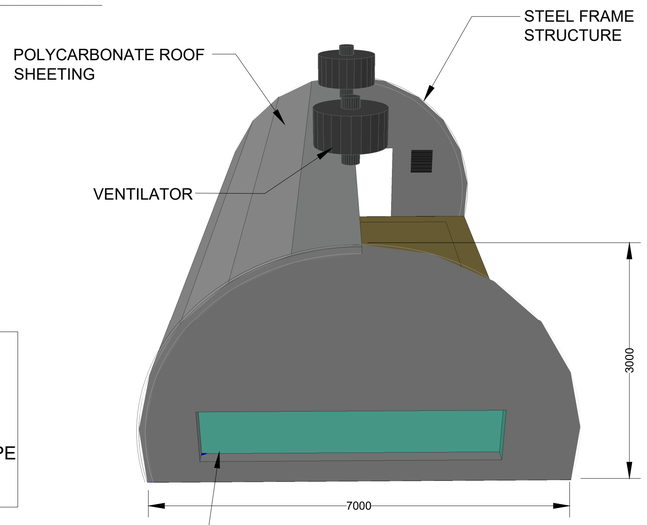

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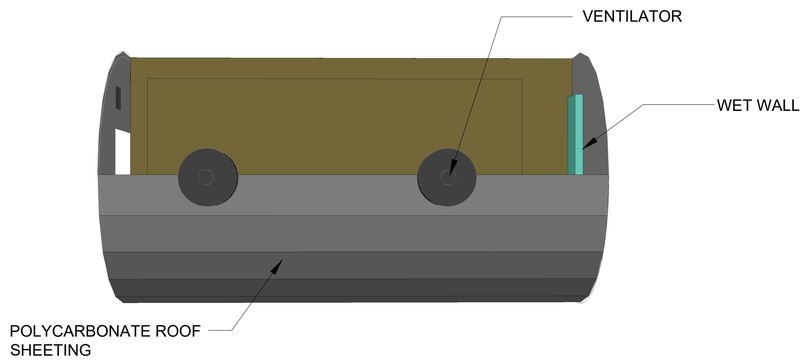

PLAN VIEW

BUILDING 15: SCOPE OF WORKS

1. Remove and install polycarbonate sheeting of nursery tunnel
2. Supply and install new Extract Ventilation Fan
3. Supply and install water wall medium
4. Irrigation system: Ø25 HDPE piping, Solenoid valves, Ø25 HDPE spray nozzles

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page type: A1

client: SANBI
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Biodiversity for Life

consultant
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P O BOX 323
GROENKLOOF
0027

discipline: STRUCTURAL

service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 15

ref.no. --

scale N.T.S

date FEB 25'

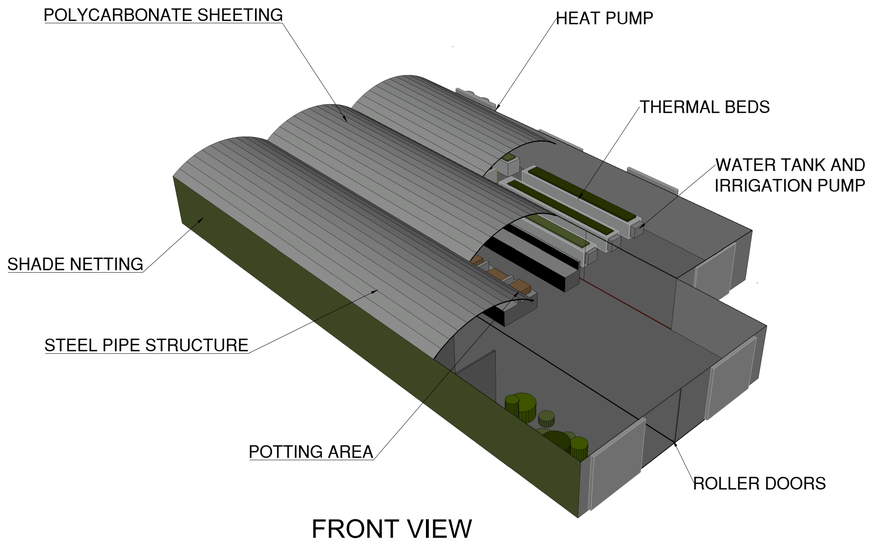
designed K JURIES

drawn T NIEFTAGODIEN

checked R ISHMAIL

drawing number: 0533-PH2-14

revision: T0



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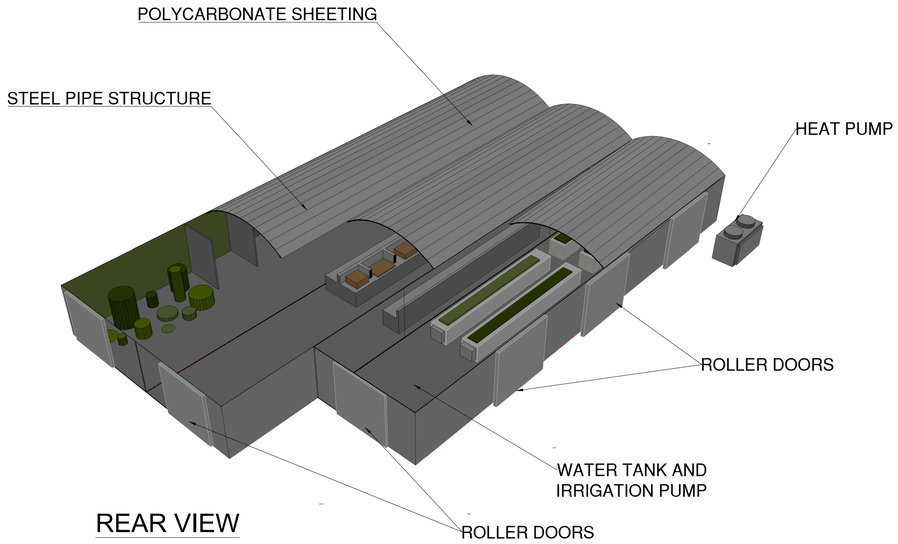

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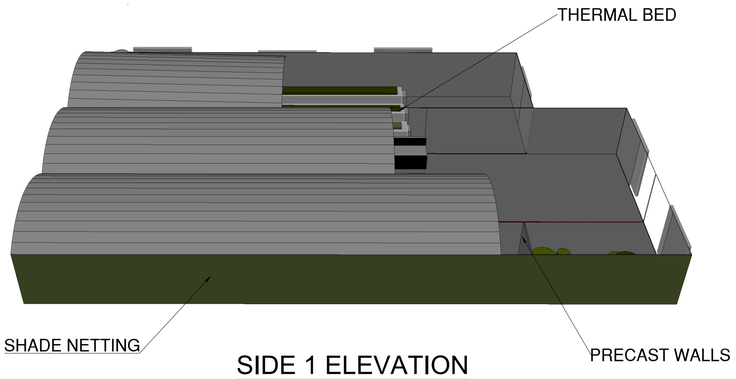

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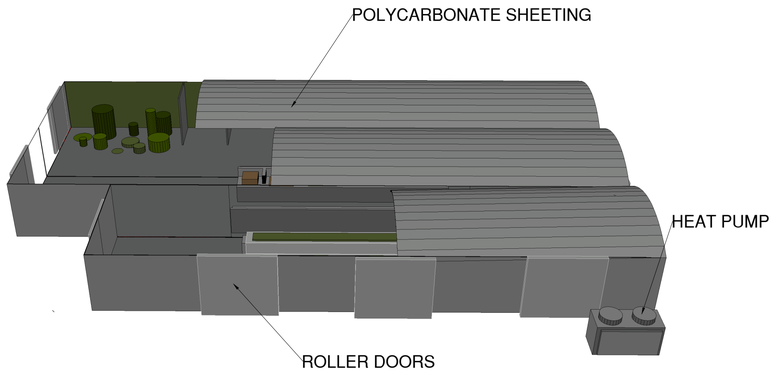


SIDE 2 ELEVATION

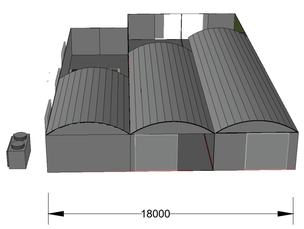
BUILDING 17: SCOPE OF WORKS

1. Remove side netting and install polycarbonate sheeting
2. Replace galvanised post bases /baseplates in corroded areas and grout

   (SS A2 Stud + Chemical anchor)
3. Supply and install 1000L water tank
4. Replace faulty sprayers
5. Supply and install 15mm Ø HDPE piping
6. Supply Install sprayers
7. Service thermal bed valves and equipment
8. Secure internal overhead shade netting
9. Supply and install new ball valve in existing JoJo tank
10. Repair and service heat pump
11. Supply and install 200 litre hot water storage tank and connect to existing

    heat pump
12. Supply and install solenoid valves
13. Supply and install Galvanised grating to floor channels (220x8mm)
14. Clean and paint rusted structural frame members.

