



C1.1 Pricing Instructions

Part C1.1.1	CONDITIONS OF TENDER	Page 1 - 2
Part C1.1.2	PRINCIPAL BUILDING AGREEMENT CONTRACT DATA	Page 1 - 14
Part C1.1.3	PRINCIPAL BUILDING AGREEMENT	Page 1
Part C1.1.4	JBCC GENERAL PRELIMINARIES	Page 1 - 7

C1.2 Pricing Documents

Part C1.2.1	Main Contract Bills of Quantities	Page 1 - 222
	<u>Specialist Bills of Quantities (carried to Main Contract Bills of Quantities)</u>	
Part C1.2.2	Electrical Installation - LOW VOLTAGE INSTALLATION + UPS	Page 1 - 17
Part C1.2.3	Electrical Installation - INFRASTRUCTURE INSTALLATION	Page 1 - 10
Part C1.2.4	Electrical Installation - STANDBY GENERATOR INSTALLATION	Page 1 - 6
Part C1.2.5	Electrical Installation - EARTHING AND LIGHTNING PROTECTION INSTALLATION	Page 1 - 6
Part C1.2.6	Electrical Installation - BMS INSTALLATION	Page 1 - 4
Part C1.2.7	Electronic Installation	Page 1 - 10
Part C1.2.8	Mechanical Installation	Page 1 - 5
Part C1.2.9	Fire Detection Installation	Page 1 - 2

C1.3 Annexures

Part C1.3.1	Annexure A - Model Preambles
Part C1.3.2	Annexure B - Health and Safety
Part C1.3.3	Annexure C - Design Indemnity Form
Part C1.3.4	Annexure D – Environmental
Part C1.3.5	Annexure E – Geotech
Part C1.3.6	Annexure F –Proposed Site Office Facilities

C1.4 Drawing Register

Part C1.1.1

CONDITIONS OF TENDER

1. TENDER DOCUMENTATION

The Tender Documents comprise the pages and annexure as listed on the Contents page/s.

Tenderers are to check the numbers of the pages and annexure and should any be missing or duplicated, or the reproduction be indistinct, or if any doubt exists as to the full intent and meaning of any description, or if this document contains any errors, the Tenderer shall notify the Quantity Surveyor at once for rectification. No liability whatsoever will be admitted in respect of errors in any tender due to the aforementioned causes.

2. SECTIONAL COMPLETION OF PROJECT

Practical completion to Section 1: External/Site Wide Civil works (inclusive of road network, & water, sewer, stormwater reticulation) will be defined as the following:

The following shall be fully finished as per the architects and engineering drawings, requirement, specifications and manufacturers specification by the date stated in Contract Data.

Unrestricted access from the town of Matjiesfontein to all three (3) buildings and antenna location including but not limited to: new civils infrastructure including a new gravel road network and water, sewer, and stormwater reticulation is required for completion of Section 01.

Practical completion to Section 2: Electrical & Fibre Infrastructure will be defined as the following:

The following shall be fully finished as per the architects and engineering drawings, requirement, specifications and manufacturers specification by the date stated in Contract Data.

- Bulk Reticulation inclusive of 11kv cables, mini-sub, etc
- Standby Generators
- Earthing & Lighting protection
- Site wide fibre reticulation

Practical completion to Section 3: Remainder of the works will be defined as the following:

Remainder of the works: The construction of three (3) new buildings (including a Main Operations Building, a Generator House, and an Entrance Gate and Guard House) shall be fully finished as per the architects and engineering drawings, requirement, specifications and manufacturers specification. The building shall be fully waterproofed and complete in a fully operational condition by the date stated in Contract Data.

All local authority and statutory requirements have been met and subsequent occupation certificates have been issued by the date stated in the contract data.



3. SITE INSPECTION MEETING

A formal site clarification meeting will be scheduled.

It is a condition of the tender that the Tenderer shall have carried out a full and detailed inspection of the site. All consultants' drawings and all tender documents may be inspected, by arrangement, at the offices of the Architect or Quantity Surveyor during office hours, prior to the submission of a tender for the project. By such an inspection, the tenderer shall be deemed to be fully informed as to the nature and degree of complexity of the project, the constructional problems related thereto, the conditions under which the work is to be carried out, the means of access to the site and generally of all matters which may influence his tender. No claim of any nature whatsoever will be considered after the submission of tenders, due to failure on the part of the tenderer to fulfil his obligation.

4. METHOD OF MEASUREMENT

Except where otherwise stated, these Bills of Quantities have been prepared in accordance with the Seventh Edition of the Standard System of Measuring Builder's Work, issued by the Association of South African Quantity Surveyors, and hereinafter termed the Standard System. Wherever the terms "shall be included in the descriptions", "shall be stated" or words having the same effect appear in the Standard System, it shall be deemed that descriptions within these Bills of Quantities incorporate such inclusions and statements.

5. MODEL PREAMBLES FOR TRADES

Except where otherwise stated these bills of quantities have been prepared in accordance with the Model Preambles for Trades (2017 Edition) as recommended and published by the Association of South African Quantity Surveyors. Tenderers are advised to study these Model Preambles before pricing these bills.

6. FLUCTUATIONS IN BUILDING COSTS

It is highlighted that the rates used in compilation of the Tender Amount will NOT be adjusted in terms of Clause 26.9.5 of the Principal Building Agreement and all tender prices shall remain fixed for the duration of the contract.



7. TENDERS

Tenders received after the stated closing time will not be considered. Incomplete Tenders or Tenders submitted in any other format will be rejected.

It is highlighted that Value Added Tax, at the current level, shall be added as a lump sum against the "Tender Amount Compilation" in Principal Building Agreement Contract Data.

Notwithstanding the provisions of clause E2.0 in Principal Building Agreement Contract Data, this tender shall remain in full legal force for 120 **(One Hundred and Twenty) calendar days**.

The lowest, or any, or portion of any, Tender will not necessarily be accepted and no reasons need be given for such decisions.

The document JBCC Edt. 6.2 Principal Building Agreement Contract Data, which incorporates the "Tender Amount Compilation", shall be completed in full.



8. RETURNABLE DOCUMENTATION

The tenderer must complete the following returnable documents and must be included with the tender submission. Failure to submit all documents may result in disqualification.

- a Section 1 : Principal Building Agreement Contract Data
- b Section 4 : Priced Main Contractor's Provisional Bills of Quantities
- c - Add for % profit and general attendance on Budgetary allowance (Bill no.1 / Page 1 / Item 1)
- d Signed Form of Indemnity by Subcontractors Undertaking Design Responsibility
- e Letter of Intent to provide a "Fixed" Construction Guarantee in terms of the Agreement
- f Preliminaries Spreadsheet, including Monthly Breakdown over the Duration of the Contract
- g Signed Copies of any Amendments issued during the Tender Period
- h Board Resolution for Authority to Sign Tender Document
- i Proposed Construction Program
- j Company Project Organogram
- k Confirmation of specialist subcontractors capability and previous experience on similar project for all trades listed as Specialist Bills of Quantities (carried to Main Contract Bills of Quantities)

Part C1.1.2

PRINCIPAL BUILDING AGREEMENT CONTRACT DATA



Should the 'Certified Stamp' above, or the QR Code on each page not be visible, then this Document cannot be certified as a true copy and there is an indication that the original has been amended



PRINCIPAL BUILDING AGREEMENT: CONTRACT DATA

Project : SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein

Employer : SOUTH AFRICAN NATIONAL SPACE AGENCY

Contractor :

Contract Date :

File Code :

The Joint Building Contracts Committee® - NPC
CONTRACT DATA
Principal Building Agreement
Edition 6.2 - May 2018

JBCC®

The Joint Building Contracts Committee® NPC (JBCC®) is representative of building owners and developers, professional consultants and general and specialist contractors who contribute their knowledge and experience to the compilation of the JBCC® documents. The JBCC® documents portray the consensus view of the constituent members and are published in the interests of standardisation and good practice with an equitable distribution of contractual risk

Application of JBCC® agreements

The definitions contained in the JBCC® Principal Building Agreement apply to this document. A word or phrase in bold type in the text has the same meaning assigned to it in the definitions of such agreement. Where a word or phrase is not in bold type it has the meaning consistent with the context of its use

This contract data contains unique requirements applicable to the project and variables referred to in the JBCC® Principal Building Agreement and the JBCC® General Preliminaries. The information provided in this document by the principal agent is complete and accurate at the time of calling for tenders. Where additional information becomes available, all tenderers will be informed in writing. Reference to clause numbers in the JBCC® Principal Building Agreement are shown in [square brackets] in this contract data eg [3.2.1]. Spaces requiring information must be filled in, or marked as 'not applicable' but not left blank

This contract data, when completed and submitted by the contractor, becomes the form of tender. Where the contractor is appointed, the contract documents comprise the signed JBCC® Principal Building Agreement, this completed contract data, the priced document, drawings and other listed documents

Warning!

The JBCC® Principal Building Agreement Edition 6.2 has been coordinated with the JBCC® Nominated/Selected Subcontract Agreement Edition 6.2, the JBCC® General Preliminaries and the JBCC® certificate forms and support documents. Forms from previous editions are not compatible with the JBCC® Principal Building Agreement Edition 6.2

Persons entering into or preparing contracts using the JBCC® suite of contract agreements and support documents are warned of the dangers inherent in modifying any part of it

Experience has shown that changes drafted by others, including members of the building professions, often have unintended results that may be prejudicial to either, or both, parties

Disclaimer

While the JBCC® aims to ensure that its publications represent best practice it does not accept or assume any liability or responsibility for any events or consequences which derive from the use of JBCC® documents

Copyright reserved

The name 'The Joint Building Contracts Committee® NPC', the abbreviation JBCC®, the electronic version e-JBCC® and the JBCC® logo are registered trademarks. The JBCC® claims authorship of this work. All rights are reserved. No part of this publication may be reproduced, stored in any retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, scanning, recording, or otherwise, without the prior permission in writing of the JBCC®. Unauthorised reproduction of the work is an infringement of the copyright. Judicial proceedings can and will be instituted to obtain relief and recovery of damages



A PROJECT INFORMATION

A 1.0 Works [1.1]

Project name	SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
Reference number	
Works description	<p>The South African National Space Agency (SANSA) is embarking on a project to implement a multi-purpose, multi-agency space exploration site in Matjiesfontein (MTJ). The MTJ site will form part of the new NASA Lunar Exploration Ground Segment (LEGS). The LEGS project is a NASA Space Communication and Navigation (SCaN) initiated effort built to deliver continuous world-wide service in support of the Artemis program and human spaceflight from thirty-six thousand kilometres (Geostationary belt orbit) up to two million kilometres from the Earth.</p> <p>MTJ will be a multi-mission facility which provides space communication services, i.e. acquisition and/or transmission of tracking, telemetry, and command (TT&C) data over the space links.</p> <p>"The work for the new ground station to be developed at Matjiesfontein will consist of: (1) the construction of three (3) new buildings (including a Main Operations Building, a Generator House, and an Entrance Gate and Guard House); (2) the installation of new site wide 11kv electrical reticulation and fibre reticulation connecting between the various buildings and antenna sites; and (3) new civils infrastructure including a new gravel road network and water, sewer, and stormwater reticulation."</p>

A 2.0 Site [1.1]

Erf / stand number	Latitude 30 14' 36.86" S Longitude 20 32' 52.90" E
Township / Suburb	Matjiesfontein town
Site address	The SANSA MTJ site complex is located proximately 5 km to the south of Matjiesfontein
Local authority	Laingsburg Municipality

A 3.0 Employer [1.1]

Name	South African National Space Agency (SANSA)		
Legal entity of above		Contact person	Gladys Magagula
Business registration number	Act 360F of 2008	Telephone number	012 334 5132
VAT/GST number		Mobile number	072 017 9062
Country		E-mail	gmagagula@sansa.org.za
Postal address	PO Box 484, Silverton		
		Postal code	0127
Physical address	SANSA Space Operations, Farm No 502JQ, Hartebeesthoek,		
	District Krugersdorp	Postal code	1740

A 4.0 Principal agent [1.1]

Name	Atarah Projects		
Legal entity of above		Contact person	Courage Karenzi
Practice number		Telephone number	
		Mobile number	
Country		E-mail	couragekarenzi@atarahprojects.co.za
Postal address			
		Postal code	
Physical address	240 Main Road, Rondebosch		
		Postal code	7700



A 5.0 Agent [1.1; 6.2]

Discipline Architect

Name	SVA International (Pty) Ltd		
Legal entity of above		Contact person	Giovanni Dolph
Practice number		Telephone number	021 421 4276
		Mobile number	
Country		E-mail	GDolph@svarchitects.com
Postal address	8th Floor, The Link, 19 D.F. Malan St, Cape Town City Centre, Cape Town,		
		Postal code	8001
Physical address	8th Floor, The Link, 19 D.F. Malan St, Cape Town City Centre, Cape Town,		
		Postal code	8001

A 6.0 Agent [1.1; 6.2]

Discipline Quantity Surveyor

Name	The Thynk Box Built Environment Solutions		
Legal entity of above		Contact person	Herman Berry
Practice number		Telephone number	
		Mobile number	082 483 3031
Country		E-mail	herman@thethynkbox.co.za
Postal address			
		Postal code	
Physical address	3rd Floor, Eikestad Mall, 43 Andringa Street, Stellenbosch		
		Postal code	7500

A 7.0 Agent [1.1; 6.2]

Discipline Mechanical & Fire Engineering

Name	EKCON		
Legal entity of above	Ekcon (Pty) Ltd	Contact person	Alex Meyer
Practice number	2000/000165/07	Telephone number	021 930 9360
		Mobile number	
Country		E-mail	alex@ekcon.co.za
Postal address	163 Uys Krige Dr, Platteklouf 1, Parow,		
		Postal code	7500
Physical address	163 Uys Krige Dr, Platteklouf 1, Parow,		
		Postal code	7500

A 8.0 Agent [1.1; 6.2]

Discipline Structural Engineering

Name	EKCON		
Legal entity of above	Ekcon (Pty) Ltd	Contact person	Charl van der Merwe
Practice number	2000/000165/07	Telephone number	021 930 9360
		Mobile number	
Country		E-mail	charlvdm@ekcon.co.za
Postal address	163 Uys Krige Dr, Platteklouf 1, Parow,		
		Postal code	7500
Physical address	163 Uys Krige Dr, Platteklouf 1, Parow,		
		Postal code	7500



A 9.0 Agent [1.1; 6.2]Discipline **Civil Engineering**

Name	EKCON		
Legal entity of above	Ekcon (Pty) Ltd	Contact person	Reyno Buckle
Practice number	2000/000165/07	Telephone number	021 930 9360
		Mobile number	
Country		E-mail	reyno@ekcon.co.za
Postal address	163 Uys Krige Dr, Platteklouf 1, Parow,		
		Postal code	7500
Physical address	163 Uys Krige Dr, Platteklouf 1, Parow,		
		Postal code	7500

A 10.0 Agent [1.1; 6.2]Discipline **Electrical Engineering**

Name	Claassen Aurret (Pty) Ltd		
Legal entity of above		Contact person	Harry Meyer
Practice number		Telephone number	(+27) 21 555 0940
		Mobile number	
Country		E-mail	harry@cai.co.za
Postal address			
		Postal code	
Physical address	1 Hawston Road, Milnerton, Cape Town		
		Postal code	7441

A 11.0 Agent [1.1; 6.2]Discipline **Occupation Health and Safety**

Name	Ransom Safety Consultants		
Legal entity of above		Contact person	Jeremy Chandler
Practice number		Telephone number	021 813 9017
		Mobile number	
Country		E-mail	jeremy@ransomsafety.com
Postal address			
		Postal code	
Physical address	19 Ravenswood Road, Cape Town, Western Cape		
		Postal code	7441

A 12.0 Agent [1.1; 6.2]Discipline **Electronic Engineer**

Name	EES Live (Pty) Ltd		
Legal entity of above		Contact person	Anton Hochleutner
Practice number		Telephone number	
		Mobile number	
Country		E-mail	anton.hochleutner@eeslive.com
Postal address			
		Postal code	
Physical address	1st Floor Amdec House, Silverberg Cl, Westlake, Cape Town, Western Cape, South Africa		
		Postal code	7945



B CONTRACT INFORMATION

B 1.0 Definitions [1.1]

Bills of quantities: System/Method of measurement	Standard System of Measurement, 7th Edition
--	---

B 2.0 Law, regulations and notices [2.0]

Law applicable to the works , state country [2.1]	Republic of South Africa
---	--------------------------

B 3.0 Offer and acceptance [3.0]

Currency applicable to this agreement [3.2]	South African Rands
--	---------------------

B 4.0 Documents [5.0]

The original signed agreement is to be held by the principal agent [5.2], if not, indicate by whom	Quantity Surveyor
Number of copies of construction information issued to the contractor at no cost [5.6]	N/A. Electronic issue

Documents comprising the agreement	Page numbers
The JBCC ® Principal Building Agreement, Edition 6.2 May 2018	1 to 30
The JBCC ® Principal Building Agreement - Contract Data, Edition 6.2 May 2018	1 to 14
The JBCC ® General Preliminaries for use with the JBCC ® Principal Building Agreement, Edition 6.2 May 2018	1 to 7

Contract drawings – description	Number	Revision	Date
Refer Drawing Register for Tender Drawings			



B 5.0 Employer's agents [6.0]

Authority is delegated to the following **agents** to issue **contract instructions** and perform duties for specific aspects of the **works** [6.2]

Principal Agent

Principal agent's and **agents'** interest or involvement in the **works** other than a professional interest [6.3]

B 6.0 Insurances [10.0]

Insurances by employer			Amount including tax	Deductible amount including tax
Contract works insurance:				
	New works [10.1.1] (contract sum or amount)		N/A	
or	Works with practical completion in sections [10.2] (contract sum or amount)			
or	Works with alterations and additions [10.3] (reinstatement value of existing structures with or including new works)		N/A	
	Direct contractors [10.1.1; 10.2] where applicable, to be included in the contract works insurance		N/A	
	Free issue [10.1.1; 10.2] where applicable, to be included in the contract works insurance		N/A	
	Escalation, professional fees and reinstatement costs if not included above		N/A	
Total of the above contract works insurance amount			N/A	
Supplementary insurance [10.1.2; 10.2]			N/A	
Public liability insurance [10.1.3; 10.2]			N/A	
Removal of lateral support insurance [10.1.4; 10.2]			N/A	
Other insurances [10.1.5]			N/A	
Yes/no?		If yes, description 1		
Yes/no?		If yes, description 2		



and/or

Insurances by contractor			Amount including tax	Deductible amount including tax
Contract works insurance:				
	New works [10.1.1] (contract sum or amount)		Included below	
	Direct contractors [10.1.1; 10.2] where applicable, to be included in the contract works insurance		Included below	
	Free issue [10.1.1; 10.2] where applicable, to be included in the contract works insurance		Included below	
	Escalation, professional fees and reinstatement costs if not included above		Included below	
Total of the above contract works insurance amount			Contract Sum+20%	
Supplementary insurance [10.1.2]			Contract Sum+20%	As per policy
Public liability insurance [10.1.3]			R 10 000 000.00	As per policy
Removal of lateral support insurance [10.1.4]			N/A	
Other insurances [10.1.5]:			N/A	
Yes/no?		If yes, description 1		
Yes/no?		If yes, description 2		

B 7.0 Obligations of the employer [12.1]

Existing premises will be in use and occupied [12.1.2]		Yes/no?	No
If yes, description			
Restriction of working hours [12.1.2]		Yes/no?	Yes
If yes, description	The local Municipality by-laws applies.		
Natural features and known services to be preserved by the contractor [12.1.3]		Yes/no?	Yes
If yes, description	Enviromental Considerations to be taken into account. Enviromental Consultant to be consulted to ensure compliance with enviromental requirements. Refer Construction Environmental Management Programme as per Part C1.1 Annexure D		
Restrictions to the site or areas that the contractor may not occupy [12.1.4]		Yes/no?	Yes
If yes, description	Refer Construction Environmental Management Programme as per Annexure		
Supply of free issue [12.1.10]		Yes/no?	No
If yes, description	None identified at this stage		



B 8.0 Nominated subcontractors [14.0]

Specialisation 1	
Specialisation 2	
Specialisation 3	
Specialisation 4	
Specialisation 5	

B 9.0 Direct contractors [16.0]

Extent of work [12.1.11]	NASA: Tenant at MTG Ground Station under contract with SANSA
Extent of work [12.1.11]	Peraton: NASA Prime Contractor for NASA equipment installation, integration and testing.
Extent of work [12.1.11]	Communication and Power Industries: Antenna vendor – Subcontractor to Peraton
Extent of work [12.1.11]	Electronic Installation such as Access Control, CCTV, etc
Extent of work [12.1.11]	SANREN are responsible for the micro ducts & fibre from the N1 to the Main Ops building.
Extent of work [12.1.11]	Energy Centre Contractor

B 10.0 Description of sections [20.1]

Section 1	External/Site Wide Civil works (inclusive of road network, & water, sewer, stormwater reticulation)
Section 2	Electrical Infrastructure (inclusive of 11kv, mini-sub, and fibre reticulation)
Section 3	Remainder of the works: The construction of three (3) new buildings (including a Main Operations Building, a Generator House, and an Entrance Gate and Guard House)
Section 4	
Section 5	
Section 6	
Section 7	
Section 8	
Section	Remainder of the works

B 11.0 Possession of site [12.1.5], practical completion[19.0;20.0] and penalties [24.0]

Practical completion for the works as a whole	Intended date of possession of the site [12.1.5]	Period for inspection by the principal agent [19.3]	Date for practical completion [12.2.7; 24.1]	Penalty [24.1]
	Date	working days	Date	Penalty amount per calendar day excl. TAX



or where **sections** are applicable

Practical completion of a section of the works	Intended date of possession of a section [12.1.5]	Period for inspection by the principal agent [19.3]	Date for practical completion [12.2.7; 24.1]	Penalty [24.1]
	Date	working days	Date	Penalty amount per calendar day excl. TAX
Section 1	10 October 2025		31 July 2026	R10,000
Section 2	10 October 2025		31 July 2026	R15,000
Section 3	10 October 2025		01 December 2026	R35,000
Section 4				
Section 5				
Section 6				
Section 7				
Section 8				
Remainder of the works				

Criteria to achieve practical completion not covered in the definition of practical completion
Refer Bill No.1 Preliminaries and General, Clause 19.0

B 12.0 Payment [25.0]

Date of month for issue of regular payment certificates [25.2]	30th		
Cost fluctuations [25.3.4; 26.9.5]	Yes/no?	No	Fixed Rates
If yes, method to calculate			

B 13.0 Dispute resolution [30.0]

Adjudication [30.6.1; 30.10] Name of nominating body	Chairman of the Association of Arbitrators
Applicable rules for adjudication [30.6.2]	Republic of South Africa
Arbitration [30.7.4; 30.10] Name of nominating body	Chairman of the Association of Arbitrators
Applicable rules for arbitration [30.7.5]	Republic of South Africa



B 14.0 JBCC® General Preliminaries – selections

Provisional bills of quantities [P2.2]		Yes/no?	Yes	
Availability of construction information [P2.3]		Yes/no?	Yes	
Previous work - dimensional accuracy - details of previous contract(s) [P3.1]		No further specific details		
Previous work - defects - details of previous contract(s) [P3.2]		No further specific details		
Inspection of adjoining properties - details [P3.3]		No further specific details		
Handover of site in stages - specific requirements [P4.1]		No.		
Enclosure of the works - specific requirements [P4.2]		No further specific details		
Geotechnical and other investigations - specific requirements [P4.3]		Contractor to familiarise themselves with the Geotech Final Report (23123G-02(0238-RP-Rev0) and expected underground conditions on site		
Existing premises occupied - details [P4.5]		No.		
Services - known - specific requirements [P4.6]		Refer to Architects site layouts		
Water [P8.1]	By contractor	Yes	Refer Bill No.1 Clause 8.1 for detail	Preliminaries-Section B-
	By employer			
	By employer – metered			
Electricity [P8.2]	By contractor	Yes	Refer Bill No.1 Clause 8.2 for detail	Preliminaries-Section B-
	By employer			
	By employer – metered			
Ablution and welfare facilities [P8.3]	By contractor	Yes		
	By employer			
Communication facilities - specific requirements [P8.4]		No further specific details		
Protection of the works - specific requirements [P11.1]		No further specific details		
Protection / isolation of existing works and works occupied in sections - specific requirements [P11.2]		No further specific details		
Disturbance - specific requirements [P11.5]		The local Municipality by-laws applies. All core drilling, jackhammer, drilling or grinding, noisy work, must be carried out after working hours (i.e. before 08h00 & after 17h00).		
Environmental disturbance - specific requirements [P11.6]		Refer to Annexure D-Environmental with the following documents being applicable. Refer Bill No.1 Preliminaries for the following sections to price in full: Section E - Environmental Authorisation Section F - Final Environmental Management Programme (EMPr) Section G - Water Use License (attached) Section H - Permit to pluck protected an unprotected flora		



B 15.0 Changes made to JBCC® documentation

Reference may be made to other documents forming part of this **agreement**

Refer to Section 2 for changes made.



C TENDER CLOSING

Tender closing date	As per bid document	Time	As per bid document
Tender submission address	SANSA office, Farm No 502JQ, Hartebeesthoek, District West Rand office		
Tender may be submitted by e-mail	yes/no?	NO	E-mail

D TENDERER'S SELECTIONS

D 1.0 Securities [11.0]

Guarantee for construction: Select Option A or B

☒ B

Option A	Guarantee for construction (variable) by contractor [11.1.1]
----------	---

Option B	Guarantee for construction (fixed) by contractor [11.1.2]
----------	--

Guarantee for payment by employer [11.5.1; 11.10]	Amount	
--	--------	--

Advance payment, subject to a guarantee for advance payment [11.2.2; 11.3]	Amount	
---	--------	--

D 2.0 Contractor's annual holiday periods during the construction period

Year 1 contractor's annual holiday period	start date	2025/12/15	end date	2026/01/09
Year 2 contractor's annual holiday period	start date	2026/12/12	end date	2027/01/09
Year 3 contractor's annual holiday period	start date		end date	

D 3.0 Payment of preliminaries [25.0]

Contractor's selection

Select Option A or B

☐

Where the **contractor** does not select an option, Option A shall apply

Option A	The preliminaries shall be paid in accordance with an amount prorated to the value of the works executed in the same ratio as the amount of the preliminaries to the contract sum , which contract sum shall exclude the amount of preliminaries . Contingency sum(s) and any provision for cost fluctuations shall be excluded for the calculation of the aforesaid ratio
----------	--

Option B	The preliminaries shall be paid in accordance with an amount agreed by the principal agent and the contractor in terms of the priced document to identify an initial establishment charge, a time-related charge and a final dis-establishment charge. Payment of the time-related charge shall be assessed by the principal agent and adjusted from time to time as may be necessary to take into account the rate of progress of the works
----------	--

Lump sum contract

Where the amount of **preliminaries** is not provided it shall be taken as 7.5% (seven and a half per cent) of the **contract sum**, excluding contingency sum(s) and any provision for cost fluctuations

D 4.0 Adjustment of preliminaries [26.9.4]

Contractor's selection

Select Option A or B

☐

Where the **contractor** does not select an option, Option A shall apply



Provision of particulars

The **contractor** shall provide the particulars for the purpose of the adjustment of **preliminaries** in terms of his selection. Where completion in **sections** is required, the **contractor** shall provide an apportionment of **preliminaries** per **section**

Option A	An allocation of the preliminaries amounts into Fixed, Value-related and Time-related amounts as defined for adjustment method Option A below, within fifteen (15) working days of the date of acceptance of the tender
Option B	A detailed breakdown of the preliminaries amounts within fifteen (15) working days of possession of the site . Such breakdown shall include, inter alia, the administrative and supervisory staff, the use of construction equipment , establishment and dis-establishment charges, insurances and guarantees, all in terms of the programme

Adjustment methods

The amount of **preliminaries** shall be adjusted to take account of the effect which changes in time and/or value have on **preliminaries**. Such adjustment shall be based on the particulars provided by the **contractor** for this purpose in terms of Options A or B, shall preclude any further adjustment of the amount of **preliminaries** and shall apply notwithstanding the actual employment of resources by the **contractor** in the execution of the **works**

Option A	<p>The preliminaries shall be adjusted in accordance with the allocation of preliminaries amounts provided by the contractor, apportioned to sections where completion in sections is required</p> <p>Fixed - An amount which shall not be varied</p> <p>Value-related - An amount varied in proportion to the contract value as compared to the contract sum. Both the contract sum and the contract value shall exclude the amount of preliminaries, contingency sum(s) and any provision for cost fluctuations</p> <p>Time-related - An amount varied in proportion to the number of calendar days extension to the date of practical completion to which the contractor is entitled with an adjustment of the contract value [23.2; 23.3] as compared to the number of calendar days in the initial construction period [26.9.4]</p>
Option B	<p>The adjustment of preliminaries shall be based on the number of calendar days extension to the date of practical completion to which the contractor is entitled with an adjustment of the contract value [23.2; 23.3] as compared to the number of calendar days in the initial construction period [26.9.4]</p> <p>The adjustment shall take into account the resources as set out in the detailed breakdown of the preliminaries for the period of construction during which the delay occurred</p>

Failure to provide particulars within the period stated

Option A	<p>Where the allocation of preliminaries amounts for Option A is not provided, the following allocation of preliminaries amounts shall apply:</p> <p>Fixed - Ten per cent (10%) Value-related - Fifteen per cent (15%) Time-related - Seventy-five per cent (75%)</p> <p>Where the apportionment of the preliminaries per section is not provided, the categorised amounts shall be prorated to the cost of each section within the contract sum as determined by the principal agent</p>
Option B	Where the detailed breakdown of preliminaries amounts for Option B is not provided, Option A shall apply

Lump sum contract

Where the amount of **preliminaries** is not provided it shall be taken as 7.5% (seven and a half per cent) of the **contract sum**, excluding contingency sum(s) and any provision for cost fluctuations



E FORM OF TENDER

E 1.0 Tenderer's details

Name	TBC		
Legal entity of above		Contact person	
Business registration number		Telephone number	
VAT/GST number		Mobile number	
Country		E-mail	
Postal address			
		Postal code	
Physical address			
		Postal code	

E 2.0 Acceptance of tender conditions

By submission of this tender to the **employer** the tenderer offers and agrees to execute and complete the **works** and to remedy any **defects** in conformity with the specification for the tender amount stated

The tender shall remain in full legal force for forty-five (45) **calendar days** from the closing date of the tender. The tenderer accepts liability for loss or damages that may be suffered by the **employer** should the tender validity period not be honoured

The lowest or any tender will not necessarily be accepted by the **employer** nor will reasons be given for such a decision

E 3.0 Tender amount compilation

			Amount	
Tenderer's work excluding tax				
Tax	15.00	%		
Total tender amount including tax				
Total tender amount including tax , in words				

Signature	Tenderer who by signature hereto warrants authority		Place		
Name		Capacity		Date	

Signature	Witness		Place		
Name				Date	



E 4.0 Tender qualifications



Part C1.1.3

PRINCIPAL BUILDING AGREEMENT



The conditions of contract which shall apply to this contract will be "JBCC Principal Building Agreement Edition 6.2 May 2018" including all supporting documentation as published by the JBCC.

The "JBCC Principal Building Agreement Edition 6.2 May 2018" are available for inspection at the offices of the Quantity Surveyor, or may be purchased from any reputable and approved distributor (e.g. <https://www.e-cloud.co.za/>).

CHANGES MADE TO STANDARD JBCC DOCUMENTS:

The following changes are made to the standard "JBCC Principal Building Agreement Edition 6.2 May 2018" as indicated in Bill No.1 Preliminaries:

Clause 1.0 Amended	Clause amended; Added to the definition for " BUDGETARY ALLOWANCE ".
Clause 2.5 Added	Clause added; Employer shall prepare a document health & safety specification.
Clause 5.4 Added	Clause amended; The Bills of Quantities may not be used for ordering purposes.
Clause 5.6 Added	Clause added; All construction information such as drawings, specification, etc will be issued electronically via email by consultants to contractor.
Clause 7.4 Added	Clause added; Portions of work which require design responsibility by the contractor.
Clause 11.5 Deleted	Clause deleted; The employer shall not provide a payment guarantee.
Clause 11.11 Added	Clause added; The contractor shall only provide security issued by a registered bank approved by the employer.
Clause 13.3 Added	Clause added; The contractor shall notify the principle agent of any encroachments.
Clause 13.4 Added	Clause added; The contractor shall ensure the setting out is done by a registered surveyor.
Clause 14.9 Added	Clause added; Contractor to provide scaffolding to nominated subcontractor for the execution of the relevant subcontract works.
Clause 15.9 Added	Clause added; Contractor to provide scaffolding to selected subcontractor for the execution of the relevant subcontract works.
Clause 16.0 Note added	Note added; Contractor made aware of the employers direct contractors.
Clause 16.4 Added	Clause added; The contractor will be liable to accommodate any direct contractors should practical completion, as per contract data, not be reached due to no fault of the employer.
Clause 19.0 Note added	Note added; The principal agent shall ensure that at practical completion minimal lists defining incomplete works and defects will be apparent and that the contractor has satisfactorily achieved this level of completion as indicated by the principal agent.
Clause 20.0 Note added	Note added; The definition of practical completion to Section 1, Section 2 & Section 3.
Clause 23.1 Note added	Sub clause added.
Clause 23.1.A Added	Clause added.
Clause 23.1.A.1 Added	Clause added; The contractor shall make provision for twenty (20) working days during the contract period for any such delays caused by one or more of the clauses as listed under 23.1.1 to 23.1.6.



The conditions of contract which shall apply to this contract will be "JBCC Principal Building Agreement Edition 6.2 May 2018" including all supporting documentation as published by the JBCC.

The "JBCC Principal Building Agreement Edition 6.2 May 2018" are available for inspection at the offices of the Quantity Surveyor, or may be purchased from any reputable and approved distributor (e.g. <https://www.e-cloud.co.za/>).

CHANGES MADE TO STANDARD JBCC DOCUMENTS:

The following changes are made to the standard "JBCC Principal Building Agreement Edition 6.2 May 2018" as indicated in Bill No.1 Preliminaries:

Clause 23.1.A.2 Added	Clause added; The contractor becomes entitled to a revision of the date for practical completion in accordance with clause 23.1 only once the accumulated working days granted are greater than twenty (20) working days over the contract period.
Clause 26.9.5 Note added	Note added; Notwithstanding the provisions of subclause 26.9.5 or any other clause, all fluctuations in costs shall be for the account of the contractor.
Clause 26.14 Added	Sub clause added; There is to be no presumption of acceptance for prices used in an interim payment certificate.



PRINCIPAL BUILDING AGREEMENT

Project

Employer

Contractor

Contract Date

File Code

The Joint Building Contracts Committee® - NPC Principal Building Agreement Edition 6.2 – May 2018

JBCC®

The Joint Building Contracts Committee® NPC (JBCC®) is representative of building owners and developers, professional consultants and general and specialist contractors who contribute their knowledge and experience to the compilation of the JBCC® documents. The JBCC® documents portray the consensus view of the constituent members and are published in the interests of standardisation and good practice with an equitable distribution of contractual risk

For more information about the JBCC®, frequently asked questions, where documents may be purchased as well as training courses visit www.jbcc.co.za. The JBCC® does not sell directly to users but may be contacted at info@jbcc.co.za

Principal Building Agreement structure

The agreement clauses follow the project execution sequence. The documents aim to set out clear, balanced and enforceable procedures, rights and obligations which, when competently managed and administered, protect the employer, contractor and subcontractors alike. The following additional documents form part of the suite of contract agreements:

- The JBCC® Principal Building Agreement - Contract Data that incorporates specific employer and contractor requirements;
- The JBCC® General Preliminaries that generally covers all aspects of preliminaries for most types of projects;
- The JBCC® Nominated/Selected Subcontract Agreement that replicates the JBCC® Principal Building Agreement with common clauses retaining the same numbering; and
- A comprehensive set of certificate forms and support documents for use in the administration of the agreement

Warning!

The JBCC® Principal Building Agreement Edition 6.2 has been coordinated with the JBCC® Nominated/Selected Subcontract Agreement Edition 6.2, the JBCC® General Preliminaries and the JBCC® certificate forms and support documents. Forms from previous editions are not compatible with the JBCC® Principal Building Agreement Edition 6.2

Persons entering into or preparing contracts using the JBCC® suite of contract agreements and support documents are warned of the dangers inherent in modifying any part of it

Experience has shown that changes drafted by others, including members of the building professions, often have unintended results that may be prejudicial to either, or both, parties

Disclaimer

While the JBCC® aims to ensure that its publications represent best practice, it does not accept or assume any liability or responsibility for any events or consequences which derive from the use of the JBCC® documents

Copyright reserved

The name 'The Joint Building Contracts Committee® NPC', the abbreviation JBCC®, the electronic version e-JBCC® and the JBCC® logo are registered trademarks. The JBCC® claims authorship of this work. All rights are reserved. No part of this publication may be reproduced, stored in any retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, scanning, recording, or otherwise, without the prior permission in writing of the JBCC®

Unauthorised reproduction of the work is an infringement of the copyright. Judicial proceedings can and will be instituted to obtain relief and recovery of damages

Actions by the parties / principal agent within a given time

Clause	Time period	Party	Purpose
2.4	1-7 CD	parties or principal agent	notices deemed to be received
6.4	5 WD	contractor > principal agent	non-performance of an agent i.t.o. this agreement
6.5	10 WD	employer	appoint another agent/contractor may object
10.6	10 WD notice	contractor > employer	failure to insure - notice – insure + recover expense
11.1	15 WD	contractor	provide guarantee for construction
11.2.1	20 WD	contractor	replace securities
11.5.1-2	15/20 WD	employer	provide / replace guarantee for payment
11.6	10 WD notice	contractor > employer	no security, contractor notice to suspend works
11.8	10 WD	parties	return original/replacement security forms
12.2.2	15 WD	contractor	submit priced document
12.2.6	15 WD	contractor	submit programme
14.4.2	15 WD guarantee	contractor > subcontractor	provide guarantee for payment to nominated subcontractor
14.5	5 WD proof payment	employer (principal agent)	pay nominated subcontractor on default by contractor
14.6	5 WD notice	contractor + subcontractor	termination of subcontractor appointment on default
15.4.2	15 WD guarantee	contractor > subcontractor	provide guarantee for payment to selected subcontractor
15.5	5 WD proof payment	employer (principal agent)	pay selected subcontractor on default by contractor
17.3	5 WD	contractor	proceed with a contract instruction, where practical
19.2.2	5 WD	contractor > principal agent	works ready for inspection
19.4	5+5 WD	contractor > principal agent	no 'list' > notice > deemed practically complete
19.6	5+agreed WD	principal agent > contractor	employer occupies portion of the works, list for completion, fix defects
21.3.1	10 WD	contractor	inspect before expiry of defects liability period
21.3.2	5 WD	contractor > principal agent	invite PA to inspect list for completion
21.5	5 WD notice	contractor > principal agent	inspect > list for final completion > certificate
21.6	10 WD notice	principal agent > contractor	no list for final completion > notice > complete
21.7.3	5 WD notice	principal agent > contractor	inspect > list for final completion > certificate
21.9	5+5 WD	contractor > principal agent	no list for final completion / deemed final completion
23.4.2*	20 WD notice	contractor > principal agent	notice of a possible delay no details yet
23.5	40 WD claim	contractor > principal agent	delay ceased, details of delay and expenses
23.7	20 WD award	principal agent > contractor	assess claim – accept/reduce/reject
25.2	date [CD]	principal agent > contr/empl	issue payment certificate and support forms
25.10	14 CD payment	employer pay contractor	make payment from date of payment certificate
25.11	21 CD	contractor pay employer	make payment i.t.o. schedule from principal agent
25.13	7 CD payment	contractor pay subcontractor	pay subcontractors i.t.o. schedule from principal agent
25.14	5 WD notice	contractor > employer	no/partial payment > suspend etc
25.15	7 CD payment	principal agent > contractor	final payment certificate after acceptance of final account
26.5*	20 WD notice	contractor > principal agent	notice of possible expense and loss
26.6	40 WD claim	contractor > principal agent	substantiated claim
26.7	20 WD award	principal agent > contractor	assess claim – accept/reduce/reject
26.10	60 WD issue FA	principal agent > contractor	issue final account
26.11	30 WD accept FA	contractor > principal agent	accept final account
26.12	10 WD notice	contractor + principal agent	agree final account or deemed acceptance
27.2.9	5 WD notice	notice to contractor	remedy default before next recovery statement
28.1	10 WD notice	contractor > employer	list of defaults to be remedied > suspend works
28.2	notice	contractor > employer	suspension of works where defaults not remedied
29.2	10 WD	employer > contractor	intention to terminate if defaults not remedied
29.3	notice	employer > contractor	default not remedied, termination forthwith
29.14	notice	contractor > employer	intention to terminate if guarantee for payment not provided/maintained
29.15	10 WD notice	contractor > employer	intention to terminate if defaults not remedied
29.16	forthwith	contractor > employer	default not remedied, termination forthwith
29.17.1	forthwith	contractor > subcontractor	termination where PBA terminated
29.17.2	10 WD notice	contractor	remove construction equipment, temporary works, etc
29.21	10 WD	either party	intention to terminate > impossible to complete
29.24.3	10 WD	contractor	remove construction equipment
29.25.2	20 WD	principal agent	prepare status report
29.25.4	60 WD	principal agent	complete final account
30.2	10 WD	either party	disagreement not resolved > dispute
30.3	10 WD	aggrieved party	refer to adjudication
30.6.4	10 WD	aggrieved party	dissatisfied with adjudication
30.6.5	10 WD	aggrieved party	no adjudication/not accept adjudication ruling > arbitration

Abbreviations: WD = working days CD = calendar days, *No notice, forfeits the opportunity to claim

PRINCIPAL BUILDING AGREEMENT

TABLE OF CONTENTS

Section	Clause No	Description	Page
INTERPRETATION	1.0	Definitions and interpretation	2
	2.0	Law, regulations and notices	5
	3.0	Offer and acceptance	5
	4.0	Cession and assignment	6
	5.0	Documents	6
	6.0	Employer's agents	6
	7.0	Design responsibility	7
INSURANCES AND SECURITIES	8.0	Works risk	7
	9.0	Indemnities	8
	10.0	Insurances	8
	11.0	Securities	9
EXECUTION	12.0	Obligations of the parties	10
	13.0	Setting out	12
	14.0	Nominated subcontractors	12
	15.0	Selected subcontractors	14
	16.0	Direct contractors	15
	17.0	Contract instructions	15
COMPLETION	18.0	(Interim completion = n/s subcontract agreement)	16
	19.0	Practical completion	16
	20.0	Completion in sections	17
	21.0	Defects liability period and final completion	17
	22.0	Latent defects liability period	18
	23.0	Revision of the date for practical completion	19
	24.0	Penalty for late or non-completion	20
PAYMENT	25.0	Payment	20
	26.0	Adjustment of the contract value and final account	22
	27.0	Recovery of expense and/or loss	23
SUSPENSION AND TERMINATION	28.0	Suspension by the contractor	24
	29.0	Termination	25
DISPUTE RESOLUTION	30.0	Dispute resolution	27
AGREEMENT		Agreement	30

INTERPRETATION

1.0 DEFINITIONS and INTERPRETATION

1.1 Definitions

A word or phrase in bold type in this agreement shall have the meaning assigned to it in these definitions
A word or phrase not in bold type shall be interpreted in the context of its usage

AGENT: An entity [CD] appointed by the **employer** to deal with specific aspects of the **works**

AGREEMENT: The completed **JBCC®** Principal Building Agreement and **JBCC®** **contract data**, the **contract drawings**, the **priced document** and any other documents reduced to writing and signed by the authorised representatives of the **parties**

BILLS OF QUANTITIES: The document drawn up in accordance with the measuring system [CD]

BUDGETARY ALLOWANCE: An amount included in the **contract sum** for work intended for execution by the **contractor**, the extent of which is identified but not detailed

CALENDAR DAYS: Twenty-four (24) hour days commencing at midnight (00:00) which include Saturdays, Sundays, proclaimed public holidays and recorded **contractor's** annual holiday periods [CD]

CERTIFICATE OF FINAL COMPLETION: A certificate issued by the **principal agent** to the **contractor** with a copy to the **employer** stating the date on which **final completion** of the **works**, or of a **section** thereof, was achieved

CERTIFICATE OF PRACTICAL COMPLETION: A certificate issued by the **principal agent** to the **contractor** with a copy to the **employer** stating the date on which **practical completion** of the **works**, or of a **section** thereof, was achieved

COMPENSATORY INTEREST: Interest due to the **contractor** at the ruling rate of **interest** on amounts certified after thirty-one (31) **calendar days** of the date of **practical completion**, compounded monthly until the date of payment

CONSTRUCTION EQUIPMENT: Equipment and/or plant provided by or belonging to the **contractor** and/or **subcontractors** and used during the **construction period**

CONSTRUCTION INFORMATION: All information issued by the **principal agent** and/or **agents** including this **agreement**, specifications, drawings, schedules, **notices** and **contract instructions** required for the execution of the **works**

CONSTRUCTION PERIOD: The period commencing on the intended date [CD] of possession of the **site** by the **contractor** and ending on the date of **practical completion**

CONTRACT DATA: The document listing the project specific information

[CD]: The notation used where project specific information is recorded in the **contract data**

CONTRACT DRAWINGS: The drawings listed [CD]

CONTRACT INSTRUCTION: A written instruction issued by or under the authority of the **principal agent** to the **contractor** that may include drawings, photographs and other **construction information**

CONTRACT SUM: The accepted tender amount inclusive of **tax** [CD], not subject to adjustment

CONTRACT VALUE: A monetary value initially equal to the **contract sum**, subject to adjustment in terms of this **agreement**

CONTRACTOR: The **party** [CD] contracting with the **employer** for the execution of the **works**

DEFAULT INTEREST: Interest at six (6) percentage points per annum above the ruling rate of **interest** where payment has not been received within the stipulated period, compounded monthly from the due date for payment until the date of payment

DEFECT: Any aspect of materials and workmanship forming part of the **works** that does not conform to the **agreement** and/or **construction information**

DIRECT CONTRACTOR: An entity appointed under separate agreement by the **employer** to do work on **site** prior to **practical completion** [CD]

EMPLOYER: The **party** [CD] contracting with the **contractor**

FINAL ACCOUNT: The document prepared by the **principal agent** that reflects the final **contract value** of the **works** at **final completion** or termination

FINAL COMPLETION: The stage of completion as certified by the **principal agent** where the **works**, or a **section** thereof, has been completed and is free of **defects**

FINAL PAYMENT CERTIFICATE: The certificate issued by the **principal agent** after the issue of the **certificate of final completion** and after the **final account** has been agreed

FORCE MAJEURE: An exceptional event or circumstance that:

- Could not have been reasonably foreseen
- Is beyond the control of the **parties**, and
- Could not reasonably have been avoided or overcome

Such an event may include but is not limited to:

- Acts of war (declared or not), invasion and/or hostile acts of foreign enemies
- Insurrection, rebellion, revolution, military or usurped power and terrorism
- Civil commotion, disorder, riots, strike, lockout by persons other than the **contractor's** employees or his **subcontractors**
- Sonic shock waves caused by aircraft or other aerial devices and ionising or radioactive contamination
- Explosive materials, except where attributable to the **contractor's** use of such technology
- Natural catastrophes including earthquakes, floods, hurricanes or volcanic activity