    (wire brush/sand with polyurethane paint -Sigmadur or similar)
15. Supply and install new 1,1kW pump for water tan



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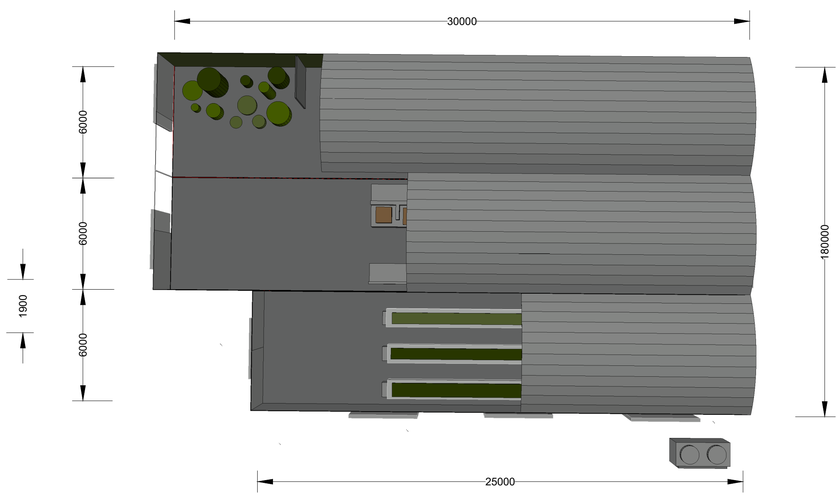

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page type: A1

client: SANBI
South African National Biodiversity Institute
Biodiversity for Life

consultant
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P O BOX 323
GROENKLOOF
0027

discipline: STRUCTURAL

service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 17

ref.no. --

designed R ISHMAIL

scale N.T.S

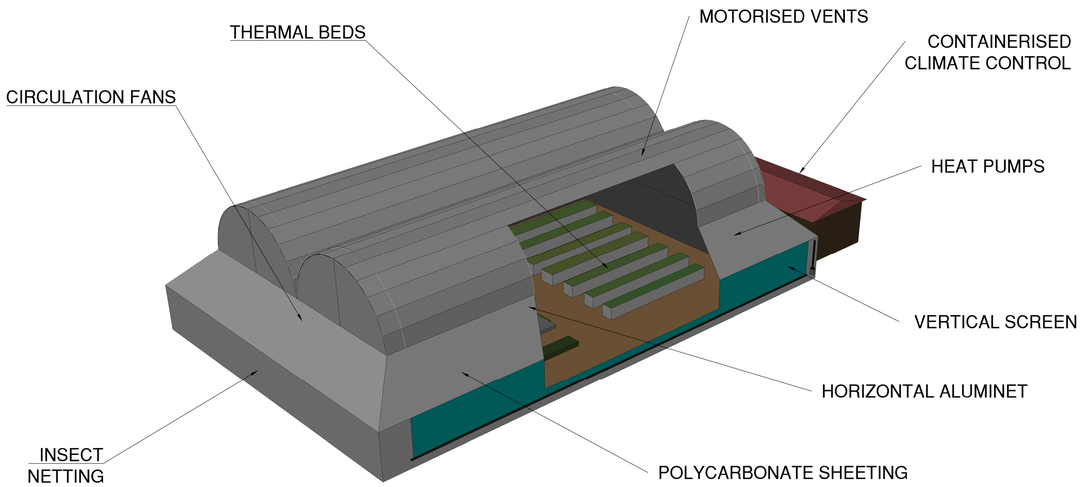
drawn K JURIES

date FEB 25'

checked S ISHMAIL

drawing number: 0553-PH2-15

revision: T0



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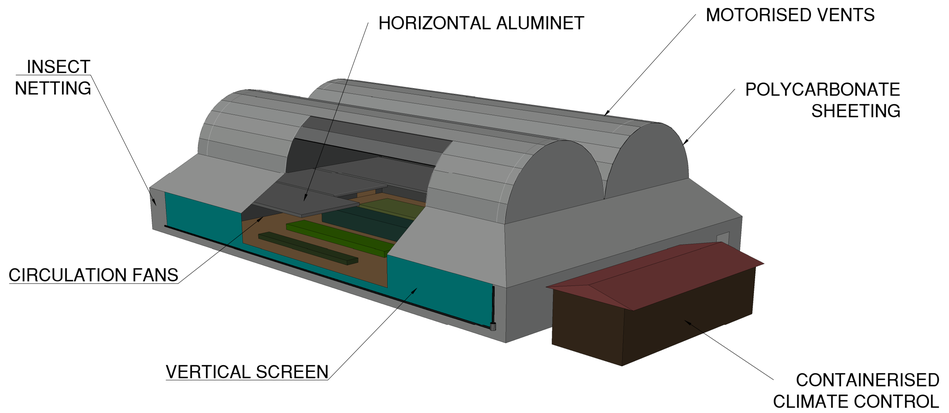

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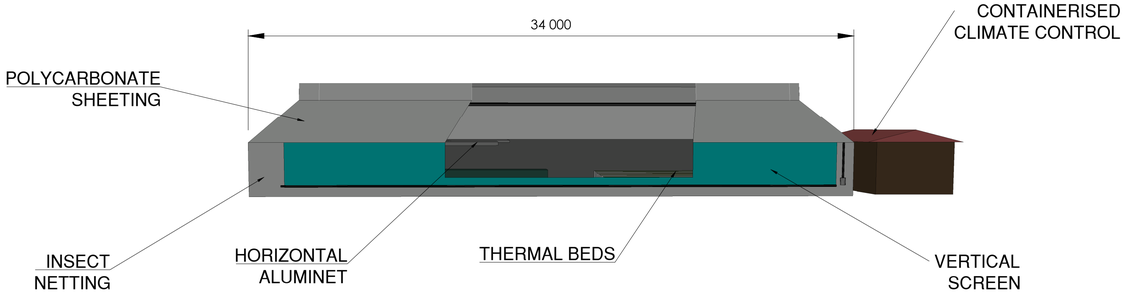
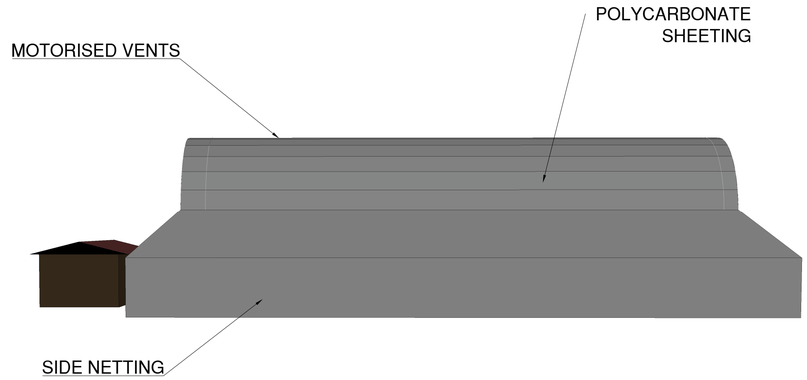


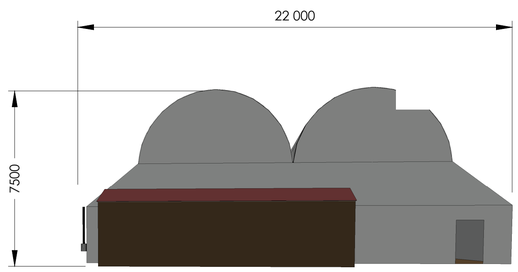
SIDE 1 ELEVATION



SIDE 2 ELEVATION

BUILDING 18: SCOPE OF WORKS

1. Reinstatement of irrigation controllers
2. Remove and install new polycarbonate sheeting in damaged areas
3. Remove and install new insect netting in sections
4. Repair external shade net rollers and arms
5. Supply and install new motor for shade roller nets
6. Supply and install temperature and Humidity sensor units
7. Supply and install mist spray nozzles
8. Replace fogger solenoid valve
9. Supply and install circulation fans
10. Service motor and gearbox to roof ventilators
11. Supply and install replacement electric motor to roof ventilators
12. Supply and install replacement gearbox to roof ventilators
13. Supply and install PIR Intruder sensor
14. Supply and install floor boxes for solenoid irrigation valves
15. Service hot water generation plant
16. Replace flexible ducting
17. Service heat pumps (3kW each)
18. Replacement of air circulation fans no 1 and 2
19. Supply and install new motor for aluminet system
20. Supply and install Sensor cabling (6mm)
21. Service electrical isolators and cabling where required
22. Supply and install of Climate Control System
23. Repair and reinstatement of roof Ventilation mechanisms



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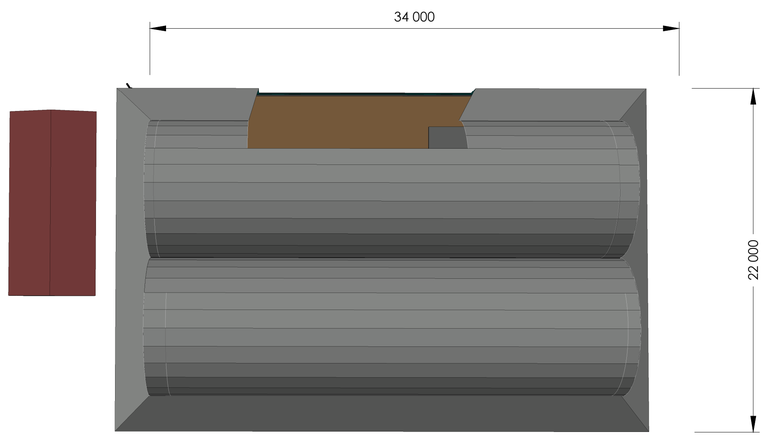

PLAN VIEW

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page type: A1

client: SANBI South African National Biodiversity Institute — Biodiversity for Life

consultant
VIRTUAL CONSULTING ENGINEERS
P O BOX 323
GROENKLOOF
0027

discipline: STRUCTURAL

service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 18

ref.no. --

designed R ISHMAIL

scale N.T.S

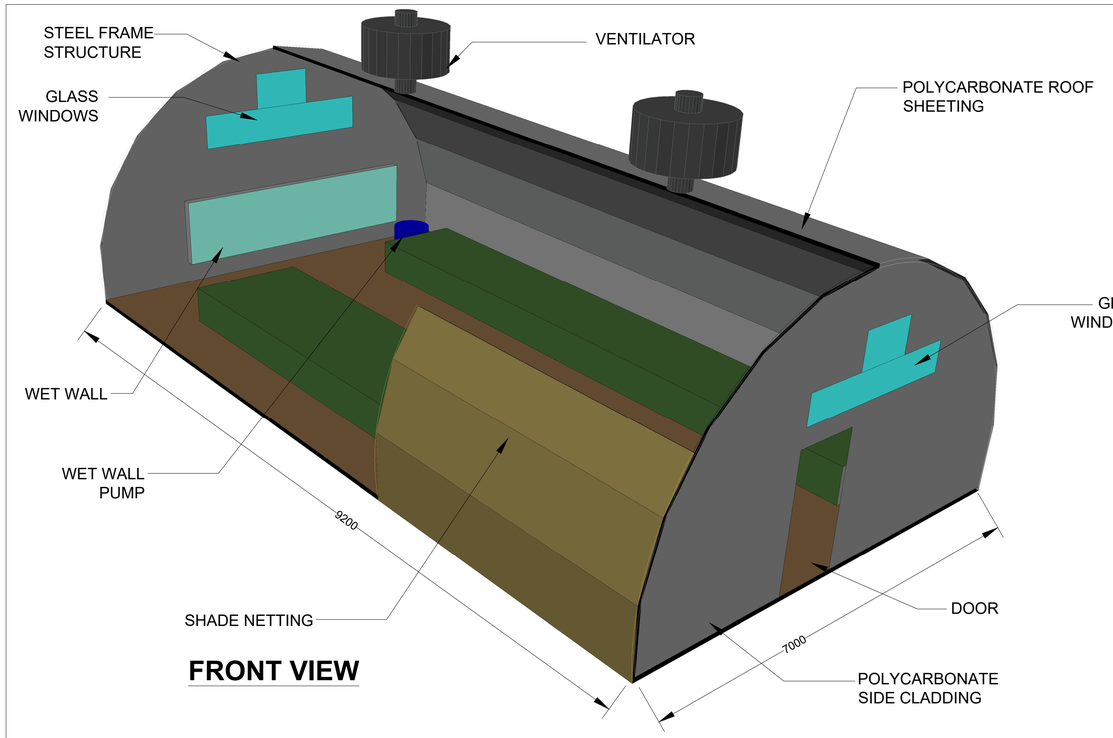
drawn K JURIES

date FEB 25'

checked S ISHMAIL

drawing number: 0553-PH2-16

revision: T0



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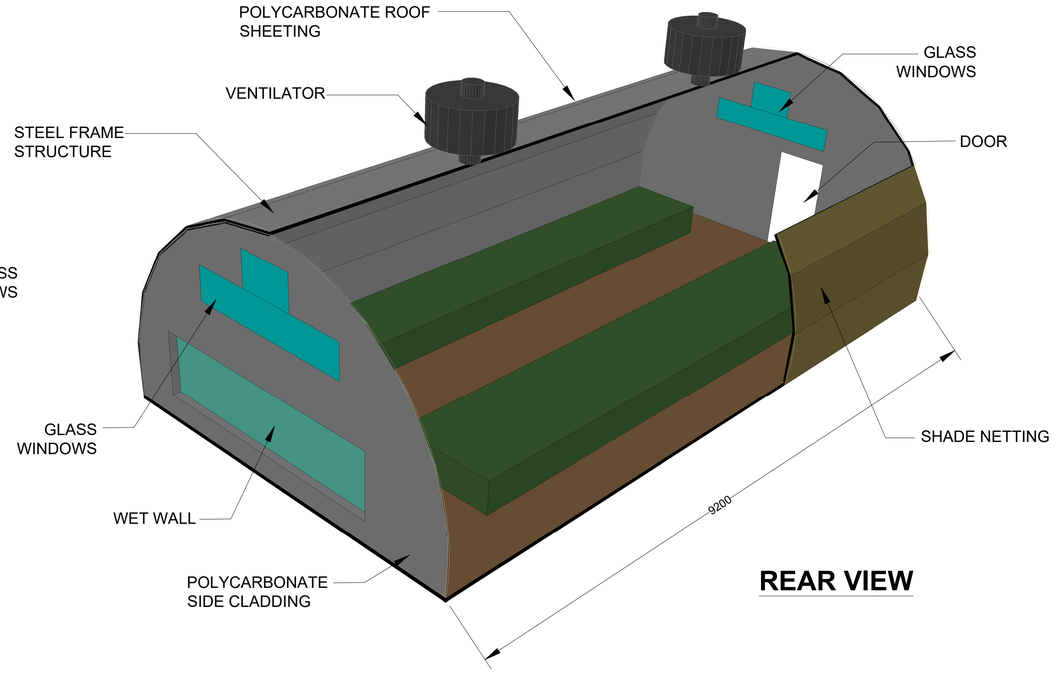

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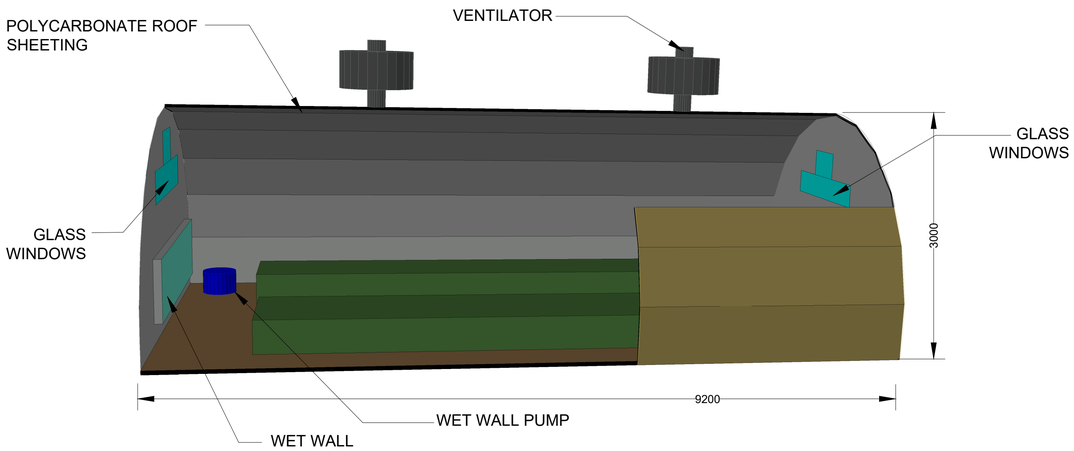

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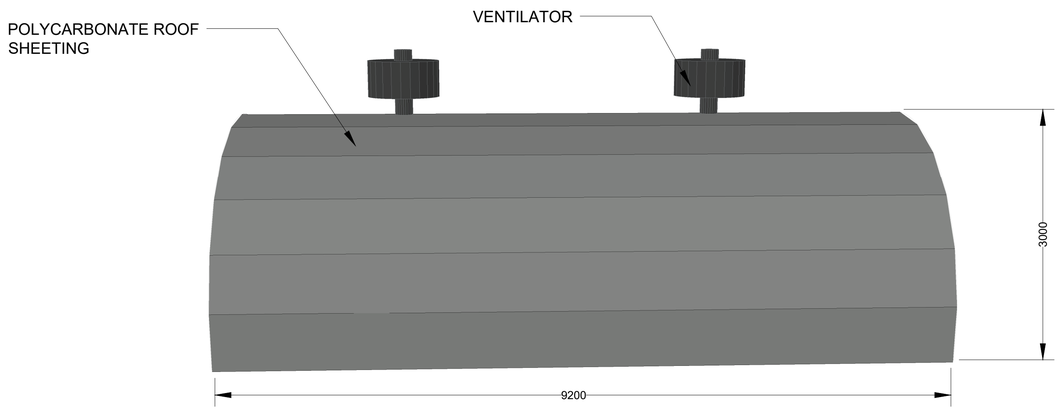