FREE ISSUE: **Materials and goods** provided at no cost to the **contractor** by the **employer** for inclusion in the **works** [CD]

GUARANTEE FOR ADVANCE PAYMENT: A **security** in terms of the **JBCC®** Guarantee for Advance Payment form, obtained by the **contractor** from an institution approved by the **employer**

GUARANTEE FOR CONSTRUCTION: A **security** in terms of the **JBCC®** Guarantee for Construction form, obtained by the **contractor** from an institution approved by the **employer** [CD]

GUARANTEE FOR PAYMENT: A **security** in terms of the **JBCC®** Guarantee for Payment form, obtained by the **employer** from an institution approved by the **contractor** [CD]

INTEREST: The bank rate applicable from time to time to registered banks borrowing money from the Central or Reserve Bank of the country [CD]. The ruling bank rate on the first **calendar day** of each month shall be used in calculating the interest due for such month

JBCC®: The Joint Building Contracts Committee® NPC

LATENT DEFECT: A **defect** that an inspection of the **works** by the **principal agent** and/or **agents** would not reasonably have revealed

LAW: The law of the country [CD]

LIST FOR COMPLETION: A list that may include marked up drawings and photographs issued by the **principal agent** where **practical completion** has been certified, listing **defects** and/or outstanding work to be completed

LIST FOR FINAL COMPLETION: A **list for completion** that may include marked up drawings and photographs issued by the **principal agent** after the inspection of the **works** for **final completion**, where **final completion** has not been achieved, listing **defects** and/or outstanding work to be completed to achieve **final completion**

LIST FOR PRACTICAL COMPLETION: A comprehensive and conclusive list that may include marked up drawings and photographs issued by the **principal agent** after the inspection of the **works** for **practical completion**, where **practical completion** has not been achieved, listing the **defects** and/or outstanding work to be completed to achieve **practical completion**

MATERIALS AND GOODS: Unfixed materials, goods and/or items fabricated for inclusion in the **works** whether stored on or off the **site** or in transit

NOTICE: A written communication, excluding social media, issued by either **party**, the **principal agent** and/or **agents** to the other **party**, the **principal agent** and/or **agents** to, inter alia, record an event, request outstanding **construction information**, or where **suspension** or resumption of the **works** and/or termination of this **agreement** is contemplated

N/S SUBCONTRACT AGREEMENT: The completed **JBCC®** Nominated/Selected Subcontract Agreement (NSSA) and **JBCC®** NSSA contract data, the subcontract drawings, the subcontract priced document and any other documents reduced to writing and signed by the authorised representatives of the **contractor** and of the **subcontractor**

PARTY: The **employer** or the **contractor** and 'parties' shall refer to both of them

PAYMENT CERTIFICATE: A certificate issued at regular agreed intervals [CD] by the **principal agent** to the **parties** certifying the amount due and payable in terms of the **JBCC®** Payment Certificate format

PENALTY: The stipulated amount per **calendar day** [CD] payable by the **contractor** to the **employer** where the date or the revised date for **practical completion**, whichever is the later, has not been met

PRACTICAL COMPLETION: The stage of completion as certified by the **principal agent** where the **works**, or a **section** thereof, has been completed and is free of patent **defects** other than minor **defects** identified in the **list for completion** and can be used for the intended purpose [CD]

PRELIMINARIES: The **JBCC®** General Preliminaries and/or the items listed in the preliminaries section of the **priced document**

PRICED DOCUMENT: The document incorporating quantities and/or rates used in the compilation of the **contract sum** such as **bills of quantities**, **preliminaries** and schedules of rates

PRIME COST AMOUNT: An amount included in the **contract sum** for the delivered cost of **materials and goods** obtained from a supplier as instructed by the **principal agent**

PRINCIPAL AGENT: The entity [CD] appointed by the **employer** with full authority and obligation to act in terms of this **agreement**

PROGRAMME: A diagrammatic representation of the planned execution of units of work or activities by the **contractor** and **subcontractors** indicating the dates for commencement and completion prepared and maintained by the **contractor**

PROVISIONAL SUM: An amount included in the **contract sum** for the supply and installation of work by a **subcontractor**

RECOVERY STATEMENT: The statement prepared and issued in conjunction with each **payment certificate** by the **principal agent** in terms of the **JBCC®** Recovery Statement format

SECTION: An identified portion of the **works** for which **practical completion** is required by a date earlier than that required for the **works** as a whole [CD]

SECURITY: A monetary guarantee [CD] provided by the **employer** to the **contractor**, or vice versa, in terms of this **agreement** from which either **party** may recover expense and loss in the event of default

SITE: The land or place where the **works** is to be executed [CD]

STATUS REPORT: A report compiled by the **principal agent** and/or **agents** in the event of termination of the **agreement**, or where the **works** has been suspended due to a **force majeure** event, or in the event of termination of a **n/s subcontract agreement** by the **contractor**, to record the state of completion or otherwise of the **works** or the n/s subcontract works. Such **status report** may include marked up drawings and photographs

SUBCONTRACTOR: A nominated or a selected subcontractor appointed in terms of the **n/s subcontract agreement** by the **contractor** in accordance with a **contract instruction** for the supply and installation of work for which a **provisional sum** has been included in the **contract sum**

SUSPENSION: The temporary cessation of the **works** by the **contractor**

TAX: Value-added tax, general sales tax or similar consumption tax applicable by **law**

WORKING DAYS: **Calendar days** which exclude Saturdays, Sundays, proclaimed public holidays and recorded **contractor's** annual holiday periods [CD]

WORKS: The extent of work to be executed by the **contractor** described in the **agreement** and **contract instructions**, which includes **free issue** and **materials and goods**. Work or installations to be executed by **direct contractors** and others responsible to the **employer** are excluded [CD]

1.2 Interpretation

- 1.2.1 In this document, unless inconsistent with the context, the words “accept, allow, appoint, approve, authorise, certify, decide, demand, designate, grant, inform, instruct, issue, list, **notice**, notify, object, record, reduce, refuse, request, state” and their derivatives require such acts to be in writing
- 1.2.2 The masculine gender includes the feminine and neuter genders and vice versa, the singular includes the plural and vice versa and a person includes juristic or artificial persons
- 1.2.3 The headings of clauses are for information only and shall not be used in interpretation
- 1.2.4 Reference to a clause number written as clause [54.3.2] means that specific clause; or clause [54.3.2-4] means sub-clauses 2 to 4 inclusively; or clause [54.3.2 & 4] means sub-clauses 2 and 4 only
- 1.2.5 The word “deemed” shall be conclusive that something is fact, regardless of the objective truth

2.0 LAW, REGULATIONS AND NOTICES

- 2.1 The **contractor** shall comply with the **law** [CD], obtain permits, licences and approvals required and pay related charges for the execution of the **works** [17.1.4]. The **employer** shall comply with the **law** [CD], obtain permits, planning, building or similar permissions and pay charges for the **works** other than those which are the responsibility of the **contractor** [26.4.1]
- 2.2 All communication or **notices** between the **parties** shall be in the language of this **agreement** and in a format that can be read, copied and recorded
- 2.3 Legal processes arising out of or concerning this **agreement** may validly be delivered to and served on the **parties** at the physical address of the **parties** recorded in this **agreement**. Either **party** may, at any time, by **notice** to the other, change his physical address provided it is in the same country as the original address
- 2.4 **Notices** given in terms of this **agreement** shall be deemed to have been received where:
 - 2.4.1 Delivered by hand - on the day of delivery
 - 2.4.2 Sent by electronic mail, excluding social media - within one (1) **working day**
 - 2.4.3 Sent by registered post - within seven (7) **calendar days** after posting

3.0 OFFER AND ACCEPTANCE

- 3.1 The objective of this **agreement** is the execution of and payment for the **works** for which there has been an offer by the **contractor** and an acceptance by the **employer**
- 3.2 The currency applicable to this **agreement** is as recorded [CD]
- 3.3 This **agreement** shall come into force on the date of acceptance by the **employer** and continue to be of force and effect until the end of the **latent defects** liability period [22.0] notwithstanding termination [29.0] or the certification of **final completion** [21.0] and final payment [25.0]
- 3.4 Should any provision of this **agreement** be unenforceable the **parties** shall act in good faith to agree alternative provisions in terms of this **agreement**
- 3.5 Failure or omission by a **party** to enforce any provision of this **agreement** shall not constitute a waiver of such provision or affect such **party's** rights to require the performance of such provision in the future

4.0 CESSION AND ASSIGNMENT

- 4.1 Neither **party** shall cede rights or assign rights and obligations under this **agreement** without the prior written consent of the other **party**, which consent shall not be unreasonably withheld
- 4.2 The **contractor** shall not consent to a nominated **subcontractor** ceding rights or assigning rights and obligations under this **agreement** without obtaining the prior written consent of the **principal agent**
- 4.3 Notwithstanding the above, where a **party** cedes any right to any monies due or to become due under this **agreement** as security in favour of a financial institution, consent shall not be required provided **notice** of such cession is timeously given to the other **party**

5.0 DOCUMENTS

- 5.1 Documents referred to in this **agreement** shall mean the current edition thereof with all amendments thereto as at the date of submission of the **contractor's** tender
- 5.2 The **parties** shall sign the original **agreement** and shall each be issued with a copy thereof by the **principal agent**. The original signed **agreement** shall be held by the **principal agent** [CD]
- 5.3 Persons authorised to act on behalf of the **parties** and/or **agents** appointed by the **employer** shall be identified in the **construction information**. Such authorised persons may be changed by **notice** to the other **party**
- 5.4 The **priced document** shall not be used as a specification of **materials and goods** or methods
- 5.5 The content of this **agreement** shall not be published or disclosed or used for any purpose other than that specified in this **agreement** by one **party** without the prior written consent of the other **party**
- 5.6 The **principal agent** and/or **agents** shall timeously provide the number of copies [CD] of drawings, un-priced **bills of quantities** and other **construction information** at no cost to the **contractor**

6.0 EMPLOYER'S AGENTS

- 6.1 The **employer** warrants that the **principal agent** has full authority and obligation to act on behalf of and bind the **employer** in terms of this **agreement**. The **principal agent** has no authority to amend this **agreement**
- 6.2 The **employer** may appoint **agents** to deal with specific aspects of the **works** in terms of this **agreement** [CD]. The **principal agent** shall give **notice** to the **contractor** where such authority is delegated to **agents** to issue **contract instructions** and perform duties for specific aspects of the **works**. An **agent** appointed in terms of this clause shall not be entitled to subdelegate his authority without the prior written consent of the **employer** and **notice** to the **contractor**
- 6.3 The **principal agent** and/or **agents** shall declare any interest or involvement in the **works** other than a professional interest, where applicable [CD]
- 6.4 Where the **principal agent** fails to act in terms of this **agreement** and/or an **agent** fails to act in terms of delegated authority, the **contractor** shall give **notice** to the **principal agent**, with a copy to the **employer**, to rectify such default within five (5) **working days**. Where such default has not been rectified, the **contractor** may give **notice** to suspend the **works** [28.0]
- 6.5 Where the **principal agent** and/or an **agent** fails to act or is unable to act or ceases to be the **principal agent** or an **agent** in terms of this **agreement**, the **employer** shall appoint another **principal agent** and/or an **agent** within ten (10) **working days** of the date of such **notice** from the **contractor**. The **employer** shall not appoint a **principal agent** and/or an **agent** against whom the **contractor** makes reasonable objection within five (5) **working days** of receipt of **notice** of intention to make such an appointment
- 6.6 The **employer** shall not interfere with or prevent the **principal agent** and/or **agents** from exercising fair and reasonable judgement when performing their obligations in terms of this **agreement**

7.0 DESIGN RESPONSIBILITY

- 7.1 The **contractor** shall not be responsible for the design of the **works** other than the **contractor's** and **subcontractors'** temporary works. The **contractor** shall not be responsible for the coordination of design elements
- 7.2 Any design responsibility undertaken by a **subcontractor** shall not devolve on the **contractor**. All contractual or other rights the **contractor** has against such **subcontractor** arising from any design responsibility undertaken shall be ceded to the **employer** on the date of **final completion** or the date of termination of this **agreement** [9.2.3]
- 7.3 The **contractor** shall be responsible for the timeous submission of design documentation by a selected **subcontractor** for acceptance and coordination by the **principal agent** and/or **agents** [23.2.8]

INSURANCES AND SECURITIES

8.0 WORKS RISK

- 8.1 The **contractor** shall take full responsibility for the **works** from the date on which possession of the **site** is given to the **contractor** and up to the date of issue of the **certificate of practical completion** or deemed achievement of **practical completion** for the **works** as a whole, or a **section** thereof. Thereafter responsibility for the **works** as a whole, or a **section** thereof, shall pass to the **employer**
- 8.2 The **contractor** shall make good physical loss and repair damage to the **works** caused by or arising from:
- 8.2.1 Any cause before the date of **practical completion** [19.0]
- 8.2.2 Any act or omission of the **contractor** in the course of any work carried out in pursuance of the **contractor's** obligations after the date of **practical completion**
- 8.3 The liability of the **contractor** in respect of any loss or damage shall include, but not be limited to:
- 8.3.1 The cost of making good such physical loss and repairing damage to the **works** including clearing away and removing all debris and any other costs to reinstate the **works**
- 8.3.2 The new replacement value of **free issue** [12.1.10]
- 8.3.3 The cost of additional professional services
- 8.4 Notwithstanding subclause 8.3, the limit of the **contractor's** liability shall not exceed the amount of the contract works insurance [10.1.1] [CD]
- 8.5 The **contractor** shall not be liable for the cost of making good physical loss and repairing damage to the **works** caused by or arising from:
- 8.5.1 The use or occupation of any part of the **works** by the **employer**, the **employer's** employees and/or **agents** and those for whose actions they are responsible
- 8.5.2 An act or omission of the **employer**, the **employer's** employees and/or an **agent** and those for whose actions they are responsible
- 8.5.3 An act or omission by a **direct contractor**
- 8.5.4 The use or occupation of any part of the **works** by a **direct contractor**
- 8.5.5 The design of the **works** for which the **contractor** is not responsible [7.1]
- 8.5.6 A **defect** in **free issue** or **materials and goods** specified by trade name where the **contractor** has no right of substitution. The **contractor** hereby cedes any right of action to the **employer** that may exist against the supplier and/or manufacturer of such **free issue** and/or **materials and goods**
- 8.5.7 **Force majeure**

- 8.6 Where the **contractor** is not liable for the cost of making good physical loss or repairing damage [8.5] such making good and/or expense and/or loss shall be measured and valued and included in the **contract value** by the **principal agent** [17.1.10]
- 8.7 The **contractor** shall immediately give **notice** to the **principal agent** on becoming aware of physical loss or damage to the **works**

9.0 INDEMNITIES

- 9.1 The **contractor** indemnifies and holds harmless the **employer**, the **employer's** employees and/or **agents** from all claims or proceedings for damages, expense and/or loss including legal fees and expenses in respect of or arising from:
- 9.1.1 Death or bodily injury or illness of any person or physical loss or damage to any property other than the **works** arising out of or due to the execution of the **works** or presence on and/or occupation of the **site** by the **contractor**. Should such an event occur, the **contractor** shall forthwith give **notice** to the **principal agent**
- 9.1.2 Non-compliance by the **contractor** with the **law**, regulation or bylaw of any local or other authority and the failure by the **contractor** to obtain any permit, licence or approval that the **contractor** is required to obtain in terms of this **agreement** [2.1]
- 9.1.3 Physical loss or damage to **construction equipment** or other property belonging to the **contractor** or the **contractor's subcontractors** but excluding **direct contractors'** equipment or property
- 9.2 The **employer** indemnifies and holds the **contractor** harmless from all claims or proceedings for damages, expense and/or loss, including legal fees and expenses, in respect of or arising from:
- 9.2.1 An act or omission of the **employer**, the **employer's** employees and/or **agents** and those for whose actions they are responsible
- 9.2.2 An act or omission of a **direct contractor** [16.0]
- 9.2.3 Design of the **works** [7.2] where the **contractor** is not responsible for such design
- 9.2.4 The use or occupation of any part of the **works** by the **employer**, tenants, **direct contractors** or others authorised by the **employer**
- 9.2.5 Proceeding with the **works** on instruction from the **employer** without the **employer** obtaining the required permission under the **law** in terms of this **agreement** [2.1]
- 9.2.6 Interference with any servitude or other right not recorded in **construction information** issued to the **contractor** that is the unavoidable result of the execution of the **works** including the removal of or weakening of or interference with the support of land and property adjacent to or within the **site** unless resulting from any negligent act or omission by the **contractor** or his **subcontractors**. Should such an event occur, the **contractor** shall forthwith give **notice** to the **principal agent**
- 9.2.7 Physical loss or damage to an existing structure and the contents thereof where this **agreement** is for alterations or additions to an existing structure. Should such an event occur, the **contractor** shall forthwith give **notice** to the **principal agent**
- 9.2.8 A **defect in free issue**
- 9.2.9 Physical loss or damage to the **works** where a **certificate of practical completion** has been issued [19.0] or **practical completion** has been deemed to have been achieved
- 9.2.10 Advance payments certified by the **principal agent** and paid by the **contractor** to **subcontractors** [27.1.8; 27.2.4]

10.0 INSURANCES

- 10.1 The **party** responsible shall effect and keep the respective insurances [CD] in force in the joint names of the **parties** from the date of possession of the **site** until the issue of the **certificate of practical completion** with an extension to cover the **contractor's** obligations after the date of **practical completion** [8.2.2]:
- 10.1.1 Contract works insurance [CD] for the **works** that shall make provision for **direct contractors** [CD], **free issue** [CD], **materials and goods**, professional fees, temporary works, clearing away and removing of all debris and any other costs to reinstate the **works** and where required, damage to **employer** owned surrounding property [CD] where not covered under the removal of lateral support insurance
- 10.1.2 Supplementary insurance [CD] for the **works** against loss or damage caused by civil commotion, riot, strike, labour disturbance and lockout to the extent not insured under the contract works insurance
- 10.1.3 Public liability insurance [CD] providing indemnity in respect of accidental death or injury to any person and accidental loss of or physical damage to tangible property, to remain in force until the date of **final completion**
- 10.1.4 Removal of lateral support insurance [CD] where the **employer** considers that the execution of the **works** could cause the removal of or weakening of or interference with the support of land or property adjacent to or within the **site** (also including **employer** owned surrounding property) and the consequences thereof. The **employer** shall appoint an **agent** to design and monitor appropriate support structures for use in excavations and/or in existing property that form part of the **works** and/or the **site**
- 10.1.5 Other insurances [CD]
- 10.2 Where **practical completion** in **sections** is required [20.0], or where the **works** is for alterations and additions, the **employer** shall effect and keep in force contract works insurance [10.1.1], supplementary insurance [10.1.2], public liability insurance [10.1.3] and where applicable, removal of lateral support insurance [10.1.4] and other insurances [10.1.5] in the joint names of the **parties** until the date of **final completion**
- 10.3 The **party** responsible for effecting insurances [10.1.1-5; 10.2] shall provide proof of the insurances effected to the other **party** before the commencement of the **construction period** and, where required, provide proof of extension or renewal of such insurances before their expiry. Upon request the **party** responsible for effecting insurances shall provide the other **party** with the entire policy wording of such insurances
- 10.4 The **contractor** shall be responsible for the deductible amounts [CD] other than where a claim against an insurance cover is due to default of the **employer**, the **employer's** employees and/or **agents** and those for whose actions they are responsible
- 10.5 The **employer** may, at his expense, require the cover of the contract works insurance [10.1.1] to be increased. The **party** responsible for effecting insurances shall provide written proof of such adjustment
- 10.6 Where the **employer** fails to effect the required insurances within ten (10) **working days** after **notice** to do so the **contractor** may, on expiry of the notice period, suspend the **works** until such insurances have been effected [28.1.4]
- 10.7 Where this **agreement** is terminated [29.0] and the **contractor** is not required to make good the physical loss or repair damage to the **works**, the right to the proceeds of an insurance claim shall vest solely in the **employer**. The **party** responsible for the insurances shall give **notice** to the insurer to clarify the status of the insurance cover and/or further insurance obligations applicable to the **works**, public liability insurance, supplementary insurance and removal of lateral support insurance
- 10.8 Any amounts not recovered from insurers shall be borne by the **employer** or **contractor** in accordance with their respective obligations under this **agreement**
- 10.9 The **party** responsible for effecting the insurances shall keep insurers informed of any relevant changes in respect of this **agreement**
- 10.10 The **parties** shall at their discretion effect insurances for aspects not insured such as **construction equipment** and work by **direct contractors** after **practical completion**

11.0 SECURITIES

- 11.1 The **contractor** shall provide to the **employer** a **guarantee for construction** within fifteen (15) **working days** of acceptance of the **contractor's** tender and choose:
- 11.1.1 A **guarantee for construction** – (variable) initially equal to ten per cent (10%) of the **contract sum** and keep such **security** valid and enforceable until the **final payment certificate** has been issued to the **contractor** [25.15]
- or ...
- 11.1.2 A **guarantee for construction** - (fixed) equal to five per cent (5%) of the **contract sum** and a payment reduction of five per cent (5%) of the value of each **payment certificate** up to a maximum of five per cent (5%) of the **contract sum** [25.3.3; 25.12]. The **contractor** shall keep such **security** valid and enforceable until the only or last **certificate of practical completion** has been issued
- 11.2 The **contractor** shall:
- 11.2.1 Maintain and/or replace a **guarantee for construction** - (variable or fixed) [11.1.1-2] at least twenty (20) **working days** before such **security** is due to expire
- 11.2.2 Provide a **guarantee for advance payment** where an advance payment is required. The **contractor** shall keep such **security** valid and enforceable until the advance payment is repaid [11.3]
- 11.3 The amount of the **guarantee for advance payment** shall be reduced by the amount repaid by the **contractor** as certified by the **principal agent** in **payment certificates**. If the advance payment is not repaid by the date a **certificate of practical completion** is issued or deemed achievement of **practical completion** or by the date of termination by the **employer** due to **contractor** default [29.9.3] the entire outstanding amount shall immediately become due and payable
- 11.4 Where the **contractor** fails to provide the specified **guarantee for construction** the **employer** may:
- 11.4.1 Hand over the **site** to the **contractor** and withhold an amount in interim **payment certificates** to the **contractor** until the total amount withheld is equal to ten per cent (10%) of the **contract sum**. The amount withheld shall be reduced at **practical completion** [19.0] to two and one half per cent (2.5%) of the **contract sum** and to zero per cent (0%) in the **final payment certificate** [25.9; 25.15]
- or ...
- 11.4.2 Terminate this **agreement** [29.1.1; 29.2]
- 11.5 The **employer** shall:
- 11.5.1 Provide to the **contractor** a **guarantee for payment** where required in the accepted tender [CD] within fifteen (15) **working days** of acceptance of the **contractor's** tender
- 11.5.2 Keep such **guarantee for payment** valid and enforceable in terms of the **security** form and/or provide a replacement **guarantee for payment** at least twenty (20) **working days** before such **security** is due to expire
- 11.6 Where the **employer** fails to provide the **guarantee for payment** [CD], or such **security** has expired, the **contractor** may, after giving ten (10) **working days** notice, where such default has not been remedied, forthwith suspend the **works** until such **security** has been provided [12.1.1; 28.1.1] or by further **notice** terminate this **agreement** [29.14.2; 29.15]
- 11.7 Where the **contract value** exceeds the **contract sum** by more than ten per cent (10%) the **guarantee for payment** shall be adjusted at the **employer's** expense. The **employer** shall provide written proof of such adjustment
- 11.8 The original or the replacement **security** form(s) shall be returned to the other **party** within ten (10) **working days** after the expiry date
- 11.9 Where a **party** makes an unjustified call on a **security**, the amount paid and **default interest** shall be paid to the other **party** [27.1.2; 27.1.5]
- 11.10 The **contractor** shall waive his lien or right of continuing possession of the **works** on receipt of a **guarantee for payment** from the **employer**

EXECUTION

12.0 OBLIGATIONS OF THE PARTIES

12.1 The **employer** shall:

- 12.1.1 Provide a **guarantee for payment** [11.5], where applicable [CD]
- 12.1.2 Record specific requirements [CD] where the existing premises will be in use and occupied during the execution of the **works** including restriction of working hours [CD]
- 12.1.3 Record and describe relevant natural features and known services [CD] where the **contractor** shall be responsible for their preservation
- 12.1.4 Define any restrictions to the **site** or areas that the **contractor** may not occupy [CD]
- 12.1.5 Give possession of the **site** to the **contractor** on the agreed date [CD]
- 12.1.6 Effect and keep in force insurances in the joint names of the **parties**, where the **employer** is responsible for providing insurances [CD]
- 12.1.7 Make payments by the due date [25.10] [CD]
- 12.1.8 Make advance payments, where required [CD]
- 12.1.9 Permit reasonable access to the **works** by the **contractor** and/or **subcontractors** subsequent to **practical completion** to fulfil outstanding obligations [17.1.17; 19.7]
- 12.1.10 Supply **free issue** [CD] to suit the **programme**
- 12.1.11 Define the extent of work to be carried out by **direct contractors** [CD]
- 12.1.12 Ensure that the **principal agent** and/or **agents** provide adequate **construction information** timeously to the **contractor**
- 12.1.13 At the **employer's** discretion make direct payment where the **contractor** has failed to honour a n/s subcontract payment advice after **notice** of default by a **subcontractor** to the **principal agent**, the **employer** and the **contractor** [14.5 and/or 15.5]

12.2 The **contractor** shall:

- 12.2.1 Have inspected the **site** and any existing structures and be thoroughly acquainted with the conditions under which the **works** is to be executed including means of access and any matters which may influence the execution and/or the pricing of the **works**
- 12.2.2 Within fifteen (15) **working days** of acceptance of the **contractor's** tender submit to the **principal agent** the **priced document** with items priced to include all costs, overheads and profit, extended and cast. Where the **priced document** contains errors or discrepancies and/or prices considered by the **principal agent** to be imbalanced or unreasonable the **principal agent** and the **contractor** shall adjust such prices without any change to the **contract sum**
- 12.2.3 Provide a **guarantee for construction** [11.1; 11.2.1]
- 12.2.4 Provide a **guarantee for advance payment** [11.2.2], where applicable [CD]
- 12.2.5 Effect and keep in force insurances in the joint names of the **parties** where the **contractor** is responsible for providing insurances [10.0] [CD]
- 12.2.6 Prepare and submit to the **principal agent** within fifteen (15) **working days** of receipt of **construction information a programme** for the **works** in sufficient detail to enable the **principal agent** to monitor the progress of the **works**
- 12.2.7 On being given possession of the **site** commence the **works** and proceed with due diligence, regularity, expedition, skill and appropriate resources to bring the **works** to **practical completion** and to **final completion** [21.12]
- 12.2.8 Provide everything necessary for the proper execution of the **works** in compliance with the **agreement**

- 12.2.9 Coordinate the **programme** with **subcontractors'** and **direct contractors' programmes**
- 12.2.10 Regularly update the **programme** to illustrate progress of the **works** and revise the **programme** where the **principal agent** has revised the date for **practical completion**
- 12.2.11 Regularly submit to the **principal agent** a progress report and a schedule of outstanding **construction information** to avoid delays to the **works**
- 12.2.12 Cooperate with the **principal agent** in the preparation of cash flow projections and the compilation of **payment certificates** [25.1]
- 12.2.13 Designate a competent person to continuously administer and control the **works** and to receive and implement **notices** and **contract instructions** on behalf of the **contractor**
- 12.2.14 Maintain daily records of categories of persons and **construction equipment** employed on the **works** and regularly provide copies to the **principal agent**
- 12.2.15 Keep on **site** a copy of all **construction information** required for execution of the **works** to which the **employer** and **principal agent** and/or **agents** shall have reasonable access
- 12.2.16 Allow the **employer** and **principal agent** and/or **agents** reasonable access to the **works**, workshops and other places where work is being prepared, executed and/or stored
- 12.2.17 Give **notice** forthwith to the **principal agent** and/or the **employer** where items of **free issue** have been received damaged prior to storage or, where on unpacking, are found not to be in good order before installing such items
- 12.2.18 Provide, maintain and remove on **practical completion** all temporary structures, **construction equipment** and notice boards
- 12.2.19 On achievement of **practical completion** hand over to the **principal agent** all information for the preparation of 'as built' documentation and applicable statutory and/or regulatory approval certificates as well as all operating and instruction manuals and the like
- 12.2.20 Cede to the **employer** on the date of issue of the **certificate of final completion** any guarantees, product warranties or indemnities pertaining to the **works**. This cession shall not prejudice any other rights that the **employer** may have [21.11]
- 12.2.21 Forthwith notify all **subcontractors** where a **certificate of practical completion** and/or a **certificate of final completion** has been issued by the **principal agent** for the **works**, or a **section** thereof
- 12.3 The **principal agent** and the **contractor** shall hold regular meetings to monitor progress of the **works** and to deal with technical and coordination matters. The **principal agent** shall record and timeously distribute the minutes of such meetings

13.0 SETTING OUT

- 13.1 The **principal agent** and/or an **agent** with delegated authority shall:
 - 13.1.1 Point out boundary pegs or beacons identifying the **site** and the datum level
 - 13.1.2 Define the setting out points and levels required for the execution of the **works**
- 13.2 The **contractor** shall:
 - 13.2.1 Be responsible for accurate setting out of the **works** notwithstanding checking by others
 - 13.2.2 Be responsible for the preservation and the reinstatement of boundary pegs, beacons and other survey information and, where disturbed or destroyed, replace such items at his expense
 - 13.2.3 Not be responsible for incorrect setting out if incorrect information was issued to the **contractor**. In such event the **contractor** may be entitled to a revision of the date for **practical completion** [23.2.5] and/or an adjustment of the **contract value** [26.0]
 - 13.2.4 Immediately suspend affected work to an appropriate extent where encroachments of adjoining structures occur and where undocumented services, natural features, articles of value or relics are uncovered on **site** and forthwith give **notice** to the **principal agent** who shall issue a **contract instruction** on how to proceed with the **works**. Any relics or other articles of value found on the **site** shall remain the property of the **employer**

14.0 NOMINATED SUBCONTRACTORS

14.1 The **principal agent** and/or **agents** shall:

- 14.1.1 Prepare tender documents in conformity with the **n/s subcontract agreement** and this **agreement** for work intended to be executed by a nominated **subcontractor**
- 14.1.2 Call for tenders
- 14.1.3 Scrutinise the received tenders for compliance with the tender documents in consultation with the **contractor**, where appointed
- 14.1.4 Nominate a **subcontractor** and instruct the **contractor** [17.1.14] to appoint such **subcontractor** as a nominated **subcontractor** in terms of the **n/s subcontract agreement** and other tender requirements
- 14.1.5 Inform the **contractor** where an advance payment is to be made to the **subcontractor** for an amount included in the accepted tender and that a **guarantee for advance payment** shall be provided by the **subcontractor** for the amount stated [NSSA-CD]

14.2 The **contractor** may refuse to appoint such **subcontractor**:

- 14.2.1 Against whom the **contractor** makes a reasonable objection
- 14.2.2 Who refuses or fails to enter into a **n/s subcontract agreement** and/or to comply with other tender requirements
- 14.2.3 Who has failed to provide a required security [NSSA-CD]

14.3 Where such **subcontractor** is not appointed by the **contractor** for the reasons stated [14.2], or where the appointment of a **subcontractor** has been terminated, another **subcontractor** shall be nominated and appointed in accordance with a **contract instruction** issued by the **principal agent**

14.4 Where the **subcontractor** has complied with the tender requirements, in accordance with a **contract instruction** issued by the **principal agent** [17.1.14], the **contractor** shall:

- 14.4.1 Appoint the **subcontractor** as a nominated **subcontractor** and forward a copy of the signed **n/s subcontract agreement** to the **principal agent**
- 14.4.2 Provide a **guarantee for payment** in the amount stated within fifteen (15) **working days** of such appointment, where required in the **n/s subcontract agreement** [CD]
- 14.4.3 Forward the **subcontractor's** regular payment claims to the **principal agent** and/or **agents** by the date stated [NSSA-CD]
- 14.4.4 Issue to each **subcontractor** (with a copy to the **principal agent**) a **JBCC®** n/s subcontract payment advice and a **JBCC®** n/s subcontract recovery statement to reconcile the amount due for payment with the amount stated in the **JBCC®** n/s subcontract payment notification issued by the **principal agent**
- 14.4.5 Pay the **subcontractor** the amount certified by the date stated in the **JBCC®** NSSA contract data [25.13]

14.5 Where the **contractor** fails to provide proof of payment to the **subcontractor** within five (5) **working days** of a **notice** by the **principal agent**, the **employer** may instruct the **principal agent** to certify direct payment to the **subcontractor** and recover such amount from the **contractor** [27.2.7]

14.6 Where a nominated **subcontractor** has been declared insolvent, or where, after notification by the **contractor**, the **principal agent** agrees that a nominated **subcontractor** is in default of a material term of the **n/s subcontract agreement**, the **principal agent** shall instruct the **contractor** to give **notice** to the **subcontractor** to rectify such default. The **principal agent** shall instruct the **contractor** to terminate the **n/s subcontract agreement** should such default continue for five (5) **working days** after such **notice** [17.1.15]

14.7 Where a **n/s subcontract agreement** with a nominated **subcontractor** is terminated:

- 14.7.1 Due to default or insolvency of the **subcontractor** [23.2.10], or default of the **employer**, the **principal agent** and/or **agents** [23.2.11] any variation in the cost of completing such subcontract works shall be for the account of the **employer**
- 14.7.2 Due to default or insolvency of the **contractor** any variation in the cost of completing such subcontract works shall be for the account of the **contractor**. The **employer** may recover expense and/or loss [27.2.8]

14.7.3 The **principal agent** shall instruct the **contractor** to appoint another nominated **subcontractor** [14.1.4] to complete the subcontract works

14.8 There shall be no privity of contract between the **employer** and a **subcontractor** appointed by the **contractor**

15.0 SELECTED SUBCONTRACTORS

15.1 The **principal agent** and/or **agents** shall:

15.1.1 Prepare tender documents in conformity with the **n/s subcontract agreement** and this **agreement** for work intended to be executed by a selected **subcontractor** in consultation with and to the reasonable approval of the **contractor**

15.1.2 Call for tenders from a list of tenderers agreed between the **contractor** and the **principal agent**

15.1.3 Scrutinise the received tenders for compliance with the tender documents in consultation with the **contractor**

15.1.4 In consultation with the **contractor**, choose the compliant tenderer to be appointed as a selected **subcontractor** in terms of the **n/s subcontract agreement**

15.1.5 Inform the **contractor** where an advance payment is to be made to the **subcontractor** for an amount included in the accepted tender and that a **guarantee for advance payment** shall be provided by the **subcontractor** for the amount stated [NSSA-CD]

15.2 The **contractor** may refuse to appoint such **subcontractor**:

15.2.1 Who refuses or fails to enter into a **n/s subcontract agreement** and/or to comply with other tender requirements

15.2.2 Who has failed to provide a required security [NSSA-CD]

15.2.3 Against whom the **contractor** makes a reasonable objection where circumstances have changed

15.3 Where such **subcontractor** is not appointed by the **contractor** for the reasons stated [15.2], or where the appointment of a **subcontractor** has been terminated, another **subcontractor** shall be chosen in consultation with the **contractor** and appointed in accordance with a **contract instruction** issued by the **principal agent**

15.4 Where the **subcontractor** has complied with the tender requirements, in accordance with a **contract instruction** issued by the **principal agent** [17.1.14], the **contractor** shall:

15.4.1 Appoint the **subcontractor** as a selected **subcontractor** and forward a copy of the signed **n/s subcontract agreement** to the **principal agent**

15.4.2 Provide a **guarantee for payment** in the amount stated within fifteen (15) **working days** of such appointment, where required in the **n/s subcontract agreement** [CD]

15.4.3 Forward the **subcontractor's** regular payment claims to the **principal agent** and/or **agents** by the date stated [NSSA-CD]

15.4.4 Issue to each **subcontractor** (with a copy to the **principal agent**) a **JBCC®** n/s subcontract payment advice and a **JBCC®** n/s subcontract recovery statement to reconcile the amount due for payment with the amount stated in the **JBCC®** n/s subcontract payment notification issued by the **principal agent**

15.4.5 Pay the **subcontractor** the amount certified by the date stated in the **JBCC®** NSSA contract data [25.13]

15.5 Where the **contractor** fails to provide proof of payment to a **subcontractor** within five (5) **working days** of a **notice** by the **principal agent**, the **employer** may instruct the **principal agent** to certify direct payment to the **subcontractor** and recover such amount from the **contractor** [27.2.7]

15.6 Where the selected **subcontractor** is in default of a material term of the **n/s subcontract agreement**, the decision of whether or not to terminate the **n/s subcontract agreement** is that of the **contractor**

15.7 Where a **n/s subcontract agreement** with a selected **subcontractor** is terminated:

- 15.7.1 Due to default of the **employer**, the **principal agent** and/or **agents** any variation in the cost of completing such subcontract works shall be for the account of the **employer** [25.3.7]
- 15.7.2 Other than due to the default by the **employer**, the **principal agent** and/or **agents** any variation in the cost of completing the subcontract works shall be for the account of the **contractor** [25.3.7]
- 15.7.3 The **principal agent** shall instruct the **contractor** to appoint another selected **subcontractor** [15.1.4] to complete the subcontract works
- 15.8 There shall be no privity of contract between the **employer** and a **subcontractor** appointed by the **contractor**

16.0 DIRECT CONTRACTORS

- 16.1 The **contractor** shall:
- 16.1.1 In accordance with a **contract instruction** [17.1.16] permit **direct contractors** [CD] to execute and/or install work as part of the **works**. Such access to the **works** shall not constitute deemed achievement of **practical completion** or occupation by the **employer** [19.6]
- 16.1.2 Make reasonable allowance in the **programme** for such work or installation
- 16.1.3 Be entitled to claim expense and/or loss caused by **direct contractors** [23.2.9; 27.1.7]
- 16.2 Payment of **direct contractors** shall be the responsibility of the **employer** outside this **agreement**
- 16.3 There shall be no privity of contract between the **contractor** and a **direct contractor** appointed by the **employer**

17.0 CONTRACT INSTRUCTIONS

- 17.1 The **principal agent** may issue **contract instructions** to the **contractor** regarding:
- 17.1.1 Rectification of discrepancies, errors in description or quantity or omission of items in the **agreement** other than in the **JBCC®** Principal Building Agreement
- 17.1.2 Alteration to design, standards or quantity of the **works** provided that such **contract instructions** shall not substantially change the scope of the **works**
- 17.1.3 The **site** [13.0]
- 17.1.4 Compliance with the **law**, regulations and bylaws [2.1]
- 17.1.5 Provision and testing of samples of **materials and goods** and/or of finishes and assemblies of elements of the **works**
- 17.1.6 Opening up of work for inspection, removal or re-execution [23.2.4; 26.4.2]
- 17.1.7 Removal or re-execution of work
- 17.1.8 Removal or substitution of any **materials and goods**
- 17.1.9 Protection of the **works**
- 17.1.10 Making good physical loss and repairing damage to the **works** [23.2.2]
- 17.1.11 Rectification of **defects** [21.2]
- 17.1.12 A **list for practical completion** specifying outstanding or defective work to be rectified to achieve **practical completion**, a **list for completion** and a **list for final completion** specifying outstanding or defective work to be rectified to achieve **final completion**
- 17.1.13 Expenditure of **budgetary allowances**, **prime cost amounts** and **provisional sums**
- 17.1.14 Appointment of a **subcontractor** [14.0; 15.0]

- 17.1.15 Termination of a nominated **n/s subcontract agreement** [14.6]
- 17.1.16 Work by **direct contractors** [16.0]
- 17.1.17 Access by others or previous contractors to remedy defective work
- 17.1.18 Removal from the **site** of any person employed on the **works**
- 17.1.19 Removal from the **site** of any person not engaged on or connected with the **works**
- 17.1.20 On **suspension** or termination, protection of the **works**, removal of **construction equipment** and surplus **materials and goods** [29.0]
- 17.2 The **contractor** shall comply with and duly execute all **contract instructions**
- 17.3 Should the **contractor** fail to proceed with a **contract instruction** with due diligence, the **principal agent** may give **notice** to the **contractor** to proceed within five (5) **working days** of receipt of such **notice**. Where the **contractor** remains in default, the **employer** may engage others to carry out such **contract instruction** and recover expense and/or loss incurred [27.2.3]
- 17.4 The **contractor** shall not be obliged to execute **contract instructions** for additional work issued after the certified or deemed date of **practical completion**
- 17.5 Oral instructions shall be of no force or effect

COMPLETION

18.0 INTERIM COMPLETION

- 18.1 This clause applies only to the **n/s subcontract agreement** and is included to retain the same clause numbers between the two agreements

19.0 PRACTICAL COMPLETION

- 19.1 The **principal agent** shall:
 - 19.1.1 Inspect the **works** at appropriate intervals to give the **contractor** interpretations and direction on the standard of work and the state of completion of the **works** required of the **contractor** to achieve **practical completion** [CD]
 - 19.1.2 Issue a **contract instruction** [17.1] consequent on each such inspection, where necessary
- 19.2 The **contractor** shall:
 - 19.2.1 Inspect the **works** in advance of the anticipated date for **practical completion** to confirm that the standard of work required and the state of completion of the **works** for **practical completion** has been achieved
 - 19.2.2 Give at least five (5) **working days notice** to the **principal agent** of the anticipated date for the inspection for **practical completion** of the **works** to meet the anticipated date for **practical completion**
- 19.3 The **principal agent** shall inspect the **works**, or a **section** thereof, within the period stated [CD] and forthwith issue to the **contractor**:
 - 19.3.1 A comprehensive and conclusive **list for practical completion** [17.1.12] where the **works** has not reached **practical completion** specifying the **defects** to be rectified and work to be completed to achieve **practical completion**
 - 19.3.2 An updated **list for practical completion** limited to items on the **list for practical completion** that have not been attended to satisfactorily. The **contractor** shall repeat the procedure until all items on the **list for practical completion** have been attended to satisfactorily before the **certificate of practical completion** is issued by the **principal agent**

or ...

- 19.3.3 A **certificate of practical completion** with a copy to the **employer** stating the date on which **practical completion** of the **works**, or a **section** thereof, was achieved
- 19.3.4 A **list for completion** with a copy to the **employer**
- 19.4 Should the **principal agent** not issue a **list for practical completion** or the updated list within five (5) **working days** after the inspection period, or the **certificate of practical completion** [19.3], the **contractor** shall give **notice** to the **employer** and the **principal agent**. Should the **principal agent** not issue such list within a further five (5) **working days** of receipt of such **notice**, **practical completion** shall be deemed to have been achieved on the date of such **notice** and the **principal agent** shall issue the **certificate of practical completion** forthwith
- 19.5 On issue of the only or last **certificate of practical completion** the **employer** shall be entitled to possession of the **works** and the **site** subject to the **contractor's** lien or right of continuing possession of the **works** where this has not been waived. On issue of the **certificate of practical completion** for a **section**, the **employer** shall be entitled to possession of such **section**
- 19.6 Where the **employer** takes possession of the whole or a portion of the **works** by agreement with the **contractor**, **practical completion** shall be deemed to have occurred. The **principal agent** shall after inspection of the **works** [19.3] issue a **certificate of practical completion** to the **contractor** with a copy to the **employer** within five (5) **working days** of the date of possession of the whole or a portion of the **works** by the **employer** and the **list for completion** of items to be rectified and work to be completed within a period agreed between **the parties**
- 19.7 On issue of the **certificate of practical completion** of the **works**, or a **section** thereof, where the **principal agent** instructs that installation work is to be executed by others, the **employer** and/or **contractor** shall allow access for such installations

20.0 COMPLETION IN SECTIONS

- 20.1 Where completion in **sections** is required [CD] the terms and conditions applicable to the **works** as a whole shall apply to each **section**
- 20.2 The **principal agent** shall for each **section** issue:
 - 20.2.1 A **certificate of practical completion** [19.3]
 - 20.2.2 A **certificate of final completion** indicating where applicable, if it is for the last **section** to reach **final completion** [21.6.2]

21.0 DEFECTS LIABILITY PERIOD AND FINAL COMPLETION

- 21.1 The defects liability period for the **works** shall commence on the **calendar day** following the date of **practical completion** and end at midnight (00:00) ninety (90) **calendar days** from the date of **practical completion** [CD] or when work on the **list for completion** has been satisfactorily attended to [21.6], whichever is the later
- 21.2 Where **defects** become apparent during the defects liability period the **principal agent** may instruct the **contractor** [17.1.11] to progressively attend to such items, whilst at all times minimising inconvenience to the occupants
- 21.3 The **contractor** shall:
 - 21.3.1 Inspect and forthwith rectify all items on the **list for completion** no later than ten (10) **working days** before the expiry of the defects liability period [19.3.4]
 - 21.3.2 Give **notice** to the **principal agent** to inspect the **works** within five (5) **working days** of receipt of such **notice**
- 21.4 Where items on the **list for completion** have not been attended to the **principal agent** shall give **notice** to the **contractor** of such outstanding items. The process [21.3] shall be repeated until all items on the **list for completion** have been attended to

- 21.5 The **contractor** shall give **notice** to the **principal agent** when the outstanding items on the **list for completion** have been attended to. The **principal agent** shall inspect the **works** within five (5) **working days** of receipt of such **notice**
- 21.6 On the expiry of the ninety (90) **calendar days** defects liability period [21.1] or when all items on the **list for completion** have been attended to and on receipt of the **contractor's notice** to the **principal agent**, whichever is the later, the **principal agent** shall inspect the **works** and within ten (10) **working days** either:
- 21.6.1 Issue a **list for final completion** detailing all outstanding work or **defects** that must be attended to, or rectified to achieve **final completion**
- or ...
- 21.6.2 Issue the **certificate of final completion** to the **contractor** with a copy to the **employer**
- 21.7 Where the **principal agent** issues a **list for final completion**:
- 21.7.1 The **contractor** shall forthwith complete all outstanding work and rectify all the **defects**
- 21.7.2 The **contractor** shall give **notice** to the **principal agent** when all outstanding work has been completed and all the **defects** have been rectified
- 21.7.3 The **principal agent** shall, within five (5) **working days** of receipt of the **contractor's notice(s)** [21.7.2] give **notice** to the **contractor** either that the items on the **list for final completion** have been completed, or issue an updated **list for final completion** of the items not completed and of any further **defects** that have become evident since the last inspection
- 21.8 Where the **principal agent** gives **notice** to the **contractor** of items on the **list for final completion** or an updated **list for final completion** specifying all outstanding work to be completed and/or **defects** to be rectified to achieve **final completion** the process [21.7.2-3] shall be repeated until all items on the (updated) **list for final completion** have been completed. On completion of all items on the (updated) **list for final completion** the **principal agent** shall forthwith issue the **certificate of final completion** to the **contractor** with a copy to the **employer**
- 21.9 Where the **principal agent** has not issued the **list for final completion** or the updated list within five (5) **working days** after the inspection period [21.6], the **contractor** shall forthwith give **notice** to the **employer** and the **principal agent**. Should the **principal agent** not issue such list within a further five (5) **working days** of receipt of such **notice**, **final completion** shall be deemed to have been achieved on expiry of such **notice** period and the **principal agent** shall forthwith issue the **certificate of final completion**
- 21.10 Where a **subcontractor's** defects liability period extends beyond the **contractor's** defects liability period:
- 21.10.1 The **contractor's** obligations and liability concerning the **subcontractor's defects** shall end on the date of issue of the **certificate of final completion**
- 21.10.2 The remaining portion of the **subcontractor's** defects liability period shall be ceded to the **employer** on the date of issue of the **certificate of final completion**
- 21.11 Where the **contractor**, a **subcontractor** or a supplier is required to give a guarantee, warranty or indemnity, other than a **security** to the **contractor**, the rights and obligations under such guarantee, warranty or indemnity shall be ceded to the **employer** on the date of issue of the **certificate of final completion**. This cession shall not prejudice any other rights the **employer** may have [12.2.20]
- 21.12 A **certificate of final completion** shall be conclusive as to the sufficiency of the **works** and that the **contractor's** obligations [12.2.7] have been fulfilled other than for **latent defects**

22.0 LATENT DEFECTS LIABILITY PERIOD

- 22.1 The **latent defects** liability period for the **works** shall commence at the start of the **construction period** and end five (5) years from the certified date of **final completion**
- 22.2 The **contractor** shall make good all **latent defects** that appear up to the date of expiry of the **latent defects** liability period [3.3]
- 22.3 Where termination of this **agreement** occurs before the date of **final completion**, the **latent defects** liability period shall end:
- 22.3.1 Five (5) years from the date of termination [29.10] for the completed portion of the **works** only

or ...