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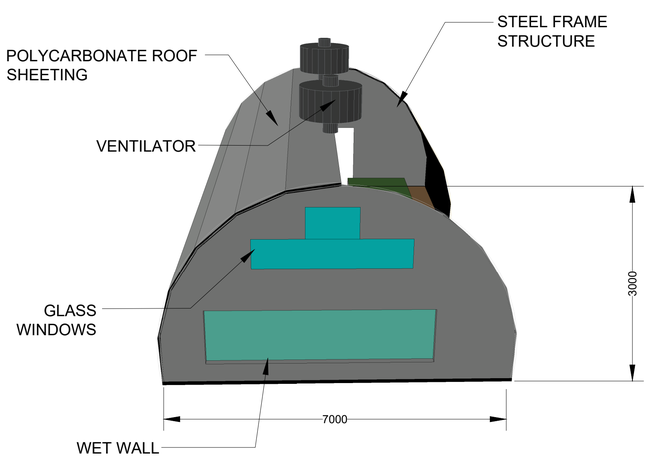

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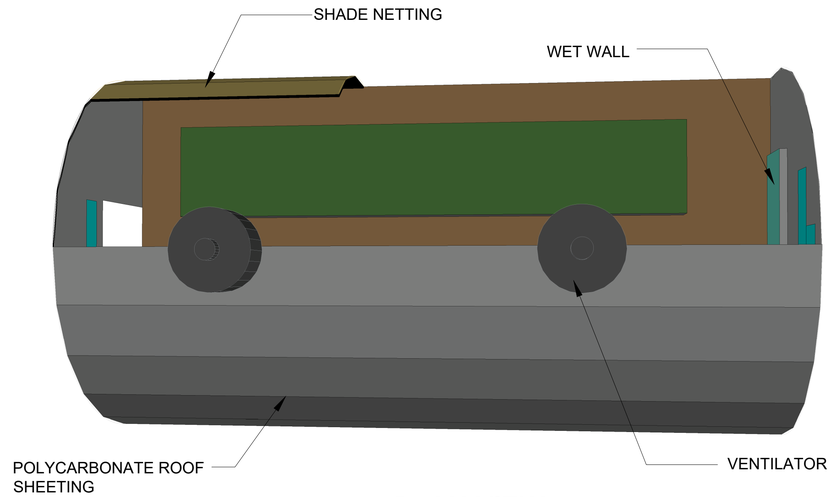

PLAN VIEW

BUILDING 16: SCOPE OF WORKS

1. Remove and install polycarbonate sheeting of nursery tunnel
2. Supply and install water wall medium
3. Replace water wall pump with 1.1kW motor

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client: SANBI
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Biodiversity for Life

consultant
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P O BOX 323
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0027

discipline: STRUCTURAL

service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

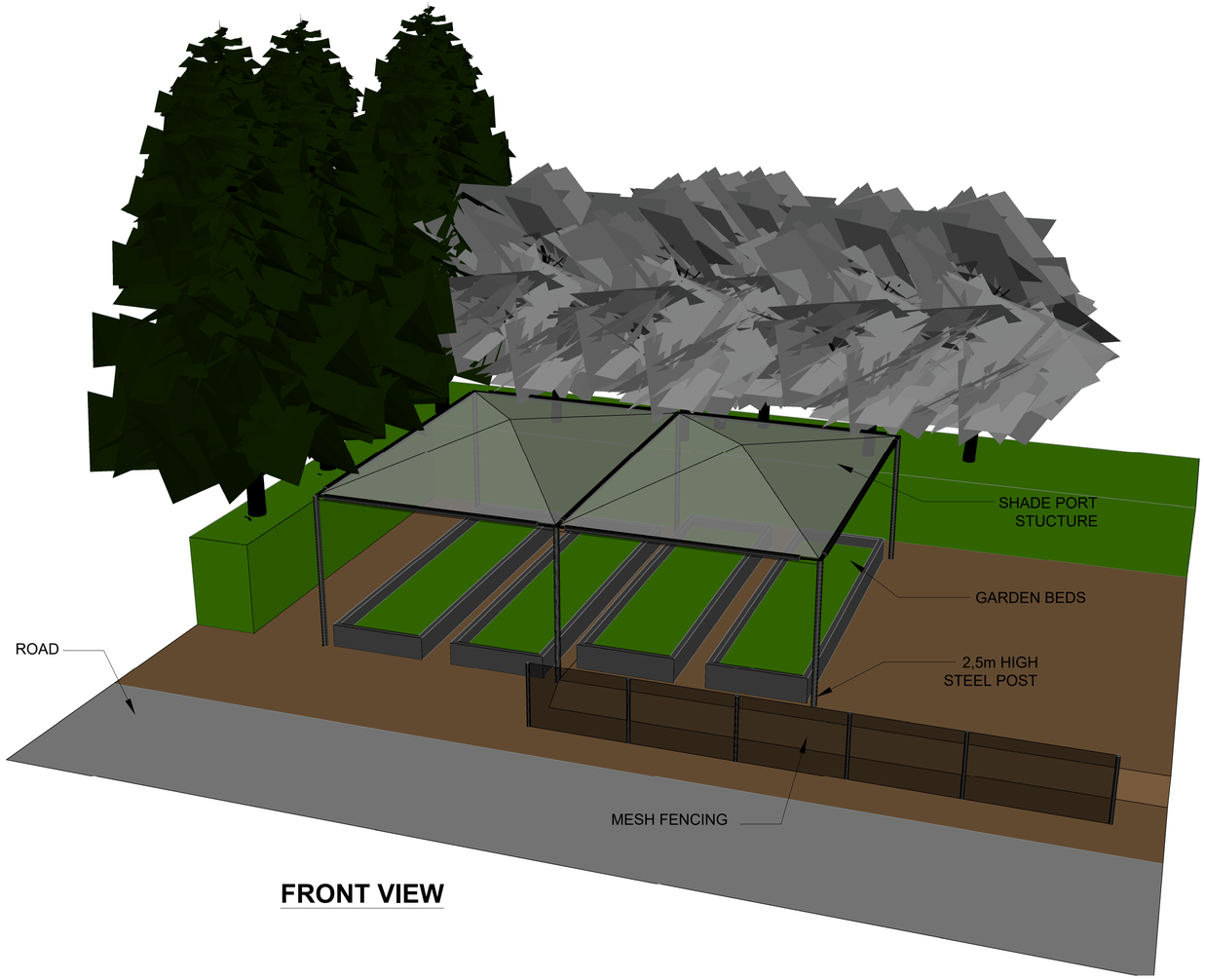
project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 16

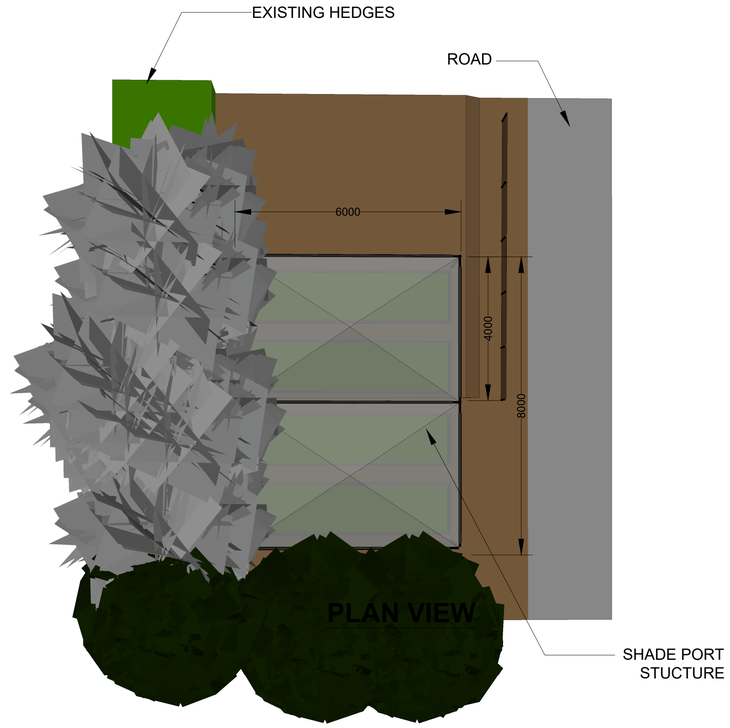
ref.no. --
designed K JURIES
scale N.T.S
drawn T NIEFTAGODIEN
date FEB 25'
checked R ISHMAIL

drawing number: 0533-PH2-17

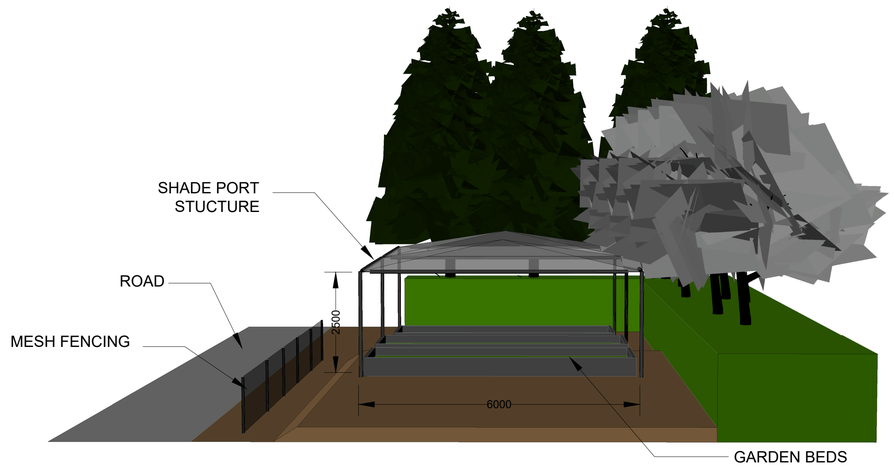
revision: T0



FRONT VIEW



PLAN VIEW



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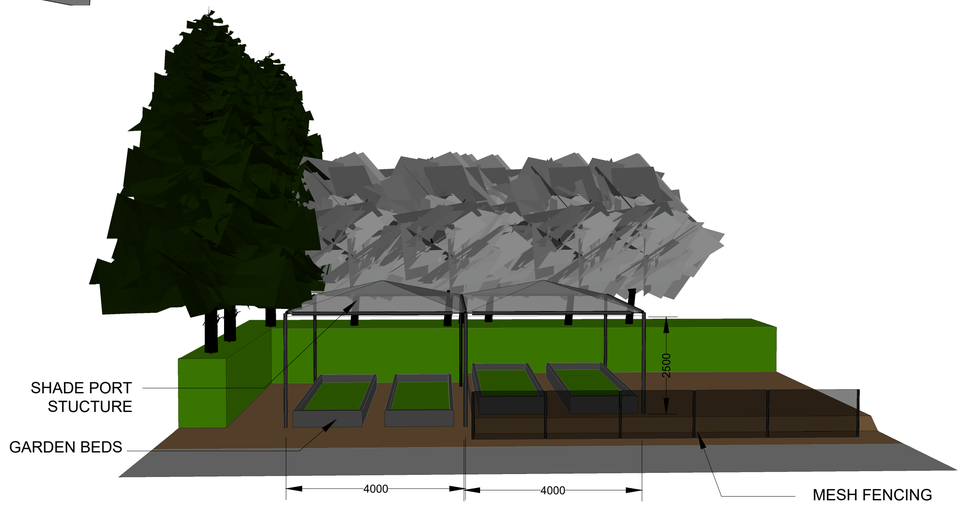

SIDE 2 ELEVATION

BUILDING 19: SCOPE OF WORKS

1. Removal of existing timber shade structure and shade netting
2. Site clearance
3. Installation of steel shade port structures

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cad file name: 0533-PH2-18

page type: A1

client: SANBI
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Biodiversity for Life

consultant
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GROENKLOOF
0027

discipline: STRUCTURAL

service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 19

ref.no. --

designed K JURIES

scale N.T.S

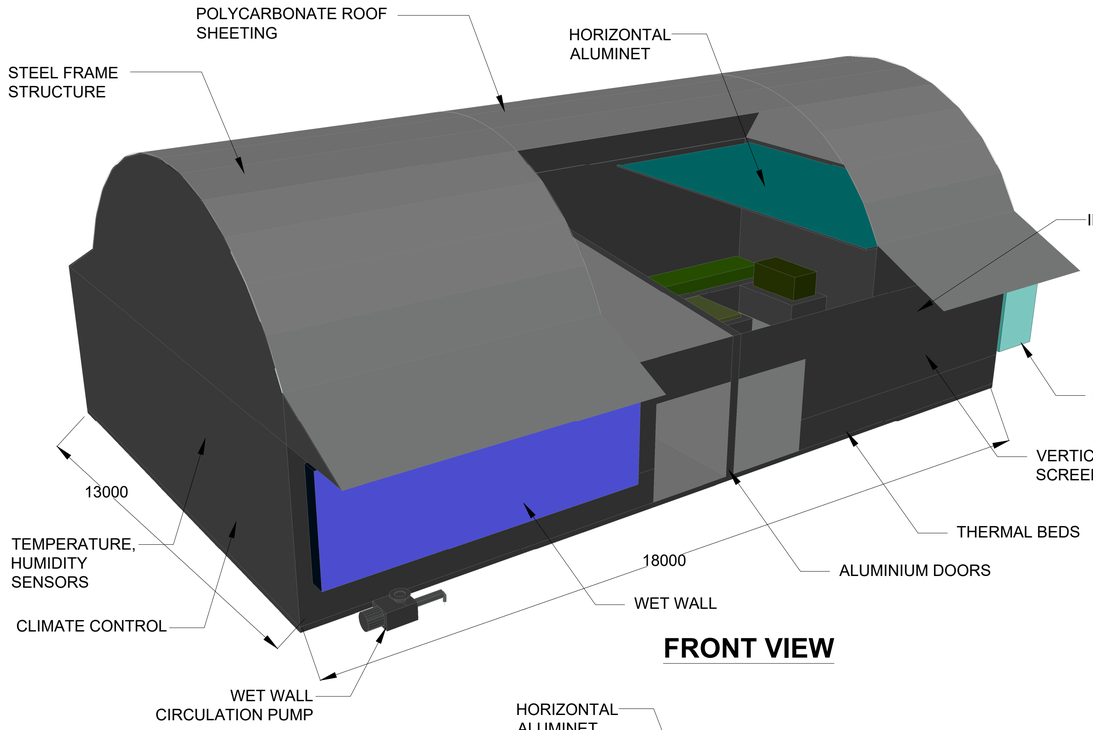
drawn T NIEFTAGODIEN

date FEB 25'

checked R ISHMAIL

drawing number: 0533-PH2-18

revision: T0



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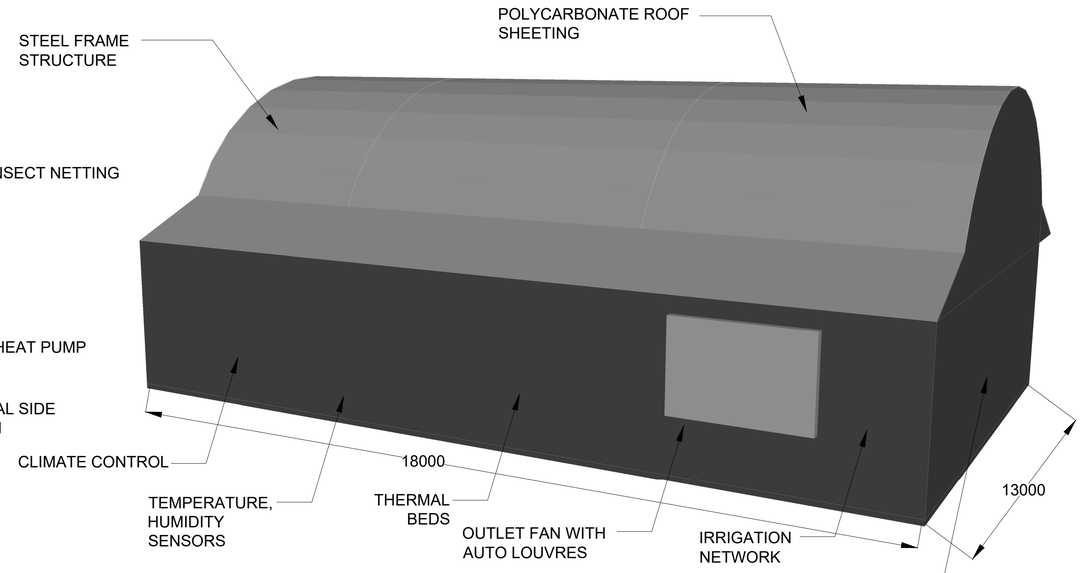

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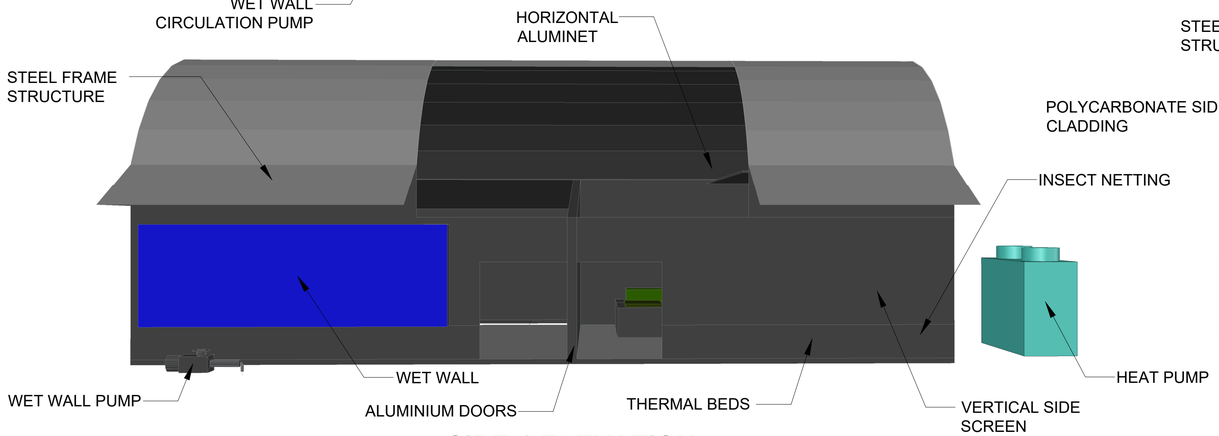