- 22.3.2 On the date of termination where execution of the **works** has become impossible due to circumstances beyond the control of either **party** [29.20], or on the date of termination by the **contractor** due to default by the **employer**, the **principal agent** and/or **agents** [29.17.3; 29.23]

23.0 REVISION OF THE DATE FOR PRACTICAL COMPLETION

- 23.1 The **contractor** is entitled to a revision of the date for **practical completion** by the **principal agent** without an adjustment of the **contract value** for a delay to **practical completion** caused by one or more of the following events:

- 23.1.1 Adverse weather conditions
- 23.1.2 Inability to obtain **materials and goods** where the **contractor** has taken reasonable steps to avoid or reduce such a delay
- 23.1.3 Making good physical loss and repairing damage to the **works** [8.2] where such risk is beyond the reasonable control of the **parties**
- 23.1.4 Late supply of a **prime cost amount** item where the **contractor** has taken reasonable steps to avoid or reduce such delay
- 23.1.5 Exercise of statutory power by a body of state or public or local authority that directly affects the execution of the **works**

23.1.6 Force majeure

- 23.2 The **contractor** is entitled to a revision of the date for **practical completion** by the **principal agent** with an adjustment of the **contract value** [26.7] for a delay to **practical completion** caused by one or more of the following events:

- 23.2.1 Delayed possession of the **site** [12.1.5]
- 23.2.2 Making good physical loss and repairing damage to the **works** [8.5] where the **contractor** is not at risk
- 23.2.3 **Contract instructions** [17.1-2] not occasioned by the **contractor's** default
- 23.2.4 Opening up and testing of work and **materials and goods** where such work is in accordance with the **agreement** [17.1.6]
- 23.2.5 Late or incorrect issue of **construction information** [12.1.12; 13.2.3]
- 23.2.6 Late supply of **free issue, materials and goods** for which the **employer** is responsible [12.1.10]
- 23.2.7 Late appointment of a **subcontractor** in terms of the agreed **programme** where the **contractor** has taken reasonable steps to avoid or reduce such delay [14.4.1; 15.4.1]
- 23.2.8 Late acceptance by the **principal agent** and/or **agents** of a design undertaken by a selected **subcontractor** where the **contractor's** obligations have been met [7.3]
- 23.2.9 An act or omission by a nominated **subcontractor** [14.0] or a **direct contractor** [16.0]
- 23.2.10 Insolvency or termination of a nominated **subcontractor** [14.7.2]
- 23.2.11 **Suspension** or termination by a **subcontractor** due to default of the **employer**, the **principal agent** and/or **agents**
- 23.2.12 Execution of additional work for which the quantity in the **bills of quantities** is not sufficiently accurate
- 23.2.13 **Suspension** of the **works** [28.0]

- 23.3 Further circumstances for which the **contractor** may be entitled to a revision of the date for **practical completion** and an adjustment of the **contract value** are delays to **practical completion** due to any other cause beyond the **contractor's** reasonable control that could not have reasonably been anticipated and provided for. The **principal agent** shall adjust the **contract value** where such delay is due to the **employer** and/or **agents**

- 23.4 Should a listed circumstance occur [23.1-3] which could cause a delay to the date for **practical completion**, the **contractor** shall:
- 23.4.1 Take reasonable steps to avoid or reduce such delay
- 23.4.2 Within twenty (20) **working days** of becoming aware, or ought reasonably to have become aware of such delay, give **notice** to the **principal agent** of the intention to submit a claim for a revision to the date for **practical completion**, failing which the **contractor** shall forfeit such claim
- 23.5 The **contractor** shall submit a claim for the revision of the date for **practical completion** to the **principal agent** within forty (40) **working days**, or such extended period as the **principal agent** may allow, from when the **contractor** is able to quantify the delay in terms of the **programme**
- 23.6 Where the **contractor** submits a claim for a revision of the date for **practical completion** the claim shall in respect of each circumstance separately state:
- 23.6.1 The relevant clause [23.1-3] on which the **contractor** relies
- 23.6.2 The cause and effect of the delay on the current date for **practical completion**, where appropriate, illustrated by a change to the critical path on the current **programme**
- 23.6.3 The extension period claimed in **working days** and the calculation thereof
- 23.7 The **principal agent** shall, within twenty (20) **working days** of receipt of the claim, grant in full, reduce or refuse the **working days** claimed, and:
- 23.7.1 Determine the revised date for **practical completion** as a result of the **working days** granted
- 23.7.2 Identify each event and the reference clause for each revision granted or amended
- 23.7.3 Give reasons where such claim is refused or reduced
- 23.8 Where the **principal agent** fails to act within the period [23.7] such claim shall be deemed to be refused. The **contractor** may give **notice** of a disagreement [30.1] where the **principal agent** refuses a claim, alternatively reduces a claim, or fails to act

24.0 PENALTY FOR LATE OR NON-COMPLETION

- 24.1 Where the **contractor** fails to bring the **works**, or a **section** thereof, to **practical completion** by the date for **practical completion** [CD], or the revised date for **practical completion**, the **contractor** shall be liable to the **employer** for the **penalty** [CD]
- 24.2 Where the **employer** elects to levy such **penalty** the **employer**, or the **principal agent** on instruction from the **employer**, shall give **notice** thereof to the **contractor**. The **principal agent** shall determine the **penalty** due from the later of the date for **practical completion** [CD], or the revised date for **practical completion**, up to and including the earlier of:
- 24.2.1 The actual or deemed date of **practical completion** of the **works**, or a **section** thereof [23.7.1]
- 24.2.2 The date of termination [29.8]
- 24.3 The **principal agent** shall include the **penalty** in regular interim **payment certificates** from the date on which the **employer's** entitlement to **penalties** commences

PAYMENT

25.0 PAYMENT

- 25.1 The **contractor** shall cooperate with and assist the **principal agent** in the preparation of cash flow statements and payment valuations by providing all required documents and quantified amounts of work duly executed. Where the **contractor** has not provided such information the **principal agent** shall make a fair estimate of the work executed

- 25.2 The **principal agent** shall regularly by the due date [CD] issue **payment certificates** to the **contractor** with a copy to the **employer** until and including the issue of the **final payment certificate**. A **payment certificate** may be for a nil or negative amount
- 25.3 Each **payment certificate** shall separately include:
- 25.3.1 A fair estimate of the value of work executed
 - 25.3.2 A fair estimate of the value of **materials and goods** [25.4; 25.5]
 - 25.3.3 **Security** adjustment [11.1.2; 11.4.1]
 - 25.3.4 Cost fluctuations, if applicable
 - 25.3.5 The gross amount certified
 - 25.3.6 The amount previously certified
 - 25.3.7 Amounts due to either **party** in the **recovery statement** [27.1]
 - 25.3.8 **Tax**
 - 25.3.9 Interest amounts included in the **recovery statement**
 - 25.3.10 Other non-taxable amounts
 - 25.3.11 The net amount certified due to the **contractor** or the **employer**
- 25.4 The value of **materials and goods** [25.3.2] (excluding **materials and goods** off **site** or in transit) shall be included in the amount certified only where:
- 25.4.1 Not prematurely delivered or offered for delivery in terms of the **programme**
 - 25.4.2 Stored and suitably protected against loss and damage
 - 25.4.3 Covered by insurances [10.0]
- 25.5 The value of **materials and goods** [25.3.2] stored off **site** and/or in transit shall be included in the amount certified only where covered by a **guarantee for advance payment** or such other **security** acceptable to the **employer**
- 25.6 **Materials and goods** when certified [25.4] and paid for shall become the property of the **employer** and shall not be removed without the written authority of the **principal agent**
- 25.7 The **principal agent** shall concurrently with each **payment certificate** issue:
- 25.7.1 To the **employer** and the **contractor** a **recovery statement** showing the amounts due to either **party** in the current **payment certificate**
 - 25.7.2 To the **contractor** a statement showing the amount certified for each **subcontractor**
 - 25.7.3 To each **subcontractor** a n/s subcontract payment notification showing the amount included in the **payment certificate** and its date of issue
 - 25.7.4 The determination of **default interest**
 - 25.7.5 The determination of **compensatory interest**
- 25.8 An interim **payment certificate** shall not be evidence that the **works** and **materials and goods** are in terms of the **agreement**
- 25.9 The **principal agent** shall certify one hundred per cent (100%) of the amount of the **final account** including adjustments [26.0; 27.0] in the **final payment certificate**
- 25.10 The **employer** shall pay the **contractor** the amount certified in an issued **payment certificate** within fourteen (14) **calendar days** of the date for issue of the **payment certificate** [CD] including **default interest** and/or **compensatory interest**
- 25.11 The **contractor** shall pay the **employer** the amount certified in an issued **payment certificate** within twenty-one (21) **calendar days** of the date of issue of the **payment certificate** [CD] including **default interest**

- 25.12 Where a **guarantee for construction** (fixed) and payment reduction [11.1.2] has been chosen the value of the **works** [26.0] and **materials and goods** [25.3.2] that exceeds the **contract sum** and any contract price adjustments (cost fluctuations) [25.3.4; 26.9.5] [CD] shall be certified in full. The value certified that does not exceed the **contract sum** shall be subject to the following percentage adjustments:
- 25.12.1 Ninety-five per cent (95%) of such value in interim **payment certificates** issued up to the date of **practical completion**
- 25.12.2 Ninety-seven and one half per cent (97.5%) of such value in interim **payment certificates** issued up to but excluding the **final payment certificate**
- 25.12.3 One hundred per cent (100%) of such value in the **final payment certificate**
- 25.13 The **contractor** shall pay all **subcontractors** within seven (7) **calendar days** of the due date for payment by the **employer** [CD] and on request provide proof thereof to the **principal agent** within seven (7) **calendar days** of a request to do so
- 25.14 Where the **employer** has made a partial or no payment of the amount due in an issued **payment certificate** by the due date or where the **principal agent** fails to issue a **payment certificate**, the **contractor** may give five (5) **working days notice** to comply, failing which the **contractor** may:
- 25.14.1 **Suspend the works** [28.1.3]
- 25.14.2 Exercise the lien or right of continuing possession of the **works** where this has not been waived
- 25.14.3 Call up the **guarantee for payment** [11.5]
- 25.15 The **principal agent** shall issue the **final payment certificate** to the **contractor** with a copy to the **employer** within seven (7) **calendar days** of acceptance of the **final account** by the **contractor**, but not before the issue of the **certificate of final completion**, other than on termination [26.11; 29.0]
- 25.16 Where the **contractor** disputes the correctness of the **final account** within the period allowed [26.12], the **principal agent** shall issue interim **payment certificates** to the **contractor** with a copy to the **employer** by the due date [CD] for the undisputed amount(s)
- 25.17 For the purposes of provisional sentence in relation to a **payment certificate** only, the **parties** consent to the jurisdiction of any court of **law** of the country [CD]

26.0 ADJUSTMENT OF THE CONTRACT VALUE AND FINAL ACCOUNT

- 26.1 The **principal agent** shall determine the value of adjustments to the **contract value** in cooperation with the **contractor** in the preparation of the **final account**. Where such adjustments require measurement on **site**, the **contractor** shall have the right to be present
- 26.2 Adjustments to the **contract value** resulting from a **contract instruction** [17.1] shall be determined as follows:
- 26.2.1 Work of a similar character executed under similar conditions shall be priced at the rates in the **priced document**
- 26.2.2 Work not of a similar character shall be priced at rates based on those in the **priced document** and adjusted to suit the changed circumstances
- 26.2.3 If the above methods do not apply, work shall be priced at rates based on the necessary use of labour, **construction equipment** and/or **materials and goods** for executing the work plus an allowance of ten per cent (10%) mark-up
- 26.2.4 Work omitted shall be valued at the rates in the **priced document**, but where the omission of such work alters the circumstances under which the remaining work is carried out, the value of the remaining work shall be determined by the above methods
- 26.3 Where work is identified as provisional in the **priced document** the **principal agent** shall omit such value from the **contract value** and add the value of work as executed to the **contract value**
- 26.4 Where the **contractor** has made payment for items not included in the **priced document** in accordance with a **contract instruction** with the approval of the **principal agent**, the actual amounts paid plus a ten per cent (10%) mark-up shall be added to the **contract value** limited to:

- 26.4.1 Charges by authorities [2.1]
- 26.4.2 The cost of opening up and testing [17.1.6], where the work is according to this **agreement**
- 26.4.3 The cost of insurances [10.0], where applicable [CD]
- 26.5 The **contractor** shall give **notice** to the **principal agent** within twenty (20) **working days** of becoming aware, or ought reasonably to have become aware of expense and/or loss for which provision was not required in the **contract sum** failing which such claim shall be forfeited
- 26.6 Following **notice** [26.5], the **contractor** shall submit a detailed and substantiated claim for the adjustment of the **contract value** to the **principal agent** within forty (40) **working days**, or such additional period as the **principal agent** may allow
- 26.7 The **principal agent** shall make a fair assessment of the claim [26.6] and adjust the **contract value** within twenty (20) **working days** of receipt of such details
- 26.8 Where the **principal agent** fails to act within such period [26.7] the claim shall be deemed to be refused. The **contractor** may give **notice** of a disagreement [30.1] where no assessment is received
- 26.9 The **principal agent** shall:
 - 26.9.1 Omit **prime cost amounts** and **budgetary allowances** [17.1.13] from the **contract sum** and determine the actual value of such work to be added to the **contract value**
 - 26.9.2 Omit **provisional sums** [17.1.13] from the **contract sum** and determine the actual value of such **subcontractors'** work to be added to the **contract value**
 - 26.9.3 Prorate the **contractor's** allowances for profit and attendance on **provisional sums** and **prime cost amounts** excluding any allowance for cost fluctuations
 - 26.9.4 Adjust the **preliminaries** amounts in accordance with the method selected [CD]
 - 26.9.5 Adjust the **contract value** to include contract price adjustments (cost fluctuations), if applicable [CD]
 - 26.9.6 Rectify discrepancies, errors in description or quantity or omission of items in this **agreement** other than in the **JBCC®** Principal Building Agreement [17.1.1]
- 26.10 The **principal agent** shall prepare and issue the **final account** to the **contractor** within sixty (60) **working days** of the date of **practical completion**
- 26.11 The **contractor** shall accept the **final account** within thirty (30) **working days** of receipt thereof or give **notice** of non-acceptance with reasons failing which the **final account** shall be deemed to be accepted
- 26.12 Should the reasons for non-acceptance of the **final account** [26.11] not be resolved within ten (10) **working days** of the **notice** of non-acceptance, or within such extended period as the **principal agent** may allow on request from the **contractor**, the **contractor** may give **notice** of a disagreement
- 26.13 The **principal agent** shall issue the **final payment certificate** to the **contractor** within seven (7) **calendar days** of acceptance of the **final account**

27.0 RECOVERY OF EXPENSE AND/OR LOSS

- 27.1 The **principal agent** shall issue a **recovery statement** with each **payment certificate** to the **parties** with explanatory documentation to support the calculation of amounts due to:
 - The **employer** resulting from:
 - 27.1.1 **Penalty** [24.3]
 - 27.1.2 **Default interest** [25.7.4]
 - 27.1.3 Expense and/or loss [27.2]
 - The **contractor** resulting from:
 - 27.1.4 **Default interest** [25.7.4]

- 27.1.5 **Compensatory interest** [25.7.5]
- 27.1.6 Damages
- 27.1.7 Expense or loss caused by a **direct contractor** [16.1.3]
- 27.1.8 Advance payments [9.2.10; 12.1.8]
- 27.1.9 Termination of a **n/s subcontract agreement** due to default of the **employer**, the **principal agent** and/or **agents** [14.7.1; 15.7.1]
- 27.2 The **employer** may recover expense and/or loss incurred or to be incurred resulting from:
 - 27.2.1 Paying charges [2.1]
 - 27.2.2 Effecting insurances due to the **contractor's** default [10.0]
 - 27.2.3 Work executed by others due to the **contractor's** default [17.3]
 - 27.2.4 Recoupment of advance payments [9.2.10; 11.3]
 - 27.2.5 The **contractor** not paying amounts due to the **employer** [25.3.7]
 - 27.2.6 Termination of this **agreement** by the **employer** [29.1]
 - 27.2.7 Amounts paid directly to **subcontractors** on default by the **contractor** [14.5; 15.5]
 - 27.2.8 Termination of a **n/s subcontract agreement** [14.7.2; 15.7.2]
 - 27.2.9 Default by the **contractor** where not less than five (5) **working days notice** detailing such default has been given before the issue of the next **recovery statement** to allow the **contractor** the opportunity to remedy such default
 - 27.2.10 Adjustment of the n/s subcontract preliminaries due to the **subcontractor** as a result of a default by the **contractor**
- 27.3 Where an amount is due to either **party** and has not been paid, the other **party** may recover the amount from any of the following:
 - 27.3.1 Subsequent **payment certificates** [25.0]
 - 27.3.2 A demand in terms of the **security** [11.0]
 - 27.3.3 The defaulting **party** as a debt
- 27.4 Where either **party** has been liquidated, or this **agreement** terminated, the other **party** may exercise rights in terms of the **security** [11.0]

SUSPENSION AND TERMINATION

28.0 SUSPENSION BY THE CONTRACTOR

- 28.1 The **contractor** may give ten (10) **working days notice** to the **employer** and the **principal agent** of the intention to suspend the **works** where the **employer** or the **principal agent** has failed to:
 - 28.1.1 Provide and/or maintain a **guarantee for payment**, where required [11.5-6]
 - 28.1.2 Issue a **payment certificate** by the due date [25.2] [CD]
 - 28.1.3 Make payment in full of an amount certified in an interim **payment certificate** by the due date [25.10] [CD]

- 28.1.4 Effect insurances [10.1.1-5; 10.2] where applicable [CD]
- 28.1.5 Appoint another **principal agent** and/or another **agent**, where applicable [6.5] or where an **agent** has failed to act in terms of delegated authority [6.4]
- 28.2 Where the **employer** has not remedied a default in terms of a **notice** the **contractor** may suspend execution of the **works** until such default has been remedied without prejudice to any rights the **contractor** may have
- 28.3 Where the **works** is suspended the **contractor** shall instruct each **subcontractor** to suspend the n/s subcontract works forthwith
- 28.4 Where the **works** has been suspended by the **contractor** [23.2.13] the **principal agent** shall revise the date for **practical completion** on resumption of the **works** with an adjustment of the **contract value**

29.0 TERMINATION

Termination by the employer

- 29.1 The **employer** may give **notice** of intention to terminate this **agreement** where the **contractor** has failed to:
 - 29.1.1 Provide and maintain a **guarantee for construction** [CD]
 - 29.1.2 Proceed with the **works** [12.2.7]
 - 29.1.3 Comply timeously with a **contract instruction** [17.0]
- 29.2 Where the **employer** contemplates terminating this **agreement** the **employer** or the **principal agent** on instruction from the **employer** shall give **notice** thereof to the **contractor** of a specified default [29.1.1-3], to be remedied within ten (10) **working days** of the date of receipt of such **notice**
- 29.3 Where the **contractor** has not remedied a specified default within such period [29.2] the **employer** may forthwith give **notice** to the **contractor** of termination of this **agreement**
- 29.4 The **employer** may employ others to safeguard the **works**, complete the outstanding work and rectify defects in that portion of the **works** executed by the **contractor** [27.2.3]. The **contractor** shall be liable to the **employer** for such costs that shall be included in the **final account** [26.10]
- 29.5 The **employer** may use **materials and goods** and temporary structures on the **site** for which payment shall be included in the **final account**
- 29.6 Should the **contractor** default on removing temporary structures or **construction equipment** from the **site** the **employer**, without being responsible for any loss or damage, may have such items belonging to the **contractor** removed or sold. Resulting costs and/or income shall be included in the **final account**
- 29.7 The **employer**, on **notice** to the **contractor**, may recover damages from the **contractor** from the date of termination including, but not limited to, additional costs incurred in the completion of the remaining work [25.3.7; 27.1.3]
- 29.8 The **employer** may apply the **penalty** [24.0] up to the date of termination where the initial or revised date for **practical completion** has passed
- 29.9 The **employer** has the right of recovery against the **contractor**, where applicable, [CD] from:
 - The **guarantee for construction** (variable) until the final payment has been made; or
 - The **guarantee for construction** (fixed) until the date of **practical completion**; or
 - The payment reduction until the final payment is made; or
 - The **guarantee for advance payment** until the outstanding balance has been repaid to the **employer**
- 29.10 The **latent defects** liability period for the completed portion of the **works** shall end [22.3.1] five (5) years from the date of termination
- 29.11 Where this **agreement** is terminated, the **contractor** shall forthwith give **notice** of termination of the n/s **subcontract agreement** to each **subcontractor**
- 29.12 Termination of the **works** shall not prejudice any rights the **employer** may have
- 29.13 The right to terminate may not be exercised where the **employer** is in material breach of this **agreement**

Termination by the contractor

- 29.14 The **contractor** may give **notice** of intention to terminate this **agreement** where:
- 29.14.1 The **employer** has failed to provide and maintain a **guarantee for payment**, where applicable [CD]
- 29.14.2 The **employer** has failed to give possession of the **site** to the **contractor** [12.1.5]
- 29.14.3 The **employer** has failed to allow the **principal agent** and/or **agents** to exercise fair and reasonable judgement as contemplated by this **agreement** [6.6]
- 29.14.4 The **employer** has failed to effect insurances, where applicable [CD]
- 29.14.5 The **employer** has failed to pay the amount certified by the due date [25.10]
- 29.14.6 The **employer** has failed to appoint another **principal agent** and/or **agents**, where applicable [6.5]
- 29.14.7 The **principal agent** has failed to issue a **payment certificate** to the **contractor** by the due date [25.2]
- 29.15 Where the **contractor** contemplates terminating this **agreement**, the **contractor** shall give **notice** to the **employer** and/or the **principal agent** of a specified default [29.14.1-7], to be remedied within ten (10) **working days** of the date of receipt of such **notice**
- 29.16 Where a specified default has not been remedied within such period [29.15] the **contractor** may forthwith give **notice** to the **employer** and the **principal agent** of the termination of this **agreement**
- 29.17 Where this **agreement** is terminated by the **contractor**:
- 29.17.1 The **contractor** shall forthwith give **notice** of termination of the **n/s subcontract agreement** to each **subcontractor**
- 29.17.2 The **contractor** shall remove temporary structures, **construction equipment** and, on **notice**, surplus **materials and goods** from the **site** within ten (10) **working days**, or such period agreed by the **principal agent**
- 29.17.3 The **latent defects** liability period shall end on the date of termination [22.3.2]
- 29.17.4 The **contractor** may be entitled to recover damages [27.1.6]
- 29.17.5 The **guarantee for construction** shall expire on the date of termination
- 29.17.6 The **guarantee for advance payment**, where applicable [CD], shall expire on repayment of amounts due to the **employer**
- 29.17.7 The **guarantee for payment** [11.5-6], where applicable [CD], shall expire on payment of the **final payment certificate** or on payment in full of the guaranteed sum or on the **security** expiry date, whichever is the earlier
- 29.18 Termination of the **works** shall not prejudice any rights the **contractor** may have
- 29.19 The right to terminate may not be exercised where the **contractor** is in material breach of this **agreement**

Termination by either party

- 29.20 Either **party** may give **notice** of intention to terminate this **agreement** where:
- 29.20.1 The **works** is for alterations and/or additions to (an) existing building(s), or a new building, which has been substantially destroyed regardless of the cause other than by the **party** seeking termination
- 29.20.2 Progress of the **works** has ceased for a continuous period of ninety (90) **calendar days**, or an intermittent period totalling one hundred and twenty (120) **calendar days** as a result of a **force majeure** event or the exercise of statutory power by a body of state or public or local authority that directly affects the execution of the **works**
- 29.21 The **party** contemplating termination of this **agreement** shall give ten (10) **working days notice** to the other **party**. Where this **agreement** is terminated by either **party**:
- 29.21.1 The **contractor** shall forthwith give **notice** of termination of the **n/s subcontract agreement** to each **subcontractor**

- 29.21.2 The **party** responsible for insurance [CD] shall inform the insurer and the other **party** of the date of termination of the **agreement**
- 29.21.3 The **guarantee for payment**, where applicable [CD], shall expire on payment of the **final payment certificate** or on payment in full of the guaranteed sum or on the **security** expiry date, whichever is the earlier
- 29.21.4 The **guarantee for construction** shall expire on the date of termination
- 29.21.5 The **guarantee for advance payment** [11.2.2; 11.3], where applicable [CD], shall expire on repayment of amounts due to the **employer**
- 29.22 Neither **party** shall be liable to the other **party** for expense and/or loss resulting from the termination
- 29.23 The **latent defects** liability period for the **works** shall end on the date of termination [22.3.2]
- Termination procedure by the employer, the contractor or by the parties**
- 29.24 On termination of this **agreement** the **contractor** shall:
- 29.24.1 Cease work and ensure that the **works** is safe in terms of the **law**
- 29.24.2 Remain responsible for the **works** [8.1] until possession is relinquished to the **employer**
- 29.24.3 Remove temporary structures, **construction equipment** and, on **notice** from the **principal agent**, surplus **materials and goods** from the **site** within ten (10) **working days**, or such period agreed by the **principal agent**
- 29.25 On termination of this **agreement** the **principal agent** shall:
- 29.25.1 Prepare and hand over to the **employer** all compliance certificates, as built drawings and product warranties in conjunction with **agents**, the **contractor** and **subcontractors**
- 29.25.2 In consultation with the **contractor** where possible, compile and issue to the **parties** a **status report** recording completed and incomplete work on the date of termination of the **works** within twenty (20) **working days** of such date
- 29.25.3 Continue to certify the value of the work executed and **materials and goods** for payment by the **employer** or the **contractor** until the issue of the **final payment certificate** [25.15]
- 29.25.4 Prepare and issue the **final account** to the **contractor** within sixty (60) **working days** of the date of termination including the cost of **materials and goods** and those ordered before termination that the **contractor** is bound to accept and make payment for
- 29.26 Termination shall take effect after completion of the procedure [29.24.1]
- 29.27 The **employer** shall arrange appropriate insurances to suit the stage of completion of the **works**
- 29.28 This clause shall, to the extent necessary to fulfil its purpose, exist independently of this **agreement**

DISPUTE RESOLUTION

30.0 DISPUTE RESOLUTION

Settlement by the parties

- 30.1 Should any disagreement arise between the **employer** (or the **principal agent** or an **agent**) and the **contractor** arising out of or concerning the action or inaction of the **employer** (or the **principal agent** or an **agent**) or the **contractor**, or any other matter concerning this **agreement** (including the validity thereof), either **party** may give **notice** of a disagreement to the other. The **parties** shall attempt to resolve such disagreement between them and record such resolution in writing signed by them

- 30.2 Where the disagreement is not resolved within ten (10) **working days** of receipt of the **notice** of disagreement, the disagreement shall be deemed to be a dispute
- 30.3 The dispute shall be referred to adjudication within ten (10) **working days** of the expiry of the period [30.2] by means of a **notice** of adjudication by the **party** (the referring party) which gave the **notice** of disagreement
- 30.4 The **notice** of adjudication shall clearly define the scope of the dispute and the relief sought by adjudication
- 30.5 Failure to comply with the procedure described [30.3-4] shall cause the dispute to be resolved by arbitration and not by adjudication

Adjudication

- 30.6 Where a dispute is referred to adjudication:
- 30.6.1 The adjudicator shall be nominated by the nominating body [CD] and shall be deemed to have been appointed by the **parties**
- 30.6.2 The applicable rules shall be stated [CD] or shall be by agreement between the **parties** and the adjudicator, failing which the rules shall be determined by the adjudicator. Neither **party** shall be entitled to legal representation, unless otherwise agreed in writing by the **parties**
- 30.6.3 A determination given by the adjudicator shall be immediately binding upon and implemented by the **parties** notwithstanding that either **party** may give **notice** to refer the dispute to arbitration
- 30.6.4 Where the adjudicator has given a determination, either **party** may give notice of dissatisfaction to the other **party** and to the adjudicator within ten (10) **working days** of receipt of the determination, or an extended time period provided in the applicable rules for adjudication whereafter such dispute shall be referred to arbitration
- 30.6.5 Where the adjudicator has not given a determination within the time period allowed or extended time period provided in the applicable rules for adjudication either **party** may give **notice** to the other **party** and to the adjudicator that if such determination is not received within ten (10) **working days** of receipt of this **notice** his appointment is thereupon automatically terminated and such dispute shall be referred to further adjudication or arbitration, at the option of the referring **party**
- 30.6.6 The adjudicator shall not be eligible for subsequent appointment as the arbitrator

Arbitration

- 30.7 Where the dispute is referred to arbitration:
- 30.7.1 Arbitration shall not be construed as a review or appeal of an adjudicator's determination. Any determination by the adjudicator shall remain in force and continue to be implemented unless and until overturned by an arbitration award
- 30.7.2 The resolution of the dispute shall commence anew
- 30.7.3 The referring **party** in the adjudication shall be the claimant in the arbitration
- 30.7.4 The arbitrator shall be nominated by the nominating body [CD] and shall be deemed to have been appointed by the **parties**
- 30.7.5 The applicable rules shall be stated [CD] or shall be by agreement between the **parties** and the arbitrator, failing which the rules shall be determined by the arbitrator
- 30.7.6 The arbitrator shall have the authority to finally determine the dispute including the authority to make, open up and revise any certificates, opinion, decision, determination, requisition or **notice** relating to the dispute as if no such certificate, opinion, decision, determination, requisition or **notice** had been issued or given
- 30.7.7 The arbitrator's award shall be final and binding on the **parties**

Mediation

- 30.8 Notwithstanding the provisions relating to adjudication and arbitration the **parties** may, by agreement and at any time, refer a dispute to mediation, in which event:

- 30.8.1 The provisions relating to adjudication and/or arbitration shall be deemed to be suspended from the time of such agreement until **notice** by either **party** that they be resumed
- 30.8.2 The appointment of a mediator, the procedure, and the status of the outcome shall be agreed between the **parties**
- 30.8.3 Regardless of the outcome of a mediation the **parties** shall bear their own costs concerning the mediation and equally share the costs of the mediator and related expenses

General

- 30.9 The **employer** consents to the joining of any **subcontractor** with the **contractor** as a party to any proceedings
- 30.10 Where the **parties** fail to specify a body to nominate the adjudicator [30.6.1] or the arbitrator [30.7.4] the referring **party** shall have the right to choose a local recognised body to suggest one or more persons with appropriate skills to be appointed as an adjudicator or an arbitrator. Such nomination shall be binding on the **parties**
- 30.11 The **parties** shall continue to perform their obligations in terms of this **agreement**, notwithstanding any disagreement or dispute that exists between them
- 30.12 This clause shall, to the extent necessary to fulfil its purpose, exist independently of this **agreement**

AGREEMENT

The **agreement** comprises the entire contract between the **parties**. No representations, terms, conditions or warranties not contained in this **agreement** shall be binding on the **parties**. No agreement or addendum varying, adding to, deleting or terminating this **agreement** including this clause shall be effective unless reduced to writing and signed by the duly authorised representatives of the **parties**

The contracting **parties**

The parties	Employer	Contractor
Business name		
Business type		
Business registration		
Tax number (VAT/GST)		
Contact person		
Telephone		
Mobile number		
E-mail		
Address: Building name		
Address: Street		
Address: Suburb		
Address: City		
Address: P O Box		
Address: Post Office		
Address: Province		
Address: Country		
Project name		
Project location		
Currency		
Accepted contract sum including tax		
Accepted contract sum including tax in words		
Signed – who by signature hereto warrants authority		
Name of signatory		
Signed: Date		
Signed: Location		
Signed: Witness		
Name of witness		

Part C1.1.4

JBCC GENERAL PRELIMINARIES



GENERAL PRELIMINARIES

The Joint Building Contracts Committee® - NPC

General Preliminaries

Edition 6.2 – May 2018

JBCC®

EXPLANATORY NOTES AND INSTRUCTIONS

Introduction

The Joint Building Contracts Committee (JBCC®) has compiled the JBCC® General Preliminaries in the interest of standardisation of documentation and good practice in the building industry. The document generally covers all aspects of preliminaries for most types of projects and should consequently simplify the procurement for and the administration of building projects and produce economic advantages to all concerned. Users should note that the JBCC® General Preliminaries has been specifically formulated for use with the May 2018 edition of the JBCC® agreements (PBA and NSSA Edition 6.2, MWA Edition 5.2)

How the document is structured

The JBCC® General Preliminaries is part of the building agreement and subcontract documentation to be referred to in the priced document. It is intended that the JBCC® General Preliminaries (May 2018) be used by reference only in the preparation of the priced document. The project specific preliminaries comprises the following:

- Section A** A recital of the headings of the individual clauses in the JBCC® Principal Building Agreement (PBA), JBCC® N/S Subcontract Agreement (NSSA) or JBCC® Minor Works Agreement (MWA). Modifications to the standard clauses should be avoided. Amendments, modifications, corrections or supplements to the aforementioned agreements may be recorded in the space provided in the relevant JBCC® Contract Data or against the relevant clause numbers in this section
- Section B** A recital of the headings of the individual clauses in the JBCC® General Preliminaries. Changes to the standard clauses should be avoided. Any modifications should be recorded against the relevant clause numbers in this section
- Section C** Any special clauses to meet the particular circumstances of a specific project are embodied in this section

The JBCC® agreements are for use with or without bills of quantities. This brings a consistency in the contractual language used and the administrative procedures required in building agreements

Preface to the project specific preliminaries

- 1 The project specific preliminaries of the priced document should contain the following introduction: "The JBCC® General Preliminaries (May 2018) published by the Joint Building Contracts Committee for use with the JBCC® Principal Building Agreement Edition 6.2 / JBCC® N/S Subcontract Agreement Edition 6.2 / JBCC® Minor Works Agreement Edition 5.2 shall be deemed to be incorporated in these bills of quantities / this lump sum document, amended as hereinafter described

The contractor is deemed to have referred to such document for the full intent and meaning of each clause

The clauses in the document are hereinafter referred to by clause number and heading only

Where standard clauses or alternatives are not entirely applicable to the agreement such amendments, modifications, corrections or supplements as will apply are given under each relevant clause heading and such amendments, modifications, corrections or supplements shall take precedence notwithstanding anything to the contrary contained in the JBCC® General Preliminaries (May 2018)"

- 2 Clauses marked with an asterisk (★) are optional clauses or clauses requiring information relating to the specific project, selection and details of which are to be included in the JBCC® Contract Data

- 3 Where clauses are not used for the specific project these should nevertheless be listed in the preliminaries of the bills of quantities / project specific preliminaries of the lump sum document but marked "Not applicable" or "N/A"

Disclaimer

While the Joint Building Contracts Committee aims to ensure that its publications represent best practice, the Joint Building Contracts Committee does not accept or assume any liability or responsibility for any events or consequences which derive from the use of the General Preliminaries

Copyright reserved

The name 'The Joint Building Contracts Committee[®] NPC', the abbreviation JBCC[®], the electronic version e-JBCC[®] and the JBCC[®] logo are registered trademarks. The JBCC[®] claims authorship of this work. All rights are reserved. No part of this publication may be reproduced, stored in any retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, scanning, recording, or otherwise, without the prior permission in writing of the JBCC[®]. Unauthorised reproduction of the work is an infringement of the copyright. Judicial proceedings can and will be instituted to obtain relief and recovery of damages

GENERAL PRELIMINARIES

TABLE OF CONTENTS

Section		Description	Page
DEFINITIONS AND INTERPRETATION	1.1	Definitions	2
	1.2	Interpretation	2
DOCUMENTS	2.1	Checking of documents	2
	2.2	Provisional bills of quantities	2
	2.3	Availability of construction information	2
	2.4	Ordering of materials and goods	2
PREVIOUS WORK AND ADJOINING PROPERTIES	3.1	Previous work - dimensional accuracy	3
	3.2	Previous work - defects	3
	3.3	Inspection of adjoining properties	3
THE SITE	4.1	Handover of site in stages	3
	4.2	Enclosure of the works	3
	4.3	Geotechnical and other investigations	3
	4.4	Encroachments	3
	4.5	Existing premises occupied	3
	4.6	Services – known	4
MANAGEMENT OF CONTRACT	5.1	Management of the works	4
	5.2	Progress meetings	4
	5.3	Technical meetings	4
SAMPLES, SHOP DRAWINGS, ETC	6.1	Samples of materials	4
	6.2	Workmanship samples	4
	6.3	Shop drawings	4
	6.4	Compliance with manufacturer's instructions	5
DEPOSITS AND FEES	7.1	Deposits and fees	5
TEMPORARY SERVICES	8.1	Water	5
	8.2	Electricity	5
	8.3	Ablution and welfare facilities	6
	8.4	Communication facilities	6
PRIME COST AMOUNTS	9.1	Responsibility for prime cost amounts	6
ATTENDANCE ON SUBCONTRACTORS	10.1	General attendance	6
	10.2	Special attendance	6
GENERAL	11.1	Protection of the works	7
	11.2	Protection/isolation of existing works and works occupied in sections	7
	11.3	Security of the works	7
	11.4	Notice before covering work	7
	11.5	Disturbance	7
	11.6	Environmental disturbance	7
	11.7	Works cleaning and clearing	7
	11.8	Vermin	7
	11.9	Overhand work	7
	11.10	Tenant installations by direct contractors	7
	11.11	Advertising	7

1.0 DEFINITIONS AND INTERPRETATION

1.1 Definitions

A word or phrase in bold type in the **JBCC**[®] General Preliminaries shall have the meaning assigned to it in the definitions listed in the **JBCC**[®] Principal Building Agreement, the **JBCC**[®] N/S Subcontract Agreement or the **JBCC**[®] Minor Works Agreement as the case may be. A word or phrase not in bold type shall be interpreted in the context of its usage

The **JBCC**[®] General Preliminaries applies with the necessary changes made to the **JBCC**[®] N/S Subcontract Agreement

1.2 Interpretation

- 1.2.1 In the **JBCC**[®] General Preliminaries, unless inconsistent with the context, the words “accept, allow, appoint, approve, authorise, certify, decide, demand, designate, grant, instruct, issue, list, **notice**, notify, object, record, reduce, refuse, request, state” and their derivatives, require such acts to be in writing
- 1.2.2 The masculine gender includes the feminine and neuter genders and vice versa, the singular includes the plural and vice versa and a person includes juristic or artificial persons
- 1.2.3 The headings of clauses are for information only and shall not be used in interpretation
- 1.2.4 Documents and legislation referred to in the **JBCC**[®] General Preliminaries shall mean the current edition thereof with all amendments thereto at the date of submission of the tender unless otherwise stated
- 1.2.5 Clauses marked with an asterisk (★) are optional clauses or clauses requiring information relating to the specific project, selection and details of which are to be included in the **JBCC**[®] Contract Data

2.0 DOCUMENTS

2.1 Checking of documents

The tenderer shall check the numbers of the pages of the tender documents and should any be missing or duplicated, or the reproduction is indistinct, or if any doubt exists as to the intent or meaning of any description, or where the **agreement** contains any obvious errors, the tenderer shall give **notice** to the **principal agent** forthwith thereof and the **principal agent** shall promptly give a written directive

2.2 ★ Provisional bills of quantities

The quantities in provisional bills of quantities are an indication of the works to be executed and are subject to remeasurement

2.3 ★ Availability of construction information

Where the **construction information** for the **works** is incomplete and will only be completed during the **construction period** the **contractor** and **principal agent** shall work together to identify the requirements for the provision of **construction information**. The **contractor** and **principal agent** shall agree the dates that are reasonable by when the **contractor** is to be provided with each outstanding item of the **construction information** in terms of the **programme**

The **contractor** and **subcontractor** shall agree dates by when the **subcontractor** is to be provided with each item of the outstanding information in terms of the **programme**

2.4 Ordering of materials and goods

Should the **contractor** use the quantities in the **priced document** for the ordering of **materials and goods**, the **contractor** does so at his own risk

3.0 PREVIOUS WORK AND ADJOINING PROPERTIES

3.1 ★ Previous work - dimensional accuracy

In successive contracts the **contractor** shall within ten per cent (10%) of the initial **construction period** or twenty (20) **working days** after taking possession of the **site**, whichever is the lesser, check the existing levels, lines, profiles and the like affecting the **works** and satisfy himself as to the dimensional accuracy of work previously executed. The **contractor** shall forthwith give **notice** to the **principal agent** and request a **contract instruction** regarding any dimensional inaccuracy found in work previously executed

3.2 ★ Previous work - defects

In successive contracts the **contractor**, on becoming aware of a **defect** in work previously executed which affects the **works**, shall forthwith give notice to the **principal agent** and request a **contract instruction** regarding such a **defect**

3.3 ★ Inspection of adjoining properties

Before commencing the **works** the **principal agent** and the **contractor** shall arrange with the owners of adjacent buildings and properties and representatives of local authorities to inspect, inter alia, the buildings, structures, pavings, kerbs, channels and fences. The **contractor** shall record all conditions that the **works** could affect and copy the **principal agent** accordingly. The **contractor** shall pay particular attention to cracks, **defects** and existing levels related to structures, pavings, kerbs, channels and fences which later could be claimed to have been caused or disturbed by the **works**

Where instructed by the **principal agent**, levels and photographs shall be taken by the **contractor** and the cost thereof shall be for the **employer's** account. Certified copies shall be lodged with the **principal agent**

4.0 THE SITE

4.1 ★ Handover of site in stages

Handover of the **site** to the **contractor** is to be done in stages

4.2 ★ Enclosure of the works

The **contractor** shall erect, maintain and remove at completion hoardings with gantries, fans, safety screens, elements thereof, all for the protection of the public and others. Specific hoarding requirements are described in the **contract data**

4.3 ★ Geotechnical and other investigations

Information relating to geotechnical and/or other investigations are recorded in the **contract data** or issued with the **agreement**

4.4 Encroachments

The **contractor** shall give **notice** to the **principal agent** within ten per cent (10%) of the initial **construction period** or twenty (20) **working days** after taking possession of the **site**, whichever is the lesser, if any encroachments of adjoining buildings, structures, pavements, boundaries, services, etc exist in order that the necessary arrangements may be made for the rectification of any encroachments

4.5 ★ Existing premises occupied

Existing premises will be in use and occupied during the execution of the **works**. The **contractor** shall execute the works in a manner to cause the least interfere with the general routine of the occupants of the premises and minimise any nuisance from dust, noise or other causes with due regard for the safety of the occupants

4.6 ★ Services - known

All known existing services are described in the **contract data** indicating whether such services are to be terminated, diverted or continued in use either temporarily or permanently

5.0 MANAGEMENT OF CONTRACT

5.1 Management of the works

The **contractor** is responsible for the management of the sequence for carrying out of the **works** to avoid, inter alia, subsequent cutting or patching of finished work

5.2 Progress meetings

The **principal agent** and **contractor** shall hold meetings related to the progress of the **works** at regular intervals and at such other times as may be necessary. **Subcontractors** shall not be present at progress meetings unless specifically requested by the **contractor** or **principal agent**. The **principal agent** shall record and distribute the minutes of the meetings

5.3 Technical meetings

At the instance of the **principal agent** or the **contractor**, meetings shall be held to deal with technical and **subcontractors'** coordination matters

6.0 SAMPLES, SHOP DRAWINGS AND MANUFACTURER'S INSTRUCTIONS

6.1 Samples of materials

The **contractor** shall furnish at his cost samples of materials and specimens of finishes as may be called for by the **principal agent** for his approval

6.2 Workmanship samples

The **principal agent** may instruct the **contractor** to furnish samples of workmanship for his approval. Where the **principal agent** requires an assembly of various elements of the building or installation which is not incorporated in the **works**, the **contractor** shall arrange such an assembly at the **employer's** expense. The **contract value** shall be adjusted accordingly

6.3 Shop drawings

Shop drawings are drawings, diagrams, designs, illustrations, schedules, performance charts, brochures, setting out drawings, shop details and other data which are prepared by the **contractor**, **subcontractor**, manufacturer, supplier or distributor which illustrate manufacturing details and methods of execution of work

Only shop drawings and/or samples submitted for review shall be considered by the **principal agent**. The **principal agent's** approval of shop drawings and/or samples shall be limited to checking for general conformity with design and specification and shall not alter the design responsibilities in terms of the **agreement**. The **principal agent** may refer shop drawings and/or samples to the relevant **agent** for revision and/or approval

Where shop drawings are called for:

6.3.1 The **contractor** shall:

- Prepare or ensure that a **subcontractor**, manufacturer, supplier or distributor prepares shop drawings at his/their own expense
- Submit two (2) copies of shop drawings to the **principal agent** for approval
- Allow the **principal agent** reasonable time to approve shop drawings
- Keep a record of all shop drawings submitted to the **principal agent**
- Ensure that shop drawings conform to the dimensions of built work

- Submit two (2) copies of the approved shop drawings to the **principal agent** for his use and for use in the **works**
- Ensure that work is not executed from shop drawings that have not been approved by the **principal agent** and/or **agents**
- Not be entitled to payment for elements of the **works** (for example steel roof truss components such as members, gussets, connection plates and the like) for which shop drawings may have been approved by the **principal agent** and/or the relevant **agent** but which are in excess of the design parameters stipulated by the relevant agent. Payment shall be based on the design parameters stipulated by the relevant **agent**

6.3.2 **The principal agent shall:**

- Check timeously the shop drawings submitted by the **contractor**
- Give **notice** to the **contractor** timeously where shop drawings are approved or are to be revised and resubmitted

6.4 **Compliance with manufacturer's instructions**

The **contractor** shall take delivery of, handle, store, use, apply and fix all products in strict accordance with the manufacturer's instructions

7.0 **DEPOSITS AND FEES**

7.1 **Deposits and fees**

The **contractor** shall arrange for and pay all deposits, fees and charges according to law, regulation or bylaw of any local or other authorities that relate to hoardings, the use of pavements, street encroachment or crossings, permission for the suspension of parking facilities and the like

8.0 **TEMPORARY SERVICES**

8.1 **★ Water**

The **employer** does not warrant that any water supply that may exist is adequate for the proper execution of the **works**. Where such supply is inadequate, the **contractor** shall provide an adequate supply at his own expense. Water for the **works**, as stated in the **contract data** shall be provided by:

8.1.1 **Option A**

The **contractor** including necessary temporary plumbing

8.1.2 **Option B**

The **employer** free of charge to the **contractor**. The **contractor** shall connect to the existing water supply at approved points and execute any necessary temporary plumbing

8.1.3 **Option C**

The **employer** to the **contractor**. The **contractor** shall connect to the existing water supply at approved points, supply and install meters and execute any necessary temporary work. The **employer** shall meter the consumption and invoice the **contractor** for payment thereof

8.2 **★ Electricity**

The **employer** does not warrant that any electricity supply that may exist is adequate for the proper execution of the **works**. Where such supply is inadequate, the **contractor** shall provide an adequate supply at his own expense. Electricity for the **works**, as stated in the **contract data** shall be provided by:

8.2.1 **Option A**

The **contractor** including necessary temporary installation work

8.2.2 **Option B**

The **employer** free of charge to the **contractor**. The **contractor** shall connect to the existing electricity supply at approved points and execute the necessary temporary installation

8.2.3 **Option C**

The **employer** to the **contractor**. The **contractor** shall connect to the existing electricity supply at approved points, supply and install meters and execute necessary temporary work. The **employer** shall meter the consumption and invoice the **contractor** for payment thereof

8.3 **★ Ablution and welfare facilities**

Ablution and welfare facilities, as stated in the **contract data** shall be provided for the use of all persons on the site by:

8.3.1 **Option A**

The **contractor** who shall maintain such facilities in a thoroughly clean and tidy condition

8.3.2 **Option B**

The **employer** who shall permit the use of existing facilities. The **contractor** shall maintain such facilities in a thoroughly clean and tidy condition and make good any damage thereto at his own expense

8.4 **★ Communication facilities**

Communication facilities, as stated in the **contract data**, shall be provided by the **contractor** who shall be entitled to recover usage costs from the users thereof

9.0 **PRIME COST AMOUNTS**

9.1 **Responsibility for prime cost amounts**

All **prime cost amounts** are for **materials and goods** delivered to the **site**. The **priced document** shall make provision for the **contractor** to separately price for overheads and profit and for taking delivery, unloading, checking against invoices and/or delivery notes, unpacking, storing, hoisting and fixing of such **materials and goods**. The **contractor** shall check the quantity and condition of all **materials and goods** on taking delivery as any **materials and goods** subsequently found missing or damaged shall be replaced at the **contractor's** expense

10.0 **ATTENDANCE ON SUBCONTRACTORS**

10.1 **General attendance**

General attendance duties of the **contractor** are listed in clause 12.2 of the **JBCC®** N/S Subcontract Agreement

10.2 **Special attendance**

The **priced document** shall make provision for the **contractor** to separately price for special attendance on each **subcontractor**. Special attendance such as unloading, storing, placing in position, providing special power supplies, specific hoisting, use of cranes and scaffolding requirements, provision of temporary casing and/or other specific protection of the **works**, special security and clearing away rubbish are described in detail in the **priced document**

11.0 GENERAL

11.1 ★ Protection of the works

Where specific protection of the **works** is required this shall be described in the **contract data**

11.2 ★ Protection/isolation of existing works and works occupied in sections

The **contractor** shall provide all reasonable temporary measures to protect/isolate the existing and/or **sections** of the occupied **works** and remove such measures on **practical completion**

11.3 Security of the works

The **contractor** shall take all appropriate measures for general security of the **works**

11.4 Notice before covering work

The **contractor** shall give adequate **notice** to the **principal agent** whenever any work or material such as foundations, plumbing, drainage and the like which is subject to inspection or remeasurement is to be covered or concealed in any way. In default of such a **notice** being received timeously by the **principal agent** such work shall be exposed and later made good at the **contractor's** expense

11.5 ★ Disturbance

The **contractor** shall execute the **works** with a minimum of disturbance to adjoining premises, any parts of the **works** already handed over and the occupants of those premises and/or parts

11.6 ★ Environmental disturbance

The **contractor** shall execute the **works** without any unreasonable adverse effect on the environment

11.7 Works cleaning and clearing

The contractor shall regularly clean and clear away all rubbish and excess materials as the works proceed and leave the works in a clean and satisfactory state for use and occupation in terms of the **agreement**

11.8 Vermin

The **contractor** shall take all necessary precautions to keep the **works** and the **site** free from vermin and shall leave the **works** vermin-free on completion

11.9 Overhand work

No provision has been made for overhand work. Where necessary, the **contractor** shall make his own arrangements with the owners of adjoining properties to execute such work

11.10 Tenant installations

On **practical completion** of a **section** of the **works** and where the **principal agent** instructs that tenant installation work is to be executed by others, then:

11.10.1 The **contractor** shall allow reasonable access

11.10.2 The **contractor** shall not receive any mark-up for overheads and profit on any omissions in this regard. Claims for loss of profit shall not be entertained

11.10.3 The **principal agent** shall carry out an inspection of such areas where tenant installation work is to be executed and record the state of completion and issue a list of **defects** pertaining to such areas

11.11 Advertising

All advertising rights on the **site** and the hoardings are reserved exclusively for the **employer**

Part C1.2.1

Main Contract Bills of Quantities

Item No	Unit	Quantity	Rate	Amount
<u>BILL No. 1</u>				
<u>PRELIMINARIES AND GENERAL</u>				
<u>PRINCIPAL BUILDING AGREEMENT</u>				
The agreement shall be the Principal Building Agreement prepared and published by the Joint Building Contracts Committee: Edition 6.2 Code 2101, May 2018. (The JBCC® Principal Building Agreement).				
<u>PRELIMINARIES</u>				
The preliminaries shall be the JBCC General Preliminaries (JBCC Edition 6.2 May 2018) published by the JBCC for use with the said JBCC® Principal Building Agreement.				
<u>FULL INTENT AND MEANING OF CLAUSES</u>				
Tenderers shall be deemed to have referred to the aforementioned documents for the full intent and meaning of each clause. These clauses are hereinafter referred to by the heading and clause number only.				
Where standard clauses or alternatives are not entirely applicable to this contract, such modifications, corrections or supplements as are necessary are given under each relevant clause heading and such modifications, corrections or supplements shall take precedence, notwithstanding anything to the contrary contained in the above mentioned documents.				
Where an item is not relevant to this specific contract, such item is marked "NA" signifying "Not applicable".				
<u>PREAMBLES FOR TRADES</u>				
The Model Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these Bills of Quantities and no claims arising from brevity of description of items fully described in the said Model Preambles will be entertained.				
Supplementary preambles are incorporated in these Bills of Quantities where necessary to satisfy the requirements of this project. Such supplementary preambles shall take precedence over the provisions of the said Model Preambles.				
Carried to Collection				
Bill No. 1 Preliminaries SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES				R

The **contractor's** prices for all items throughout these **Bills of Quantities** must take account of and include for all of the obligations, requirements and specifications given in the said Model Preambles and in any supplementary preambles.