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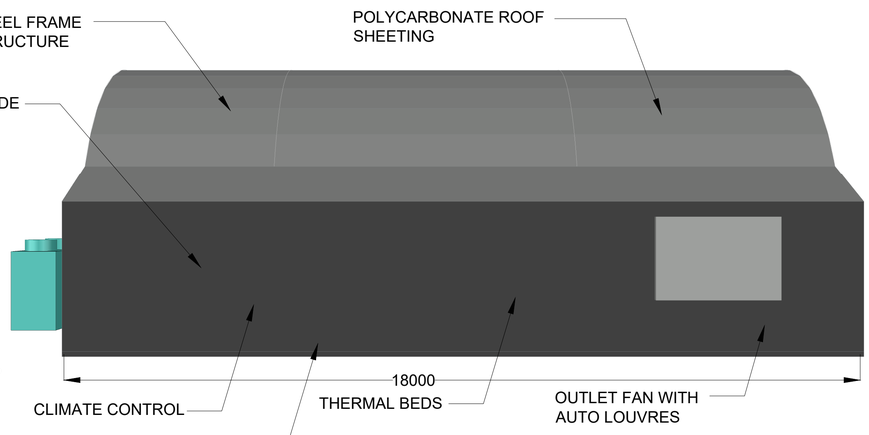
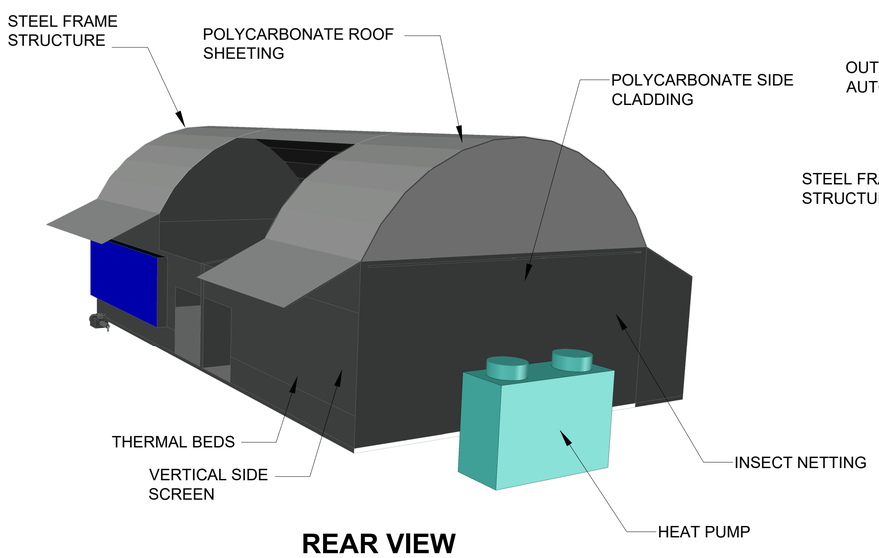


SIDE 2 ELEVATION

BUILDING 6.2 : SCOPE OF WORKS

1. Refurbish aluminet cable mechanisms and clips
2. Remove and install polycarbonate sheeting
3. Remove and install insect netting in sections
4. Remove and install aluminet material
5. Reinstate fogger sprayer system
6. Supply and install spray heads
7. Service and repair ventilation fans and dampers
8. Service hot bed thermal valves
9. Supply and install Temperature and humidity sensors
10. Supply and install mist nozzles
11. Supply and install PIR intruder sensors
12. Repair external shade net rollers
13. Repair motor arms and stabilise support system
14. Servicing and refurbish horizontal aluminet
15. Replace water wall circulation pump
16. Repair Service Heat Pump
17. Install Heat pump holding Cylinder
18. Supply and install of Climate Control System



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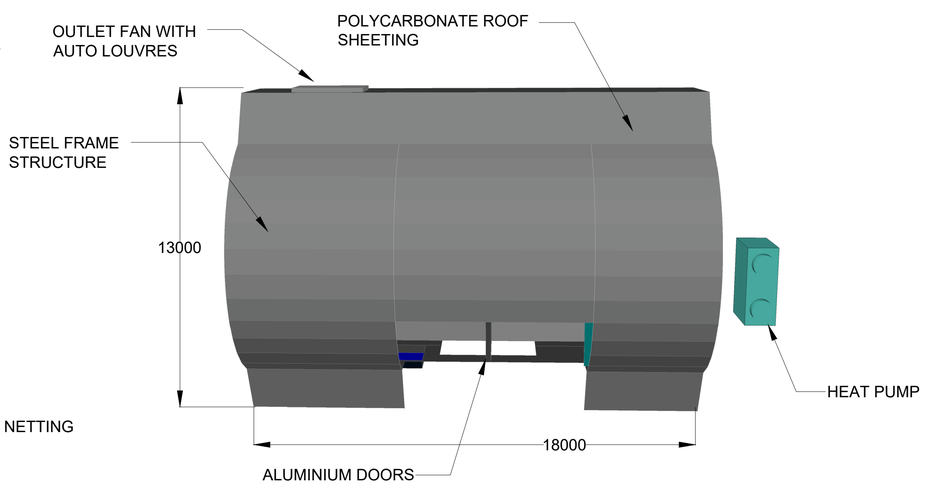

PLAN VIEW

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GROENKLOOF
0027

discipline: STRUCTURAL

service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 6.2

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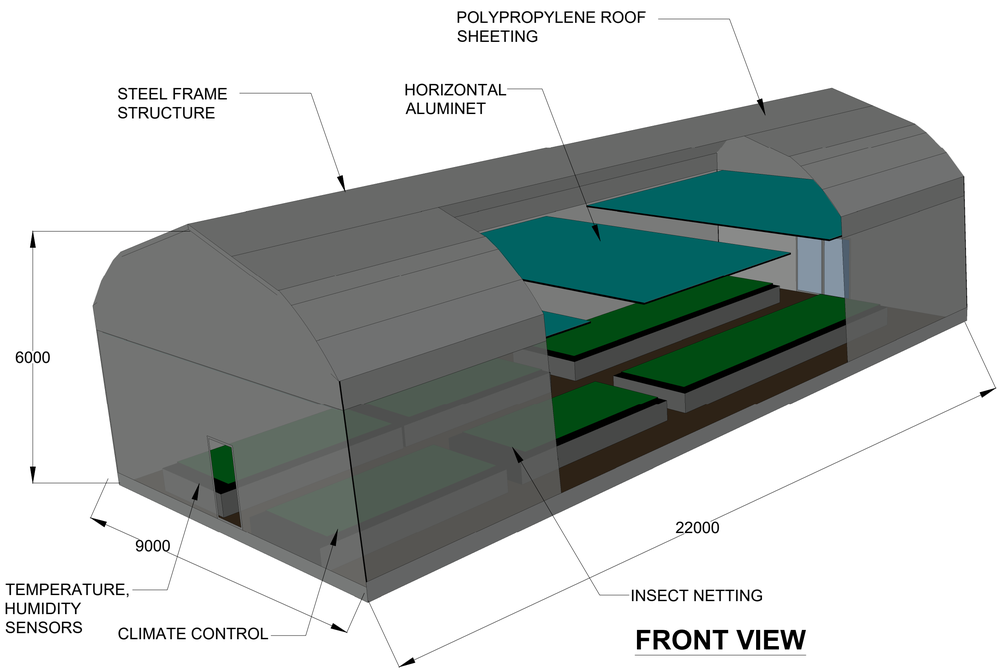
scale N.T.S
date FEB 25'
designed K JURIES
drawn T NIEFTAGODIEN
checked R ISHMAIL

drawing number: 0533-PH2-19

revision: T0



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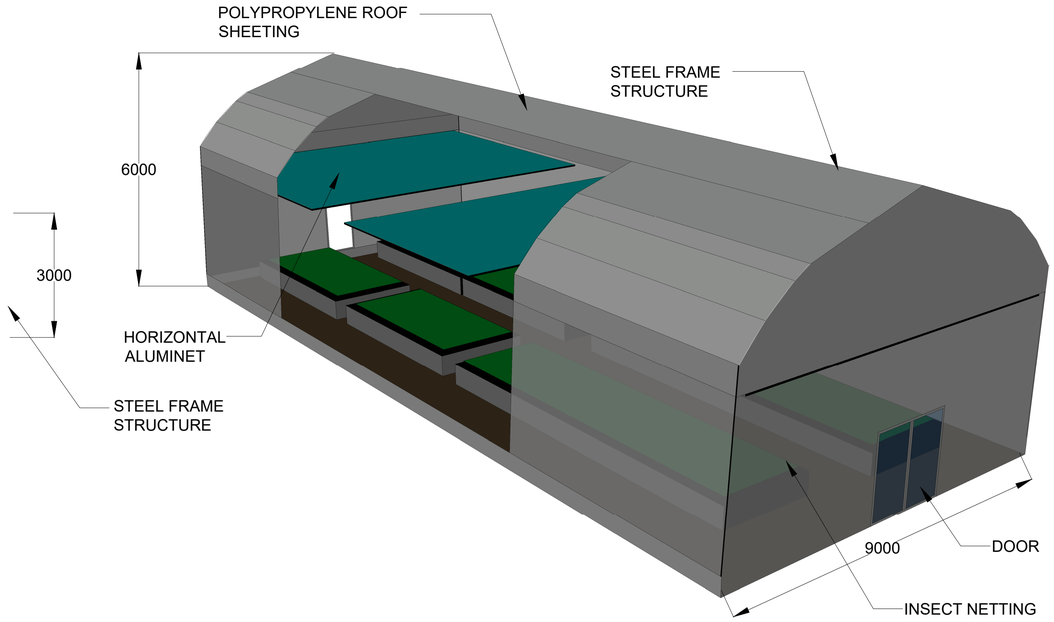

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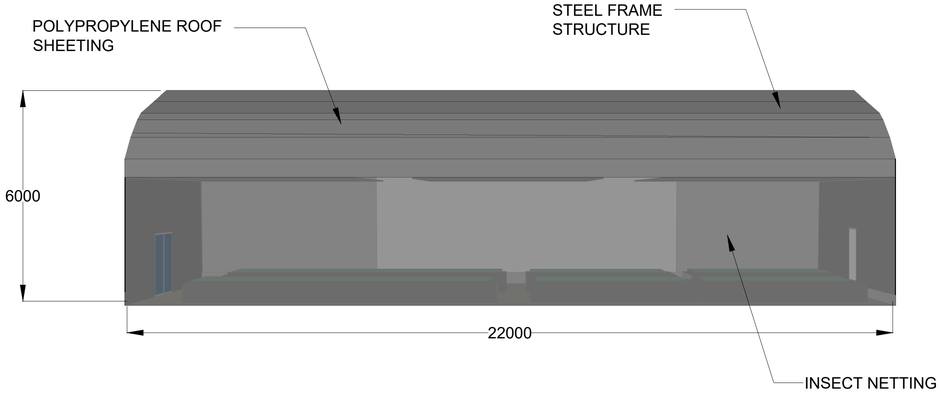

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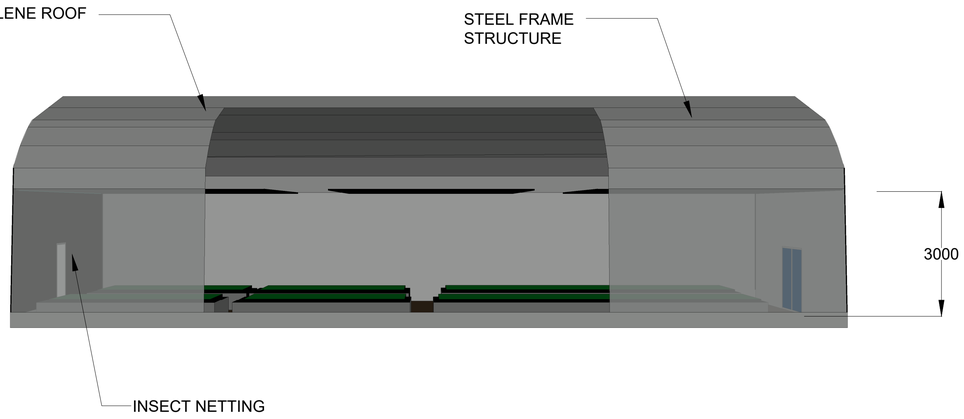

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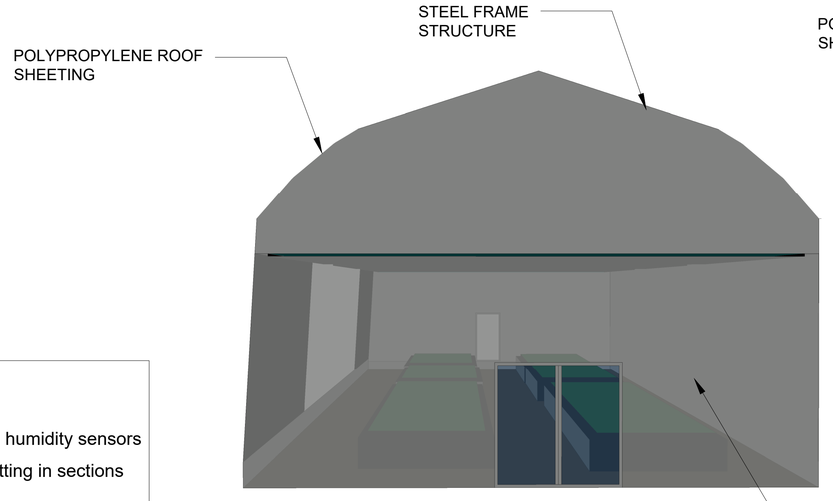

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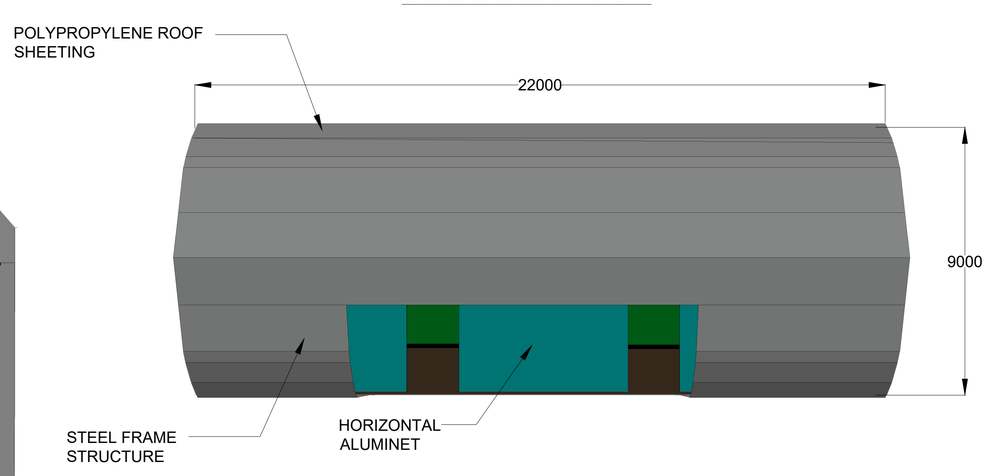

PLAN VIEW

BUILDING 10: SCOPE OF WORKS

1. Automation of horizontal aluminet
2. Supply and install Temperature and humidity sensors
3. Replacement of damaged insect netting in sections
4. Servicing of doors
5. Installation of roof cover structure
6. Supply and install PIR Intruder sensor

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P O BOX 323
GROENKLOOF
0027

discipline: STRUCTURAL

service: SANBI KIRSTENBOSCH: INVESTIGATION, DESIGN PROCUREMENT AND CONSTRUCTION MONITORING FOR THE REPAIRS AND UPGRADE OF EXISTING NURSERIES AND GLASSHOUSE INFRASTRUCTURE.

project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 10

ref.no. --

designed K JURIES

scale N.T.S

drawn T NIEFTAGODIEN

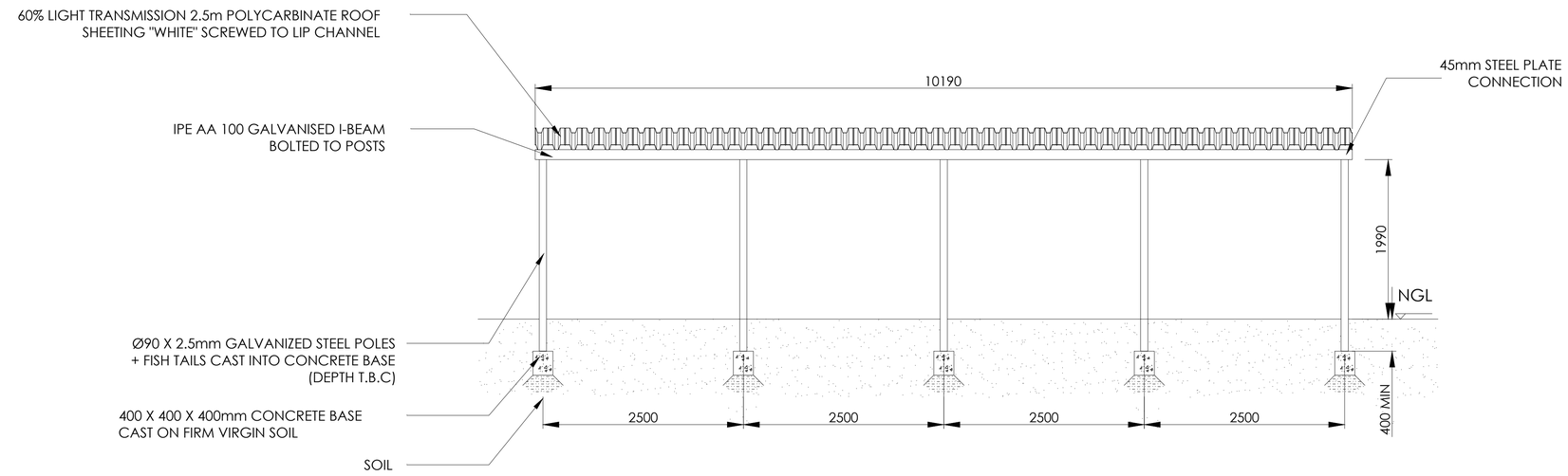
date FEB 25'