PRICING OF CLAUSES

Tenderers shall allow opposite each clause for any cost involved with complying with such clause. Any clauses left unpriced shall be deemed to be covered by rates and prices elsewhere incorporated throughout these **bills of quantities**.

PAYMENT CATEGORIES

Should "Option A" in terms of subclause D4.0 of the **Contract Data** be used for the adjustment of preliminaries, then each item priced is to be allocated to one or more categories by the insertion of the letter "F", "V" or "T", as the case may be, against the price in the rate column. These letters shall indicate the relevant categories as follows :

- "F" - A fixed amount, which shall not be varied
- "V" - An amount which shall be varied in proportion to the **contract value**
- "T" - An amount which shall be varied in proportion to the **construction period**.

Carried to Collection

Bill No. 1

Preliminaries

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

STRUCTURE OF THIS PRELIMINARIES BILL

Section A - JBCC Principal Building Agreement

Section B - JBCC General Preliminaries

Section C - Specific Preliminaries

Section D - SCM-F-10 - Bid Documents

Section E - Environmental Authorisation

Section F - Final Environmental Management Programme (EMPr)

Section G - Water Use License (attached)

Section H - Permit to pluck protected an unprotected flora

Section I - 23123G-02(0238-RP-Rev0)(Geotech Final Report) (1)

Section J - Local Economic Development requirements (client to confirm)

Carried to Collection

Bill No. 1

Preliminaries

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

SECTION A : JBCC PRINCIPAL BUILDING AGREEMENT

INTERPRETATION

A Definitions and Interpretation.

The following to be added to the definition "Budgetary Allowance" :

BUDGETARY ALLOWANCE: The contractor to submit three (3) quotes for approval for budgetary allowance amounts stipulated in the Bills of Quantities. In addition the contractor to price a fixed mark-up for on all budgetary allowances in the Bills of Quantities which will be added to the approved quote amount:

Add for profit and general attendance ____%

The definition for "Compensatory Interest" is deemed to be amended by the addition of the following:

Clause 1.0

Item

Carried to Collection

R

Bill No. 1

Preliminaries

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

A	Law, Regulations and Notices.				
	The following new subclause is hereby added to this clause:				
	<div>2.5</div> <div>Without limiting the generality of the provisions of clause 2.1 of the agreement, the contractor's attention is drawn to the provisions of the Construction Regulations, 2014 issued in terms of the Occupational Health and Safety Act, 1993. It is specifically stated that the employer shall prepare a documented health and safety specification for the works and that the employer shall ensure that the contractor has made provision for the cost of health and safety measures during the execution of the works. The contractor shall price opposite this item for compliance with the act and the regulations and the reasonable provisions of the aforementioned health and safety specifications.</div> <div>Refer Part C1.1 - Annexure B for the following documents and price against this item to comply with all the requirements in full:</div> <div><div>- SANSA MTJ_Construction Project Baseline Risk Assessment</div><div>- SANSA MTJ_Construction Project Health and Safety Specifications</div></div> <div>Clause 2.0</div>		Item		
B	Offer and Acceptance.	Clause 3.0		Item	
C	Cession and Assignment.	Clause 4.0		Item	
D	Documents.				
	The following new subclauses are hereby to this clause:				
	<div>5.4</div> <div>The Bills of Quantities may not be used for ordering purposes.</div> <div>The following new subclauses are hereby to this clause:</div> <div>5.6</div> <div>All drawings will be issued electronically via portal by consultant to contractor.</div> <div>Clause 5.0</div>		Item		

A	Employer's Agents.		Item		
	Clause 6.0				
B	Design Responsibility.				
	The following new subclauses is hereby added to this clause:				
7.4	Notwithstanding the provisions of 7.2, the contractor				
	shall ensure that every such domestic or nominated or				
	selected subcontractor shall simultaneously with the				
	signing of the relevant domestic or nominated or				
	selected subcontract sign and deliver to the employer				
	a Design Materials and Workmanship Warranty and				
	Undertaking in favour of the employer or a Materials				
	and Workmanship Undertaking strictly in accordance				
	with the instructions or provisions contained in the				
	tender documents for the domestic or nominated or				
	selected subcontract works .				
	The following portions of work will require design				
	responsibility from the contractor :				
	1. Aluminium Installation: Shopfronts / Doors / Windows				
	2. Balustrades				
	3. Fences and Gates				
	4. Architectural Metalwork				
	5. Joinery Fittings				
	Refer Part C1.1 - Annexure C for the Design				
	Indemnity Form documents and price against this				
	item to comply with all the requirements in full:				
	Clause 7.0		Item		

Carried to Collection

R

Bill No. 1

Preliminaries

SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

<u>INSURANCE AND SECURITY</u>			
Work Risk.	Clause 8.0	Item	
Indemnities.	Clause 9.0	Item	
Insurances.	Clause 10.0	Item	
Security.			
Clause 11.5 is hereby deleted in it's entirety. The Employer shall not provide a payment guarantee.			
The following new subclause is hereby added to this clause:			
11.11 The contractor shall only provide security issued by a registered bank approved by the employer	Clause 11.0	Item	
<u>EXECUTION</u>			
Obligations of the Parties.	Clause 12.0	Item	
Setting Out.			
The following new subclause is hereby added to this clause:			
13.3 The contractor shall notify the principal agent if any encroachments of adjoining foundations, buildings, structures, pavements, boundaries, etc. exist in order that the necessary arrangements may be made for the rectification of any such encroachments.			
13.4 The contractor shall ensure the setting out is done by a registered surveyor, proof of which shall be issued to the principal agent	Clause 13.0	Item	

A	<p>Nominated Subcontractors.</p> <p>Clause 14.0 is deemed to be amended by the addition of the following:</p> <p>14.9 Notwithstanding the provision of the contractors general attendance in accordance with the n/s agreement, general attendance shall be deemed to include for the contractor to provide free of charge to any n/s subcontractor erected scaffolding, including special scaffolding, mobile scaffolds and all façade scaffolding by the contractor (owned or hired) as may reasonably be required by such n/s subcontractor for the execution of the relevant subcontract works</p> <p style="text-align: right;">Clause 14.0</p>				
			Item		
B	<p>Selected Subcontractors.</p> <p>Clause 15.0 is deemed to be amended by the addition of the following:</p> <p>15.9 Notwithstanding the provision of the contractors general attendance in accordance with the n/s agreement, general attendance shall be deemed to include for the contractor to provide free of charge to any n/s subcontractor erected scaffolding, including special scaffolding, mobile scaffolds and all façade scaffolding by the contractor (owned or hired) as may reasonably be required by such n/s subcontractor for the execution of the relevant subcontract works</p> <p style="text-align: right;">Clause 15.0</p>				
			Item		
C	<p>Direct Contractors.</p> <p>16.4 The contractor will be liable to accommodate any direct contractors should practical completion, as per contract data, not be reached due to no fault of the employer</p> <p>The contractor to provide direct contractors with scaffolding, water and electricity, office and storage space.</p> <p><u>Direct Contractor # 1:</u></p> <p>Name of contractor: NASA Contractors' role: Tenant at MTG Ground Station under contract with SANSA Scope of works description: Oversight of NASA contractors and coordination with SANSA for interim building / site</p>				

inspections and final life safety and security review of completed facility.
Works to be executed: Periodic inspections of building progress; final inspection of completed site/building in accordance with NASA Facility Requirements Document (FRD) and NASA Authority Having Jurisdiction (AHJ) and NASA Security Officer
Duration (months contractor will require access): Duration of construction contract
Any other information: drawings of works to be done if available:

Direct Contractor # 2

Name of contractor: Peraton
Contractors' role: NASA Prime Contractor for NASA equipment installation, integration and testing.
Scope of works description: Responsible for integration, testing, and oversight of NASA technical equipment installation including tie into SANSA provided infrastructure, provided under SANSA facility contract.
Works to be executed: Pre-coordination during SANSA construction efforts, electrical and site coordination of potential concurrent work including outfitting of NASA equipment and operation rooms, telecommunication equipment racks and NASA LAN fibre networks. Participation in antenna testing and acceptance. Coordination with NASA for final inspections and approvals.
Duration (months contractor will require access): End of construction contract. Timeframe to be coordinated with SANSA and NASA AHJ and Security Officer. Do not anticipate a lot of overlap of NASA contractors and SANSA building contractors.
Any other information: drawings of works to be done if available: None at this time. Coordination/interface drawings will be developed during SANSA construction phase and interface coordinated with SANSA.

Direct Contractor # 3

Name of contractor: CPI Communication and Power Industries
– Not currently under contract for site work
Contractors' role: Antenna vendor – Subcontractor to Peraton
Scope of works description: Antenna site preparation, antenna installation and final testing
Works to be executed: antenna foundation, power and fibre connections to common site interface, final grading, antenna installation and testing/acceptance.
Duration (months contractor will require access):
Antenna currently expected to arrive November '26;
Antenna site work takes around 6 months and will precede antenna arrival – assume CPI mobilizes May '26;
Antenna installation takes 3 months – Nov '26 – Feb '27
Antenna test takes 2 months – Feb '27 to April '27
CPI demobilizes and SANSA fence contractor comes in to

Carried to Collection

Bill No. 1

Preliminaries

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

make final secure of the site
Any other information: drawings of works to be done if available: Drawings will be made available when ready.
Interface drawings to be coordinated with SANSA and SANSA's contractor(s).

Direct Contractor # 4:

Name of contractor: TBC
Contractors' role: ICT contractor to SANSA
Scope of works description: Oversight of SANSA ICT data installation.
Duration (months contractor will require access): During construction they will require to have access to site to inspect the works, and post completion will require access to building to do ICT data cabling after PC.
Any other information: drawings of works to be done if available: None at this stage.

Direct Contractor # 5:

Name of contractor: SANREN
Contractors' role: Laying of Micro ducts and fibre
Scope of works description: Oversight on behalf of SANSA as part of laying the micro ducts and fibre from the N1 to the main admin building.
Duration (months contractor will require access): During construction period of the civil road works from the N1 to the main admin building.
Any other information: drawings of works to be done if available: None at this stage

Direct Contractor # 6:

Name of contractor: TBC
Contractors' role: Construction of the Energy centre
Scope of works description: Oversight on behalf of SANSA for the development of an energy centre which will constitute of the Eskom substation, DC/Battery Plant, PV Plant, Generators and MV/LV Plantroom.
Duration (months contractor will require access): During construction period of the project.
Any other information: drawings of works to be done if available: None at this stage

Clause 16.0

Item

A Contract Instructions.

Clause 17.0

Item

COMPLETION

B Interim Completion

Clause 18.0

Item

Carried to Collection

R

Bill No. 1

Preliminaries

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

A	<p>Practical completion.</p> <p>The following note is hereby added to this clause:</p> <p>The principal agent shall ensure that at practical completion minimal lists defining incomplete works and defects will be apparent and that the contractor has satisfactorily achieved this level of completion as indicated by the principal agent</p> <p>All handover certificates, manuals and other required documents shall be in place.</p> <p>In the event whereby the contractor fails to rectify snags after a second inspection The principal agent may recover the services from the consultant from the contractor as per professional bodies approved hourly rates.</p> <p style="text-align: right;">Clause 19.0</p>				
			Item		
B	Completion in Sections.		Item		
C	<p>The following new subclause 20.3 is added to this clause:</p> <p><u>Practical completion to Section 1: External/Site Wide Civil works (inclusive of road network, & water, sewer, stormwater reticulation) will be defined as the following:</u></p> <p>The following shall be fully finished as per the architects and engineering drawings, requirement, specifications and manufacturers specification by the date stated in Contract Data.</p> <p>Unrestricted access from the town of Matjiesfontein to all three (3) buildings and antenna location including but not limited to: new civils infrastructure including a new gravel road network and water, sewer, and stormwater reticulation is required for completion of Section 01.</p>				
	<p style="text-align: right;">Carried to Collection</p> <p>Bill No. 1 Preliminaries SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES</p>			R	

A	<p><u>Practical completion to Section 2: Electrical & Fibre Infrastructure will be defined as the following:</u></p> <p>The following shall be fully finished as per the architects and engineering drawings, requirement, specifications and manufacturers specification by the date stated in Contract Data.</p> <ul style="list-style-type: none"> - Bulk Reticulation inclusive of 11kv cables, mini-sub, etc - Standby Generators - Earthing & Lighting protection - Site wide fibre reticulation 	Item		
B	<p><u>Practical completion to Section 3: Remainder of the works will be defined as the following:</u></p> <p>Remainder of the works: The construction of three (3) new buildings (including a Main Operations Building, a Generator House, and an Entrance Gate and Guard House) shall be fully finished as per the architects and engineering drawings, requirement, specifications and manufacturers specification. The building shall be fully waterproofed and complete in a fully operational condition by the date stated in Contract Data.</p> <p>All local authority and statutory requirements have been met and subsequent occupation certificates have been issued by the date stated in the contract data.</p>	Item		
C	<p>Defects Liability Period and Final Completion.</p>	Item		
D	<p>Latent Defects Liability Period.</p>	Item		
	<p style="text-align: right;">Carried to Collection</p>		R	
	<p>Bill No. 1 Preliminaries SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES</p>			

A	<p>Revision of the date for practical completion.</p> <p>A new subclause 23.1A shall be inserted after clause 23.1 as follows:</p> <p>23.1A For purposes of clause 23.1, it is agreed as follow:</p> <p>23.1A.1 The contractor shall make provision for Twenty (20) working days during the contract period for any such delays caused by one or more of the clauses as listed under 23.1.1 to 23.1.6.</p> <p>23.1A.2 The contractor becomes entitled to a revision of the date for practical completion in accordance with clause 23.1 only once the accumulated working days granted are greater than twenty (20) working days over the contract period.</p> <p style="text-align: right;">Clause 23.0</p>				
B	<p>Penalty for Late or Non-Completion.</p> <p style="text-align: right;">Clause 24.0</p>		Item		
	<p><u>PAYMENT</u></p>				
C	<p>Payment.</p> <p>Notwithstanding this or any other clause, materials and goods stored off site shall <u>not</u> be included in the amount authorised for payment.</p> <p style="text-align: right;">Clause 25.0</p>		Item		
D	<p>Adjustment of the Contract Value and Final Account.</p> <p>Notwithstanding the provisions of subclause 26.9.5 or any other clause, all fluctuations in costs shall be for the account of the contractor.</p> <p>The following new subclause 26.14 is added to this clause:</p> <p>Where prices are submitted by the contractor or n/s subcontractor during the progress of the works in respect of contract instructions or in regard to a claim under the terms of the contract and notwithstanding the fact that such prices may be used in an interim payment certificate, there is to be no presumption of acceptance. Should the principal agent wish to accept any such prices prior to the issue of the final payment certificate, it shall be in writing.</p> <p style="text-align: right;">Clause 26.0</p>		Item		
	<p style="text-align: right;">Carried to Collection</p> <p>Bill No. 1 Preliminaries SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES</p>			R	

A	Recovery of Expense and/or Loss.	Clause 27.0	Item
<u>SUSPENSION AND TERMINATION</u>			
B	Suspension by the Contractor.	Clause 28.0	Item
C	Termination.	Clause 29.0	Item
<u>DISPUTE RESOLUTION</u>			
D	Dispute Resolution.	Clause 30.0	Item
<div> <div>Carried to Collection</div> <div> <div>Bill No. 1</div> <div>Preliminaries</div> <div>SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein</div> <div>PROVISIONAL BILLS OF QUANTITIES</div> </div> </div>			

SECTION B: JBCC GENERAL PRELIMINARIES

1.0 DEFINITIONS AND INTERPRETATION

A	Definitions.	Clause 1.1	Item
B	Interpretation.	Clause 1.2	Item

2.0 DOCUMENTS

C	Checking of documents.	Clause 2.1	Item
D	Provisional bills of quantities.	Clause 2.2	Item
E	Availability of construction documentation. The budgetary allowances and selected subcontract amounts allocated for subsequent trades included in this document will be separately procured, based on multiple procurement of selected subcontractors during the construction period .	Clause 2.3	Item
F	Ordering of materials and good.	Clause 2.4	Item

3.0 PREVIOUS WORK AND ADJOINING PROPERTIES:

G	Previous work - dimensional accuracy.	Clause 3.1	Item
H	Previous work - defects .	Clause 3.2	Item
J	Inspection of adjoining properties.	Clause 3.3	Item

4.0 THE SITE

K	Handover of site in stages.	Clause 4.1	Item
---	-----------------------------	------------	------

Carried to Collection

Bill No. 1
Preliminaries
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

Part C1.2.1: Pricing Data - Page No.16

A	<p>Shop drawings</p> <p>Clause 6.3 is hereby amended by the addition of the following:</p> <p>General responsibilities</p> <p>The contractor shall provide a person or persons who shall be available immediately upon commencement of the contract, whose responsibility will be:</p> <p>a) To familiarise himself with all drawings produced by the professional team. This will involve a clear understanding of services and element co-ordination performed by the architect, in order that subcontractors can be properly briefed.</p> <p>b) To provide the professional team with comprehensive lists of shop drawings to be prepared by relevant subcontractors.</p> <p>c) To check all shop drawings for sufficiency prior to submission to the relevant consultant in the professional team. It is expected that such checking will include all co-ordination and pro-active resolution of any conflicting services and elements.</p> <p>It is also noted that resolution of co-ordination problems will require attendance at services and element co-ordination meetings, called by the principal agent as and when necessary.</p> <p style="text-align: right;">Clause 6.3</p>				
B	<p>Compliance with manufacturers' instructions.</p> <p style="text-align: right;">Clause 6.4</p>				
	<p><u>7.0 DEPOSITS AND FEES</u></p>				
C	<p>Deposits and fees.</p> <p style="text-align: right;">Clause 7.1</p>				
	<p style="text-align: right;">Carried to Collection</p>			R	
	<p>Bill No. 1 Preliminaries SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES</p>				

8.0 TEMPORARY SERVICES

A	<p>Water.</p> <p>Clause 8.1 is hereby amended by the addition of the following:</p> <p>The site will have no permanent water connection from the date of site handover. The contractor must make adequate provisions to supply all water required for construction activities, including commissioning, as well as potable water for hydration and hygienic purposes to all personal on site. This responsibility shall remain with the contractor for the duration of the project.</p> <p>No delays will be entertained due to unplanned water outages. The contractor to actively plan around these type of eventualities.</p> <p>The employer has applied for a permanent water connection to the site boundary from the local municipality. Once the permanent water connection is in place this pricing item will be reviewed.</p> <p>All Direct Contractors, as listed under clause 16.4, will be required to utilize the temporary water services provided by the contractor until the last practical completion date of the project without addition cost to the project.</p> <p style="text-align: right;">Clause 8.1</p>			
B	<p>Electricity.</p> <p>Clause 8.2 is hereby amended by the addition of the following:</p> <p>The site will have no permanent power connection from the date of site handover. The contractor must make adequate provisions to supply temporary power and electricity required for all construction activities, including commissioning. This responsibility shall remain with the contractor for the duration of the project.</p> <p>No delays will be entertained due to unplanned power outages or events such as load shedding. The contractor to actively plan around these type of eventualities.</p> <p>All Direct Contractors, as listed under clause 16.4, will be required to utilize the temporary electrical services provided by the contractor until the last practical completion date of the project without addition cost to the project.</p> <p style="text-align: right;">Clause 8.2</p>			
	Carried to Collection			
	<p>Bill No. 1</p> <p>Preliminaries</p> <p>SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein</p> <p>PROVISIONAL BILLS OF QUANTITIES</p>			

A	Telecommunication facilities.	Clause 8.3	Item
B	Ablution facilities.	Clause 8.4	Item
9.0 PRIME COST AMOUNTS			
C	Responsibility for prime cost amounts .	Clause 9.1	Item
10.0 ATTENDANCE ON N/S SUBCONTRACTORS			
D	General attendance.	Clause 10.1	Item
E	Special attendance.	Clause 10.2	Item
11.0 GENERAL			
F	Protection of the works .	Clause 11.1	Item
G	Protection/isolation of existing works and works occupied in sections.	Clause 11.2	Item
H	Security of the works . The contractor shall provide and maintain twenty-four hour site security and loss control systems all to the satisfaction of the principal agent. It is envisaged that these procedures will incorporate, inter alia, gate control for personnel and vehicles, individual entry permits, regular security patrols and the like.	Clause 11.3	Item
J	Notice before covering work.	Clause 11.4	Item
K	Disturbance.	Clause 11.5	Item
L	Environmental disturbance.	Clause 11.6	Item
Carried to Collection			
Bill No. 1 Preliminaries SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES			

Bill No. 1
Preliminaries
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

SECTION C : SPECIFIC PRELIMINARIES

SUPPLEMENTARY DOCUMENTATION

A As-built drawings.

The position of construction breaks and the extent of individual concrete pours are to be recorded by the **contractor** on the structural engineer's drawings and are to be submitted to the **principal agent** and the structural engineer for their records.

Item

B **Site instructions.**

Contract instructions issued on site are to be recorded in triplicate in an instruction book which is to be maintained on site by the **contractor** and cost shall be agreed with project Quantity Surveyor

Item

MATERIALS AND WORKMANSHIP

Testing of windows to ensure watertightness

C As the windows are fixed they shall be glazed and prepared so that each window can be tested for watertightness with water sprayed on by means of a 20mm hosepipe using adequate pressure. If the pressure proves to be inadequate, in the opinion of the **principal agent**, then the pressure in the hosepipe shall be boosted by means of compressed air or other approved means. Each window section shall be tested under the supervision of the **principal agent** and approved before final acceptance of the fenestration.

Item

Testing of flat roof waterproofing to ensure watertightness

D As waterproofing is completed, areas shall be prepared with small sand dykes around them of a size and enclosing an area approved by the **principal agent**, flooded with water and kept "ponded" for at least 36 hours as a test to ensure the watertightness of the waterproofing concerned before any further construction work is carried out above the waterproofing.

Item

Warranties for materials and workmanship

E The **contractor** shall obtain written warranties where called for, addressed to the **employer**, from the firms supplying the materials or doing the work and deliver such guarantees to the **principal agent** on the certified completion of the **contract**.

Item

Carried to Collection

R

Bill No. 1

Preliminaries

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

A	<p>The warranties shall state that workmanship, materials and installation are guaranteed for a specified period reckoned from the date of certified completion of the works and that any defects in the workmanship, materials and installation that may arise during that period shall be made good at the expense of the firm doing the work upon written notice from the principal agent or the employer to do so.</p>	Item	
	<p><u>FINANCIAL ASPECTS</u></p> <p><u>Overtime</u></p>		
B	<p>The additional costs of overtime work shall not be for the employer's account except when prior written agreement thereto is given by the principal agent.</p>	Item	
	<p><u>GENERAL</u></p> <p><u>Agreement</u></p>		
C	<p>The contractor will allow for all costs deemed to be incurred in the fulfilment of all contractual obligations as stated in the JBCC Principal Building Agreement Contract Data.</p>	Item	
	<p><u>Contractor to be responsible</u></p>		
D	<p>The contractor acknowledges that the principal objective of his appointment is his expert knowledge in the execution of the scope of work of this contract. The contractor shall therefore be solely responsible for all aspects of the construction of the works including but not limited to management, resourcing, programming, co-ordination, etc. all as required for the type of project described within the time limits and quality standards specified.</p>	Item	
	<p><u>Unauthorised persons on site</u></p>		
E	<p>The contractor shall at all times strictly exclude all unauthorised persons from the works. No workmen are to be allowed to sleep on the premises.</p> <p>The principal agent to be made aware of any incidence by where unauthorised persons tried to enter the site or any such security breaches</p>	Item	
	<p style="text-align: right;">Carried to Collection</p>		

Bill No. 1
Preliminaries
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

<u>Use of site</u>					
A	The contractor shall not use the site for any purposes other than carrying out the works .	Item			
<u>Contractors site offices</u>					
B	The contractor is required to provide a site office in accordance with the minimum requirements as outlined in "Part C1.3.7 : Annexure F - Proposed Site Office Facilities". The site office must include a suitable facility for holding regular site meetings, adequately furnished and equipped to accommodate project stakeholders. All costs associated with establishing, maintaining, and operating this site office shall be included in the contractor's pricing. Price against this item comply with all the requirements in full	Item			
<u>Printer/Plotter on site</u>					
C	The contractors is to price against this item for the incorporation of the following requirements for printing / plotting drawings on site: "BIM360" or similar approved is the document control system used on this project and once any drawing/specification/contract instruction/etc are uploaded it is deemed issued. No hard copies of technical detail/construction drawings will be issued other than the drawings issued at the site handover meeting as listed in the contract data. The contractor is to make his own arrangements to print/plot electronically issued drawings, including colour copies, for construction purposes.	Item			
Carried to Collection					
Bill No. 1					
Preliminaries					
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein					
PROVISIONAL BILLS OF QUANTITIES					

R

<u>Interpretation of drawings, specifications and bills of quantities</u>				
A	<p>Should any part or parts of the drawings, specifications or bills of quantities not be clearly intelligible to the contractor, or the material or articles to be used in the execution of the works be considered insufficiently described or the manner in which the work is to be carried out not be clear, the contractor must obtain from the principle agent the necessary information to clarify such drawings, specifications, bills of quantities or instructions which request shall be in writing.</p> <p>The contractor shall be held solely responsible for and shall, at his own expense, rectify any errors arising out of incorrect interpretation of the drawings, specification, bills of quantities or instructions.</p> <p>The contractor remains responsible to always ensure they are working for the latest Revision drawing.</p>		Item	
	<u>City by-laws</u>			
B	<p>The contractor to allow for complying to all local Municipality by-laws</p>		Item	
	<u>Copyright</u>			
C	<p>The ownership of the copyright in and to: all drawings, specifications, models and documents of any nature delivered to the contractor or produced by or on behalf of the contractor in connection with the works; and, the artistic character and/or artistic design of the works, shall remain vested in and/or is hereby assigned to the employer by the contractor.</p>		Item	
	<u>Community Liaison Officer</u>			
D	<p>The contractor are to allow against this item all costs deemed to be incurred in complying with the following tender condition:</p> <p>The main contractor shall appoint a Community Liaison Officer (CLO) to assist with the recruitment and employment of eligible locally based labour. The CLO must have free access to the site and use of dedicated office for the duration of the contract.</p>		Item	
Carried to Collection				
Bill No. 1				
Preliminaries				
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein				
PROVISIONAL BILLS OF QUANTITIES				

Co-ordination

A The **contractor** shall be solely responsible for the co-ordination of all subcontracts, whether nominated or otherwise, into the general programme of work. He shall be required to convene meetings with subcontractors and suppliers as and when required for this purpose and must keep under constant review his own and all sub-contract labour force and supply of materials and equipment in order to adhere to the building programme.

The **contractor** is to submit a schedule of information required to all parties concerned, giving dates upon which such information and details are required on site.

Timeous advance notice is to be given by the **contractor** of information or drawings which are required on site.

The **principal agent** reserves the right to attend meetings between main contractor and subcontractors and/or suppliers.

Item

Carried to Collection

R

Bill No. 1

Preliminaries

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

SECTION D : SCM-F-10 - BID DOCUMENTS

A The contractor is referred to refer to the Bid Document (SCM-F-10) forming part of this tender document, and price against this item comply with all the requirements in full

Item

Carried to Collection

R

Bill No. 1
Preliminaries
**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

SECTION E : ENVIRONMENTAL AUTHORISATION

- A The contractor need to refer to the Environmental Authorisation included as per "Part C1.3.4 : Annexure D - Environmental " of this tender document, and price against this item comply with all the requirements in full

Item

Carried to Collection

R

Bill No. 1
Preliminaries
**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

SECTION F : CONSTRUCTION ENVIRONMENTAL MANAGEMENT PROGRAMME (CEMP)

A Construction Environmental Management Programme (CEMP)

The CEMP - Construction Environmental Management Programme (refer Part C1.3.4 : Annexure D - Environmental) to guide and manage contractor and their the construction activities according to the project specific requirements.

The Contractor and all Sub-Contractors are contractually required to adhere to the CEMP.

The contractor and subcontractors are required to submit a Environmental Method Statements (EMS) for specific activities, as stipulated in the CEMP, to the ECO and the ESM for approval 20 days prior to the commencement of the activity (Annexure 1 of the CEMP). As a guide the following list is indicative (but not exhaustive) of the main activities requiring a MS:

- Construction procedures,
- Materials and equipment to be used,
- Transporting the equipment to and from site,
- How the equipment/ material will be moved while on site,
- How and where material will be stored,
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur,
- Timing and location of activities,
- Compliance/ non-compliance with the Specifications, and
- Any other information deemed necessary by the Engineer.

The contractor shall price for full compliance of the Construction Environmental Management Programme under this item provided in the bills of quantities and no additional cost will be entertained for compliance measures in addition to priced item. The contractor to actively plan around these type of eventualities

Dust Control

Refer to "*Part C1.3.4 Annexure D – Enviromental*" of the tender document.

The contractors attention is drawn to clause 5.2.16. Dust Control of the SANSA Draft EMPr Client Review 21 Oct. The contractor shall price for dust control under the item provided in the bills of quantities and no additional cost will be entertained for dust control measures in addition to priced item. The contractor to actively plan around these type of eventualities

Carried to Collection

Bill No. 1

Preliminaries

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

Item

R

SECTION G : WATER USE LICENSE

- A The contractor need to refer to the Water Use License included as per "Part C1.3.4 : Annexure D - Environmental " of this tender document, and price against this item comply with all the requirements in full

Item

Carried to Collection

R

Bill No. 1
Preliminaries
**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

SECTION H : PERMIT TO PLUCK PROTECTED AND UNPROTECTED FLORA

- A The contractor need to refer to the Permit to pluck protected an unprotected flora included as per "Part C1.3.4 : Annexure D - Environmental " of this tender document, and price against this item comply with all the requirements in full

Item

Carried to Collection

R

Bill No. 1

Preliminaries

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

SECTION I : GEOTECHNICAL REPORT

A The contractor need to refer to the Geotech Final Report [23123G-02(0238-RP-Rev0)] included as per "Part C1.3.4 : Annexure E - Geotech " of this tender document, and price against this item comply with all the requirements in full

Item

Carried to Collection

R

Bill No. 1

Preliminaries

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

Item No	Quantity	Rate	Amount
BILL No. 2			
EARTHWORKS			
NOTE: Tenderers are advised to study the Model Preambles for Trades 2017 before pricing this bill			
SUPPLEMENTARY PREAMBLES			
<u>Nature of the ground</u>			
A geotechnical investigation has been carried out on the site by the engineer refer to "Part C1.3.5 Annexure E – Geotechnical Survey" of the tender document.			
All classes of excavations in accordance with South African National Standards (1990) SANS 1200 D: Earthworks and Table 4-4, Classes of Excavation according to SANS 1200D, of the <i>Geotechnical Survey</i>			
Carried to Collection		R	
Bill No. 2 Earthworks SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES			

The Tenderer shall acquaint himself by personal examination of the nature of the ground. Descriptions of excavations shall be deemed to include all ground conditions classifiable as "earth or soft excavations" and where conditions of a more difficult character are indicated these are separately measured.

"Earth or soft excavations" shall mean all excavation in material that can be efficiently removed by a back-acting excavator of flywheel power approximately 0.10 kW per millimetre of tined-bucket width, without the use of pneumatic tools such as paving breakers for restricted excavation (e.g. trenching), and for unrestricted excavation in accordance with SANS 1200 D: Earthworks, Classes of Excavation, and shall include the following ground conditions descriptions:

- Loose, SAND and GRAVEL
- Loose to medium dense, SAND and GRAVEL
- Medium dense, SAND and GRAVEL
- Medium dense to dense, GRAVEL
- Completely weathered, very soft rock, TILLITE
- Highly weathered, soft rock, TILLITE

"Intermediate Excavation" shall mean all excavation in material that requires a back-acting excavator of flywheel power exceeding 0.10 kW per millimetre of tined-bucket width or the use of pneumatic tools before removal by equipment equivalent to that specified for soft excavation for restricted excavation (e.g. trenching), and for unrestricted excavation in accordance with SANS 1200 D: Earthworks, Classes of Excavation, and shall include the following ground conditions descriptions:

- Moderately weathered, medium hard rock, TILLITE

"Hard Excavation" shall mean hard rock excavation and shall be excavation in material (excluding boulder excavation) that cannot be efficiently removed without blasting or wedging and splitting for restricted excavation (e.g. trenching), and for unrestricted excavation in accordance with SANS 1200 D: Earthworks, Classes of Excavation.

Carried to Collection

Bill No. 2

Earthworks

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

Subterranean water

The contractors attention is drawn to the geotechnical investigation. The contractor shall price for dewatering of subterranean water under the item provided in the bills of quantities and no additional cost will be entertained for removal of additional subterranean water in addition to priced item. The contractor to actively plan around these type of eventualities

Bulking

No allowance is made in the measurements below for bulking

Filling

Notwithstanding the reference to prescribed multiple handling in clause 1 page 6 of the Standard System of Measuring Building Work, prices for filling and backfilling shall include for all selection and any necessary multiple handling of material

Excavated material

Descriptions 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 carting away to a designated area within the site boundary, including spreading of the material as per the Civil Engineer's requirements

Testing

Prices for filling are to include for all necessary density tests in accordance with SANS 1200D

Carried to Collection

Bill No. 2

Earthworks

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

<u>EXCAVATION, FILLING, ETC OTHER THAN BULK</u>					
<u>Excavation in earth not exceeding 2m deep</u>					
A	Trenches	m3	1 206		
B	Holes	m3	273		
<u>Extra over excavations for excavations in</u>					
C	Intermediate excavation	m3	367		
D	Hard rock excavation	m3	71		
<u>Back excavation of vertical sides of excavation in earth for working space including backfilling with backfilling supplied by the contractor compacted in 250mm layers to 96% (100% for sand) Mod AASHTO density</u>					
E	Exceeding 500mm and not exceeding 1 500mm deep for placing and removing formwork to bases, foundation beams, etc against excavated face	m2	2 527		
F	Exceeding 1 500mm and not exceeding 3 000mm deep for placing and removing formwork to bases, foundation beams, etc against excavated face	m2	115		
<u>Extra over back excavation in earth for working space for excavation in "intermediate excavations"</u>					
G	Exceeding 500mm and not exceeding 1 500mm deep for placing and removing formwork to strip footings, foundations beams, bases, etc against excavated face	m2	632		
H	Exceeding 1 500mm and not exceeding 3 000mm deep for placing and removing formwork to bases, foundation beams, etc against excavated face	m2	29		
<u>Extra over back excavation in earth for working space for excavation in "hard rock excavations"</u>					
J	Exceeding 500mm and not exceeding 1 500mm deep for placing and removing formwork to strip footings, foundations beams, bases, etc against excavated face	m2	127		
K	Exceeding 1 500mm and not exceeding 3 000mm deep for placing and removing formwork to bases, foundation beams, etc against excavated face	m2	22		
Carried to Collection				R	
Bill No. 2					
Earthworks					
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein					
PROVISIONAL BILLS OF QUANTITIES					

FILLING, ETC

Earth filling obtained from the excavations and/or prescribed stock piles on site compacted in 250mm layers to 96% Mod AASHTO density or 100% Mod AASHTO density for sand

A	Backfilling to trenches, holes, etc	m3	698
B	Under floors, steps, pavings, etc	m3	384
<u>Sub-base filling supplied by the contractor under surface bed</u>			
C	Subbase course of G7 material in accordance with SABS 1200 DM, compacted in layers not exceeding 150mm to 97% Mod AASHTO density	m3	311
D	Subbase course of G5 material in accordance with SABS 1200 DM, compacted in layers not exceeding 150mm to 98% Mod AASHTO density	m3	114
E	Subbase course of G5 material in accordance with SABS 1200 DM, compacted in layers not exceeding 150mm to 98% Mod AASHTO density to received polished concrete surface bed (elsewhere measured) including plate testing and all in accordance with the flooring specialist requirements	m3	98
<u>Compaction of surfaces</u>			
F	Compaction of excavated ground surface under floors etc, including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to a CBR of 15 at 95% Mod AASHTO density	m2	2 563

Carried to Collection

R

Bill No. 2

Earthworks

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

Item No	Unit	Quantity	Rate	Amount
<p><u>BILL No. 3</u></p> <p><u>CONCRETE, FORMWORK AND REINFORCEMENT</u></p> <p><u>NOTE:</u> Tenderers are advised to study the Model Preambles for Trades 2017 before pricing this bill</p> <p><u>SUPPLEMENTARY PREAMBLES</u></p> <p>Refer to '<i>Part C1.4: Drawings</i>' of the tender document for specifications and requirements of the reinforced concrete, etc.</p> <p><u>Cost of tests</u></p> <p>The costs of making, storing and testing of concrete test cubes as required under Clause 7 "Tests" of SABS 1200 G shall include the cost of providing cube moulds necessary for the purpose, for testing costs and for submitting reports on the tests to the Engineer. The testing shall be undertaken by an independent firm or institution nominated by the Contractor to the approval of the Engineer (Test cubes are measured separately).</p> <p><u>Formwork</u></p> <p>Descriptions of formwork shall be deemed to include use and waste only (except where described as "left in" or "permanent"), for fitting together in the required forms, wedging, plumbing and fixing to true angles and surfaces as necessary to ensure easy release during stripping and for reconditioning as necessary before re-use. The vertical strutting shall be carried down to such construction as is sufficiently strong to afford the required support without damage and shall remain in position until the newly constructed work is able to support itself.</p>				
<p style="text-align: right;">Carried to Collection</p>				R
<p>Bill No. 3 Concrete, Formwork and Reinforcement SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES</p>				

Formwork to soffits of solid slabs, etc shall be deemed to be to slabs not exceeding 250mm thick unless otherwise described.

Formwork has been measured to the sides of all reinforced concrete in foundations and will be remeasured according to actual usage. However, formwork necessitated by irregularity or collapse of excavated faces will not be measured and the cost thereof shall be deemed to be included in the allowance for taking the risk of collapse of the sides of the excavations, provision for which is made in "Earthworks".

Concrete waterproofing specification

Where concrete is specified as concrete with "Penetron Admix":

"Penetron" or similar approved is to added to the reinforced concrete at dosage rate of 3kg/m³ concrete. Final design mix to be submitted by Ready Mix supplier for approval

Carried to Collection

Bill No. 3

Concrete, Formwork and Reinforcement

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

**UNREINFORCED CONCRETE CAST AGAINST
EXCAVATED SURFACES**

15MPa/19mm concrete

A	Surface blinding under footings and bases	m3	69
---	---	----	----

30MPa/19mm concrete

B	Surface beds cast in panels on waterproofing	m3	327
---	--	----	-----

30MPa/13mm (at a course aggregate volume of 420 litres/m3)
strength concrete

C	Surface beds cast in panels on waterproofing (surface bed prepared and placed by the specialist flooring contractor undertaking the 7-Stage Concrete Grinding and Polishing on specified floors) all in accordance with the engineers requirements	m3	98
---	--	----	----

UNREINFORCED CONCRETE

15MPa/13mm concrete

D	Filling to cavity of hollow walls	m3	50
---	-----------------------------------	----	----

Carried to Collection

Bill No. 3
Concrete, Formwork and Reinforcement
**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

<u>REINFORCED CONCRETE</u>					
A	Strip footings	m3	324		
B	Bases	m3	153		
<u>REINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES</u>					
<u>30MPa/19mm strength concrete with "Penetron Admix" waterproofing additive as per manufactures specification</u>					
C	Walls in foundation	m3	81		
<u>30MPa/19mm concrete</u>					
D	Slabs including beams and inverted beams	m3	27		
E	Isolated beams	m3	80		
F	Stairs including landings, beams and inverted beams	m3	2		
G	Walls	m3	233		
H	Columns in foundations	m3	10		
J	Columns	m3	45		
<u>TEST BLOCKS</u>					
<u>Test blocks</u>					
K	Making and testing set of three 150 x 150 x 150mm concrete strength test cubes	No	109		
Carried to Collection					
Bill No. 3					
Concrete, Formwork and Reinforcement					
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein					
PROVISIONAL BILLS OF QUANTITIES					

R

FORMWORK

ROUGH FORMWORK (DEGREE OF ACCURACY III)

Rough formwork to sides

A	Bases	m2	363
B	Strip foundations	m2	612
C	Rectangular columns in foundations	m2	126
D	Edges of surface bed panels, ramps, etc not exceeding 300mm high or wide	m	151
E	Edges, risers, ends and reveals not exceeding 300mm high or wide	m	95

Carried to Collection

Bill No. 3
Concrete, Formwork and Reinforcement
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

<u>ROUGH FORMWORK (DEGREE OF ACCURACY II)</u>					
<u>Rough formwork to sides</u>					
A	Rectangular columns with total height not exceeding 3 500mm above bearing level	m2	228		
B	Rectangular columns with total height exceeding 3 500mm and not exceeding 5 000mm above bearing level	m2	195		
C	Rectangular columns with total height exceeding 5 000mm and not exceeding 6 500mm above bearing level	m2	152		
D	Rectangular columns with total height exceeding 6 500mm and not exceeding 8 000mm above bearing level	m2	74		
E	Upstand beams	m2	41		
F	Upstand beams over concrete	m2	41		
G	Sloping and stepped outer edges of stairs 300mm high extreme	m	9		
<u>Rough formwork to soffits</u>					
H	Stairs with sloping soffits	m2	7		
J	Slabs propped up not exceeding 3 500mm high	m2	63		
K	Slabs propped up exceeding 6 500mm not exceeding 8 000m high	m2	10		
<u>Boxing out rough formwork to form</u>					
L	15 x 15mm Vertical chamfer at corners	m	3 726		
Carried to Collection				R	
Bill No. 3 Concrete, Formwork and Reinforcement SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES					

SMOOTH FORMWORK (DEGREE OF ACCURACY II)

Smooth formwork to sides

A	Isolated beams	m2	635
B	Walls with total height not exceeding 3 500mm high above bearing level	m2	764
C	Walls with total height exceeding 3 500mm and not exceeding 5 000mm high above bearing level	m2	241
D	Walls with total height exceeding 5 000mm and not exceeding 6 500mm high above bearing level	m2	351
E	Walls slanted at 71deg with total height not exceeding 3 500mm high above bearing level	m2	280
F	Walls slanted at 71deg with total height exceeding 3 500mm and not exceeding 5 000mm high above bearing level	m2	186
G	Walls slanted at 71deg with total height exceeding 5 000mm and not exceeding 6 500mm high above bearing level	m2	10

Carried to Collection

Bill No. 3
Concrete, Formwork and Reinforcement
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

Smooth formwork to sides and soffits

A Sloping isolated beams (illustration below for more detail)



m2 49

Smooth formwork to soffits

B Isolated beams propped up not exceeding 3 500mm high

m2 147

C Isolated beams propped up exceeding 5 000mm not exceeding 6 500mm high

m2 2

Carried to Collection

R

Bill No. 3
Concrete, Formwork and Reinforcement
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

MOVEMENT JOINTS, ETC

Expansion joints with "Sondor Jointex" or similar approved between horizontal concrete surfaces

A	10mm Joints not exceeding 300mm high	m	236
---	--------------------------------------	---	-----

Expansion joints with "Sondor Jointex" or similar approved between vertical concrete and brick surfaces

B	10mm Joints not exceeding 300mm wide	m	1 199
---	--------------------------------------	---	-------

Expansion joints with "Flexcell" or similar approved impregnated fibreboard between vertical concrete surfaces

C	10mm Joints not exceeding 300mm high	m	1 357
---	--------------------------------------	---	-------

Saw cut joints in two operations including Pu seal (Pu seal elsewhere measured)

D	6 x 50mm Saw cut joints in top of concrete	m	932
---	--	---	-----

Carried to Collection

Bill No. 3
Concrete, Formwork and Reinforcement
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

REINFORCEMENT

Mild / High tensile steel reinforcement to structural concrete work

A	8 - 32mm Diameter bars	to	97.763	
<u>Fabric reinforcement</u>				
B	Type 245 fabric reinforcement in concrete surface beds etc.	m2	26	
C	Type 617 fabric reinforcement in concrete surface beds etc.	m2	567	

Carried to Collection

Bill No. 3
Concrete, Formwork and Reinforcement
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

Item No		Unit	Quantity	Rate	Amount
	<u>BILL No. 4</u>				
	<u>MASONRY</u>				
	<u>NOTE:</u> Tenderers are advised to study the Model Preambles for Trades 2017 before pricing this bill				
	<u>SUPPLEMENTARY PREAMBLES</u>				
	<u>BRICKWORK</u>				
	<u>Sizes in descriptions</u>				
	Where sizes in descriptions are given in brick units, "one brick" shall represent the length and "half brick" the width of a brick				
	<u>Hollow walls, etc</u>				
	Descriptions of hollow walls shall be deemed to include leaving every fifth perpend of the bottom course of the external skin open as a weep hole				
	Walls in two skins described as "bagged and sealed" shall be deemed to include having the outer face of the inner skin bagged with 1:6 cement and sand mixture and sealed with two coats "Brixal" bitumen emulsion waterproof coating				
	Galvanized butterfly ties complying with SANS 28 or approved polypropylene ties shall be built into cavity walls (with cavities not wider than 50mm) at a rate of 4 ties per m ² minimum				
	<u>Pointing</u>				
	Descriptions of recessed pointing to fair face brickwork and face brickwork shall be deemed to include square recessed, hollow recessed, weathered pointing, etc				
	<u>Samples</u>				
	Samples of all masonry building units, except those for walls described as "load bearing", shall consist of a minimum of six units. Samples of building units to be used in walls described as "load bearing" shall consist of thirty units from every thirty thousand units delivered to site				
	Carried to Collection			R	
	Bill No. 4 Masonry SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES				

Bagged brick finish

Bagged brickwork shall be of the mortar as described rubbed onto wall with hessian cloth to provide a fair finish. The finished surface shall be free of penetrations or pitted openings or large protruding lumps of mortar. The finish shall be to the principal agent's approval

BLOCKWORK

Concrete masonry units

Blocks are to be either solid or hollow modular dense concrete masonry units having a compressive strength of 7MPa

Wall ties for blockwork

Wall ties shall be polypropylene ties complying with BS 76377. Ties for hollow walls shall be of sufficient length to allow not less than 75mm of each end to be built into the blockwork. Ties are to be spaced at intervals of not more than 1m in the horizontal direction and not more than 400mm staggered in the vertical direction except at openings, vertical joints or ends of walls where they are to be placed vertically above each other

Blockwork

Blockwork shall comply with SANS 10145 "Concrete Masonry Construction"

Surfaces to be plastered shall have joints raked out to a depth of at least 10mm to provide a key. Cavities of hollow walls shall be kept free of mortar droppings or other undesirable matter. Every second perpend of the bottom course of the external skin of hollow walls shall be left open as a weep hole

Standard complementary blocks

Descriptions of blockwork shall be deemed to include standard complementary blocks such as corner, three-quarter, half and quarter blocks required in the construction of corners, reveals, jambs, ends, etc to solid and hollow walls and for bonding as necessary

Carried to Collection

Bill No. 4

Masonry

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

BRICKWORK IN FOUNDATIONS

Brickwork of clay "Maxi" bricks (14 MPa nominal compressive strength) in Class II mortar

A	280mm Hollow walls in foundations of two half brick skins including wire ties and concrete filling (concrete elsewhere measured)	m2	40
---	--	----	----

Brickwork of clay "NFX" bricks (14 MPa nominal compressive strength) in Class II mortar

B	One brick walls in foundations	m2	383
C	280mm Hollow walls of two half brick skins including wire ties, etc (concrete measured elsewhere)	m2	334
D	330mm Hollow walls of two half brick skins including wire ties, etc. (concrete measured elsewhere)	m2	233

BRICKWORK IN SUPERSTRUCTURE

Brickwork of clay "Maxi" bricks (7 MPa nominal compressive strength) in Class II mortar

E	Half brick walls	m2	46
F	One brick walls	m2	27
G	280mm Hollow walls of two half brick skins including wire ties	m2	155

Brickwork of clay "NFP" bricks (7 MPa nominal compressive strength) in Class II mortar

H	Half brick walls	m2	238
J	One brick walls	m2	1 261
K	280mm Hollow walls of two half brick skins including wire ties	m2	1 436
L	330mm Hollow walls of two half brick skins including wire ties	m2	672
M	90mm Cut linings to concrete	m2	143

Carried to Collection

Bill No. 4
Masonry
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

[illegible]

Item No	Unit	Quantity	Rate	Amount
<u>BILL No. 5</u>				
<u>WATERPROOFING</u>				
<u>NOTE:</u> Tenderers are advised to study the Model Preambles for Trades 2017 before pricing this bill				
<u>SUPPLEMENTARY PREAMBLES</u>				
<u>Guarantee</u>				
Waterproofing of roofs, basements, etc shall be laid under a ten year guarantee. Waterproofing to roofs shall be laid to even falls to outlets, etc with necessary ridges, hips and valleys. Descriptions of sheet or membrane waterproofing shall be deemed to include additional labour to turn-ups and turn-downs				
<u>DAMPPROOFING OF WALLS AND FLOORS</u>				
<u>One layer 250 micron green polyethylene waterproof sheeting (SANS 952-1985 type C) sealed at laps with PVC self-adhesive tape</u>				
A Under surface beds	m2	3 075		
B On floors	m2	60		
<u>One layer 375 micron embossed polyethylene dampproof course (SANS 952-1985).</u>				
C In walls	m2	941		
Carried to Collection				R
Bill No. 5 Waterproofing SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES				

<u>WATERPROOFING TO ROOFS, BASEMENTS, ETC</u>					
	<u>Prime with one coat bitumen primer and fully bonded waterproof membrane comprising two bitumen layers reinforced with woven spunbonded polyester fabric and coated with polyethelene film for heat bonding, laid with 100mm side and 150mm end laps</u>				
A	On roofs	m2	71		
B	Additional membrane 150mm girth at internal and external angles	m	74		
C	Dressing and sealing into 110mm internal diameter outlet, including additional membrane	No	1		
<u>WATERPROOFING OF WALLS AND FLOORS</u>					
	<u>Sika BlackSeal polymer modified bitumen emulsion coating applied according to manufacturers specifications</u>				
D	On brickwork	m2	143		
	<u>Prime with one coat bitumen primer and fully bonded waterproof membrane comprising two bitumen layers reinforced with woven spunbonded polyester fabric and coated with polyethelene film for heat bonding, laid with 100mm side and 150mm end laps</u>				
E	To walls	m2	137		
	<u>Sikalastic 560 membrane reinforced cementitious waterproofing reinforced with Sikalastic Reemat. Applied according to manufacturer's specifications</u>				
F	To Showers	m2	28		
G	Walls as cover flashing strips not exceeding 300mm girth, including sealing top edges into grooves (grooves elsewhere) with mastic	m	472		
<u>PROTECTION TO WATERPROOFING</u>					
	<u>"PT115" Filter Fabric or similar approved</u>				
H	On roofs	m2	71		
Carried to Collection				R	
Bill No. 5 Waterproofing SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES					

	<u>4mm Masonite or similar approved softboard protection to waterproofing</u>				
A	Behind retaining walls to protect waterproofing during backfilling	m2	371		
	<u>PROTECTIVE STONE DRESSING</u>				
	<u>River washed, smooth, round aggregate graded 20mm to 40mm nominal diameter, free from fractures, loam, sand or other foreign substances</u>				
B	50mm Thick on waterproofing to roofs	m2	131		
	<u>JOINT SEALANTS, ETC</u>				
	<u>"Jointex" or similar approved temporary seal with 50% MAF (Jointex elsewhere measured)</u>				
C	10 x 10mm In expansion joints between walls and columns	m	1 199		
D	10 x 10mm In expansion joints in floors	m	1 714		
	<u>Sealing of the joints with Sikaflex®-11 FC polyurethane or MasterSeal HY 495, elastomeric sealant including backing cord, bond breaker, "Sika primer-3" or similar approved, etc</u>				
E	6 x 6mm wide in saw-cut joints (SCJ) in floors	m	932		
	<u>"Sikaflex pro 3I -Cure" two-part polyurethane joint sealing compound including backing cord, bond breaker, etc. applied in accordance with the manufacturers specifications</u>				
F	10 x 10mm in wall joints (WJ) in floors to be applied after one year	m	1 357		
	<u>Approved silicone pointing</u>				
G	Between sanitary fittings and walls	m	26		
	Carried to Collection				
	Bill No. 5				
	Waterproofing				
	SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein				
	PROVISIONAL BILLS OF QUANTITIES				

R

[illegible]

Item No		Unit	Quantity	Rate	Amount
	<u>BILL No. 6</u>				
	<u>ROOF COVERINGS, CLADDING, ETC</u>				
	<u>NOTE:</u> Tenderers are advised to study the Model Preambles for Trades 2017 before pricing this bill				
	<u>SUPPLEMENTARY PREAMBLES</u>				
	<u>Guarantees</u>				
	The contractor will be required to provide a written guarantee for the roof covering as follows:				
	- Roof covering material - fifteen (15) years				
	- Workmanship - ten (10) years				
	<u>PROFILED METAL SHEETING AND ACCESSORIES</u>				
	<u>0,53mm "Saflok 700" profiled Zinalume® AZ150 or similar approved, coated steel G550 with ColorPlus Matt colour coated to one side (Color: Raincloud) with Cool Grey backing coat interlocking roof sheeting fixed to steel purlins at 2 000mm centres using "Saflok 700" clips, including all accessories for fixing complete all in accordance to manufacturer's and architects specification (Purlins and steel trusses elsewhere measured)</u>				
A	Roof coverings (measured nett on plan) with pitch not exceeding 5 degrees	m2	2 675		
B	Roof coverings (measured nett on plan) with 12 degrees pitch	m2	170		
C	Circular cutting	m	17		
D	Headwall flashing 375mm girth, two times bent along girth and notched on site to suit roof profile	m	105		
E	Ridge flashing 46mm girth, bent along girth and notched on site to suit roof profile	m	140		
F	Barge flashing 462mm girth, two times bent along girth and notched on site to suit roof profile	m	107		
	Carried to Collection				
	Bill No. 6				
	Roof Coverings, Claddings, etc				
	SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein				
	PROVISIONAL BILLS OF QUANTITIES				

A	Sidewall flashing 375mm girth, two times bent along girth and notched on site to suit roof profile	m	160
B	Counter flashing 154mm girth, two times bent along girth and notched on site to suit roof profile	m	333
C	Narrow and broad flute closers 150mm girth	m	68
D	Custom headwall flashing 805mm girth, two times bent along girth and notched on site to suit roof profile	m	68
E	Back flashing 375mm girth, two times bent along girth and notched on site to suit roof profile	m	45
F	Gutter flashings 154mm girth	m	272
	<u>Palermo Sunlok "Suntuf 10000" or similar approved Polycarbonate sheeting in colour Clear – high wind load clips to receive a saddle washer and 14 x 22mm stitching fastener including side stitching of 500mm centres all in accordance with manufacturer's instructions</u>		
G	Roof coverings (measured nett on plan) with pitch not exceeding 5 degrees	m2	36
H	Roof coverings (measured nett on plan) with 12 degrees pitch	m2	78
J	Circular cutting	m	17
	<u>Safintra Saflok 700 - 0.53mm thick ColorPlus or similar approved, colour to be "Raincloud", C.1.S finish with standard backing coat G550 interlocking roof sheeting with AZ150 spelter to both sides fixed to steel purlins at internal spans as per engineer's specifications using SAFLOK 700 clips screw fixed to steel purlins secured with Safintra approved wafer head fastener, all in accordance with manufacturer's recommendations</u>		
K	Side cladding	m2	122
	<u>Sunlok "Suntuf 10000" or similar approved Polycarbonate sheeting in colour Clear – high wind load clips to receive a saddle washer and 14 x 22mm stitching fastener including side stitching of 500mm centres all in accordance with manufacturer's instructions</u>		
L	Side cladding	m2	512
Carried to Collection			
Bill No. 6			
Roof Coverings, Claddings, etc			
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein			
PROVISIONAL BILLS OF QUANTITIES			

R

SPACER SYSTEM

Purlin Spacers installed over 135mm bulk insulation to receive roof sheeting (elsewhere measured)

A	Spacer/packer cut to size installed on purlin, complete	m	2 701
---	---	---	-------

Carried to Collection

Bill No. 6
Roof Coverings, Claddings, etc
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

Item No		Quantity	Rate	Amount
	BILL No. 7			
	CARPENTRY AND JOINERY			
	<u>NOTE:</u> Tenderers are advised to study the Model Preambles for Trades 2017 before pricing this bill			
	SUPPLEMENTARY PREAMBLES			
	<u>General</u>			
	All dimensions are to be checked with on site and with the architects drawings and any discrepancies brought to the architect's attention before any construction work commences			
	<u>Joinery</u>			
	Descriptions of frames shall be deemed to include frames, transomes, mullions, rails, etc			
	Descriptions of hardwood joinery shall be deemed to include pelleting of bolt holes			
	Prices are to include for all ironmongery, finishes, etc unless otherwise described			
	Prices are to include for the making of holes, etc to accommodate lighting, conduiting, pipes, sanitary fittings, etc			
	Prices are to include for approved silicone sealant at all junctions of work tops, side panels, etc with walls			
	<u>Fixing</u>			
	Items described as "nailed" shall be deemed to be fixed with hardened steel nails or shot pins to brickwork or concrete			
	<u>Decorative laminate finish</u>			
	Laminate finish shall be glued under pressure. Edge strips shall be butt jointed at junctions with adjacent similar finish			
	Doors to be delivered with protection for the finished surfaces.			
	Carried to Collection		R	
	Bill No. 7 Carpentry and Joinery SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES			

Specification

The tenderer is referred to the SVA "Architectural Specification" document SMFN-SVA-A-SP-01-101 Rev C and is to ensure that all work is done in accordance to the specifications as laid out in this document.

Fire doors

Fire doors are to be in accordance with SANS 1253

Joint sealant

Contractor to allow for silicon seals in rate build up

Carried to Collection

Bill No. 7

Carpentry and Joinery

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

ROOFS, ETC

Sawn softwood - SA Pine

A	38 x 114mm Wall plates	m	8
B	50 x 152mm Bolted roof truss members in lengths exceeding 2.4m and not exceeding 3.9m	m	37
C	50 x 76mm Purlins	m	16

EAVES, VERGES, ETC

"Nutec" medium density plain sheets

D	12 x 225mm Fascias and barge boards, including H-profile plastic jointing strips	m	246
---	--	---	-----

DOORS, ETC

TIMBER DOORS

Semi-solid flush panel timber door with 0.7mm Rovere Valdweg woodgrain laminate finish and 10mm concealed hardwood edgings all round. single ledge and brace door hung to timber frames (frames elsewhere measured)

E	44mm Single door 725 x 2100mm high - D01	No	10
F	44mm Single door 1100 x 2100mm high - D02	No	1
G	44mm Single door 1015 x 2356mm high - D06	No	1
H	44mm Single door 813 x 2100mm high, including opening to take 0.6mm louvre 682 x 200mm high - D10	No	2
J	44mm Single door 813 x 2044mm high, with 44mm overcut - D17	No	7
K	44mm Single door 1100 x 2100mm high - D18	No	1
L	44mm Single door 813 x 2100mm high - D20	No	7

Carried to Collection

Bill No. 7

Carpentry and Joinery

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

	<u>Semi-solid flush panel timber door with 0.7mm Rovere Valdweg woodgrain laminate finish and 10mm concealed hardwood edgings all round. Hung to steel frames (frames measured elsewhere)</u>				
A	44mm Double door 1500 x 2387mm high - D03	No	1		
B	44mm Double door 1500 x 2100mm high - D07	No	2		
C	44mm Double door 1820 x 2400mm high - D11	No	3		
D	44mm Double door 1500 x 2400mm high - D14	No	1		
	<u>Semi-solid timber door with hardwood edgings all round. Door to have acoustic rating of Rw 45 dB. Facing: 0.7mmmm Rovere Valdweg woodgrain laminate. 10mm concealed hardwood edging single ledge and brace door hung to timber frames (frames elsewhere measured)</u>				
E	44mm Double door 1686 x 2476mm high acoustic door - D12	No	1		
	<u>"Varikust (VKF105)" or similar approved solid timber door. flush panel, external face to receive paint finish, internal face to receive 0.7mm Rovere Valdweg Aleve woodgrain laminate. Single ledge and brace door hung to steel frames (frames elsewhere measured)</u>				
F	44mm Single door 1100 x 2100mm high - D08	No	1		
	<u>"Swartland" Cape Culture Solid meranti frame ledge and braced timber door with rebated meeting stiles. density greater than 560kg/m². Door leaf to receive solid board infill on inside face of leaf to mid-rail height. Door hung to steel frames (frames elsewhere measured)</u>				
G	44mm Double door 1820 x 2400mm high - D13	No	1		
	<u>Solid flush panel timber door to received paint finish. Hung to steel frames (frames measured elsewhere)</u>				
H	44mm Single door 910 x 2100mm high - D15	No	2		
J	44mm Single door 813 x 2032mm high - D16	No	2		
K	44mm Single door 813 x 2032mm high - D19	No	2		
Carried to Collection					R
Bill No. 7					
Carpentry and Joinery					
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein					
PROVISIONAL BILLS OF QUANTITIES					

Hufcor Series U901 Unispan self support system for manually operated accordion partitions. Panels consisting of medium density fibreboard header side panels with mineral wool insulation for sound retardation. Facing to be fabric covered, colour: TBC.

A	Folding door 4877 x 3682mm high - FD1	No	1
---	---------------------------------------	----	---

TIMBER DOOR FRAMES

44x69mm Solid light oak frame to receive oil finish (measured elsewhere) with 45 x 15mm rebates in 110mm walls

B	Frame for single door 813 x 2044mm high	No	7
---	---	----	---

C	Frame for single door 813 x 2144mm high	No	6
---	---	----	---

D	Frame for single door 1188 x 2144mm high	No	1
---	--	----	---

E	Frame for single door 873 x 2130mm high	No	2
---	---	----	---

F	Frame for double door 1774 x 2520mm high	No	1
---	--	----	---

G	Frame for single door 1100 x 2100mm high	No	1
---	--	----	---

44x69mm Solid light oak frame to receive oil finish (measured elsewhere) with 45 x 15mm rebates in 230mm walls

H	Frame for single door 813 x 2144mm high	No	11
---	---	----	----

J	Frame for single door 1530x 2444mm high, to accommodate full height side glazing panel (glazing measured elsewhere).	No	1
---	--	----	---

Carried to Collection

Bill No. 7

Carpentry and Joinery

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

FIRE DOORS

Fire doors complete with MDF face finish, to receive paint finish. Intumescent fire seals to suit fire ratings. Doors to be labelled, indicating manufacturers name, fire rating, reference no. and year of manufacture

A	Class "B" 120min fire double door 1820 x 2400mm high, including 1.6mm thick pressed steel door frame designed to achieve requisite fire rating for 230mm brick wall, with hinges as required per leaf, including preparing frame for door closer and magnetic lock - D05	No	1
	<u>Fire doors complete with 0.7mm Rovere Valdweg woodgrain laminate finish. Intumescent fire seals to suit fire ratings. Doors to be labelled, indicating manufacturers name, fire rating, reference no. and year of manufacture</u>		
B	Class "B" 120min fire single door 813 x 2032mm high, with hardwood edgings including 1.6mm thick pressed steel door frame designed to achieve requisite fire rating for 230mm brick wall, with hinges as required per leaf, including preparing frame for door closer and magnetic lock - D09	No	2
	<u>Fire doors complete with 0.7mm Rovere Valdweg woodgrain laminate finish to one side and paint finish to one side. Intumescent fire seals to suit fire ratings. Doors to be labelled, indicating manufacturers name, fire rating, reference no. and year of manufacture</u>		
C	Class "B" 120min fire double door 1500 x 2400mm high, including 1.6mm thick pressed steel door frame designed to achieve requisite fire rating for 230mm brick wall, with hinges as required per leaf, including preparing frame for door closer and magnetic lock - D04	No	1

Carried to Collection

R

Bill No. 7

Carpentry and Joinery

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

JOINERY FITTINGS					
	<u>Legni Woodgrains fixed to walls, 4627 Rovere Valdweg finished on 16mm chipboard substrate, all according to manufacturers specifications. Format: 3050 x 1300mm, Colour: Light Oak, Supplier: Max On Top (MOT)</u>				
A	On Walls	m2	30		
	<u>Custom made bench comprising of 44mm thick timber with 5mm radiused corner on top and bottom edges. Including subframe, supplied and installed complete. Refer to Architects Drawing A(76)1002</u>				
B	709mm Wide custom made bench	m	5		
	<u>20mm Thick Concrete cloud Phoenix Stone Engineered-quartz counter tops (Colour: Grey, Finish: Matt). Designed, supplied and installed complete as per Architects Drawing: A(76)1003 Main Building - Joinery - Details</u>				
C	600mm wide counter tops	m	15		
	<u>Cupboard carcasses consisting of 16mm Thick suitable Melamine faced chipboard with 2mm PVC edging on both sides (Colour: Grey). Refer to Architect Drawings: Main Building - Joinery - Details A(76)1003, Gatehouse - Joinery - Extents Plan A(76)1004 & Generator Building - Joinery - Extents Plan A(76)1005</u>				
D	600 x 900mm high floor units	m	15		
E	320 x 950mm high wall units	m	4		
F	320 x 514mm high wall units	m	9		
	<u>Custom made reception desk comprising of 20mm Concrete cloud Phoenix Stone Engineered -quartz (colour: grey) with oak finish timber on subframe. (Supplier: WOMAG). Designed, supplied and installed complete as per Architects Drawing: A(76)1003 Main Building - Joinery - Details & A(76)1004 Gatehouse - Joinery Extents Plan</u>				
G	Reception desk overall size 3 924 x 750 x 1 100mm high complete - Main Building	No	1		
H	Reception desk overall size 2 468 x 570 x 1 100mm high complete - Gatehouse	No	1		
Carried to Collection				R	
Bill No. 7					
Carpentry and Joinery					
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein					
PROVISIONAL BILLS OF QUANTITIES					

PERGOLAS (Footings measured under bill items)

Galvanised columns and beams in single lengths with flat base, cap, bearer and connection plates, including painting (colour to be confirmed)

A	203 x 133 x 25kg/m H	t	1.32
B	203 x 133 x 25kg/m UB	t	0.19
C	Connection plates, etc	t	0.20
D	Hot dip galvanised fixing bolts	t	0.10
<u>"Balau" or similar approved Wrought laminated timber</u>			
E	76 x 225mm Beams, pergola beams, etc, bolted	m	123

Carried to Collection

Bill No. 7
Carpentry and Joinery
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

Bulkheads have only been described as such where they conform to the above definition and where the horizontal or vertical dimensions do not exceed 1200mm. Where these dimensions are more than 1200mm such portions of ceilings have been included in the appropriate general items of ceilings

Unless otherwise described bulkheads shall be deemed to be horizontal along the length

Steel Components

All steel components for ceilings, partitions, etc are to be galvanised in accordance with SANS 121

Carried to Collection

Bill No. 8

Ceilings, Partitions and Access Flooring

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

PRICING NOTES

All ceilings are to be priced as suspended not exceeding 1m from soffits, and an additional extra over item will be measured where additional cost for higher suspension subgrid systems will be allowed for.

Bulkheads are to be measured in vertical and/or horizontal components. Where bulkheads are of irregular shape, the components should be included as either vertical or horizontal bulkheads not exceeding 1 200mm width or height, If exceeding then components would be included in ceiling quantity as stated above.

Contractors are to allow in their price for the above mentioned when pricing the nailed up ceilings section of this tender document as no claims will be entertained in this regard.

Skimmed Plaster

Where so described skimming / plastering to plasterboard as a whole (ceilings or partitions) shall be priced for a 3mm lightweight retarded semi hydrate gypsum plaster applied to the complete surface as a smooth polished application.

Skimming / Plastering deemed to be included in the rate

Carried to Collection

Bill No. 8

Ceilings, Partitions and Access Flooring

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

SUSPENDED CEILINGS

12.5mm Thick gypsum plasterboard with 63mm wide strips of mesh scrim screwed over joints and the whole finished with and including gypsum skim plaster trowelled to a smooth polished surface to the thickness recommended by the manufacturer fixed to with and including a concealed tee suspension system including main and cross tees, necessary hangers, grids, etc

A	Ceilings suspended not exceeding 1m below steel trusses at approximately 5m centres with rigid hangers	m2	261
B	Ceilings suspended exceeding 2m and not exceeding 3m below steel trusses at approximately 5m centres with rigid hangers	m2	145
C	Sloped ceilings suspended not exceeding 1m below steel trusses at approximately 5m centres with rigid hangers (measured nett on plan)	m2	97
D	Sloped ceilings suspended exceeding 3m and not exceeding 4m below steel trusses at approximately 5m centres with rigid hangers (measured nett on plan)	m2	22
E	Vertical bulkheads between suspended ceilings, formed of one 270mm element, including 38 x 38mm sawn softwood banding at 300mm centres	m	22
F	Vertical bulkheads between suspended ceilings, formed of one 3000mm element, including 38 x 38mm sawn softwood banding at 300mm centres	m	20
G	Vertical bulkheads between suspended ceilings, formed of one 3320mm element, including 38 x 38mm sawn softwood banding at 300mm centres	m	16
H	Circular cutting	m	15

Carried to Collection

Bill No. 8

Ceilings, Partitions and Access Flooring

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

12.5mm moisture resistant plasterboard with 63mm wide strips of mesh scrim screwed over joints and the whole finished with and including gypsum skim plaster trowelled to a smooth polished surface to the thickness recommended by the manufacturer fixed to with and including a concealed tee suspension system including main and cross tees, necessary hangers, grids, etc

A	Ceilings suspended not exceeding 1m below steel trusses at approximately 5m centres with rigid hangers	m2	71
B	Ceilings suspended not exceeding 1m below concrete slab at approximately 5m centres with rigid hangers	m2	37
C	Ceilings suspended exceeding 2m and not exceeding 3m below steel trusses at approximately 5m centres with rigid hangers	m2	14
D	Vertical bulkheads between suspended ceilings, formed of one 300mm element, including 38 x 38mm sawn softwood brandering at 300mm centres	m	93
E	Vertical bulkheads between suspended ceilings, formed of one 470mm element, including 38 x 38mm sawn softwood brandering at 300mm centres	m	11
F	Vertical bulkheads between suspended ceilings, formed of one 590mm element, including 38 x 38mm sawn softwood brandering at 300mm centres	m	5
G	Vertical bulkheads between suspended ceilings, formed of one 1100mm element, including 38 x 38mm sawn softwood brandering at 300mm centres	m	7

Carried to Collection

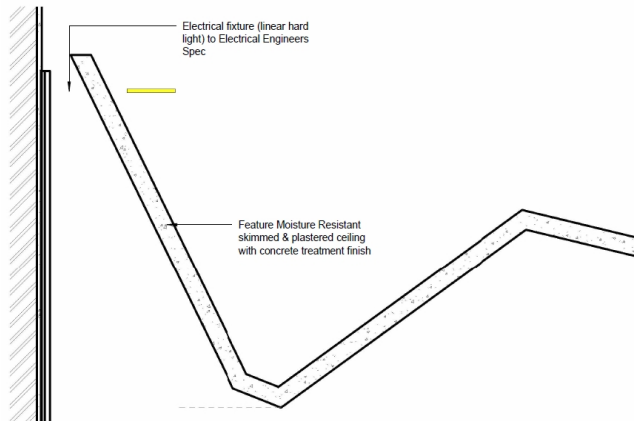
R

Bill No. 8

Ceilings, Partitions and Access Flooring

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

- A Combination bulkheads between nailed up ceilings as per detail below. Refer to Architects Drawing A(14)1001 Reflected Ceiling Plan - A. Main Building



3 Ceiling Detail - Section (Ablutions Bulkhead)
1 : 10

		m	9
	<u>600 x 600 x 12mm Thick "Minerval A" or other similar approved high performance acoustic ceiling tiles including ceiling grid suspension system with main and cross tees, necessary hangers, grids, etc</u>		
B	Ceilings suspended exceeding 1m and not exceeding 2m below steel trusses at approximately 5m centres with rigid hangers	m2	639
C	Circular cutting	m	25
D	Vertical bulkheads between suspended ceilings, formed of one 260mm element, including 38 x 38mm sawn softwood banding at 300mm centres	m	31
	<u>1200 x 600 x 12mm Thick "Minerval A" or other similar approved high performance acoustic lay-in grid ceiling tiles on and including grid suspension system including main and cross tees, necessary hangers, grids, etc</u>		
E	Ceilings suspended exceeding 1m and not exceeding 2m below steel trusses at approximately 5m centres with rigid hangers	m2	259

Carried to Collection

R

Bill No. 8
Ceilings, Partitions and Access Flooring
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

A	Sloped ceilings suspended exceeding 1m and not exceeding 2m below steel trusses at approximately 5m centres with rigid hangers (measured nett on plan)	m2	16
B	Circular cutting <u>1800 x 600 x 40mm Thick "Echophon Solo Baffle" or other similar approved ceiling tiles on and including grid suspension system including main and cross tees, necessary hangers, grids, etc</u>	m	31
C	Ceiling panels suspended not exceeding 1m below steel trusses, hung from wires, all in accordance to manufacturer's specifications	No	92
D	Ceiling panels suspended exceeding 1m and not exceeding 2m below steel trusses, hung from wires, all in accordance to manufacturer's specifications <u>1195 x 595 x 4mm "Nutec" plain ceiling panels on and including "Nutec" pre-painted exposed tee suspension system, including main and cross tees, necessary hangers, grids, etc</u>	No	62
E	Ceilings suspended not exceeding 1m below steel trusses at approximately 5m centres with rigid hangers <u>Cornices to suspended ceilings</u>	m2	7
F	"DONN" SM25 or similar approved pre-painted wall angles, plugged <u>INSULATION</u> <u>"Gyrproc" glasswool insulation laid on top of ceilings</u>	m	1 017
G	50mm Thick insulation laid on top of ceilings (measured nett on plan)	m2	915

Carried to Collection

R

Bill No. 8
Ceilings, Partitions and Access Flooring
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

<u>PARTITIONS</u>					
<u>"Gyproc Rhinoboard" or similar approved drywall system with one layer of 12.5mm boards on both sides</u>					
A	Slanted partitions 6560mm high with bottom track nailed and top track fitted with standard aluminium channel cappings	m	28		
B	Extra over partitions 6560mm high for vertical abutment against structure	No	9		
C	Extra over partitions 6560mm high for corner	No	9		
D	Extra over partitions 6560mm high for fair end, including fitted with standard aluminium channel capping	No	1		
<u>"Gyproc Rhinoboard" or similar approved drywall system with one layer of 12.5mm boards on both sides, including 50mm thick glasswool insulation in blanket form with a 14kg/m³ density</u>					
E	Partitions 2000mm high with bottom track nailed and top track fitted with standard aluminium channel cappings	m	2		
F	Partitions 2530mm high with bottom track nailed and top track fitted with standard aluminium channel cappings	m	5		
G	Partitions 2730mm high with bottom track nailed and top track fitted with standard aluminium channel cappings	m	5		
H	Partitions 3075mm high with bottom track nailed and top track fitted with standard aluminium channel cappings	m	10		
J	Partitions 3275mm high with bottom track nailed and top track fitted with standard aluminium channel cappings	m	6		
K	Extra over partitions 2000mm high for vertical abutment against structure	No	2		
L	Extra over partitions 2530mm high for vertical abutment against structure	No	2		
M	Extra over partitions 2730mm high for vertical abutment against structure	No	2		
N	Extra over partitions 3075mm high for vertical abutment against structure	No	4		
Carried to Collection					
Bill No. 8					
Ceilings, Partitions and Access Flooring					
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein					
PROVISIONAL BILLS OF QUANTITIES					

Bill No. 8
Ceilings, Partitions and Access Flooring
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

ACCESS FLOORING

SANS 1549 Class C Heavy duty access floor sealed at the perimeter, colour: Stipple White

A	600 x 600mm Modular and interchangeable "Solidfeel 30" or similar approved board panel access flooring including pedestals and panels finished with and including anti-static HPL including glued on with approved adhesive (access flooring to finish 500mm above concrete sub-floor)	m2	369
B	Junctions against walls and columns	m	140
C	600 x 600mm Modular and interchangeable "Solidfeel 30" or similar approved board panel access flooring including pedestals and panels finished with and including anti-static HPL including glued on with approved adhesive (access flooring to finish 600mm above concrete sub-floor)	m2	145
D	Junctions against walls and columns	m	66

Carried to Collection

Bill No. 8
Ceilings, Partitions and Access Flooring
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

Item No	Quantity	Rate	Amount
<u>BILL No. 9</u>			
<u>FLOOR COVERINGS, WALL LININGS, ETC</u>			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Fixing</u>			
Floor coverings, wall linings, etc shall, where applicable, be fixed with adhesive as recommended by the manufacturers of the flooring, linings, etc			
<u>Surface Preparation</u>			
New surfaces must be solid, firm and free of dust, mould oil, grease, sealers, wax polish and organic growth. Organic growth must be removed and the spores killed with an effective fungicide such as a household bleaching solution.			
Carried to Collection			
			R
Bill No. 9 Floor Coverings, Wall Linings, etc SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES			

FLOOR COVERINGS

500 x 500mm "Vanguard Collection" Canvas carpet tiles (Colour: Dusky Blue, Supplier: KBAC Flooring) or similar approved glue fixed carpet tiles with underlay all fixed in accordance with manufacturers specifications

A	Floors	m2	864
---	--------	----	-----

SKIRTINGS

Aluminium

B	3x 38mm wide Natural anodised cover strips between carpet and tile/polished concrete fixed to concrete	m	10
---	--	---	----

C	30 x 30 x 3mm Aluminium angle trim plugged and screwed to floor slab	m	39
---	--	---	----

D	75 x 1.6mm Thick skirtings	m	269
---	----------------------------	---	-----

Carried to Collection

Bill No. 9

Floor Coverings, Wall Linings, etc

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

HINGES, BOLTS, ETC

Dormakaba or similar approved

A	102x75x3mm, EN1935 Grade 13, Two ball bearing butt hinge. Fire Rated. 120kg carrying capacity per pair. Finish: Stainless Steel. Product Code: DBB-SS-009	Pairs	96.0
---	---	-------	------

LOCKS, ETC

Dormakaba or similar approved

B	Cylinder sash lock. Case dimensions: 116.5H x 78D. Forend dimensions: 168H x 22W. Backset 57mm, Centres 61mm. Finish: Stainless Steel. Product Code: D036S SS	No	8
C	63mm - 31.5+31.5mm Europrofile Nickel plated E-SP 5 Pin Double cylinder - Grand master keyed. Finish: Satin Nickel. Product Code: DDC206301 GMK	No	8
D	Single electromagnetic lock with 600 lbf (2669N) holding force, motise-mounted, lock with status sensor(29860502). Finish: Anodized aluminium. Product Code: EMC 600 AM	Sets	29.0
E	L+Z Bracket for EMC 600 ALH. Finish: Satin nickel. Product Code: L+Z Bracket 600	Sets	29.0
F	Bathroom sash lock. Case dimensions 102H x 78D. Forend dimensions 155H x 22W. Backset 57mm. Centres 57mm. Finish: Stainless steel. Product Code: D035S SS	No	14
G	Cylinder Deadlock. Case dimesions 116.5H x 78D. Forend dimensions 168H x 22W. Backset 57mm. Finish: Stainless steel. Product Code: D037D SS	No	4
H	63mm - 31.5 + 31.5mm Europrofile nickel plated E-SP 5 pin double cylinder - Grand master keyed. Finish: Satin nickel. Product Code: DDC206301 GMK	No	4
J	Round Cylinder escutcheon. Finish: Stainless steel. Product Code: DCE-002 S.S	Pairs	4.0
K	40.5 - Europrofile nickel plated E-SP 5 pin single cylinder - grand master keyed. Finish: Satin Nickel. Product Code: DSC204101 GMK	No	2

Carried to Collection

R

Bill No. 10
Ironmongery
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

[illegible]

HANDLES, ETC

Dormakaba or similar approved

A	Lever handle on rose with cylinder escutcheons. Finish: Stainless Steel. Product Code: TH125 Cyl S.S	Sets	8.0
B	DPH301C Pull handle BT fixed on a 150 x 300 x 1.2mm thick Grade 304 stainless steel plate with no cylinder cutout. Stainless steel plate to have 6 countersunk holes for screw fixing. (Special order). Finish: 304 Brushed stainless steel. Product Code: DHP-304-BL-SF 150x300	No	4
C	Lever handle on rose with Bathroom/WC Furniture. Finish: Stainless Steel. Product Code: TH125 WC S.S	Sets	14.0
D	325 x 25mm Straight tubular pull handle flange fixing. Finish: Stainless Steel. Product Code: DPH301B	No	6
E	300x30mm Straight tubular pull handle BTB (BTB fixing sets included). Finish: Stainless steel. Product Code: DPH210 BTB	Pairs	33.0
F	Two pint locking panic bar - Single door - door leaf 1000mm wide x 2270mm high (2201. 2104. PHX02. PHX04). Product Code: PHA2 S SD	Sets	1.0
G	Exterior access lock with lever handle (cylinder not included). Finish: Satin Nickel. Product Code: PHT3901	No	2
H	Three point locking panic bar - double door - door leaf 1000mm wide x 2270mm high (2101. 2104. 2104. 2201. PHX02. PHX04). Finish: Stainless steel. Product Code: PHA3 S DD	Sets	1.0

Carried to Collection

Bill No. 10
Ironmongery
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

KICKPLATES, PUSHPLATES ETC

Dormakaba or similar approved

A	150 x 300 x 1.2mm Thick Grade 304 stainless steel plate. Stainless steel plate to have 6 countersunk holes for screw fixing (special order). Finish: 304 Brushed Stainless Steel. Product Code: DPP-304-BL-SF 150x300	No	4
B	600x(width of door)x1.2mm Thick Grade 304 stainless steel kick plate. Stainless steel kick plate to have 18 countersunk holes for screw fixing (special order). Finish: 304 Brushed stainless steel. Product Code: DKP-304-SF 600	No	6

Carried to Collection

Bill No. 10
Ironmongery
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

<u>DOOR CLOSERS, ETC</u>				
<u>Dormakaba or similar approved</u>				
A	EN3 Cam action door closer with standard NON HOLD OPEN slide channel arm. EN1154, certified to ISO 9001. Hydraulic speed control. Standard pull-side door leaf fixing. Transom push-side fixing. EN# suitable for door width 850-900mm. Fire rated: CERTI FIRE approved (CF 119) for door types ITT 120, MM/IMM 240. Finish: Silver. Product Code: TS91B-SL	No	14	
B	EN 3/4 Cam action door close with standard NON HOLD OPEN slide channel arm. EN1154. certified to ISO 9001, hydraulic speed control and backcheck. Standard pull side fixing, transom push-side fixing. EN3 suitable for door width 850-950mm, EN4 suitable for door width 950-11100mm. Fire rated: CERTI FIRE approved (CF119) for door types ITT 120, MM/IMM 240. Finish: Silver. Product Code: TS90-SL	No	1	
C	EN 1-4 Rack and pinion door closer with standard NON HOLD OPEN scissor arm and parallel arm bracket. EN1154, certified to ISO 9001. Hydraulic speed control, backcheck and DELAYED ACTION. Standard push side fixing. EN 1 suitable for door width <850mm, EN2 suitable for door width 750-850mm, EN3 suitable for door width 850-950mm, EN4 suitable for door width 950-1100mm. Fire rated. Approved to AS1905 Part 1. Finish: Silver. Product Code: TS73V DC PA-SL	Sets	3.0	
D	Non-hold open co-ordinated door closer system for rebated doors between 1350-1900mm. Closing Force EN3. Hydraulic speed control. Max door width 950mm per leaf. Pull-side fixing. Door closer compliant with EN 1154. Door co-ordinators tested to EN 1158. Door closer is CERTI FIRE approved (Cert. no. CF119) for door types ITT 120, MM/IMM 240. Certified manufacturer to ISO 9001. Finish: Silver. Product Code: TS91B G-SR	Sets	12.0	
E	EN 1-4 Cam action door closer with NON HOLD OPEN slide channel arm and angle bracket. EN1154, certified to ISO 9001. Adjustable hydraulic speed control. Standard push-side door leaf fixing. Transom push-side fixing. EN1 suitable for door width < 50mm, EN2 suitable for door width 750-850mm, EN3 suitable for door width 850-950mm, EN4 suitable for door width 950-1100mm. Fire rated: CERTI FIRE approved (CF 119) for door types ITT 120, MM/IMM 240. Finish: Silver. Product Code: TS92G-AB-SL	Sets	1.0	
Carried to Collection				
Bill No. 10 Ironmongery SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES				R

SUNDRIES, ETC

Dormakaba or similar approved

A	Floor mounted door stop. Finish: Stainless Steel. Product Code: DDS-SS-017	No	39
B	M4 Patent Male/Female fixing screw pack (2 pairs per pack)	pack	8
C	Hat and coat hook with rubber buffer. Finish: Stainless Steel. Product Code: DHC-SS-031B	No	13

Carried to Collection

Bill No. 10

Ironmongery

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

<u>SIGNAGE</u>					
<u>Dormakaba or similar approved</u>					
A	150 x 150mm FEMALE sign. Finish: Stainless Steel. Product Code: DSS-131 F	No	1		
B	150 x 150mm MALE sign. Finish: Stainless Steel. Product Code: DSS-130 M	No	1		
C	150x150mm SHOWER sign. Finish: Stainless Steel. Product Code: DSS-139 S	No	1		
D	150 x 150mm DISABLED PERSONS sign. Finish: Stainless steel. Product Code: DSS-133 P	No	3		
E	150 x 150mm MALE/FEMALE sign. Finish: Stainless steel. Product Code: DSS-132 MF	No	2		
<u>2mm Thick fabricated aluminium individual Lettering plate, powdercoated (colour: RAL7043), rod welded to the back of lettering chemically fixed in concrete/masonry wall as per structural engineer's specification. Refer to Architect Drawings: Main building - Signage Reference Plan (74)1000 & Gatehouse & C. Gen - Signage Reference Plan (74)1001</u>					
F	450mm high "SANSA" sign mounted to wall - S01	No	2		
<u>3mm Thick Aluminium door sign plate powercoated, colour: RAL 7021 with white vinyl stickers for lettering as per door sign plate schedule with silicone adhesive to manufacturer's specifications Refer to Architect Drawings: Main building - Signage Reference Plan (74)1000 & Gatehouse & C. Gen - Signage Reference Plan (74)1001</u>					
G	400 x 70mm high sign mounted to door- S03	No	12		
H	400 x 70mm high sign mounted to wall - S04	No	16		
<u>3mm Thick Aluminium door sign plate powercoated, colour: RAL 7021 with white vinyl stickers for lettering as per door sign plate schedule with silicone adhesive to manufacturer's specifications and vinyl film applied to hide residue. Refer to Architect Drawings: Main building - Signage Reference Plan (74)1000 & Gatehouse & C. Gen - Signage Reference Plan (74)1001</u>					
J	400 x 70mm high sign fixed to glazing panel - S05	No	5		
Carried to Collection				R	
Bill No. 10 Ironmongery SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES					

Wayfinding signs specifications. Refer to Architect Drawings:
Main building - Signage Reference Plan (74)1000 &
Gatehouse & C. Gen - Signage Reference Plan (74)1001

A	150 x 150mm high mobility impaired sign - S06	No	3
B	150 x 150mm high female sign - S07	No	6
C	150 x 150mm high male sign - S08	No	6
D	150 x 150mm high directional sign - S09	No	3

Carried to Collection

Bill No. 10
 Ironmongery
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

PHOTOLUMINESCENT SIGNS

SUPPLEMENTARY PREAMBLES

Signs are to comply with SANS 1186-1 to 5 and to be to the approval of the local authority. Signs are to have anodised aluminium frames

Prices are to include for fixing by approved methods. The use of double sided tape will not be permitted. Surface mounted signs are to be concealed fixed and ceiling mounted signs are to be hung with 2mm diameter stainless steel cables

Single sided ceiling mounted signs are to have 2mm satin chrome anodised aluminium back panels

Samples, specifications, literature, etc of materials and fabricated articles the tenderer proposes to use shall be submitted with the tender

A ten year guarantee on materials and workmanship shall be submitted by the successful tenderer

Wall mounted photoluminescent statutory signs in 150 x 150mm modules

A	150 x 150mm Sign with one pictogram	No	31
B	300 x 150mm Sign with two pictograms	No	8

Ceiling mounted double sided photoluminescent statutory signs in 150 x 150mm modules

C	300 x 150mm Sign with two pictograms	No	31
---	--------------------------------------	----	----

Carried to Collection

Bill No. 10

Ironmongery

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

Item No	Quantity	Rate	Amount
<u>BILL No. 11</u>			
<u>STRUCTURAL STEEL</u>			
<u>NOTE:</u> Tenderers are advised to study the Model Preambles for Trades before pricing this bill			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Descriptions</u>			
Descriptions of bolts shall be deemed to include nuts and washers			
Descriptions of L-shaped and U-shaped anchor bolts shall be deemed to include bending, threading, nuts and washers and embedding in concrete			
Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete			
Where anchor bolts are described as embedded in sides or soffits of concrete it shall be deemed to include holes through formwork			
<u>General</u>			
All dimensions are to be checked with engineer's drawings and any discrepancies brought to the architect's attention before any construction work commences			
Products different to those specified may be used with the engineer's prior approval			
Do not scale from engineer's drawings			
<u>Structural steelwork</u>			
All structural steelwork shall be fabricated and erected in accordance with the latest edition of SANS 1200H			
All dimensions shall be checked on site before shop drawings commence. Any discrepancies shall be brought to the attention of the engineer. Final dimensions and fitting of members shall remain the responsibility of the contractor			
Carried to Collection			R
Bill No. 11 Structural Steel SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES			

A complete set of shop drawings shall be submitted to the Engineer for approval before fabrication commences. The contractor shall allow one week for checking and approval by the Engineer, and shall also allow for any possible changes to shop drawings

The contractor shall design all welds and, where necessary, gussets of sufficient strength, shall be approved to obtain the required weld strength

Setting out points (S.O.P's) at member centroids shall conform to those shown on general arrangement drawings. No eccentricities, except those shown on the Engineer's drawings, shall be allowed

All structural steelwork shall be S355JR and cold formed sections shall have a yield strength of 200MPa unless noted otherwise

A certificate from the steel manufacturer in which the grade of the structural steel is verified shall be handed to the Engineer for approval

Anchor bolts and structural bolts for fixing the purlins shall be Grade 4.8 galvanised. All other bolts and lugs shall be grade 8.8 galvanised unless otherwise noted and shall be deemed to be included

Chemical anchor bolts will have a minimum Grade 8.8. The preferred epoxy will be forwarded to the engineer for approval

The proposed method and sequence of erection of the structure shall be submitted to the Engineer for written approval. Such submission is to take place at time of shop drawing submittal. The contractor shall indicate the proposed method of propping to ensure stability of the structure during erection. Such stability during erection remains the contractor's responsibility. Where temporary bracing and propping is necessary, the contractor shall be responsible for the design, erection, maintenance and removal (where necessary) of such supports. Proposal of such bracing or propping shall be submitted to the engineer at an early stage for written approval

No stacking of roof sheets or other point loads shall be allowed on the structure during the construction process

Carried to Collection

Bill No. 11

Structural Steel

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

Welding to structural steelwork

Minimum weld size to be 6mm continuous fillet welds all around, unless shown otherwise. All butt welds shall be full penetration welds and be of full strength

All welds on this project shall be executed by coded welders. Proof of the relevant certificates shall be submitted to the engineer prior to fabrication of any structural steelwork

Surface preparation

Structural steel to be engineered to be smooth i.e. no welding spatter, sharp edges, slag etc. should be present prior to the application of the final painting coat

All structural steelwork will be chipped and mechanically wire brushed to standard "SD3" to remove all scale, weld slag and flux, it will then be degreased before primer coat is applied

All paint shall be applied strictly in accordance with SANS 1200 HC and the manufacturer's instructions.