checked R ISHMAIL

drawing number: 0533-PH2-20

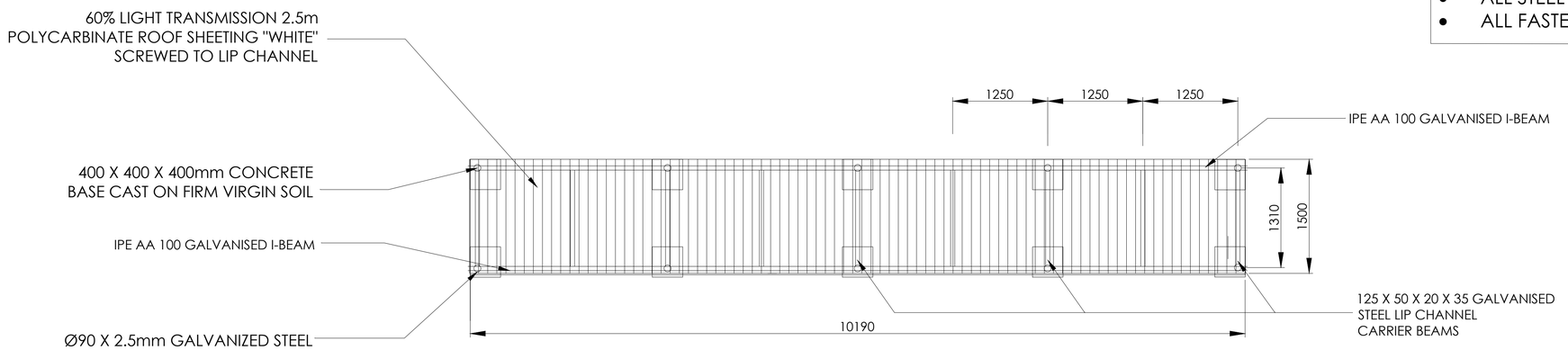
revision: T0

FINAL DIMENSIONS OF STRUCTURE TO BE DETERMINED ON SITE

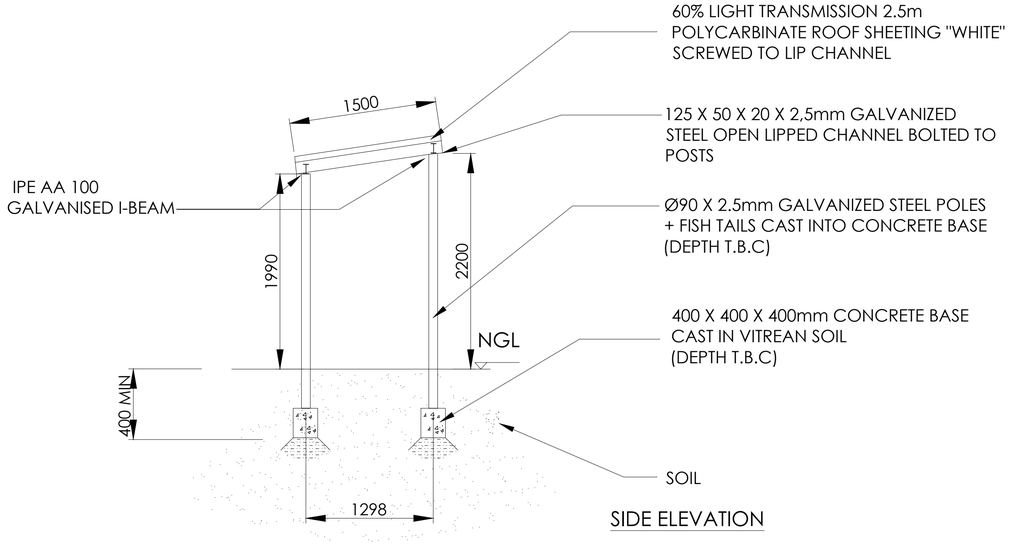


FRONT ELEVATION

NOTE:
- ALL STEEL TO BE GALVANISED.
- ALL FASTENERS TO BE HDG.



PLAN VIEW



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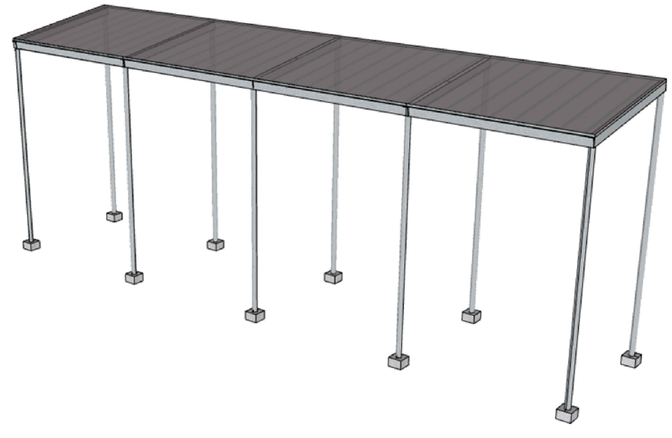

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page type: A1

client: SANBI South African National Biodiversity Institute — Biodiversity for Life

consultant
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P O BOX 323
GROENKLOOF
0027

discipline: STRUCTURAL

service: SANBI KIRSTENBOSCH: REPAIRS AND UPGRADES OF THE EXISTING NURSERIES AND ASSOCIATED GLASS HOUSE INFRASTRUCTURE

project number: 0533

drawing title: SANBI KIRSTENBOSCH: BUILDING 8 NEW ROOF STRUCTURE

ref.no. --

designed K.JURIES

scale 1:100

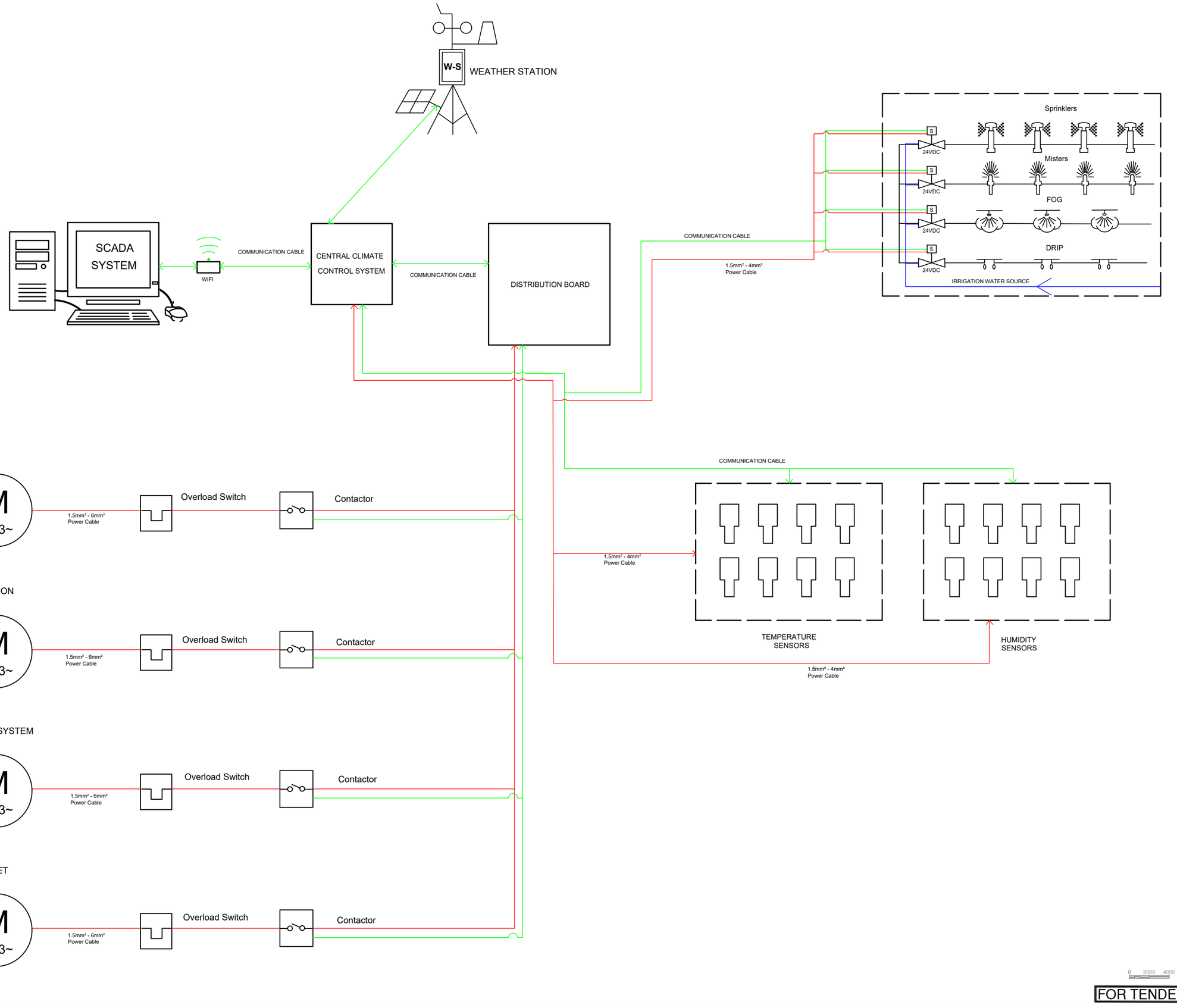
drawn T. NIEFTAGODIEN

date FEB 25

checked R. ISHMAIL

drawing number: 0533-PH2-21

revision: T0



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page type: A1

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discipline: ELECTRICAL

service

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project number: 0533

drawing title: ELECTRICAL CLIMATE CONTROL SYSTEM

ref.no. --

scale: NTC

date: MAR 25

designed: M GWARUBANA

drawn: M GWARUBANA

checked: M RATSHITANGA

drawing number: 0533-PH2-22

revision: T0