The paint and application shall carry a 5 year guarantee

Repair of damaged paint and painting of site connections and connectors shall be in accordance with SANS 1200 HC and SANS 0120: Part 3 Section HC

Different paint coats to have different colours or shades for easy verification

Where applicable, non shrink grout (Sika grout 212) shall be provided under base plates before any primary loads are applied to the structure

The contractor shall, at the commencement of the project, acquaint himself with the availability and delivery time of the products and steel profiles specified on the drawings so that such material can be ordered ahead of time

The erecting and removing of scaffolding should be included in all rates applicable

Carried to Collection

Bill No. 11

Structural Steel

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

Galvanizing Specification

System no. 150 from SANS 0120: Part 3 section HC-1988 shall be used for the corrosion protection of structural steel, and is as follows:

- a) Remove all slag from welded joints to expose the steelwork
- b) Hot dip galvanized to SANS 763
- c) The galvanizer must be a member of the Hot Dipped Galvanizers Association of South Africa
- d) If hot dip fasteners are not used, paint electroplated fasteners with organic paint
- e) Contact architect for paint colours if applicable

Carried to Collection

Bill No. 11

Structural Steel

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

STEEL COLUMNS AND BEAMS

Welded columns in single lengths with flat base, cap, bearer and connection plates, bolted to concrete

A	120 x 64mm x 10.4kg/m (IPE 120) I-section beams	t	0.44
B	160 x 80 x 4.0mm x 14.64kg/m Rectangular hollow section beams	t	0.04
C	305 x 165 x 40kg/m I-section columns	t	4.17
<u>Welded beams in single lengths with flat bearer and connection plates, bolted to steel</u>			
D	305 x 165 x 40kg/m I-section beams	t	0.23
E	180 x 91mm x 18.8kg/m (IPE 180) I-section beams	t	2.13

Carried to Collection

Bill No. 11

Structural Steel

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

GALVANISED STEEL COLUMNS AND BEAMS

Welded columns in single lengths with flat base, cap, bearer and connection plates, bolted to concrete

A	60 x 60 x 4.0mm x 3.70kg/m steel angle beams	t	0.31
B	65 x 50 x 8.0mm x 6.75kg/m steel angle beams	t	0.07
C	203 x 133 x 25kg/m UB	t	0.28
D	305 x 165 x 40kg/m I-section	t	2.08

Carried to Collection

Bill No. 11
Structural Steel
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

STEEL TRUSSES, ETC.

Welded roof trusses of angle rafters, tie beams, rails, struts, braces, cleats, etc and flat bearer, gusset and connection plates, bolted to steel

A	Lattice trusses (Truss 1) 8.10m long x 1,25m high extreme (In No 8)	t	1.60
B	Lattice trusses (Truss 2) 11,13m long x 1,84m high extreme (In No 8)	t	2.49
C	Lattice trusses (Truss 3) 9.66m long x 1.84m high extreme (In No 11)	t	3.06
D	Lattice trusses (Truss 4) 13.60m long x 1.26m high extreme (In No 1)	t	0.31
E	Lattice trusses (Truss 5) 13,40m long x 1,32m high extreme (In No 1)	t	0.29
F	Lattice trusses (Truss 6) 13,00m long x 1,28m high extreme (In No 1)	t	0.28
G	Lattice trusses (Truss 7) 13,00m long x 1,20m high extreme (In No 1)	t	0.27
H	Lattice trusses (Truss 8) 12,70m long x 1,20m high extreme (In No 1)	t	0.27
J	Lattice trusses (Truss 9) 12,30m long x 1,20m high extreme (In No 1)	t	0.28
K	Lattice trusses (Truss 10) 12,00m long x 1,70m high extreme (In No 1)	t	0.26
L	Lattice trusses (Truss 11) 9,70m long x 1,85m high extreme (In No 1)	t	0.28
M	Lattice trusses (Truss 12) 9,24m long x 0,90m high extreme (In No 1)	t	0.18
N	Lattice trusses (Truss 1 Generator) 10m long x 1,20m high extreme (In No 16)	t	5.01

Carried to Collection

Bill No. 11

Structural Steel

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

Welded rafters in single lengths with flat bearer and connection
plates bolted to steel

A	PFC 180 x 70mm x 21.1kg/m	t	1.03
B	PFC 200 x 75mm x 25g/m	t	2.95

Carried to Collection

R

Bill No. 11
Structural Steel
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

**PRE-GALVANISED STEEL PURLINS, GIRTS,
BRACING, ETC**

Purlins and girts, bolted to steel

A	125 x 65 x 20 x 3.0mm Thick cold-formed lipped channel purlins	t	18.91
B	150 x 75 x 20 x 2.5mm Thick cold-formed lipped channel girts	t	4.06
<u>Welded bracing, anti-sag rails, etc with flat connection plates, bolted to steel</u>			
C	60 x 60 x 4mm Angle bracing	t	1.86
D	125 x 75 x 8mm Angle - Fly Brace	t	1.70
E	120 x 75 x 8mm Angle - Knee Brace	t	0.80

Carried to Collection

Bill No. 11
Structural Steel
**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

**PRE-GALVANISED STEEL PURLINS, GIRTS,
BRACING, ETC TO BULKHEAD SUPPORT**

Purlins and girts, bolted to masonry / concrete

A	75 x 50 x 20 x 2,5mm Thick cold-formed lipped channel bulkhead supports	t	1.46
---	--	---	------

Welded bracing, anti-sag rails, etc with flat connection plates,
bolted to masonry / concrete

B	Angle bracing - Ceiling Support Frame	t	1.15
---	---------------------------------------	---	------

Carried to Collection

Bill No. 11

Structural Steel

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

GALVANISED STEEL GUTTERS AND RAINWATER PIPES

2.5mm Welded plate gutters

A	Box gutters 725mm girth 2.5mm thick, six times bent along length including necessary collared and sealed expansion joints (bearers elsewhere) - Gutter type 4	t	0.17
---	---	---	------

B	Box gutters 1 100mm girth 2.5mm thick, four times bent along length and necessary collared and sealed expansion joints (bearers elsewhere) Gutter type 1	t	3.73
---	--	---	------

2.5mm Welded plate rainwater pipes, including holderbats, brackets, etc

C	110mm Internal diameter pipes	t	0.69
---	-------------------------------	---	------

D	Extra over for outlet with spout for 200mm diameter pipe, including wire balloon grating	No	21
---	--	----	----

E	Extra over for bend	No	21
---	---------------------	----	----

F	Extra over for shoe	No	21
---	---------------------	----	----

G	400 x 400 x 500mm Deep rainwater head with overflow and outlet with spout for 200mm pipe, including wire balloon grating	No	3
---	--	----	---

Carried to Collection

Bill No. 11
Structural Steel
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

BOLTS, FASTENERS, ETC

A	Hot dip galvanised fixing bolts 4% of mass	t	2.32
B	M16 Grade 8.8 anchor bolts embedded minimum 150 deep into concrete and epoxy fixed with Hilti HIT-HY 200	No	2 080

SUNDRIES

"SIKA GROUT 212" non-shrink grout

C	Bedding approximately 25mm thick under base plate including chamfered edges all round	m2	8
---	---	----	---

Carried to Collection

Bill No. 11
Structural Steel
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

PAINTING

Prepare and apply one coat "Zinc phosphate" high build alkyd primer (DFT 60-100 micron), one coat super universal gloss enamel undercoat (DFT 25-35 micron) and one coat super universal gloss enamel (DFT 25-35 micron) finishing paint (colour: to Architect's specification) strictly in accordance with SANS 1200 HC-1988 and the manufacturer's instructions

A On structural steel columns, beams, etc t 8.05

B On structural steel lattice girders, trusses, rafters, etc t 16.97

C On structural structural steel bracing, rails, purlins, etc. t 6.97

Prepare and apply one coat "Interguard 403" primer (DFT 80-125 micron), one coat super universal gloss enamel undercoat (DFT 25-35 micron) and one coat super universal gloss enamel (DFT 25-35 micron) finishing paint (colour: to Architect's specification) strictly in accordance with SANS 1200 HC-1988 and the manufacturer's instructions

D On galvanised structural steel columns, beams, etc t 2.63

E On galvanised structural steel lattice girders, trusses, rafters, etc t 0.56

F On galvanised structural steel gutters and rainwater pipes t 4.59

Carried to Collection

R

Bill No. 11

Structural Steel

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

Item No	Quantity	Rate	Amount
<u>BILL No. 12</u>			
<u>METALWORK</u>			
<u>NOTE:</u> Tenderers are advised to study the Model Preambles for Trades 2017 before pricing this bill			
<u>NOTE:</u> Tenderers are advised that the design, supply and installation of the aluminium windows, doors & shop fronts are to be carried out in strict accordance with the Architect's specification and all aluminum profiles, manufacturing and fixing methods are to comply with AAMSA Specifications and Installation Standards			
<u>NOTE:</u> Tenderers are advised that all aluminium profiles and glazing to comply with SABS standards and Municipal Regulations			
<u>NOTE:</u> Tenderers are to provide a design indemnity letter with reference to Part C1.3.3 Annexure C -Design Indemnity Form			
<u>NOTE:</u> Tenderers are to provide shop drawings for approval by the Architect within two weeks of acceptance of tender			
<u>NOTE:</u> Aluminium profiles and colour samples must be approved by Architect prior to manufacturing			
<u>NOTE:</u> Framework & structural support to the shop fronts to be sized by the Tenderer and be included in the shopfront drawings, with suitable thickness to comply with wind load requirements & SABS Specifications (allowances to be made for all fixings required for shopfronts)			
<u>NOTE:</u> The Tenderer to allow for / calculate tolerances for for expansion and contraction of aluminium			
<u>NOTE:</u> The Tenderer to provide waterproofing guarantess for all shopfronts and windows			
Carried to Collection			
			R
Bill No. 12 Metalwork SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES			

NOTE: All external shopfronts to be fixed to steel beams / concrete beams / lintels

NOTE: Where shopfront a butts steel / concrete column, a 40 x 40mm angle needs to be fixed to column prior to shopfront being installed

NOTE: All dimensions to be checked on site by manufacturer before manufacturing commences. Any variations must be approved by the Architect.

NOTE: Roller shutters, hood, guide rails and protection angles to be hot dipped galvanised steel.

NOTE: Roller shutter, guide rails and protection angles to match finish

NOTE: Automation to comply with all CE safety and control standards

SUPPLEMENTARY PREAMBLES

Aluminium doors, windows, shopfronts, etc

Doors and windows shall comply with AAAMSA design criteria

The following certificates shall be provided prior to commencement of site work:

- 1 A copy of the relevant AAAMSA Performance Test Certificate from the manufacturer/contractor supplying the architectural aluminium product
- 2 A Certificate of Conformance confirming that anodising or powder coating has been processed in accordance with SANS 999 and SANS 1796 respectively

Carried to Collection

Bill No. 12

Metalwork

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

- | | | | | |
|---|---|--|--|--|
| 3 | A powder guarantee of not less than 15 years issued by the powder manufacturer. The specific conditions contained in this guarantee shall form part of the powder coating process | | | |
| 4 | A Certificate of Conformance confirming that glazing has been installed in accordance with SANS 0137, ensuring that safety glazing materials have been installed in the mandatory areas and that each individual pane of safety glazing materials has been permanently marked | | | |
| 5 | A warranty from the manufacturer of the laminated safety glass and/or hermetically sealed glazing units guaranteeing the products against delamination and colour degradation for a period of not less than five years | | | |

Finishes

Final product shall be free from all sharp edges

Ironmongery

All ironmongery in accordance with the architects drawings, to be supplied by the Subcontractor unless otherwise specified. Subcontractors are to provide samples for approval by the Architect of these ironmongery on submission of their tenders. All ironmongery shall be approved by the Architect prior to installation

Subcontractor to supply all relevant doors, windows & shopfronts with catches, handles, hinges etc. to match shopfronts and doors, all to the Architects approval

All doors referred in the schedule as fire escape doors to include all ironmongery to be supplied by the subcontractor, including panic bars, door closers, etc.

Sliding gear

All sliding gear to sliding doors to be supplied by the subcontractor unless otherwise specified. Subcontractors are to provide samples for approval by the Architect of these sliding gear on submission of their tenders. All sliding gear shall be approved by the Architect prior to installation

Carried to Collection

Bill No. 12

Metalwork

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

Joints and Sealants

All joints in frames shall be made by mechanical means an approved silicone sealant is to be provided for both sides of all internal and external shop fronts between the aluminium frames and brick wall or concrete column and between the aluminium frame and plaster finish

Structural support

Should additional structural steelwork be necessary, it must be sized and included in the cost of the relevant doors, windows and shopfronts. No exposed structural support steelwork will be permitted and all sections must be accommodated within the aluminium profile if necessary

Protection

The subcontractor are to liaise with the main contractor to ensure that allowances are made for sufficient protection against damage, etc as required

Doors and windows shall be supplied with protective tape and plastic and shall be removed only once surrounding trades have been completed

Cleaning

The subcontractor are to liaise with the main contractor to ensure that allowances are made for sufficient cleaning as required

Electronic installation and cable routes

Subcontractors are to allow for the installation of electric shear locks

Subcontractors are to allow for cable routes in shopfronts where automatic sliding gear are to be installed

Subcontractors are to allow for cable routes in shopfronts where access control and intruder detection are to be installed

Waterproofing angle

Waterproofing angles is deemed to be included for all external doors windows and shopfronts

Carried to Collection

Bill No. 12

Metalwork

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

Glass

All glass shall comply with SANS 50572-1&2:1994, SANS 1263-1:2013 and SANS 10137.

In particular, all safety glass shall be marked in accordance with the requirements of SANS 1263 and AAAMSA.

All toughened glass shall be heat soak tested (after toughening) in accordance with DIN 18516: Part 4.

All laminated safety glass to be suitably polished on a straight line polishing machine.

Wind loading

All external facades shall be designed for an unfactored uniform wind pressure of 1.8kPa (inwards and outwards); all internal glazing shall be designed for an unfactored uniform pressure of 0.6kPa (acting both ways)

Specification

The tenderer is referred to the SVA "Architectural Specification SMFN-SVA-A-SP-01-101 and is to ensure that all work is done in accordance to the specifications as laid out in this document.

The tenderer is referred to the SVA Drawings: Main Building Shopfront Ref Plan - A(32)1000, Main Building Shopfront Elevations - A(32)1001 & A(32)1002, Gatehouse Shopfront Plan & Elevations - A(32)1003 and Generator Building Shopfront Plan & Elevations - A(32)1004 and is to ensure that all work is done in accordance to the specifications as laid out in this document.

Carried to Collection

Bill No. 12

Metalwork

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

PRESSED STEEL DOOR FRAMES

1.6mm Double rebated frames for 280mm brick walls

A	Frame for double door 1880 x 2430mm high	No	1
---	--	----	---

GALVANIZED PRESSED MILD STEEL DOOR FRAMES

1.6mm Double rebated frames for one brick walls

B	Frame for single door 810 x 2100mm high	No	2
---	---	----	---

C	Frame for single door 873 x 2062mm high	No	1
---	---	----	---

D	Frame for double door 1560 x 2130mm high	No	2
---	--	----	---

E	Frame for double door 1560 x 2430mm high	No	1
---	--	----	---

F	Frame for double door 1880 x 2430mm high	No	3
---	--	----	---

1.6mm Double rebated frames for 280mm brick walls

G	Frame for single door 813 x 2032mm high	No	3
---	---	----	---

H	Frame for single door 1160 x 2130mm high	No	1
---	--	----	---

J	Frame for double door 1560 x 2430mm high	No	1
---	--	----	---

ROLLER SHUTTERS

"Roll-up Serrada" or equal approved motorised industrial powder coated slatted roller shutter doors including shutter box, fixing brackets, guide channels, frames, corner protectors, motor etc, all fixed to brickwork, concrete or steel beams. Colour: RAL 7021

K	Automated slatted roller shutter 3950 x 3050mm high complete as per architects drawing OPT-SVA-ADR-A(30)1014	No	1
---	--	----	---

Carried to Collection

R

Bill No. 12

Metalwork

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

ALUMINIUM GRILLES

Natural anodised aluminium door grilles

A	682 x 200mm high door grille	No	2
B	"TroX WG" type weather louvres fixed to walls	No	1

ALUMINIUM WINDOWS

Class 2 powder coated aluminium windows (Colour: RAL 7043) as per architect's specifications including single glazed clear safety glass in accordance with AAAMSA standards, plugged to brickwork/concrete/steel beams/partitions including waterproofing angles, necessary sealants and aluminium/rubber gaskets, ironmongery, all designed in accordance with architects drawings, supplied and installed by specialist subcontractor

C	Window 340 x 2262mm high overall - W01 Gatehouse	No	4
D	Window 340 x 2738mm high overall - W02 Gatehouse	No	1
E	Window 200 x 1432mm high overall - W-01-A	No	1
F	Window 199 x 1931mm high overall - W-01-B	No	1
G	Window 200 x 2507mm high overall - W-01-C	No	1
H	Window 185 x 3448mm high overall - W-01-D	No	1
J	Window 7735 x 750mm high with 827 x 1950mm high side panel - W-02-E	No	1
K	Window 4074 x 750mm high overall - W-02-F	No	1
L	Window 3700 x 750mm high overall - W-03-G	No	1

Carried to Collection

Bill No. 12

Metalwork

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

ALUMINIUM SHOPFRONTS

Shopfront facade comprised of class 2 powder coated aluminium alloy extrusions (Colour: RAL 7043) for framing, perimeter or fully framed, fixed with required deadlock and wind load brackets, compensating channel head restraints, filled in with butt-jointed single glazed toughened PG SmartGlass: clear safety glass or similar approved in accordance with AAAMSA standards. Facade to include all fixings, anchors, bolts, cast-in channels, structural steel supports required, external - and internal corners, waterproofing angles, ironmongery, etc. , all designed in accordance with architects drawings, supplied and installed by specialist subcontractor

External

A	Shopfront 1370 x 2400mm high - SF-01-A (Gatehouse)	No	1
B	Shopfront 1406 x 6119mm high - SF-01-A and SD21 (Generator Building)	No	1
C	Shopfront 1500 x 2400mm high - SF-01-B (Gatehouse)	No	1
D	Shopfront 1510 x 2400mm high - SF-01-C (Gatehouse)	No	1
E	Shopfront 345 x 5019mm high - SF-01-E (Generator Building)	No	1
F	Shopfront 1380 x 2750mm high - SF-01-O	No	4
G	Shopfront 600 x 2750mm high - SF-01-P	No	8
H	Shopfront 700 x 2750mm high - SF-01-Q	No	2
J	Shopfront 2945 x 5799mm high - SF-01-C	No	1
K	Shopfront 12118 x 1300mm high - SF-02-K	No	1
L	Shopfront 3097 x 2400mm high - SF03-B (Generator Building)	No	1
M	Shopfront 5755 x 2740mm high and 5755 x 2186mm high - SF-03-D1 (Gatehouse)	No	1
N	Shopfront 8814 x 2750mm high - SF-03-I	No	1
P	Shopfront 5817 x 5934mm high - SF-03-R	No	1

Carried to Collection

Bill No. 12

Metalwork

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

Shopfront facade comprised of class 1 powder coated aluminium alloy extrusions (Colour: RAL7043) for framing, perimeter or fully framed, fixed with required deadlock and wind load brackets, compensating channel head restraints, filled in with butt-jointed single glazed toughened PG SmartGlass: clear safety glass or similar approved in accordance with AAAMSA standards. Facade to include all fixings, anchors, bolts, cast-in channels, structural steel supports required, external - and internal corners, waterproofing angles, ironmongery, etc. , all designed in accordance with architects drawings, supplied and installed by specialist subcontractor

Internal

A	Shopfront 600 x 2750mm high - SF-01-P	No	3
B	Shopfront 10010 x 3480mm high overall - SF-01-A	No	1
C	Shopfront 9958 x 2820mm high overall - SF-01-B	No	1
D	Shopfront 5600 x 2807mm high - SF-01-D	No	1
E	Shopfront 4600 x 2750mm high - SF-01-E	No	1
F	Shopfront 1620 x 2750mm high - SF-01-F	No	1
G	Shopfront 6274 x 2750mm high - SF-01-J	No	1
H	Shopfront 4073 x 1400mm high - SF-01-G	No	1
J	Shopfront 2034 x 1400mm high - SF-01-H	No	1
K	Shopfront 4317 x 1450mm high - SF-02-L	No	1
L	Shopfront 3651 x 1450mm high - SF-02-M	No	1
M	Shopfront 5024 x 1450mm high - SF-02-N	No	1

Carried to Collection

Bill No. 12

Metalwork

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

Bill No. 12
Metalwork
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

ALUMINIUM DOORS

Class 2 powder coated aluminium doors (Colour: RAL 7043), as per architect's specifications including single glazed clear safety glass in accordance with AAAMSA standards, plugged to brickwork/concrete/steel beams/ partitions including waterproofing angles, necessary sealants and aluminium/rubber gaskets, ironmongery, all designed in accordance with architects drawings, supplied and installed by specialist contractor

A	Door 986 x 2465mm high overall - SD1	No	4
	<u>Class 1 powder coated aluminium doors (Colour: RAL 7043), as per architect's specifications including single glazed clear safety glass in accordance with AAAMSA standards, plugged to brickwork/concrete/steel beams/ partitions including waterproofing angles, necessary sealants and aluminium/rubber gaskets, ironmongery, all designed in accordance with architects drawings, supplied and installed by specialist contractor</u>		
B	Door 986 x 2465mm high overall - SD1	No	1
C	Door 986 x 2390mm high overall - SD2	No	4
D	Door 705 x 2460mm high overall - SD3	No	2
E	Door 1630 x 2700mm high overall - SD6	No	1

Carried to Collection

Bill No. 12

Metalwork

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

SUNDRY ALUMINIUM WORK

"Dibond" or Similar approved fixed according to manufacturer's specifications. Colour: RAL 7043.

A	To walls	m2	19
---	----------	----	----

GALVANISED STEEL BOLLARDS, CAT LADDER, ETC

480mm wide cat ladder and 820mm wide cage, ladder comprising of 22mm diameter GMS guard rails spaced at 600mm cc's and welded to 38mm diameter GMS vertical members. 38mm diameter members to be welded to 90mm diameter GMS fixing plates, bolted to brickwork. 22mm diameter GMS step rails spaced 300mm cc's and welded to 38mm diameter vertical members. Including 410 x 890mm metis grid platform. All supplied and constructed as per drawings. Refer to Architects Drawing A(29)1002.

B	480 x 8000mm high Cat ladder and 820mm wide cage - Cat Ladder A	No	1
---	---	----	---

C	480 x 8500mm high Cat ladder and 820mm wide cage - Cat ladder B	No	1
---	---	----	---

D	480 x 8000mm high Cat ladder and 820mm wide cage - Cat Ladder C	No	1
---	---	----	---

Bumpers as per Uni Cape Equipment (PTY) Ltd. Type MI2/4 DB402D (OEA) or similar approved, fixed vertically to manufacturer's specifications in front of loading dock @ 2300mm cc's.

E	115 x 95mm Bumpers plugged to walls	No	3
---	-------------------------------------	----	---

Carried to Collection

Bill No. 12

Metalwork

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

STEEL GATES, SCREENS, ETC

MTX-01 - 103/280D Mentex by Mentis Afirca or equally approved mesh and gates to structural framing

A	Mesh covering in approximately 2750mm high panels fixed 80 x 40 x 3mm RHS posts at 2400mm spacing welded to 8 x 100 x 150mm baseplates and 80 x 40 x 3mm RHS midspan and top of vertical support members - Powder Coated, colour: 7043	m	19
B	Single gate 1180 x 2750mm high with 80 x 40 x 3mm RHS vertical members and 80 x 40 x 3mm RHS horizontal members fitted with a pair of suitable hinges welded complete prepared to receive access control (elsewhere measured) - Powder Coated, colour: 7043	No	3

Carried to Collection

Bill No. 12

Metalwork

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

Item No	Unit	Quantity	Rate	Amount
<u>BILL No. 13</u>				
<u>PLASTERING</u>				
<u>NOTE:</u> Tenderers are advised to study the Model Preambles for Trades 2017 before pricing this bill				
<u>SUPPLEMENTARY PREAMBLES</u>				
<u>GRANOLITHIC</u>				
<u>Method</u>				
The method to be used shall be either the monolithic method or the bonded method				
<u>Preparation</u>				
For granolithic applied monolithically, the concrete floor shall be swept clean after bleeding of the concrete has ceased and the slab has begun to stiffen; any remaining bleed water shall be removed and the granolithic applied immediately thereafter. For granolithic to be bonded to the floor slab after it has hardened, the slab surface shall be hacked (preferably by mechanical means) until all laitance, dirt, oil, etc is dislodged and swept clean of all loose matter. The slab shall then be wetted and kept damp for at least six hours before applying the granolithic				
<u>Mix</u>				
Granolithic shall attain a compressive strength of at least 41MPa. The coarse aggregate shall comply with SANS 1083 and shall generally be capable of passing a 10mm mesh sieve. Where the thickness of the granolithic exceeds 25mm, the size of the coarse aggregate shall be increased to the maximum size compatible with the thickness of the granolithic				
Carried to Collection				R
Bill No. 13 Plastering SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES				

Panels

Granolithic shall be laid in panels not exceeding 14m² for monolithic finishes, not exceeding 9,5m² for bonded finishes and not exceeding 6m² for all external granolithic. Wherever possible, panels shall be square but at no time should the length of the panel exceed 1,5 times its width

Where possible joints between panels shall be positioned over joints in the floor slab and shall be at least 3mm wide through the full thickness of the finish, separated by strips of wood or fibreboard and finished with V-joints

Laying

Monolithic granolithic shall be applied to the partially set slab and thoroughly compacted and lightly wood floated to the required levels

Bonded granolithic shall be applied to the slab after applying a 1:1 sand-and-cement slurry brushed over the surface and allowed to partially set before applying the granolithic. The granolithic shall be throughly compacted and lightly wood floated to the required levels

After wood floating, the monolithic and bonded granolithic shall remain undisturbed until bleeding has ceased and the surface has stiffened. Any remaining bleed water and laitance shall then be removed and the surface steel trowelled or power floated

Curing, seasoning and protection

Granolithic shall be covered with clean hessian with waterproof building foil over and kept wet for at least seven days after laying

Colour

Coloured granolithic shall be tinted with an approved colouring pigment mixed into the granolithic in the proportion of ? kg pigment per pocket of cement, of uniform appearance and consistent colour throughout

Carried to Collection

R

Bill No. 13

Plastering

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

INTERNAL PLASTER

Cement plaster steel trowelled, on brickwork

A	On walls	m2	3 938
B	On narrow widths	m2	111

Cement plaster wood floated for tiles, on brickwork

C	On walls	m2	141
D	On narrow widths	m2	2

EXTERNAL PLASTER

Cement plaster on brickwork

E	On walls	m2	1 235
F	On narrow widths not exceeding 300mm wide	m2	82

Cement plaster wood floated, on concrete

G	On projecting and isolated columns	m2	325
H	On projecting and isolated beams	m2	421

Carried to Collection

R

Bill No. 13
Plastering
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

Item No	Unit	Quantity	Rate	Amount
<u>BILL No. 13</u>				
<u>TILING</u>				
<u>NOTE:</u> Tenderers are advised to study the Model Preambles for Trades 2017 before pricing this bill				
<u>SUPPLEMENTARY PREAMBLES</u>				
<u>Descriptions</u>				
All floor tiles are to be completely covered/backed with adhesive in order to ensure no hollow areas behind tiles.				
<u>Repairs</u>				
Repairs to damaged areas in the existing concrete surface bed or slab is to be done using "TAL Superscreed" or similar approved				
<u>Sealants, etc</u>				
Tenders should include in their price for silicone sealant between all skirting tiles and floor tiles.				
<u>Movement joints</u>				
Tenders are to include in their price for soft joint and sealants horizontally and vertically every 5m² to floor tiling or in accordance with the manufacturer's requirements. Joints to be sealed with "Sikaflex Pro 2HP" or similar approved after priming the joint with "Sika Primer" or similar approve. Where practical the bulk of the depth of the joint can be filled with 6mm diameter closed cell polyethylene chord.				
Always provide expansion joint on wall perimeter of tiles.				
<u>Grouting joints</u>				
Joints to be 3 to 5mm maximum width				
Carried to Collection				R
Bill No. 14				
Tiling				
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein				
PROVISIONAL BILLS OF QUANTITIES				

Item No	Quantity	Rate	Amount
<u>BILL No. 15</u>			
<u>PLUMBING AND DRAINAGE</u>			
<p><u>NOTE:</u> Tenderers are advised to study the Model Preambles for Trades 2017 before pricing this bill</p>			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>uPVC pipes and fittings</u>			
Sewer and drainage pipes and fittings shall be jointed and sealed with butyl rubber rings Soil, waste and vent pipes and fittings shall be solvent weld jointed			
<u>uPVC pressure pipes and fittings</u>			
Pipes for water supply shall be of the class stated Pipes of 40mm diameter and smaller shall be plain ended with solvent welded uPVC loose sockets and fittings Pipes of 50mm diameter and greater shall have sockets and spigots with push-in type integral rubber ring joints. Bends shall be uPVC and all other fittings shall be cast iron, all with similar push-in type joints			
<u>Copper pipes</u>			
Pipes shall be hard drawn and half-hard pipes of the class stated. Class 0 (thin walled hard drawn) pipes shall not be bent. Class 1 (thin walled half-hard), class 2 (half-hard) and class 3 (heavy walled half-hard) pipes shall only be bent with benders with inner and outer formers. Fittings to copper waste, vent and anti-syphon pipes, capillary solder fittings and compression fittings shall be "Cobra Watertech" type. Capillary solder fittings shall comply with ISO 2016. Only compression fittings shall be used in walls or in ground			
<u>Fixing of pipes</u>			
Unless specifically otherwise stated, descriptions of pipes shall be deemed to include fixing to walls etc, casting in, building in or suspending not exceeding 1m below suspension level			
Carried to Collection			
Bill No. 15 Plumbing and Drainage SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES			

Reducing fittings

Where fittings have reducing ends or branches they are described as "reducing". In the case of pipes with diameters not exceeding 60mm only the largest end or branch size is given. Should the contractor wish to use other fittings and bushes or reducers he may do so on the understanding that no claim in this regard will be entertained. In the case of pipes with diameters exceeding 60mm all sizes are given and no claim for extra bushes, reducers, etc will be entertained

Wire gratings

Descriptions of gutter outlets etc shall be deemed to include wire balloon gratings

Excavations

No claim for rock excavation will be entertained unless the contractor has timeously notified the quantity surveyor thereof prior to backfilling "Soft rock" and "hard rock" shall be as defined in "Earthworks"

Laying, backfilling, bedding, etc of pipes

Pipes shall be laid and bedded and trenches shall be carefully backfilled in accordance with manufacturers' instructions

Where no manufacturers' instructions exist pipes shall be laid in accordance with clauses 5.1 and 5.2 of each of the following:

SANS 1200 L : Medium-pressure pipelines

LD : Sewers

LE : Stormwater drainage

Pipe trenches etc shall be backfilled in accordance with clauses 3, 5.5, 5.6, 5.7 and 7 of SANS 1200 DB : Earthworks (Pipe trenches)

Pipes shall be bedded in accordance with clauses 3.1 to 3.4.1, 5.1 to 5.3 and 7 of SANS 1200 LB : Bedding (Pipes).

Unless otherwise described bedding of rigid pipes shall be class B bedding

Carried to Collection

Bill No. 15

Plumbing and Drainage

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

Flush pans

Flush pans shall have straight or side outlets and "P" or "S" traps as necessary

Stainless steel basins, sinks, wash troughs, urinals, etc

Units shall have standard aprons on all exposed edges and tiling keys against walls where applicable

Waste unions

Descriptions of waste unions shall be deemed to include rubber or vulcanite plugs and chains fixed to fittings

Sealing

Prices for sanitary fittings shall include for sealing against walls with silicone sealing compound. This shall apply to all sanitary fittings with a "ABE" Dow corning acetoxy silicone sealant.

"Geberit"

All "Geberit" specified items to be supplied and installed according to "Geberit" specifications. "Geberit" conditional guarantee to be provided after installation.

"Mepla"

All "Mepla" specified items to be supplied and installed according to "Mepla" specifications. "Mepla" conditional guarantee to be provided after installation.

Guarantee

The subcontractor shall guarantee the material, apparatus and workmanship delivered by him for a period of eighteen (18) months from date of practical completion

As-built drawings

The contractor shall prepare an updated set of as-built drawings. At completion of the contract the contractor shall hand these drawings to the principal agent for reproducing onto the originals for handing over to the employer (provision for allowance of as-built drawings elsewhere)

Carried to Collection

Bill No. 15

Plumbing and Drainage

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

<u>RAINWATER DISPOSAL</u>				
	<u>"Gutterfast" or similar approved seamless aluminium prepainted gutters and rainwater pipes, all designed in accordance with architects drawings, supplied and installed by specialist subcontractor</u>			
A	140 x 120mm deep Roof gutters with beaded front edge and including integrated flashing , three times bent along length including fixing traps along the length of the gutter - Gutter type 2	m	23	
B	120 x 100mm deep Roof gutters with beaded front edge and including integrated flashing, three times bent along length including fixing traps along the length of the gutter - Gutter type 5	m	51	
C	240 x 200mm deep Roof gutters with 665mm girth, three times bent along length including fixing traps along the length of the gutter - Gutter type 3	m	14	
D	100 x 75mm Rainwater pipes	m	96	
E	Extra over for outlet with spout for 200mm diameter pipe, including wire balloon grating	No	21	
F	Extra over rainwater pipe for 100 x 75mm Shoe	No	21	
G	Extra over rainwater pipe 100 x 75mm for bend	No	21	
	<u>"Saint-Gobain" Rain-Flo 90 degree flat grate fulbore with uPVC adaptor. Including dome grate</u>			
H	110mm 90° Horizontal outlet	No	1	
	<u>uPVC class 6 pipes fixed to slab soffits including fixing to walls and columns with and including hot dipped galvanized purpose made fabricated welded and drilled brackets with flat bar bracket bent to suit pipe fitted with rawl bolts</u>			
J	110mm Diameter pipes	m	4	
	<u>Extra over uPVC Class 6 for fittings</u>			
K	110mm Bend	No	1	
L	110mm Elbow	No	1	
Carried to Collection				R
Bill No. 15				
Plumbing and Drainage				
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein				
PROVISIONAL BILLS OF QUANTITIES				

SANITARY FITTINGS

Manufactured by "Duravit" or similar approved

A	D-Neo wall mounted pan rimless, colour: white alpin. Code: 2577090000	No	16
B	D-Neo removable seat and cover, colour: white. Code: 0021690000	No	16
C	Handrinse basin 36cm D-code, with right punched. Code: 07053600082. Including fixing bolts M10.	No	4
D	Washbasin 60cm D-code Med, Code: 23116000702. Including fixing bolts set for basin	No	3

Manufactured by "Geberit" or similar approved

E	Kombifix with Sigma concealed cistern. Code: 110.798.00.1	No	19
F	Sigma10 actuator plate. Plate and button: black, Design ring: bright chrome-plated. Code: 115.758.KM.5	No	16
G	Sigma cover plate, colour: white. Code: 115.768.11.1	No	3
H	Type 01 remote flush actuation remote actuator. Code: 116.045.11.1	No	3
J	Selnova Comfort wall hung WC, barrier-free. Code: 500.693.01.2	No	3
K	Selnova Comfort wall hung WC seat, barriers free. Code: 501.559.01.1	No	3
L	Flush control installation set with nipple made of brass. Code: 116.004.00.1	No	4
M	Selnova wall-hung urinal for exposed control top entry, Colour: White. Code: 500.343.01.1	No	4
N	Outlet siphon with syphonic action horizontal outlet. Code: 0051130000.	No	4
P	Water inlet mechanism 1/2" for urinals with back supply. Code: 6958000000.	No	4

Carried to Collection

Bill No. 15
Plumbing and Drainage
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

A	Urinal flush control with pneumatic flush actuation actuator plate type 30 black/bright chrome/black. Code: 116.017.KM.1	No	4
B	Selnova Wall-hung urinal division. Color: white Code: 110000000. <u>Manufactured by "Sotran" or similar approved</u>	No	4
C	530 x 450mm Stone lay-on washbasin, organic shape with tap hole bench. <u>Manufactured by "Franke" or similar approved</u>	No	13
D	LDS drip sink. Code: 2630026	No	1
E	925 x 500 x 169mm CDX611 Cascade single bowl sink. Including 1x90mm basket strainer waste fitting. Finish: Stainless steel. Code: 1990032	No	3

Carried to Collection

Bill No. 15
Plumbing and Drainage
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

<u>WASTE UNIONS, ETC</u>					
<u>Manufactured by "Cobra" or similar approved</u>					
A	32mm Pop-up basin waste, unslotted. Code: P8640	No	16		
<u>TRAPS, ETC</u>					
<u>Manufactured by "Gio" or similar approved</u>					
B	32 x 32mm Round heavy duty bottle trap, including rubber bun. Code: A186	No	20		
<u>Manufactured by "Herbish" or similar approved</u>					
C	Floor drain with adjacent flange (vertical outlet). Code: HB125V-50	No	22		
<u>Manufactured by "TrapMate" or similar approved</u>					
D	40mm P-trap with basin and sink fittings. Code: 111214	No	3		
<u>Manufactured by "Hydrotec" or similar approved</u>					
E	Sarah-Lee horizontal (blue), complete with black grid. Code: HTSL-50/75 HB	No	5		
<u>TAPS, VALVES, ETC</u>					
<u>"Decor" or similar approved</u>					
F	Single lever basin mixer with extra long handle. Code: 31910223	No	3		
<u>"Hansgrohe" or similar approved</u>					
G	Vernis Blend overhead shower 200 1 Jet Ecosmart. Code: 26277000	No	5		
H	Vernis Blend Shower Arm 24cm. Code: 27809000	No	5		
J	Vernis blend 2 hole concealed basin mixer. Code: 71576000, including basin mixer set. Code: 13622180	No	13		
K	2-Hole concealed basin mixer set. Code: 13622180	No	17		
Carried to Collection				R	
Bill No. 15					
Plumbing and Drainage					
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein					
PROVISIONAL BILLS OF QUANTITIES					

A	Vernis blend concealed shower mixer. Code: 71649000	No	5
B	Shower basic set DN15. Code: 13620180	No	5
C	Decor single lever kitchen mixer, finish: chrome. Code: 31820223	No	3
D	Vernis blend single lever basin. Code: 71570003	No	4
	<u>"Cobra" or similar approved</u>		
E	Bibtap chrome plated with threaded nozzle hose union: 059-15. Code: 207 EC - 15	No	1
F	Bibtap chrome plated with threaded nozzle hose union: 059-15. Code: 206 EC - 15	No	1
	<u>"Geberit Mepla" Isolating valves</u>		
G	16mm Isolating ball valve	No	53
H	20mm Isolating ball valve	No	4
J	26mm Isolating ball valve	No	6
K	32mm Isolating ball valve	No	7
L	40mm Isolating ball valve	No	2
	<u>Angle valves</u>		
M	1/2" x 1/2" angle valve. Code: 5188DR	No	6

Carried to Collection

R

Bill No. 15
Plumbing and Drainage
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

VALVE BOXES, METER BOXES, ETC.

"SENSUS MEISTREAM" or similar approved

A	32mm "SYR" strainer	No	1
B	32mm Water meter including meter box	No	1
C	40mm "SYR" strainer	No	2
D	40mm Water meter including meter box	No	2

Carried to Collection

R

Bill No. 15
Plumbing and Drainage
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

BATHROOM ACCESSORIES

Manufactured by "Franke" or similar approved

A	CNTX PAR Paraplegic grab rail. Code: 2510012	No	3
B	CNTX600 Straight grab rail. Code: 2510005	No	3
<u>Manufactured by "Franke" or similar approved</u>			
C	RODX625 Satin stainless steel electronic soap dispenser, wall mounted	No	11
D	RODX672 Double toilet roll holder, wall mounted. Code: 2120101	No	19
E	Jetstream Airtonic hand dryer 2500002, wall mounted	No	5

Carried to Collection

Bill No. 15
Plumbing and Drainage
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

SANITARY PLUMBING

"HDPE" pipes with butt welded joints and expansion and
electro welded couplings

A	56mm Pipes	m	14
B	63mm Pipes	m	3
C	110mm Pipes	m	47
<u>"HDPE" pipes with butt welded joints and expansion and electro welded couplings chased in walls</u>			
D	56mm Pipes	m	11
E	63mm Pipes	m	3
F	110mm Pipes	m	36

Carried to Collection

Bill No. 15
Plumbing and Drainage
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

Extra over "HDPE" pipes with butt welded joints and expansion and electro welded couplings for fittings

A	56mm Bend	No	29
B	56mm Junction	No	4
C	56mm Access bend	No	5
D	56mm Inspection eye	No	3
E	56mm Rodding eye	No	3
F	63mm Bend	No	3
G	63mm Junction	No	2
H	63mm Access bend	No	5
J	63mm Inspection eye	No	4
K	63 x 56mm reducing junction	No	2
L	110mm Pan connector	No	19
M	100 x 32mm reducing junction	No	1
N	110 x 56mm Reducer	No	6
P	110mm "GI One-way" vent valve	No	3
Q	110mm "GI Two-way" vent valve	No	4
R	110mm Bend	No	29
S	110mm Junction	No	17
T	110 x 56mm Reducing junction	No	10
U	110 x 63mm Reducing junction	No	1

Carried to Collection

Bill No. 15
Plumbing and Drainage
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

Bill No. 15
Plumbing and Drainage
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

HOT AND COLD WATER SUPPLY

"Geberit" or similar Multi layer pipe

A	16mm Pipes	m	51
B	20mm Pipes	m	22
C	26mm Pipes	m	28
D	32mm Pipes	m	54
E	40mm Pipes	m	4

"Geberit" or similar Multi layer pipe chased in walls

F	16mm Pipes	m	50
G	32mm Pipes in walls	m	9
H	40mm Pipes in walls	m	4

Extra over class "Geberit" or similar Multi layer pipes for fittings

J	16mm Fittings	No	94
K	20mm Fittings	No	41
L	26mm Fittings	No	10
M	32mm tee	No	6
N	32 x 16mm Reducer tee	No	3
P	32 x 20mm Reducer tee	No	5
Q	32 x 26mm Reducer tee	No	4
R	40mm Elbow	No	2
S	40 x 26mm Reducer tee	No	1

Carried to Collection

Bill No. 15
Plumbing and Drainage
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

LAGGING

"Insulflex" or similar approved pipe insulation

A	Insulation to 16mm pipe and couplings	m	29
B	Insulation to 20mm pipe and couplings	m	16
C	Extra for wrapping around 16mm diameter fittings	No	22
D	Extra for wrapping around 20mm diameter fittings	No	16

Testing

E	Testing water pipe system	Item	
---	---------------------------	------	--

Carried to Collection

R

Bill No. 15
Plumbing and Drainage
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

CONDENSATE PLUMBING

"HDPE" pipes with butt welded joints and expansion and electro welded couplings

A	32mm Pipes	m	25
B	56mm Pipes	m	43
C	75mm Pipes	m	7
<u>Extra over "HDPE" pipes with butt welded joints and expansion and electro welded couplings for fittings</u>			
D	32mm Bend	No	5
E	32mm Junction	No	4
F	32mm P-trap	No	9
G	56mm Bend	No	6
H	56mm Junction	No	1
J	56mm P-trap	No	7
K	56 x 32mm reducing junction	No	4
L	75 x 50mm Reducing junction	No	1
M	75mm Bend	No	1

Carried to Collection

Bill No. 15
Plumbing and Drainage
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

FIREWATER SUPPLY

Steel pipes with welded joints and expansion and couplings all in accordance to SANS 62. Including Red oxide primer coat

A	100mm Pipes	m	60
---	-------------	---	----

Steel pipes with welded joints and expansion and couplings all in accordance to SANS 62. Including Red oxide primer coat in walls

B	28mm Pipes in walls	m	15
---	---------------------	---	----

C	100mm Pipes in walls	m	8
---	----------------------	---	---

Extra over steel pipes for fittings

D	28mm Fittings	No	11
---	---------------	----	----

E	80mm Bend	No	2
---	-----------	----	---

F	100mm Bend	No	7
---	------------	----	---

G	100 x 28mm Reducer junction	No	3
---	-----------------------------	----	---

H	100 x 80m Reducer junction	No	1
---	----------------------------	----	---

FIRE APPLIANCES, ETC

Fire hosereels

J	Fire hose reel complete with 30m hose, chromium plated stopcock, shut-off nozzle and wall bracket	No	7
---	---	----	---

Fire Extinguishers

K	4.5kg Dry chemical powder fire extinguisher on and including a painted backing board	No	25
---	--	----	----

L	9kg Dry chemical powder fire extinguisher on and including a painted backing board	No	4
---	--	----	---

Fire Hydrant

M	80mm Hydrant, including flanges, 80mm duck foot bend, bolts, gaskets, etc	No	2
---	---	----	---

Carried to Collection

Bill No. 15

Plumbing and Drainage

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

BUDGETARY ALLOWANCES

A	Allow budgetary amount of R250 000.00 (Two Hundred and Fifty Thousand RAND) for fire stopping to be used as directed by the Principal Agent and deducted in whole or in part if not required			Item	250 000.00
---	--	--	--	------	------------

ELECTRIC WATER HEATERS

"Kwikot" or similar approved

B	150 Litre standard floor mounted electric water heater	No	2		
C	Horizontal polyethylene drip tray for 150 liter geyser with outlet, including timber bearers	No	2		
D	200 Litre standard floor mounted electric water heater	No	2		
E	Horizontal polyethylene drip tray for 200 liter geyser with outlet, including timber bearers	No	2		
F	9kW Heat pump, with 230V, 50Hz electrical requirements and including electrical connection	No	1		

AS-BUILT DRAWINGS

G	Provision of as-built drawings			Item	
---	--------------------------------	--	--	------	--

Carried to Collection

R

Bill No. 15
Plumbing and Drainage
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

Item No	Quantity	Rate	Amount
<u>BILL No. 16</u>			
<u>ELECTRICAL INSTALLATION</u>			
<p><u>NOTE:</u> Tenderers are advised to study the Model Preambles for Trades before pricing this bill</p> <p><u>NOTE:</u> A complete Bill of Quantities for this trade is attached to this tender document under Part C1.2.2 - Part 1.2.6</p> <p>The Bill in Part C1.2.2 - Part 1.2.6 should be fully priced and form part of the tender returnable documentation as accompanying documentation.</p> <p>The relevant Bill total in Part C1.2.2 - Part 1.2.6 should be carried forward to this trade and builders profit and attendance should then be priced for accordingly.</p>			
<u>SUPPLEMENTARY PREAMBLES</u>			
<p>The following are for work to be carried out by selected subcontractors in terms of Clause 21 of the Principal Building Agreement prepared and published by the Joint Building Contracts Committee: Edition 5.0 Code 2101, July 2007. (The JBCC Series 2000 Principal Building Agreement).</p>			
Carried to Collection			R
<p>Bill No. 16 Electrical Installation SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES</p>			

General attendance on nominated/selected subcontractors

The item "Attendance" which follows each provisional sum for nominated/selected subcontractors' work, shall be deemed to cover all the contractor's costs incurred in providing free of charge to the nominated/selected subcontractors, the following:

1. Access to the site and places where the subcontract work is to be carried out, including the reasonable use of any temporary personnel hoists erected by the contractor
2. The provision of water and lighting and of single phase electric power to a position within 50 metres of the place where the subcontract or subcontractors work is to be carried out other than water, fuel and power for commissioning of any installation
3. The provision of an area for the subcontractor to establish temporary office accommodation and workshops and for the storage of plant and materials and goods
4. The use of erected scaffolding belonging to the contractor, in common with others having the like right, while it remains erected on the site. It is submitted that the contractor is only entitled to charge a subcontractor for the use of scaffolding if it is needed by the subcontractor for an extended period due to his own default
5. The use of ablution facilities and the like, where provided
6. The use of the site telecommunication facilities, where provided, subject to payment by the subcontractor for usage thereof
7. Making good all trades and cleaning down and removal of rubbish on completion

Special attendance on nominated/selected subcontractors

Where applicable, special attendance will be described under the relevant subcontract listed below, in accordance with Clause B8.1 of the Preliminaries

Carried to Collection

Bill No. 16

Electrical Installation

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

**ELECTRICAL INSTALLATION - LOW VOLTAGE
INSTALLATION + UPS**

A Electrical Installation - LOW VOLTAGE INSTALLATION + UPS
total value as carried over from Part C1.2.2

Item

B Add for profit

Item

C Add for general attendance on subcontractor

Item

D Add for special attendance on subcontractor

Item

Selected subcontractors name:

Carried to Collection

R

Bill No. 16

Electrical Installation

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

**ELECTRICAL INSTALLATION - INFRASTRUCTURE
INSTALLATION**

- A Electrical Installation - INFRASTRUCTURE INSTALLATION
total value as carried over from Part C1.2.3
- B Add for profit
- C Add for general attendance on subcontractor
- D Add for special attendance on subcontractor

Item

Item

Item

Item

Selected subcontractors name:

Carried to Collection

R

Bill No. 16

Electrical Installation

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

**ELECTRICAL INSTALLATION - STANDBY
GENERATOR INSTALLATION**

A	Electrical Installation - STANDBY GENERATOR INSTALLATION total value as carried over from Part C1.2.4	Item
B	Add for profit	Item
C	Add for general attendance on subcontractor	Item
D	Add for special attendance on subcontractor	Item
Selected subcontractors name:		

Carried to Collection

R

Bill No. 16
Electrical Installation
**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

**ELECTRICAL INSTALLATION - EARTHING AND
LIGHTNING PROTECTION INSTALLATION**

A Electrical Installation - EARTHING AND LIGHTNING
PROTECTION INSTALLATION total value as carried over from
Part C1.2.5

Item

B Add for profit

Item

C Add for general attendance on subcontractor

Item

D Add for special attendance on subcontractor

Item

Selected subcontractors name:

Carried to Collection

R

Bill No. 16

Electrical Installation

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

ELECTRICAL INSTALLATION - BMS INSTALLATION

- A Electrical Installation - BMS INSTALLATION total value as carried over from Part C1.2.6
- B Add for profit
- C Add for general attendance on subcontractor
- D Add for special attendance on subcontractor

Item

Item

Item

Item

Selected subcontractors name:

Carried to Collection

R

Bill No. 16

Electrical Installation

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

Item No		Quantity	Rate	Amount
	<u>BILL No. 17</u>			
	<u>ELECTRONIC INSTALLATION</u>			
	<u>NOTE:</u> Tenderers are advised to study the Model Preambles for Trades before pricing this bill			
	<u>NOTE:</u> A complete Bill of Quantities for this trade is attached to this tender document under Part C1.2.7.			
	The Bill in Part C1.2.7 should be fully priced and form part of the tender returnable documentation as accompanying documentation.			
	The relevant Bill total in Part C1.2.7 should be carried forward to this trade and builders profit and attendance should then be priced for accordingly.			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	The following are for work to be carried out by selected subcontractors in terms of Clause 21 of the Principal Building Agreement prepared and published by the Joint Building Contracts Committee: Edition 5.0 Code 2101, July 2007. (The JBCC Series 2000 Principal Building Agreement).			
	<u>General attendance on nominated/selected subcontractors</u>			
	The item "Attendance" which follows each provisional sum for nominated/selected subcontractors' work, shall be deemed to cover all the contractor's costs incurred in providing free of charge to the nominated/selected subcontractors, the following:			
	1. Access to the site and places where the subcontract work is to be carried out, including the reasonable use of any temporary personnel hoists erected by the contractor			
	2. The provision of water and lighting and of single phase electric power to a position within 50 metres of the place where the subcontract or subcontractors work is to be carried out other than water, fuel and power for commissioning of any installation			
	3. The provision of an area for the subcontractor to establish temporary office accommodation and workshops and for the storage of plant and materials and goods			
	Carried to Collection		R	
	Bill No. 17			
	Electronic Installation			
	SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein			
	PROVISIONAL BILLS OF QUANTITIES			

4. The use of erected scaffolding belonging to the contractor, in common with others having the like right, while it remains erected on the site. It is submitted that the contractor is only entitled to charge a subcontractor for the use of scaffolding if it is needed by the subcontractor for an extended period due to his own default

5. The use of ablution facilities and the like, where provided

6. The use of the site telecommunication facilities, where provided, subject to payment by the subcontractor for usage thereof

7. Making good all trades and cleaning down and removal of rubbish on completion

Special attendance on nominated/selected subcontractors

Where applicable, special attendance will be described under the relevant subcontract listed below, in accordance with Clause B8.1 of the Preliminaries

Carried to Collection

Bill No. 17

Electronic Installation

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

ELECTRONIC INSTALLATION

A Electronic Installation consisting of passive network - fibre
reticulation and data cabling total value as carried over from
Part C1.2.7

Item

B Add for profit

Item

C Add for general attendance on subcontractor

Item

D Add for special attendance on subcontractor

Item

Selected subcontractors name:

Carried to Collection

R

Bill No. 17

Electronic Installation

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

Bill No. 17

Electronic Installation

COLLECTION

Total Brought Forward from Page No.

**Page
No**

169

170

171

Amount

Carried to Summary

R

Bill No. 17

Electronic Installation

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

Item No	Quantity	Rate	Amount
BILL No. 18			
MECHANICAL INSTALLATION			
<u>NOTE:</u> Tenderers are advised to study the Model Preambles for Trades before pricing this bill			
<u>NOTE:</u> A complete Bill of Quantities for this trade is attached to this tender document under Part C1.2.8.			
The Bill in Part C1.2.8 should be fully priced and form part of the tender returnable documentation as accompanying documentation.			
The relevant Bill total in Part C1.2.8 should be carried forward to this trade and builders profit and attendance should then be priced for accordingly.			
SUPPLEMENTARY PREAMBLES			
The following are for work to be carried out by selected subcontractors in terms of Clause 21 of the Principal Building Agreement prepared and published by the Joint Building Contracts Committee: Edition 5.0 Code 2101, July 2007. (The JBCC Series 2000 Principal Building Agreement).			
Carried to Collection			R
Bill No. 18 Mechanical Installation SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES			

General attendance on nominated/selected subcontractors

The item "Attendance" which follows each provisional sum for nominated/selected subcontractors' work, shall be deemed to cover all the contractor's costs incurred in providing free of charge to the nominated/selected subcontractors, the following:

1. Access to the site and places where the subcontract work is to be carried out, including the reasonable use of any temporary personnel hoists erected by the contractor
2. The provision of water and lighting and of single phase electric power to a position within 50 metres of the place where the subcontract or subcontractors work is to be carried out other than water, fuel and power for commissioning of any installation
3. The provision of an area for the subcontractor to establish temporary office accommodation and workshops and for the storage of plant and materials and goods
4. The use of erected scaffolding belonging to the contractor, in common with others having the like right, while it remains erected on the site. It is submitted that the contractor is only entitled to charge a subcontractor for the use of scaffolding if it is needed by the subcontractor for an extended period due to his own default
5. The use of ablution facilities and the like, where provided
6. The use of the site telecommunication facilities, where provided, subject to payment by the subcontractor for usage thereof
7. Making good all trades and cleaning down and removal of rubbish on completion

Special attendance on nominated/selected subcontractors

Where applicable, special attendance will be described under the relevant subcontract listed below, in accordance with Clause B8.1 of the Preliminaries

Carried to Collection

Bill No. 18

Mechanical Installation

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

MECHANICAL INSTALLATION

- A Mechanical Installation total value as carried over from Part C1.2.8
- B Add for profit
- C Add for general attendance on subcontractor
- D Add for special attendance on subcontractor

Item

Item

Item

Item

Selected subcontractors name:

Carried to Collection

R

Bill No. 18
Mechanical Installation
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

Item No		Quantity	Rate	Amount
	<u>BILL No. 19</u>			
	<u>FIRE DETECTION INSTALLATION</u>			
	<p><u>NOTE:</u> Tenderers are advised to study the Model Preambles for Trades before pricing this bill</p> <p><u>NOTE:</u> A complete Bill of Quantities for this trade is attached to this tender document under Part C1.2.9.</p> <p>The Bill in Part C1.2.9 should be fully priced and form part of the tender returnable documentation as accompanying documentation.</p> <p>The relevant Bill total in Part C1.2.9 should be carried forward to this trade and builders profit and attendance should then be priced for accordingly.</p>			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	<p>The following are for work to be carried out by selected subcontractors in terms of Clause 21 of the Principal Building Agreement prepared and published by the Joint Building Contracts Committee: Edition 5.0 Code 2101, July 2007. (The JBCC Series 2000 Principal Building Agreement).</p> <p><u>General attendance on nominated/selected subcontractors</u></p> <p>The item "Attendance" which follows each provisional sum for nominated/selected subcontractors' work, shall be deemed to cover all the contractor's costs incurred in providing free of charge to the nominated/selected subcontractors, the following:</p> <ol style="list-style-type: none"> 1. Access to the site and places where the subcontract work is to be carried out, including the reasonable use of any temporary personnel hoists erected by the contractor 2. The provision of water and lighting and of single phase electric power to a position within 50 metres of the place where the subcontract or subcontractors work is to be carried out other than water, fuel and power for commissioning of any installation 3. The provision of an area for the subcontractor to establish temporary office accommodation and workshops and for the storage of plant and materials and goods 			
	Carried to Collection		R	
	Bill No. 19 Fire Detection Installation SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES			

4. The use of erected scaffolding belonging to the contractor, in common with others having the like right, while it remains erected on the site. It is submitted that the contractor is only entitled to charge a subcontractor for the use of scaffolding if it is needed by the subcontractor for an extended period due to his own default

5. The use of ablution facilities and the like, where provided

6. The use of the site telecommunication facilities, where provided, subject to payment by the subcontractor for usage thereof

7. Making good all trades and cleaning down and removal of rubbish on completion

Special attendance on nominated/selected subcontractors

Where applicable, special attendance will be described under the relevant subcontract listed below, in accordance with Clause B8.1 of the Preliminaries

Carried to Collection

Bill No. 19

Fire Detection Installation

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

FIRE DETECTION INSTALLATION

- A Fire Detection Installation total value as carried over from Part C1.2.9
- B Add for profit
- C Add for general attendance on subcontractor
- D Add for special attendance on subcontractor

Item

Item

Item

Item

Selected subcontractors name:

Carried to Collection

R

Bill No. 19

Fire Detection Installation

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

[illegible]

<u>ON FLOATED PLASTER SURFACES</u>					
<u>Prepare and apply one coat "Amoriguard A Gain exterior filler and two coats Amoriguard A grain top coat (colour: Grey), applied as per manufacturer's specifications</u>					
A	On internal walls and columns	m2	4 082		
B	On beams	m2	339		
<u>Prepare and apply one coat "Amoriguard A Gain exterior filler and two coats Amoriguard A grain top coat (colour: Grey), applied as per manufacturer's specifications</u>					
C	On external walls and columns	m2	1 595		
D	On beams	m2	448		
<u>ON BAGGED BRICKWORK OR CONCRETE SURFACES</u>					
<u>Prepare and apply one coat alkali resistant primer and two coats superior quality acrylic emulsion paint for interior and exterior use to manufacturer's specifications</u>					
E	On walls and columns	m2	944		
<u>Prepare and apply one coat alkali resistant primer and two coats superior quality acrylic emulsion paint for interior and exterior use to manufacturer's specifications</u>					
F	On walls and columns	m2	55		
<u>ON PLASTER BOARD</u>					
<u>Prepare and apply one coat "Amoriguard A Gain" exterior filler and two coats Amoriguard A grain top coat (colour: Grey), applied as per manufacturer's specifications</u>					
G	On ceilings	m2	556		
H	On bulkheads	m2	15		
J	On Partitions	m2	260		
Carried to Collection				R	
Bill No. 21 Paintwork SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES					

ON WOOD

Two coats wood primer

A	On backs of frames, linings, etc not exceeding 300mm wide	m	277
---	---	---	-----

One coat "Jax Oleu" oil wood primer or similar approved,
colour: Corn Silk

B	Door frames	m2	17
---	-------------	----	----

One coat primer, one coat alkyd based universal undercoat
and two coats superior quality universal enamel paint

C	On doors	m2	102
---	----------	----	-----

Carried to Collection

Bill No. 21

Paintwork

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

Item No	Quantity	Rate	Amount
<u>BILL No. 22</u>			
<u>EXTERNAL WORKS</u>			
<p><u>NOTE:</u> Tenderers are advised to study the Model Preambles for Trades 2017 before pricing this bill</p>			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Wire gratings</u>			
Descriptions of gutter outlets etc shall be deemed to include wire balloon gratings			
<u>Stormwater channels</u>			
Descriptions of channels shall be deemed to include all necessary excavation and disposal of surplus material			
<u>Nature of the ground</u>			
A geotechnical investigation has been carried out on the site by the engineer refer to " <i>Part C1.3.5 Annexure E – Geotechnical Survey</i> " of the tender document.			
All classes of excavations in accordance with South African National Standards (1990) SANS 1200 D: Earthworks and Table 4-4, Classes of Excavation according to SANS 1200D, of the <i>Geotechnical Survey</i>			
Carried to Collection			R
Bill No. 22 External Works - General Buildings SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES			

The Tenderer shall acquaint himself by personal examination of the nature of the ground. Descriptions of excavations shall be deemed to include all ground conditions classifiable as "earth or soft excavations" and where conditions of a more difficult character are indicated these are separately measured.

"Earth or soft excavations" shall mean all excavation in material that can be efficiently removed by a back-acting excavator of flywheel power approximately 0.10 kW per millimetre of tined-bucket width, without the use of pneumatic tools such as paving breakers for restricted excavation (e.g. trenching), and for unrestricted excavation in accordance with SANS 1200 D: Earthworks, Classes of Excavation, and shall include the following ground conditions descriptions:

- Loose, SAND and GRAVEL
- Loose to medium dense, SAND and GRAVEL
- Medium dense, SAND and GRAVEL
- Medium dense to dense, GRAVEL
- Completely weathered, very soft rock, TILLITE
- Highly weathered, soft rock, TILLITE

"Intermediate Excavation" shall mean all excavation in material that requires a back-acting excavator of flywheel power exceeding 0.10 kW per millimetre of tined-bucket width or the use of pneumatic tools before removal by equipment equivalent to that specified for soft excavation for restricted excavation (e.g. trenching), and for unrestricted excavation in accordance with SANS 1200 D: Earthworks, Classes of Excavation, and shall include the following ground conditions descriptions:

- Moderately weathered, medium hard rock, TILLITE

"Hard Excavation" shall mean hard rock excavation and shall be excavation in material (excluding boulder excavation) that cannot be efficiently removed without blasting or wedging and splitting for restricted excavation (e.g. trenching), and for unrestricted excavation in accordance with SANS 1200 D: Earthworks, Classes of Excavation.

Carried to Collection

Bill No. 22

External Works - General Buildings

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

No claim for "Intermediate Excavation" or "Hard Rock Excavation" will be entertained unless the contractor has timeously notified the principal agent thereof prior to backfilling

Keeping excavations free of water

Further to clause R.18.6 of the Model Preambles for Trades, excavations for sumps, catch pits, inspection chambers, junction boxes and the like shall be deemed to include for keeping free of water

Dewatering

The contractors attention is drawn to the geotechnical investigation. The contractor shall price for dewatering of subterranean water under the item provided in the bills of quantities and no additional cost will be entertained for removal of additional subterranean water in addition to priced item. The contractor to actively plan around these type of eventualities

Laying, backfilling, bedding, etc of pipes

Pipes shall be laid and bedded and trenches shall be carefully backfilled in accordance with manufacturers' instructions

Where no manufacturers' instructions exist pipes shall be laid in accordance with clauses 5.1 and 5.2 of each of the following:

SABS 1200L : Medium-pressure pipelines, SABS 1200LD : Sewers and SABS 1200LE : Stormwater drainage

Pipe trenches etc shall be backfilled in accordance with clauses 3, 5.5, 5.6, 5.7 and 7 of SABS 1200DB : Earthworks (Pipe trenches)

Pipes shall be bedded in accordance with clauses 3.1 to 3.4.1, 5.1 to 5.3 and 7 of SABS 1200LB : Bedding (Pipes). Unless otherwise described bedding of rigid pipes shall be class B bedding

Concrete pipes

Pipes shall be jointed with ogee joints with rubber collars or socket and spigot joints with rubber rings

Carried to Collection

Bill No. 22

External Works - General Buildings

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

uPVC pipes and fittings

Sewer and drainage pipes and fittings shall be jointed and sealed with butyl rubber rings

Soil, waste and vent pipes and fittings shall be solvent weld jointed or sealed with butyl rubber rings

Gratings, covers, etc

Gratings, covers, etc shall be as manufactured by "Besaans du Plessis Foundries", unless otherwise described

uPVC pressure pipes and fittings

Pipes for water supply shall be of the class described

Pipes of 40mm diameter and smaller shall be plain ended with solvent welded uPVC loose sockets and fittings

Pipes of 50mm diameter and greater shall have sockets and spigots with push-in type integral rubber ring joints. Bends shall be uPVC and all other fittings shall be cast iron, all with similar push-in type joints

General

Pipe trenches is measured according to Method "B" of the Standard System of Measuring Building Work 2015, 7th Edition

Excavations for sumps, catch pits, inspection chambers, junction boxes and the like shall be deemed to include for risk of collapse, keeping free of water, backfilling, compaction to a minimum of 93% Modified AASHTO density and disposal of surplus material

Testing of material and filling

Descriptions of earth filling, compaction, etc shall be deemed to include for all necessary testing required in accordance with the SABS 1200 series

Precast concrete block road surfacing

Paving shall be laid in accordance with SABS 1200 MJ, SANS 1058 and the Concrete Masonry Association's specifications

Carried to Collection

Bill No. 22

External Works - General Buildings

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

Carried to Collection

Bill No. 22
External Works - General Buildings
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

<u>RETAINING STRUCTURES & PLINTHS</u>					
<u>Excavations in earth not exceeding 2m deep</u>					
A	Trenches	m3	25		
<u>Risk of collapse of excavations</u>					
B	Sides of trench and hole excavations not exceeding 1.5m deep	m2	68		
<u>Earth filling obtained from the excavations and/or prescribed stock piles on site, compacted in not exceeding 200mm layers to 93% modified AASHTO density</u>					
C	Behind retaining blocks	m3	65		
<u>Filling supplied by the contractor under parking areas, roadways, etc</u>					
D	Subbase course of G7 material in accordance with SABS 1200 ME, compacted in layers not exceeding 150mm to 97% Mod AASHTO density	m3	14		
<u>15MPa/19mm concrete</u>					
E	Surface blinding under footings and bases	m3	5		
<u>25MPa/19mm concrete</u>					
F	Strip footings	m3	6		
<u>30MPa/19mm concrete</u>					
G	Plinths	m3	19		
H	Plinth walls	m3	13		
<u>Rough formwork to sides</u>					
J	Walls with total height not exceeding 3 500m	m2	224		
<u>Mild / High tensile steel reinforcement to structural concrete work</u>					
K	8 - 32mm Diameter bars	to	2.424		
Carried to Collection				R	
Bill No. 22					
External Works - General Buildings					
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein					
PROVISIONAL BILLS OF QUANTITIES					

MARSHALLING YARD

Concrete class 30/26 (CEM III A-S cement to sand EN 197-1 and slag to SANS 1491)

A	Marshalling yard cast in 4.5 x 4.5m panels on layerworks	m3	98
	<u>Finishing top surfaces of concrete with a power float and a coarse hard grass broom. No curing compound to be used, only water and plastic (clean wrap)</u>		
B	Marshalling yard	m2	545
	<u>Rough formwork to sides</u>		
C	Edges of surface bed panels, ramps, etc not exceeding 300mm high or wide	m	126
	<u>Saw cut joints in two operations including Pu seal (Pu seal elsewhere measured)</u>		
D	6 x 50mm Saw cut joints in top of concrete	m	226
	<u>"MM80" heavy duty epoxy resin joint sealant as per manufactures specifications</u>		
E	To 50 x 6mm wide saw-cut joints (SCJ) in floors to be applied after one year	m	226

Carried to Collection

Bill No. 22
External Works - General Buildings
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

ROADWORK, PARKING AREAS AND PAVING

Earth filling obtained from the excavations and/or prescribed stock piles on site, including haulage exceeding 100m and not exceeding 200m from perimeter of excavations or stock piles

A	Subbase course over site compacted to 95% modified AASHTO density	m3	690
---	---	----	-----

Filling supplied by the contractor under parking areas, roadways, etc

B	Subbase course of G7 material in accordance with SABS 1200 ME, compacted in layers not exceeding 150mm to 97% Mod AASHTO density	m3	149
---	--	----	-----

C	Subbase course of G5 material in accordance with SABS 1200 DM, compacted in layers not exceeding 150mm to 98% Mod AASHTO density	m3	366
---	--	----	-----

D	Subbase course of C4 material in accordance with SABS 1200 ME, compacted in layers not exceeding 150mm to 98% Mod AASHTO density	m3	394
---	--	----	-----

Additional tests required by the principal agent

E	CBR test in accordance with method A8 of TMH1	No	10
---	---	----	----

De-watering of seepage water and water from other sub-soil sources

F	Dewatering system for removal of seepage water and water from other subterranean sources in the bulk excavations designed and executed by the contractor including all temporary pipes, drainage sumps, silt trap, connections, well points, etc.	Item	
---	---	------	--

Keeping bulk excavations free of water

G	Keeping excavations free of all water other than subterranean water	Item	
---	---	------	--

Carried to Collection

R

Bill No. 22

External Works - General Buildings

SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein

PROVISIONAL BILLS OF QUANTITIES

	<u>220 x 110 x 50mm Thick Nougat Paver (Supplier: Corobrik, colour: Tan) or similar approved laid in herringbone pattern in accordance with SANS 1058, laid to falls on and including 25mm thick sand layer with joints filled with sand, compacted with a vibration roller</u>		
A	Paving to sidewalks, etc to falls	m2	643
B	Extra over paver for brick-on-flat header course edging units on and including 15/19mm concrete bedding	m	89
	<u>200 x 100 x 50mm Thick Bond Paver (Supplier: CEL, Colour: Grey) or similar approved laid in herringbone pattern in accordance with SANS 1058, laid to falls on and including 25mm thick sand layer with joints filled with sand, compacted with a vibration roller</u>		
C	Paving to sidewalks, etc. to falls	m2	352
D	Extra over paver for brick-on-flat header course edging units on and including 15/19mm concrete bedding	m	290
	<u>203 x 102 x 80mm Thick interlocking paving (Supplier: CEL, colour: Charcoal) or similar approved in accordance with SANS 1058, laid to falls on and including 25mm thick sand layer with joints filled in with sand, compacted with a vibration compactor</u>		
E	Paving to parking areas etc to falls, including necessary straight edge blocks	m2	3 061
F	Circular cutting	m	30
	<u>80mm Thick cobble stone in accordance with SANS 1058, laid to falls on and including 25mm thick sand layer with joints filled in with sand, compacted with a vibration compactor</u>		
G	Paving to parking areas to create parking line	m	240

Carried to Collection

R

Bill No. 22
External Works - General Buildings
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

PRECAST CONCRETE

Precast concrete finished smooth on exposed surfaces, including excavation, backfilling, 50mm min. 20 MPa bedding, 20 MPa continuous backing behind kerbs, jointing and pointing etc. in accordance with SANS 927 and SANS 1200MK

A	100 x 250mm High edging (SANS 927 fig E3)	m	263
B	150 x 250mm High kerb (SANS 927 fig BK2)	m	388
C	75 x 150mm High edgings (SANS 927 fig 12) circular on plan exceeding 4m radius formed with straight edgings	m	7
D	75 x 150mm High edgings (SANS 927 fig 12) circular on plan not exceeding 4m radius formed with short lengths of straight edgings	m	22
E	Combination kerb type BK2 + C1	m	167

Carried to Collection

Bill No. 22
External Works - General Buildings
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

ROAD MARKINGS

Road signs with painted background and symbols and with signboard constructed from aluminium sheeting (2mm thick) complete and in accordance to class III of SANS 1519

A	Stop sign (Type R1) 600mm high octagon size including galvanized steel post 75mm diameter including concrete base with excavations, 2 500mm high	No	2
B	Yield sign (Type R2) 900mm high triangular size including galvanized steel post 75mm diameter including concrete base with excavations, 2 500mm high	No	2
C	Standard "DISABLED" sign with 50mm diameter galvanised mild steel post bedded in and including unreinforced concrete base, including any necessary excavation, paint finish, etc	No	3
	<u>Prepare and apply two coats reflective road marking paint on bituminous road surfacing, precast concrete paving blocks, etc</u>		
D	Disabled sign	No	3

Carried to Collection

Bill No. 22

External Works - General Buildings

SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein

PROVISIONAL BILLS OF QUANTITIES

R

STORMWATER DRAINAGE

Slotted uPVC geopipes type: CORFLO to SABS 1601 including 19mm crushed stone encasing size 500 x 300mm and "Polytex Wowen" Geotextile (Type PT110) filter blanket wrapped around encasing with side and end laps including stitching

A	110mm Pipes laid in trenches (trenches elsewhere measured under "Earthworks")	m	449
B	EO for 110mm Cast iron rodding eye	No	5
	<u>Heavy duty (Class 34) uPVC pipes</u>		
C	200mm Pipes laid in and including trenches not exceeding 1m deep	m	25
D	EO for rodding eye	No	5
	<u>Precast concrete, Class 100D, spigot and socket pipes</u>		
E	450mm Pipes laid in and including trenches not exceeding 1m deep	m	33
F	450mm Pipes laid in and including trenches exceeding 1m and not exceeding 2m deep	m	40
	<u>Extra over excavations for excavations in</u>		
G	Intermediate excavation	m3	15
	<u>Construct concrete headwall units</u>		
H	(W) 860 x (X) 520 x (Y)900mm Headwall complete as per typical detail, drawing No P3589-C-T-005	No	4
	<u>Precast concrete circular inspection chambers including 560mm diameter type 2A (SABS 558-1973) cover and frame</u>		
J	Manhole 1 050mm internal diameter exceeding 1 250mm and not exceeding 1 500mm deep internally	No	3

Carried to Collection

R

Bill No. 22
External Works - General Buildings
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

[illegible]

<u>FOUL SEWER</u>				
<u>Excavation in earth exceeding 2m deep and not exceeding 4m deep</u>				
A	Holes - for conservancy tanks	m3	125	
<u>Extra over excavations for excavations in</u>				
B	Intermediate excavation	m3	85	
<u>Risk of collapse of excavations</u>				
C	Sides of trench and hole excavations exceeding 1.5m deep	m2	325	
<u>Heavy duty (Class 34) uPVC pipes</u>				
D	110mm Pipes laid in and including trenches not exceeding 1m deep	m	51	
E	110mm Pipes laid in and including trenches exceeding 1m and not exceeding 2m deep	m	90	
F	110mm Pipes laid in and including trenches exceeding 2m and not exceeding 3m deep	m	52	
G	110mm Pipes vertically or ramped to rodding eyes, etc (no excavations)	m	8	
<u>Precast concrete circular inspection chambers including 560mm diameter type 2A (SABS 558-1973) cover and frame</u>				
H	Manhole 1 050mm internal diameter exceeding 1 250mm and not exceeding 1 500mm deep internally	No	2	
J	Manhole 1 050mm internal diameter exceeding 2 250mm and not exceeding 2 500mm deep internally	No	1	
<u>Conservancy tank complete with and including excavation, bedding and jointing, concrete base slabs, jointing to drains and backfilling, compaction, etc and disposal of surplus material on site all in accordance with the manufactures instructions and in accordance with the engineers drawing P3589-C-TD-002</u>				
K	6000 litre conservancy tank complete with all necessary accessories, components, etc complete	No	5	
Carried to Collection				R
Bill No. 22				
External Works - General Buildings				
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein				
PROVISIONAL BILLS OF QUANTITIES				

	<u>Testing</u>				
A	Testing foul water sewer pipe system		Item		
	<u>WATER RETICULATION</u>				
	<u>SECTIONAL STEEL WATER TANK</u>				
B	5.44kL Sectional steel water tank, with and including all pipework and fittings, complete (as per engineers details Wet Services P3589-W-02) concrete plinths measured elsewhere	No	2		
C	110kL Sectional steel water tank, split in two for domestic water and fire with and including all pipework and fittings, complete (as per engineers details Wet Services P3589-W-02) concrete plinths measured elsewhere	No	1		
D	Pumpset consisting of duty and standby pump at 0.9L/s @ 3.5 Bar, 25A/380V/3-Phase D-Curve breaker, including neutral and earth electrical connection	No	2		
E	Pumpset consisting of duty and standby pump at 1.5L/s @ 4.0 Bar, 25A/380V/3-Phase D-Curve breaker, including neutral and earth electrical connection	No	1		
	<u>"HDPE P PN12.5" pressure pipes to SABS966</u>				
F	28mm Pipes laid in and including trenches not exceeding 1m deep	m	80		
G	32mm Pipes laid in and including trenches not exceeding 1m deep	m	3		
H	40mm Pipes laid in and including trenches not exceeding 1m deep	m	20		
J	80mm Pipes laid in and including trenches not exceeding 1m deep	m	13		
K	100mm Pipes laid in and including trenches not exceeding 1m deep	m	13		
	<u>Extra over "HDPE PE100 PN12.5" pressure pipes for fittings</u>				
L	28mm Fittings	No	8		
	Carried to Collection			R	
	Bill No. 22				
	External Works - General Buildings				
	SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein				
	PROVISIONAL BILLS OF QUANTITIES				

A	32mm Bend	No	3
B	40mm Bend	No	2
C	40mm Tee	No	2
D	80mm Bend	No	3
E	100 x 50mm Reducer	No	3
F	100mm Bend	No	3

Carried to Collection

Bill No. 22
External Works - General Buildings
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

FENCING AND GATES

"Clearvu" Invisible wall fencing comprising of 3297 x 1800mm high density pressed mesh panels with 2 x 70mm flanges to sides and 2 x 30mm flanges to top and bottom. 65mm tapered posts reducing to 45mm complete including Marine fusion bond finish as per manufacturer's specifications

A	Perimeter fencing 1 800mm high including concrete bases to all posts	m	107
---	--	---	-----

LANDSCAPING

Grassing, ground covers, etc

B	19mm Aggregate with tumble foliage shrubbery, colour natural brown	m2	71
C	570 x 380 x 100mm "CEL pavers" or similar approved, hard lawn concrete block allowing for water run-off and grass growth, colour standard grey colour.	m2	484

Landscaping

D	Budgetary amount of R350 000.00 (Three Hundred and Fifty Thousand Rand) for supply and installation of landscaping to be used as directed by the Principle Agent and deducted in whole or in part if not required	Item	350 000.00
---	--	------	------------

Carried to Collection

R

Bill No. 22
External Works - General Buildings
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

Item No	Quantity	Rate	Amount
<u>BILL No. 23</u>			
<u>CIVIL WORKS - SITE WIDE INFRASTRUCTURE</u>			
<p><u>NOTE:</u> Tenderers are advised to study the Model Preambles for Trades 2017 before pricing this bill</p>			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Wire gratings</u>			
Descriptions of gutter outlets etc shall be deemed to include wire balloon gratings			
<u>Stormwater channels</u>			
Descriptions of channels shall be deemed to include all necessary excavation and disposal of surplus material			
<u>Excavations</u>			
A geotechnical investigation has been carried out on the site by the engineer refer to " <i>Part C1.3.5 Annexure E – Geotechnical Survey</i> " of the tender document.			
All classes of excavations in accordance with South African National Standards (1990) SANS 1200 D: Earthworks and Table 4-4, Classes of Excavation according to SANS 1200D, of the <i>Geotechnical Survey</i>			
Carried to Collection			
			R
Bill No. 23 Civil Works - Site Wide Infrastructure SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES			

The Tenderer shall acquaint himself by personal examination of the nature of the ground. Descriptions of excavations shall be deemed to include all ground conditions classifiable as "earth or soft excavations" and where conditions of a more difficult character are indicated these are separately measured.

"Earth or soft excavations" shall mean all excavation in material that can be efficiently removed by a back-acting excavator of flywheel power approximately 0.10 kW per millimetre of tined-bucket width, without the use of pneumatic tools such as paving breakers for restricted excavation (e.g. trenching), and for unrestricted excavation in accordance with SANS 1200 D: Earthworks, Classes of Excavation, and shall include the following ground conditions descriptions:

- Loose, SAND and GRAVEL
- Loose to medium dense, SAND and GRAVEL
- Medium dense, SAND and GRAVEL
- Medium dense to dense, GRAVEL
- Completely weathered, very soft rock, TILLITE
- Highly weathered, soft rock, TILLITE

"Intermediate Excavation" shall mean all excavation in material that requires a back-acting excavator of flywheel power exceeding 0.10 kW per millimetre of tined-bucket width or the use of pneumatic tools before removal by equipment equivalent to that specified for soft excavation for restricted excavation (e.g. trenching), and for unrestricted excavation in accordance with SANS 1200 D: Earthworks, Classes of Excavation, and shall include the following ground conditions descriptions:

- Moderately weathered, medium hard rock, TILLITE

"Hard Excavation" shall mean hard rock excavation and shall be excavation in material (excluding boulder excavation) that cannot be efficiently removed without blasting or wedging and splitting for restricted excavation (e.g. trenching), and for unrestricted excavation in accordance with SANS 1200 D: Earthworks, Classes of Excavation.

Carried to Collection

Bill No. 23
Civil Works - Site Wide Infrastructure
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

No claim for "Intermediate Excavation" or "Hard Rock Excavation" will be entertained unless the contractor has timeously notified the principal agent thereof prior to backfilling

Once topsoil is stripped and weathering of the rock can be confirmed, suitable excavation method can be determined. If the weathering is high, excavation can be executed using dozer ripping or large excavator. If the weathering is limited and mostly bed rock, blasting will be more feasible.

Before any excavations commence, approval needs to be given by the civil engineer.

Descriptions 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

Keeping excavations free of water

Further to clause R.18.6 of the Model Preambles for Trades, excavations for sumps, catch pits, inspection chambers, junction boxes and the like shall be deemed to include for keeping free of water

Dewatering

The contractors attention is drawn to the geotechnical investigation. The contractor shall price for dewatering of subterranean water under the item provided in the bills of quantities and no additional cost will be entertained for removal of additional subterranean water in addition to priced item. The contractor to actively plan around these type of eventualities

Laying, backfilling, bedding, etc of pipes

Pipes shall be laid and bedded and trenches shall be carefully backfilled in accordance with manufacturers' instructions

Carried to Collection

Bill No. 23

Civil Works - Site Wide Infrastructure

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

Where no manufacturers' instructions exist pipes shall be laid in accordance with clauses 5.1 and 5.2 of each of the following:

SABS 1200L : Medium-pressure pipelines, SABS 1200LD : Sewers and SABS 1200LE : Stormwater drainage

Pipe trenches etc shall be backfilled in accordance with clauses 3, 5.5, 5.6, 5.7 and 7 of SABS 1200DB : Earthworks (Pipe trenches)

Pipes shall be bedded in accordance with clauses 3.1 to 3.4.1, 5.1 to 5.3 and 7 of SABS 1200LB : Bedding (Pipes). Unless otherwise described bedding of rigid pipes shall be class B bedding

Concrete pipes

Pipes shall be jointed with ogee joints with rubber collars or socket and spigot joints with rubber rings

uPVC pipes and fittings

Sewer and drainage pipes and fittings shall be jointed and sealed with butyl rubber rings

Soil, waste and vent pipes and fittings shall be solvent weld jointed or sealed with butyl rubber rings

Gratings, covers, etc

Gratings, covers, etc shall be as manufactured by "Besaans du Plessis Foundries", unless otherwise described

uPVC pressure pipes and fittings

Pipes for water supply shall be of the class described

Pipes of 40mm diameter and smaller shall be plain ended with solvent welded uPVC loose sockets and fittings

Pipes of 50mm diameter and greater shall have sockets and spigots with push-in type integral rubber ring joints. Bends shall be uPVC and all other fittings shall be cast iron, all with similar push-in type joints

Carried to Collection

Bill No. 23

Civil Works - Site Wide Infrastructure

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

General

Pipe trenches is measured according to Method "B" of the Standard System of Measuring Building Work 2015, 7th Edition

Excavations for sumps, catch pits, inspection chambers, junction boxes and the like shall be deemed to include for risk of collapse, keeping free of water, backfilling, compaction to a minimum of 93% Modified AASHTO density and disposal of surplus material

Testing of material and filling

Descriptions of earth filling, compaction, etc shall be deemed to include for all necessary testing required in accordance with the SABS 1200 series

Precast concrete block road surfacing

Paving shall be laid in accordance with SABS 1200 MJ, SANS 1058 and the Concrete Masonry Association's specifications

Carried to Collection

Bill No. 23

Civil Works - Site Wide Infrastructure

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

<u>BULK EXCAVATION, FILLING, ETC</u>					
	<u>Digging up topsoil</u>				
A	Digging up topsoil to an average depth of 220mm and preserving in stockpile as per EMP	m2	24 458		
	<u>Open face excavation in earth over sloping site</u>				
B	Open face excavation (cut)	m3	10 811		
	<u>Extra over excavations for excavations in</u>				
C	Intermediate excavation	m3	2 056		
D	Hard rock excavation	m3	1 243		
	<u>De-watering of seepage water and water from other sub-soil sources</u>				
E	Dewatering system for removal of seepage water and water from other subterranean sources in the bulk excavations designed and executed by the contractor including all temporary pipes, drainage sumps, silt trap, connections, well points, etc.			Item	
	<u>Keeping bulk excavations free of water</u>				
F	Keeping excavations free of all water other than subterranean water			Item	
	<u>Earth filling obtained from the excavations and/or prescribed stock piles on site, compacted in layers of max 250mm thick to 97% Mod AASHTO density (100% for sand)</u>				
G	Over site to make up levels (fill)	m3	7 940		
H	Extra over earth filling obtained from excavations for crushing of identified Intermediate excavation and hard rock material to meet Engineers specification	m3	3 299		
	<u>Embankment constructed from cut material generated on site including haulage exceeding 100m from perimeter of excavations or stock piles to Main Building</u>				
J	Embankments to be sloped and constructed in accordance with TRH9 (all as per civil engineers drawing P3589 - C - BE - 008)	m3	2 870		
Carried to Collection				R	
Bill No. 23					
Civil Works - Site Wide Infrastructure					
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein					
PROVISIONAL BILLS OF QUANTITIES					

A	Embankments to be sloped and constructed in accordance with TRH9 (all as per civil engineers drawing P3589 - C - BE - 008) with cut material generated from foundations and civil services excavations	m3	1 947		
	<u>Embankment constructed from earth filling supplied by the contractor, compacted to 97% Mod AASHTO density</u>				
B	Embankments to be sloped and constructed in accordance with TRH9 (all as per civil engineers drawing P3589 - C - BE - 008)	m3	5 183		
	<u>BUDGETARY ALLOWANCES</u>				
	<u>Prescribed density tests on filling</u>				
C	Allow the Budgetary Allowance of R10 000.00 (Ten Thousand Rand) for prescribed density tests on filling to be used as directed by the Engineer and deducted in whole or in part if not required		Item		10 000 00
	Carried to Collection			R	
	Bill No. 23 Civil Works - Site Wide Infrastructure SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES				

ROADWORK, PARKING AREAS AND PAVING

Preparation of sub-grade

A	Compaction of ground surfaces under roadways, etc, including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 95% Mod AASHTO density	m2	21 896
---	--	----	--------

Filling supplied by the contractor under parking areas, roadways, etc

B	225mm Thick G5 wearing course with min CBR of 45 at 97% MOD AASHTO density, maximum material size 53mm	m3	1 254
C	225mm Thick road gravel wearing course with min CBR of 45 at 97% MOD AASHTO density, maximum material size 53mm	m3	3 782

Carried to Collection

Bill No. 23
Civil Works - Site Wide Infrastructure
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

R

STORMWATER DRAINAGE

Shaping/finishing/trimming of side drain (bulk excavation measured elsewhere) as part of erosion protection in accordance with NOTE 5 on engineers drawing P3589-C-TD-00

Pricing Note:

Erosion protection as determined by slope:

12% - Grouted stone pitching with energy dissipation as required, to be determined and agreed on-site in liaison with the ECO.

7-12% - 100mm topsoil and ungrouted stone pitching with energy dissipation as required, to be determined and agreed on-site in liaison with the ECO.

3-7% - 100mm topsoil, energy dissipation by means of stone or similar check weirs installed at intervals to be determined and agreed on-site. Mitre drains as per table in road design report.

1-3% - 100mm topsoil and mitre drains.

A	V-Drains (Road side drains)	m	1 291
B	Mitre Drain	m	3 260
C	Cut-Off Drain	m	378

Carried to Collection

Bill No. 23

Civil Works - Site Wide Infrastructure

**SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES**

R

<u>Supply, handle, lay, bed Class 100D concrete stormwater pipes, ogee joint type with joints wrapped with a minimum of two layers of 150mm wide burlap, 340g/m², pre-impregnated with bitumen emulsion or similar approved for: (Civil Drawings - General details P3589-C-T-005)</u>					
A	450mm Diameter pipes laid in and including trenches not exceeding 1m deep	m	7		
B	750mm Diameter pipes laid in and including trenches not exceeding 1m deep	m	7		
<u>Supply and install stormwater headwall complete as per - (Civil Drawings - General details P3589-C-T-005)</u>					
C	450mm Diameter	No	2		
D	750mm Diameter	No	2		
<u>Supply and install stormwater drift crossing complete as per general detail: (P3589-C-T-005)</u>					
E	2% Drift crossing with and including 2No Reno Matresses, Armoflex 180 Grass blocks wired with 3.1mm Galvanised steel wire, Bidum geofabric	No	9		
Carried to Collection					
Bill No. 23					
Civil Works - Site Wide Infrastructure					
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein					
PROVISIONAL BILLS OF QUANTITIES					

R

WATER RETICULATION

MUNICIPAL WATER CONNECTION

A	Budgetary amount of R75 000.00 (Seventy Five Thousand Rand) for municipal water connection to be used as directed by the Principle Agent and deducted in whole or in part if not required		Item	75 000.00
	<u>HDPE PE100 PN12 pressure pipes to SABS 966</u>			
B	63mm Pipes laid in and including trenches not exceeding 1m deep	m	939	
	<u>Extra over HDPE PE100 PN12 pressure pipes to SABS 966 for fittings with solvent welded joints</u>			
C	63mm Bend	No	78	
D	63mm T-section	No	3	
	<u>Extra over Class 9 uPVC pressure pipes for cast iron pressure fittings</u>			
E	Unreinforced concrete thrust blocks around bends, tees, etc	No	78	
	<u>Sundries</u>			
F	600 x 600mm Brick valve chamber 1 000mm deep internally (cover and frame elsewhere)	No	3	
G	200 x 200mm Heavy duty cover and frame - ductile iron with chain fixed to cover and frame	No	3	
H	Gate valve to be "AVK" or similar approved of the resilient seal type, clockwise opening / left-hand closing, heavy duty class 16 with non-rising spindle	No	3	
	<u>Testing</u>			
J	Testing water pipe system		Item	
Carried to Collection				R
Bill No. 23 Civil Works - Site Wide Infrastructure SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES				

CABLE DUCTS

SUPPLEMENTARY PREAMBLES

Pricing Note:

Trenches for cable ducts is measured according to Method "A" of the Standard System of Measuring Building Work 2015, 7th Edition

Excavation in earth not exceeding 2m deep

A	Pipe trenches	m3	1 772
	<u>Extra over excavations for excavations in</u>		
B	Intermediate excavation	m3	362
	<u>Risk of collapse of excavations</u>		
C	Sides of excavations not exceeding 1,5m deep	m2	5 838
	<u>Earth filling supplied by the contractor compacted to 90% Mod AASHTO density</u>		
D	Sand backfill	m3	800
	<u>Earth filling obtained from the excavations and/or prescribed stock piles on site compacted to 90% Mod AASHTO density</u>		
E	Backfilling to pipe trenches	m3	971
	<u>"Kabelflex" corrugated HDPE sleeves to BS EN 50086-24 laid in trenches with and including 3.2mm Class B galvanised mild steel draw wire</u>		
F	1 x 110mm Pipes laid in trenches (trenches elsewhere)	m	1 089
G	2 x 110mm Pipes laid in trenches (trenches elsewhere)	m	2 683

Carried to Collection

R

Bill No. 23

Civil Works - Site Wide Infrastructure

SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein
PROVISIONAL BILLS OF QUANTITIES

<u>Electrical manhole, etc including rounded mortar capping (gratings and covers elsewhere)</u>				
A	1 000 x 1 000mm Brick inspection chamber exceeding 500mm and not exceeding 1 000mm deep internally with and including a 100mm thick 20MPa concrete foundation including excavations, backfill, etc. as per Civil Drawing P3589-C-SL-001	No	3	
<u>Covers, etc</u>				
B	600 x 600mm Medium density polymer cover and frame	No	3	
<u>Sundry</u>				
C	Danger tape with the SANS approved marking to be placed in trenches above all MV and LV electrical cables	m	6 007	
D	MV cable markers placed on top of excavations at 20m c/c	No	34	
Carried to Collection				R
Bill No. 23				
Civil Works - Site Wide Infrastructure				
SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein				
PROVISIONAL BILLS OF QUANTITIES				

Bill No	<u>FINAL SUMMARY</u>			Page No	Amount
1	Preliminaries			34	
2	Earthworks			41	
3	Concrete, Formwork and Reinforcement			54	
4	Masonry			60	
5	Waterproofing			64	
6	Roof Coverings, Claddings, etc			69	
7	Carpentry and Joinery			79	
8	Ceilings, Partitions and Access Flooring			90	
9	Floor Coverings, Wall Linings, etc			93	
10	Ironmongery			104	
11	Structural Steel			118	
12	Metalwork			132	
13	Plastering			137	
14	Tiling			140	
15	Plumbing and Drainage			160	
16	Electrical Installation			168	
17	Electronic Installation			172	
18	Mechanical Installation			176	
19	Fire Detection Installation			180	
20	Glazing			181	
21	Paintwork			186	
Carried Forward					R
Bill No. 23 Civil Works - Site Wide Infrastructure SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES					

Section No	FINAL SUMMARY	Page No	Amount
1	Part C1: Pricing Data	221	
	TOTAL (EXCLUDING VAT) CARRIED FORWARD TO JBCC CONTRACT DATA		R
	CARRIED TO JBCC PBA CONTRACT DATA CE SOUTH AFRICAN NATIONAL SPACE AGENCY , Matjiesfontein PROVISIONAL BILLS OF QUANTITIES		R



Due to the specialized nature of this work, tenderers must demonstrate, as part of the evaluation criteria, that the following specialist trades will be carried out by subcontractors with a proven track record in successfully completing similar contracts of comparable size, complexity, greenfield conditions, remoteness, and project requirements.

- Electrical Low Voltage

- Electrical Infrastructure

- Standby Generator

- Earthing and Lightning Protection

All submissions must adhere to the specified requirements outlined in the BOQ and align with the project's standards and specifications.

Specialist Bills of Quantities (carried to Main Contract Bills of Quantities)
Part C1.2.2

Electrical Installation - LOW VOLTAGE INSTALLATION + UPS

SANSa MATJIESFONTEIN

ELECTRICAL INSTALLATION - LOW VOLTAGE INSTALLATION + UPS

PART C1.2.2

BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
2.0	BILL NO. 2					
	LOW VOLTAGE INSTALLATION					
	LOW VOLTAGE DISTRIBUTION BOARDS					
	Supply and installation of low voltage electrical distribution boards					
2.1.1	MLV		Supply	1	R	-
	Main LV Distribution board in Energy Centre Building		Install	1	R	-
2.1.2	SMDB-1		Supply	1	R	-
	Main Operations Building MDB		Install	1	R	-
2.1.3	SDB-1		Supply	1	R	-
	Main Operations Building General DB		Install	1	R	-
2.1.4	SDB-2		Supply	1	R	-
	Energy Centre Building General DB		Install	1	R	-
2.1.5	DB-SANSA-A		Supply	1	R	-
	Distribution boards for SANSA A-Supply in SANSA equipment room		Install	1	R	-
2.1.6	DB-SER		Supply	1	R	-
	SANSA equipment room general DB		Install	1	R	-
2.1.7	DB-UPS-A		Supply	1	R	-
	Distribution boards for NASA A-Supply UPS loads in NASA equipment room		Install	1	R	-
2.1.8	DB-UPS-B		Supply	1	R	-
	Distribution boards for NASA B-Supply UPS loads in NASA equipment room		Install	1	R	-
2.1.9	DB-GH		Supply	1	R	-
	Distribution boards for Main Gate Guardhouse		Install	1	R	-
2.1.10	Kiosk 1		Supply	1	R	-
	IP54 Polycarbonate Kiosk with wooden backboard, front and back padlock lockable doors, Mains Isolator, Busbars, DIN rail and MCB's for general circuits.		Install	1	R	-
2.1.11	DB-NER		Supply	1	R	-
	General/Utility Distribution board for NASA equipment room		Install	1	R	-
2.1.12	NASA MDP-A		Supply	1	R	-
	Distribution board for NASA equipment room A-Supply		Install	1	R	-
2.1.13	NASA MDP-B		Supply	1	R	-
	Distribution board for NASA equipment room B-Supply		Install	1	R	-
2.1.14	DB-ATS1		Supply	1	R	-
	Automatic Transfer Switch for NASA CRAC Unit 1		Install	1	R	-
2.1.15	DB-ATS2		Supply	1	R	-
	Automatic Transfer Switch for NASA CRAC Unit 2		Install	1	R	-
2.1.16	DB-ATS3		Supply	1	R	-
	Automatic Transfer Switch for NASA CRAC Unit 3		Install	1	R	-
2.1.17	DB-DSL		Supply	1	R	-
	IP43 Polycarbonate Kiosk with wooden backboard, front and back padlock lockable doors, Mains Isolator, Busbars, DIN rail and MCB's for general circuits.		Install	1	R	-
	BULK LV CABLING AND BUSBAR					
2.2	600/1000V PVC/PVC/SWA/PVC/Cu cable in shaft, sleeve, trench, on cable rack or on surface, including strapping or clamping, supports etc. Terminations and connections of 600/1000V PVC/PVC/SWA/PVC/Cu cable including drilling, bolting, lugs, number tags, core markers, gland, shroud, etc					
2.2.1	1,5mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.2	1,5mm² 4C SWA Cu ECC	Supply	m	1	R	-
		Install	m	1	R	-
2.2.3	2,5mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.4	2,5mm² 4C SWA Cu ECC	Supply	m	1	R	-
		Install	m	1	R	-
2.2.5	4mm² 4C SWA Cu	Supply	m	75	R	-
		Install	m	75	R	-
2.2.6	4mm² 4C SWA Cu ECC	Supply	m	1	R	-
		Install	m	1	R	-
2.2.7	6mm² 4C SWA Cu	Supply	m	20	R	-
		Install	m	20	R	-

SANSA MATJIESFONTEIN

ELECTRICAL INSTALLATION - LOW VOLTAGE INSTALLATION + UPS

PART C1.2.2

BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
2.2.8	6mm² 4C SWA Cu ECC	Supply	m	1	R	-
		Install	m	1	R	-
2.2.9	10mm² 4C SWA Cu	Supply	m	145	R	-
		Install	m	145	R	-
2.2.10	10mm² 4C SWA Cu ECC	Supply	m	1	R	-
		Install	m	1	R	-
2.2.11	16mm² 4C SWA Cu	Supply	m	316	R	-
		Install	m	316	R	-
2.2.12	16mm² 4C SWA Cu ECC	Supply	m	1	R	-
		Install	m	1	R	-
2.2.13	25mm² 4C SWA Cu	Supply	m	80	R	-
		Install	m	80	R	-
2.2.14	25mm² 4C SWA Cu ECC	Supply	m	1	R	-
		Install	m	1	R	-
2.2.15	35mm² 4C SWA Cu	Supply	m	152	R	-
		Install	m	152	R	-
2.2.16	35mm² 4C SWA Cu ECC	Supply	m	1	R	-
		Install	m	1	R	-
2.2.17	50mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.18	50mm² 4C SWA Cu ECC	Supply	m	1	R	-
		Install	m	1	R	-
2.2.19	70mm² 4C SWA Cu	Supply	m	30	R	-
		Install	m	30	R	-
2.2.20	70mm² 4C SWA Cu ECC	Supply	m	1	R	-
		Install	m	1	R	-
2.2.21	95mm² 4C SWA Cu	Supply	m	101	R	-
		Install	m	101	R	-
2.2.22	95mm² 4C SWA Cu ECC	Supply	m	1	R	-
		Install	m	1	R	-
2.2.23	120mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.24	120mm² 4C SWA Cu ECC	Supply	m	1	R	-
		Install	m	1	R	-
2.2.25	150mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.26	150mm² 4C SWA Cu ECC	Supply	m	1	R	-
		Install	m	1	R	-
2.2.27	185mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.28	185mm² 4C SWA Cu ECC	Supply	m	1	R	-
		Install	m	1	R	-
2.2.29	240mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.30	240mm² 4C SWA Cu ECC	Supply	m	1	R	-
		Install	m	1	R	-
2.2.31	2,5mm² 12C Multicore Copper Cable	Supply	m	80	R	-
		Install	m	80	R	-
2.3	600/1000V PVC/PVC/SWA/PVC/ Alu cable in shaft, sleeve, trench, on cable rack or on surface, including strapping or clamping, supports etc. Terminations and connections of 600/1000V PVC/PVC/SWA/PVC/ Alu cable including drilling, bolting, lugs, number tags, core markers, gland, shroud, etc					
2.3.1	25mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.3.2	35mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.3.3	50mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.3.4	70mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only

SANS MATJIESFONTEIN

ELECTRICAL INSTALLATION - LOW VOLTAGE INSTALLATION + UPS

PART C1.2.2

BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
2.3.5	95mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.3.6	120mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.3.7	150mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.3.8	185mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.3.9	240mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.4	Cable terminations					
	Terminate and connect 600/1000V PVC/PVC/SWA/PVC/Cu cable including drilling, bolting, lugs, number tags, core markers, gland, shroud, etc					
2.4.1	1,5mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.2	2,5mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.3	4mm² 4C SWA Cu	Supply	each	10	R	-
		Install	each	10	R	-
2.4.4	6mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.5	10mm² 4C SWA Cu	Supply	each	4	R	-
		Install	each	4	R	-
2.4.6	16mm² 4C SWA Cu	Supply	each	24	R	-
		Install	each	24	R	-
2.4.7	25mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.8	35mm² 4C SWA Cu	Supply	each	20	R	-
		Install	each	20	R	-
2.4.9	50mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.10	70mm² 4C SWA Cu	Supply	each	4	R	-
		Install	each	4	R	-
2.4.11	95mm² 4C SWA Cu	Supply	each	8	R	-
		Install	each	8	R	-
2.4.12	120mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.13	150mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.14	185mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.15	240mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.16	2,5mm² 12C Multicore Copper Cable	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.5	Cable terminations					
	Terminate and connect 600/1000V PVC/PVC/SWA/PVC/ALU cable including drilling, bolting, lugs, number tags, core markers, gland, shroud, etc					
2.5.1	25mm² 4C SWA Alu	Supply	m	4	R	-
		Install	m	4	R	-
2.5.2	35mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.5.3	50mm² 4C SWA Alu	Supply	m	2	R	-
		Install	m	2	R	-
2.5.4	70mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.5.5	95mm² 4C SWA Alu	Supply	m	2	R	-
		Install	m	2	R	-

SANS MATJIESFONTEIN

ELECTRICAL INSTALLATION - LOW VOLTAGE INSTALLATION + UPS

PART C1.2.2

BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
2.5.6	120mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.5.7	150mm² 4C SWA Alu	Supply	m	18	R	-
		Install	m	18	R	-
2.5.8	185mm² 4C SWA Alu	Supply	m	16	R	-
		Install	m	16	R	-
2.5.9	240mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.6	<u>Earth conductors</u>					
	Copper earth conductor in trench or sleeve, on racking, steelwork or strapped to cable.					
2.6.1	1,5mm² 1C BLACK Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.6.2	2,5mm² 1C BLACK Cu	Supply	m	65	R	-
		Install	m	65	R	-
2.6.3	4mm² 1C BLACK Cu	Supply	m	10	R	-
		Install	m	10	R	-
2.6.4	6mm² 1C BLACK Cu	Supply	m	391	R	-
		Install	m	391	R	-
2.6.5	10mm² 1C BLACK Cu	Supply	m	150	R	-
		Install	m	150	R	-
2.6.6	16mm² 1C BLACK Cu	Supply	m	152	R	-
		Install	m	152	R	-
2.6.7	25mm² 1C BLACK Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.6.8	35mm² 1C BLACK Cu	Supply	m	30	R	-
		Install	m	30	R	-
2.6.9	50mm² 1C BLACK Cu	Supply	m	101	R	-
		Install	m	101	R	-
2.6.10	70mm² 1C BLACK Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.6.11	95mm² 1C BLACK Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.6.12	120mm² 1C BLACK Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.6.13	150mm² 1C BLACK Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.6.14	185mm² 1C BLACK Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.6.15	240mm² 1C BLACK Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.7	<u>Earth conductors Terminations</u>					
	Terminate and connect earth conductor including lug, bolt, nut, etc.					
2.7.1	1,5mm² 1C BLACK Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.7.2	2,5mm² 1C BLACK Cu	Supply	each	6	R	-
		Install	each	6	R	-
2.7.3	4mm² 1C BLACK Cu	Supply	each	4	R	-
		Install	each	4	R	-
2.7.4	6mm² 1C BLACK Cu	Supply	each	24	R	-
		Install	each	24	R	-
2.7.5	10mm² 1C BLACK Cu	Supply	each	6	R	-
		Install	each	6	R	-
2.7.6	16mm² 1C BLACK Cu	Supply	each	20	R	-
		Install	each	20	R	-
2.7.7	25mm² 1C BLACK Cu	Supply	each	0		Rate Only

SANS MATJIESFONTEIN

ELECTRICAL INSTALLATION - LOW VOLTAGE INSTALLATION + UPS

PART C1.2.2

BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
		Install	each	0		Rate Only
2.7.8	35mm² 1C BLACK Cu	Supply	each	4	R	-
		Install	each	4	R	-
2.7.9	50mm² 1C BLACK Cu	Supply	each	8	R	-
		Install	each	8	R	-
2.7.10	70mm² 1C BLACK Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.7.11	95mm² 1C BLACK Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.7.12	120mm² 1C BLACK Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.7.13	150mm² 1C BLACK Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.7.14	185mm² 1C BLACK Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.7.15	240mm² 1C BLACK Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.8	CABLE LADDERS					
	Similar or equal to O-line/Cabstrut Power way heavy duty cable ladder, including all necessary supports, clamps, strapping, welding lugs onto cast-in steel plates in Basement slab, brackets, splicers, hangers. Cable ladders to be supported to 1m centres.					
2.8.1	150mm Wide Cable Ladder	Supply	m	20	R	-
		Install	m	20	R	-
2.8.2	150mm Wide Cable Ladder 90° Bend	Supply	Each	12	R	-
		Install	Each	12	R	-
2.8.3	150mm Wide Cable Ladder T-Piece	Supply	Each	0		Rate Only
		Install	Each	0		Rate Only
2.8.4	150mm Wide Cable Ladder Vertical Inner Bend	Supply	Each	0		Rate Only
		Install	Each	0		Rate Only
2.8.5	200mm Wide Cable Ladder	Supply	m	90	R	-
		Install	m	90	R	-
2.8.6	200mm Wide Cable Ladder 90° Bend	Supply	Each	13	R	-
		Install	Each	13	R	-
2.8.7	200mm Wide Cable Ladder Vertical Inner Bend	Supply	Each	3	R	-
		Install	Each	3	R	-
2.8.8	200mm Wide Cable Ladder Outer Bend	Supply	Each	7	R	-
		Install	Each	7	R	-
2.8.9	300mm Wide Cable Ladder	Supply	m	10	R	-
		Install	m	10	R	-
2.8.10	300mm Wide Cable Ladder 90° Bend	Supply	Each	1	R	-
		Install	Each	1	R	-
2.8.11	300mm Wide Cable Ladder T-Piece	Supply	Each	0		Rate Only
		Install	Each	0		Rate Only
2.8.12	300mm Wide Cable Ladder Vertical Inner Bend	Supply	Each	0		Rate Only
		Install	Each	0		Rate Only
2.8.13	300mm Wide Cable Ladder Outer Bend	Supply	Each	0		Rate Only
		Install	Each	0		Rate Only
2.8.14	400mm Wide Cable Ladder	Supply	m	20	R	-
		Install	m	20	R	-
2.8.15	400mm Wide Cable Ladder 90° Bend	Supply	Each	0		Rate Only
		Install	Each	0		Rate Only
2.8.16	400mm Wide Cable Ladder T-Piece	Supply	Each	0		Rate Only
		Install	Each	0		Rate Only
2.8.17	400mm Wide Cable Ladder Vertical Inner Bend	Supply	Each	6	R	-
		Install	Each	6	R	-
2.8.18	400mm Wide Cable Ladder Outer Bend	Supply	Each	0		Rate Only
		Install	Each	0		Rate Only
2.8.19	500mm Wide Cable Ladder	Supply	m	95	R	-

SANSA MATJIESFONTEIN**ELECTRICAL INSTALLATION - LOW VOLTAGE INSTALLATION + UPS****PART C1.2.2****BILL OF QUANTITIES**

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
		Install	m	95	R	-
2.8.20	500mm Wide Cable Ladder 90° Bend	Supply	Each	4	R	-
		Install	Each	4	R	-
2.8.21	500mm Wide Cable Ladder T-Piece	Supply	Each	3	R	-
		Install	Each	3	R	-
2.8.22	500mm Wide Cable Ladder Vertical Inner Bend	Supply	Each	2	R	-
		Install	Each	2	R	-
2.8.23	500mm Wide Cable Ladder Outer Bend	Supply	Each	4	R	-
		Install	Each	4	R	-
2.8.24	600mm Wide Cable Ladder	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.8.25	600mm Wide Cable Ladder 90° Bend	Supply	Each	0		Rate Only
		Install	Each	0		Rate Only
2.8.26	600mm Wide Cable Ladder T-Piece	Supply	Each	0		Rate Only
		Install	Each	0		Rate Only
2.8.27	600mm Wide Cable Ladder Vertical Inner Bend	Supply	Each	0		Rate Only
		Install	Each	0		Rate Only
2.8.28	600mm Wide Cable Ladder Outer Bend	Supply	Each	0		Rate Only
		Install	Each	0		Rate Only
2.8.29	800mm Wide Cable Ladder	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.8.30	800mm Wide Cable Ladder 90° Bend	Supply	Each	0		Rate Only
		Install	Each	0		Rate Only
2.8.31	800mm Wide Cable Ladder T-Piece	Supply	Each	0		Rate Only
		Install	Each	0		Rate Only
2.8.32	800mm Wide Cable Ladder Vertical Inner Bend	Supply	Each	0		Rate Only
		Install	Each	0		Rate Only
2.8.33	800mm Wide Cable Ladder Outer Bend	Supply	Each	0		Rate Only
		Install	Each	0		Rate Only
2.9	WIRE BASKET AND TRUNKING					
	Trunking channel as per specification and drawings complete with mounting brackets, hangers, cover plates, knock outs, etc.					
	Wire baskets Similar or equal to O-Line/Cabstrut GS 75 heavy duty type Grid span wire mesh basket and accessories, including all necessary supports, clamps, strapping, brackets, splicers, hangers, etc.					
2.9.1	150mm Wire Mesh	Supply	m	335	R	-
		Install	m	335	R	-
2.9.2	150mm Wire Mesh 90° Bend	Supply	each	29	R	-
		Install	each	29	R	-
2.9.3	150mm Wire Mesh T-Piece	Supply	each	49	R	-
		Install	each	49	R	-
2.9.4	150mm Wire Mesh Inner Bend	Supply	each	34	R	-
		Install	each	34	R	-
2.9.5	150mm Wire Mesh Outer Bend	Supply	each	16	R	-
		Install	each	16	R	-
2.9.6	300mm Wire Mesh	Supply	m	500	R	-
		Install	m	500	R	-
2.9.7	300mm Wire Mesh 90° Bend	Supply	each	36	R	-
		Install	each	36	R	-
2.9.8	300mm Wire Mesh T-Piece	Supply	each	38	R	-
		Install	each	38	R	-
2.9.9	300mm Wire Mesh Inner Bend	Supply	each	25	R	-
		Install	each	25	R	-
2.9.10	300mm Wire Mesh Outer Bend	Supply	each	20	R	-
		Install	each	20	R	-
2.9.11	600mm Wire Mesh	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.9.12	600mm Wire Mesh 90° Bend	Supply	each	0		Rate Only
		Install	each	0		Rate Only

SANSA MATJIESFONTEIN

ELECTRICAL INSTALLATION - LOW VOLTAGE INSTALLATION + UPS

PART C1.2.2

BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
2.9.13	600mm Wire Mesh T-Piece	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.9.14	600mm Wire Mesh Inner Bend	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.9.15	600mm Wire Mesh Outer Bend	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.9.16	P2000 Galvanised Metal Trunking	Supply	each	160	R	-
		Install	each	160	R	-
2.9.17	P2000 Galvanised Metal Trunking 90° Bend	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.9.18	P2000 Galvanised Metal Trunking T-Piece	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.9.19	P8000 Galvanised Metal Trunking	Supply	each	900	R	-
		Install	each	900	R	-
2.9.20	P8000 Galvanised Metal Trunking 90° Bend	Supply	each	63	R	-
		Install	each	63	R	-
2.9.21	P8000 Galvanised Metal Trunking T-Piece	Supply	each	47	R	-
		Install	each	47	R	-
2.9.22	P8000 Galvanised Metal Trunking Cross-Piece	Supply	each	7	R	-
		Install	each	7	R	-
2.9.23	P9000 Galvanised Metal Trunking	Supply	each	300	R	-
		Install	each	300	R	-
2.9.24	P9000 Galvanised Metal Trunking 90° Bend	Supply	each	23	R	-
		Install	each	23	R	-
2.9.25	P9000 Galvanised Metal Trunking T-Piece	Supply	each	27	R	-
		Install	each	27	R	-
2.9.26	P9000 Galvanised Metal Trunking Cross-Piece	Supply	each	2	R	-
		Install	each	2	R	-
2.9.27	P9000 Galvanised Metal Trunking Distribution Board Entry	Supply	each	4	R	-
		Install	each	4	R	-
	TOTAL - BILL NO 2 CARRIED TO FINAL SUMMARY PAGE				R	-
3.0	BILL NO. 3					
	MEDIUM VOLTAGE INSTALLATION					
	<i>Infrastructure measured under Infrastructure BoQ</i>					
	TOTAL - BILL NO 3 CARRIED TO FINAL SUMMARY PAGE				R	-

SANS MATJESFONTEIN

ELECTRICAL INSTALLATION - LOW VOLTAGE INSTALLATION + UPS

PART C1.2.2

BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
4.0	BILL NO. 4					
	POWER INSTALLATION FITTINGS AND ACCESSORIES					
4.1	Socket Outlet and Isolators					
	Isolators (All isolators to include relevant adapters, glands, labelling etc) All socket outlets to include relevant adapters, glands, labelling etc) Conduit to be Chased in PVC and to include all required round boxes, covers etc.					
4.1.1	16A Combination Socket Outlet Type 1A as per Major Tech Vet3 1 x 16A RSA, 3 x SANS 164-2, 1 x Black SP Switch, 100x100 Black Cover Plate	Supply	No	52	R	-
		Install	No	52	R	-
4.1.2	16A Combination Socket Outlet Type 1B as per Major Tech Vet3 1 x 16A RSA, 3 x SANS 164-2, 1 x White SP Switch, 100x100 White Cover Plate	Supply	No	28	R	-
		Install	No	28	R	-
4.1.3	16A Combination Socket Outlet Type 2A as per Major Tech Vet3 1 x 16A RSA, 2 x SANS 164-2, 2x USB Type A, 1 x Black SP Switch, 100x100 Black Cover Plate	Supply	No	10	R	-
		Install	No	10	R	-
4.1.4	16A Combination Socket Outlet Type 2B as per Major Tech Vet3 1 x 16A RSA, 2 x SANS 164-2, 2x USB Type A, 1 x White SP Switch, 100x100 White Cover Plate	Supply	No	0		Rate Only
		Install	No	0		Rate Only
4.1.5	16A Combination Socket Outlet in Weather Proof Slide Lid Box 1 x 16A RSA, 1 x SANS 164-2, 1 x White SP Switch	Supply	No	1	R	-
		Install	No	1	R	-
4.1.6	Double 16A Dedicated Socket Outlet as per Major Tech Vet3 2 x Shaved 16A RSA, 2 x Red SP Switch, 100x100 Red Cover Plate	Supply	No	174	R	-
		Install	No	174	R	-
4.1.7	Blank Cover Plate Type A as per Major Tech Vet3 1 x Black 100x100 Blank Cover Plate	Supply	No	150	R	-
		Install	No	150	R	-
4.1.8	Blank Cover Plate Type B as per Major Tech Vet3 1 x White 100x100 Blank Cover Plate	Supply	No	0		Rate Only
		Install	No	0		Rate Only
4.1.9	Box for 2 x RJ45 Mods as per Major Tech Vet3 (RJ45 Modules Excluded) 1 x Black Cover Plate	Supply	No	150	R	-
		Install	No	150	R	-
4.1.10	32A 3P+N+E Surface Mounted IP44 Socket Outlet Welding Socket	Supply	No	0		Rate Only
		Install	No	0		Rate Only
4.1.11	32A 2P+E Surface Mounted IP44 Socket Outlet Welding Socket	Supply	No	28	R	-
		Install	No	28	R	-
4.1.12	32A DP Isolator Type A Installed in recessed or surface 100x100 box with Black cover plate	Supply	No	10	R	-
		Install	No	10	R	-
4.1.13	32A DP Isolator Type B Installed in recessed or surface 50x100 box with white cover plate	Supply	No	2	R	-
		Install	No	2	R	-
4.1.14	32A DP Weatherproof Isolator Installed in surface Weather Proof box with slide lid 100x100 box with white cover plate	Supply	No	12	R	-
		Install	No	12	R	-
4.1.15	Floor Box 2 x Shaved 16A RSA, 2 x Red SP Switch, 1 x 16A RSA, 1 x SANS 164-2, 1 x White SP Switch	Supply	No	5	R	-
		Install	No	5	R	-
4.1.16	63mm PVC Round Box Recessed or surface with white cover plate	Supply	No	738	R	-
		Install	No	738	R	-
4.1.17	2x4 PVC Box 50x100 Recessed or surface Box	Supply	No	7	R	-
		Install	No	7	R	-
4.1.18	4x4 PVC Box 100x100 Recessed or surface Box	Supply	No	625	R	-
		Install	No	625	R	-
4.2	Power Skirting as per Cabstrut Platinum Black or equal.					
	Socket outlets on power skirting including all fittings to mount fittings on power skirting.					
4.2.1	Dual Compartment PVC Power Skirting as per Cabstrut Platinum Black	Supply	m	185	R	-
		Install	m	185	R	-
4.2.2	16A Combo Socket Outlet as per Major Tech Vet1 1 x 16A RSA, 1 x SANS 164-2 Black	Supply	No	68	R	-
		Install	No	68	R	-
4.2.3	16A Dedicated Socket Outlet as per Major Tech Vet1 1 x Red 16A RSA, 1 x Red SP Switch, Red Cover Plate	Supply	No	102	R	-
		Install	No	102	R	-
4.2.4	Dual RJ45 Outlet as per Crabtree Classic 1 x Yoke and Cover for Dual RJ45. RJ45 Sockets Excluded	Supply	No	55	R	-
		Install	No	55	R	-
4.2.5	63mm PVC Round Box Recessed or surface with white cover plate	Supply	No	140	R	-
		Install	No	140	R	-
4.2.6	2x4 PVC Box 50x100 Recessed or surface Box	Supply	No	63	R	-
		Install	No	63	R	-
4.2.7	4x4 PVC Box 100x100 Recessed or surface Box	Supply	No	68	R	-
		Install	No	68	R	-

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - LOW VOLTAGE INSTALLATION + UPS
PART C1.2.2
BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
4.3	Conductors					
	600/1000V PVC insulated copper conductors into conduit, trunking, void duct or power skirting, including conductor identification labels, terminating, etc.					
4.3.1	2,5mm² Conductor	Supply	m	5 455	R	-
		Install	m	5 455	R	-
4.3.2	4mm² Conductor	Supply	m	6 150	R	-
		Install	m	6 150	R	-
4.3.3	6mm² Conductor	Supply	m	0		Rate Only
		Install	m	0		Rate Only
4.3.4	2,5mm² T&E Conductor	Supply	m	0		Rate Only
		Install	m	0		Rate Only
4.3.5	4mm² T&E Conductor	Supply	m	0		Rate Only
		Install	m	0		Rate Only
4.3.6	6mm² T&E Conductor	Supply	m	0		Rate Only
		Install	m	0		Rate Only
4.3.7	2,5mm² 2C+E Surfix	Supply	m	0		Rate Only
		Install	m	0		Rate Only
4.3.8	4mm² 2C+E Surfix	Supply	m	0		Rate Only
		Install	m	0		Rate Only
4.3.9	6mm² 2C+E Surfix	Supply	m	0		Rate Only
		Install	m	0		Rate Only
4.3.10	2,5mm² 4C+E Surfix	Supply	m	0		Rate Only
		Install	m	0		Rate Only
4.3.11	4mm² 4C+E Surfix	Supply	m	0		Rate Only
		Install	m	0		Rate Only
4.3.12	6mm² 4C+E Surfix	Supply	m	0		Rate Only
		Install	m	0		Rate Only
4.4	PVC/Bosal conduit complete with bends, joints, adaptors, couplings, saddles, cutting, etc.					
4.4.1	20mm PVC Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	4 088	R	-
		Install	m	4 088	R	-
4.4.2	25mm PVC Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	362	R	-
		Install	m	362	R	-
4.4.3	32mm PVC Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	60	R	-
		Install	m	60	R	-
4.4.4	20mm Bosal Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	0		Rate Only
		Install	m	0		Rate Only
4.4.5	25mm Bosal Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	300	R	-
		Install	m	300	R	-
4.4.6	32mm Bosal Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	0		Rate Only
		Install	m	0		Rate Only
TOTAL - BILL NO 4 CARRIED TO FINAL SUMMARY PAGE					R	-

SANS MATJESFONTEIN

ELECTRICAL INSTALLATION - LOW VOLTAGE INSTALLATION + UPS

PART C1.2.2

BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
	BILL NO. 5					
	LIGHTING INSTALLATION FITTINGS AND ACCESSORIES					
5.1	Light Fittings					
	Supply, store and installation of light fittings.					
5.1.1	Type A	Supply	Each	33	R	-
	Vapor Proof LED Fitting Aquaman 40W - LED Light Consult or Similarly Approved	Install	Each	33	R	-
5.1.2	Type AE	Supply	Each	34	R	-
	Vapor Proof LED Fitting Aquaman 40W With 2hr Battery Back-Up - LED Light Consult or Similarly Approved	Install	Each	34	R	-
5.1.3	Type AEX	Supply	Each	2	R	-
	Spark/Explosion Proof LED Fitting Aquaman-EX-VP 38W - LED Light Consult or Similarly Approved	Install	Each	2	R	-
5.1.4	Type B1	Supply	Each	79	R	-
	600x600 LED Fitting Luxon Prism Backlit - Regent Lighting or Similarly Approved	Install	Each	79	R	-
5.1.5	Type B1E	Supply	Each	45	R	-
	600x600 LED Fitting Luxon Prism Backlit With 2hr Battery Back-Up - Regent Lighting or Similarly Approved	Install	Each	45	R	-
5.1.6	Type C1	Supply	Each	162	R	-
	Dimmable GU10 LED Downlight 2229 Low-Glare Downlight With 5W Osram 3000k Bulb - LED Light Consult or Similarly Approved	Install	Each	162	R	-
5.1.7	Type C2	Supply	Each	32	R	-
	Dimmable GU10 LED Downlight 2229 Low-Glare Downlight With 5W Osram 4000k Bulb - LED Light Consult or Similarly Approved	Install	Each	32	R	-
5.1.8	Battery Packs For Type C1E & C2E	Supply	Each	20	R	-
	2hr Self Testing Battery Pack For 3x C1 or C2 Downlights(3x Downlights Per Pack)	Install	Each	20	R	-
5.1.9	Type C3	Supply	Each	4	R	-
	Integrated LED Downlight MERA-M 18W 44° 3000k - LED Light Consult or Similarly Approved	Install	Each	4	R	-
5.1.10	Type C3E	Supply	Each	12	R	-
	Integrated LED Downlight MERA-M 18W 44° 3000k With 2hr Battery Back-Up- LED Light Consult or Similarly Approved	Install	Each	12	R	-
5.1.11	Type C4	Supply	Each	6	R	-
	Integrated LED Downlight MERA-M 18W 44° 4000k - LED Light Consult or Similarly Approved	Install	Each	6	R	-
5.1.12	Type C4E	Supply	Each	7	R	-
	Integrated LED Downlight MERA-M 18W 44° 4000k With 2hr Battery Back-Up- LED Light Consult or Similarly Approved	Install	Each	7	R	-
5.1.13	Type D1	Supply	m	60	R	-
	Dimmable LED Linear Light Fitting Batman 75 16,4W/m 3000k - LED Light Consult or Similarly Approved	Install	m	60	R	-
5.1.14	Type D1E	Supply	m	2	R	-
	Dimmable LED Linear Light Fitting Batman 75 16,4W/m 3000k With 2hr Battery Back-Up - LED Light Consult or Similarly Approved	Install	m	2	R	-
5.1.15	Type D2	Supply	m	80	R	-
	Dimmable LED Linear Light Fitting Batman 75 16,4W/m 4000k - LED Light Consult or Similarly Approved	Install	m	80	R	-
5.1.16	Type D2E	Supply	m	20	R	-
	Dimmable LED Linear Light Fitting Batman 75 16,4W/m 4000k With 2hr Battery Back-Up - LED Light Consult or Similarly Approved	Install	m	20	R	-
5.1.17	Type E1	Supply	Each	58	R	-
	LED Foot Light IP65 Plato 7W 4000k - Regent Lighting or Similarly Approved	Install	Each	58	R	-
5.1.18	Type E2	Supply	Each	28	R	-
	LED Flood Light IP65 Nerus 65W 4000k - LED Light Consult or Similarly Approved	Install	Each	28	R	-
5.1.19	Type E3	Supply	Each	3	R	-
	LED Bulkhead Giza Eyelid 13W 4000k - Regent Lighting or Similarly Approved	Install	Each	3	R	-
5.1.20	Type E4	Supply	Each	8	R	-
	LED Flood Light IP65 Nerus 180W 4000k - LED Light Consult or Similarly Approved	Install	Each	8	R	-
5.1.21	Type E5	Supply	Each	10	R	-
	LED Bulkhead Focal Round 8W 3000k - LED Light Consult or Similarly Approved	Install	Each	10	R	-
5.1.22	Type F1	Supply	Each	0		Rate Only
	Concrete LED Bollard Light Slabo 7W 3000k - Regent Lighting or Similarly Approved	Install	Each	0		Rate Only
5.1.23	Type F1E	Supply	Each	8	R	-
	Concrete LED Bollard Light Slabo 7W 3000k With 2hr Battery Back-Up - Regent Lighting or Similarly Approved	Install	Each	8	R	-
5.1.24	Type F2	Supply	Each	8	R	-
	Concrete LED Bollard Light Slabo 7W 4000k - Regent Lighting or Similarly Approved	Install	Each	8	R	-
5.1.25	Type PL1	Supply	Each	2	R	-
	3,5m Light Pole Black galvanized	Install	Each	2	R	-
5.1.26	Type PL2	Supply	Each	4	R	-
	5m Light Pole Black galvanized	Install	Each	4	R	-

SANS MATJESFONTEIN

ELECTRICAL INSTALLATION - LOW VOLTAGE INSTALLATION + UPS

PART C1.2.2

BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
5.1.27	Type Track	Supply	m	60	R	-
	Three Wire Recessed Track - Spazio or Similarly Approved	Install	m	60	R	-
5.1.28	Type T1	Supply	Each	62	R	-
	GU10 LED Track Spot With 5W Osram 3000k Bulb - LED Light Consult or Similarly Approved	Install	Each	62	R	-
5.1.29	Type T2	Supply	Each	0		Rate Only
	GU10 LED Track Spot With 5W Osram 4000k Bulb - LED Light Consult or Similarly Approved	Install	Each	0		Rate Only
5.1.30	Type TE	Supply	Each	0		Rate Only
	Emergency LED Track Spot - Regent Lighting or Similarly Approved	Install	Each	0		Rate Only
5.1.31	Type LED1-DIM	Supply	m	75	R	-
	Dimmable LED Strip Light With 24V 22W/m LED Board 3000k - LED Light Consult or Similarly Approved	Install	m	75	R	-
5.1.32	Type LED1	Supply	m	45	R	-
	Non-Dimmable LED Strip Light With 24V 22W/m LED Board 3000k - LED Light Consult or Similarly Approved	Install	m	45	R	-
5.1.33	Type LED2	Supply	m	10	R	-
	Non-Dimmable LED Strip Light Slim Recessed Profile Black With 9W/m 24V LED Tape 3000k - LED Light Consult or Similarly Approved	Install	m	10	R	-
5.1.34	Type LED3	Supply	m	4	R	-
	Non-Dimmable LED Strip Light Slim Recessed Profile Black With 9W/m 24V LED Tape 4000k - LED Light Consult or Similarly Approved	Install	m	4	R	-
5.1.35	Type LED Driver - DIM	Supply	Each	17	R	-
	Dimmable LED Strip Light Driver 120W 24V LED Strip Light Driver - LED Light Consult or Similarly Approved	Install	Each	17	R	-
5.1.36	Type LED Driver	Supply	Each	15	R	-
	NON Dimmable LED Strip Light Driver 120W 24V LED Strip Light Driver - LED Light Consult or Similarly Approved	Install	Each	15	R	-
5.1.37	Type S1 Occupancy sensor	Supply	Each	34	R	-
		Install	Each	34	R	-
5.2	5A socket outlet mounted on trunking or concrete including all boxes, glands and fixings, Wiring included in Section 4 of this bill.					
5.2.1	5A Unswitched Socket outlets	Supply	No	465	R	-
	5A unswitched socket outlet in surface mounted 75x75 metal box mounted on P8000 ceiling void trunking	Install	No	465	R	-

SANS MATJIESFONTEIN

ELECTRICAL INSTALLATION - LOW VOLTAGE INSTALLATION + UPS

PART C1.2.2

BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
5.3	Light switches					
	Light switches, complete with all necessary connections, labelling, screws, cover plates, etc as specified. 50x100 flush metal back boxes are to be allowed with all light switches					
5.3.1	16A one lever one-way flush mounted light switch	Supply	No	18	R	-
		Install	No	18	R	-
5.3.2	16A one lever two-way flush mounted light switch	Supply	No	2	R	-
		Install	No	2	R	-
5.3.3	16A two lever one-way flush mounted light switch	Supply	No	0		Rate Only
		Install	No	0		Rate Only
5.3.4	16A three lever one-way flush mounted light switch	Supply	No	0		Rate Only
		Install	No	0		Rate Only
5.3.5	16A four lever one-way flush mounted light switch	Supply	No	0		Rate Only
		Install	No	0		Rate Only
5.3.6	16A one lever DIMMABLE one-way flush mounted light switch with bell press switch	Supply	No	0		Rate Only
		Install	No	0		Rate Only
5.3.7	16A two lever DIMMABLE one-way flush mounted light switch with bell press switch	Supply	No	4	R	-
		Install	No	4	R	-
5.3.8	Photocell	Supply	No	4	R	-
		Install	No	4	R	-
5.4	Conductors					
	600/1000V PVC insulated copper conductors into conduit, trunking, void duct or power skirting, including conductor identification labels, terminating, etc.					
5.4.1	1,5mm² Conductor	Supply	m	17 000	R	-
		Install	m	17 000	R	-
5.4.2	2,5mm² Conductor	Supply	m	2 160	R	-
		Install	m	2 160	R	-
5.4.3	4mm² Conductor	Supply	m	0		Rate Only
		Install	m	0		Rate Only
5.4.4	6mm² Conductor	Supply	m	0		Rate Only
		Install	m	0		Rate Only
5.4.5	2,5mm² 2C+E Surfix	Supply	m	0		Rate Only
		Install	m	0		Rate Only
5.8	PVC/Bosal conduit complete with bends, joints, adaptors, couplings, saddles, cutting, etc.					
5.8.1	20mm PVC Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	5 040	R	-
		Install	m	5 040	R	-
5.8.2	25mm PVC Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	0		Rate Only
		Install	m	0		Rate Only
5.8.3	32mm PVC Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	0		Rate Only
		Install	m	0		Rate Only
5.8.4	20mm Bosal Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	0		Rate Only
		Install	m	0		Rate Only
5.8.5	25mm Bosal Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	0		Rate Only
		Install	m	0		Rate Only
5.8.6	32mm Bosal Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	0		Rate Only
		Install	m	0		Rate Only
TOTAL - BILL NO 5 CARRIED TO FINAL SUMMARY PAGE					R	-

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - LOW VOLTAGE INSTALLATION + UPS
PART C1.2.2
BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
	BILL NO. 6					
	HVAC INSTALLATION					
6.1	Isolators for indoor and outdoor units installed in surface mounted boxes with the appropriate glands cover plates, fixings,etc. Wiring included in Bill No 4. 100x100 back boxes are to be allowed with all isolators unless otherwise specified.					
6.1.1	30A DP Isolator	Supply	No	10	R	-
	Flush or Surface for indoor application	Install	No	10	R	-
6.1.2	60A DP Isolator	Supply	No	0		Rate Only
	Flush or Surface for indoor application	Install	No	0		Rate Only
6.1.3	30A 3P Isolator	Supply	No	0		Rate Only
	Flush or Surface for indoor application	Install	No	0		Rate Only
6.1.4	60A 3P Isolator	Supply	No	0		Rate Only
	Flush or Surface for indoor application	Install	No	0		Rate Only
6.1.5	32A 2P+N+E Rotary Isolator with Lockout, IP67	Supply	No	32	R	-
	For outdoor application	Install	No	32	R	-
6.1.6	63A 2P+N+E Rotary Isolator with Lockout, IP67	Supply	No	2	R	-
	For outdoor application	Install	No	2	R	-
6.1.7	32A 3P+N+E Rotary Isolator with Lockout, IP67	Supply	No	11	R	-
	For outdoor application	Install	No	11	R	-
6.1.8	63A 3P+N+E Rotary Isolator with Lockout, IP67	Supply	No	3	R	-
	For outdoor application	Install	No	3	R	-
6.1.9	Blank Cover Plate Type A as per Major Tech Vet3	Supply	No	28	R	-
	1 x Black 100x100 Blank Cover Plate	Install	No	28	R	-
6.1.10	Blank Cover Plate Type B as per Major Tech Vet3	Supply	No	0		Rate Only
	1 x White 100x100 Blank Cover Plate	Install	No	0		Rate Only
6.1.11	63mm PVC Round Box	Supply	No	206	R	-
	Recessed or surface with white cover plate	Install	No	206	R	-
6.1.12	2x4 PVC Box	Supply	No	50	R	-
	50x100 Recessed or surface Box	Install	No	50	R	-
6.1.13	4x4 PVC Box	Supply	No	53	R	-
	100x100 Recessed or surface Box	Install	No	53	R	-
6.2	Conductors					
	600/1000V PVC insulated copper conductors into conduit, trunking, void duct or power skirting, including conductor identification labels, terminating, etc.					
6.2.1	2,5mm ² Conductor	Supply	m	0		Rate Only
		Install	m	0		Rate Only
6.2.2	4mm ² Conductor	Supply	m	0		Rate Only
		Install	m	0		Rate Only
6.2.3	6mm ² Conductor	Supply	m	0		Rate Only
		Install	m	0		Rate Only
6.2.4	2,5mm ² T&E Conductor	Supply	m	0		Rate Only
		Install	m	0		Rate Only
6.2.5	4mm ² T&E Conductor	Supply	m	0		Rate Only
		Install	m	0		Rate Only
6.2.6	6mm ² T&E Conductor	Supply	m	0		Rate Only
		Install	m	0		Rate Only
6.2.7	2,5mm ² 2C+E Surfex	Supply	m	852	R	-
		Install	m	852	R	-
6.2.8	4mm ² 2C+E Surfex	Supply	m	1 085	R	-
		Install	m	1 085	R	-
6.2.9	6mm ² 2C+E Surfex	Supply	m	0		Rate Only
		Install	m	0		Rate Only
6.2.10	2,5mm ² 4C+E Surfex	Supply	m	610	R	-
		Install	m	610	R	-
6.2.11	4mm ² 4C+E Surfex	Supply	m	0		Rate Only
		Install	m	0		Rate Only
6.2.12	6mm ² 4C+E Surfex	Supply	m	0		Rate Only
		Install	m	0		Rate Only

SANS MATJESFONTEIN

ELECTRICAL INSTALLATION - LOW VOLTAGE INSTALLATION + UPS

PART C1.2.2

BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
6.3	PVC/Bosal conduit complete with bends, joints, adaptors, couplings, saddles, cutting, etc.					
6.3.1	20mm PVC Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	420	R	-
		Install	m	420	R	-
6.3.2	25mm PVC Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	264	R	-
		Install	m	264	R	-
6.3.3	32mm PVC Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	0		Rate Only
		Install	m	0		Rate Only
6.3.4	20mm Bosal Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	0		Rate Only
		Install	m	0		Rate Only
6.3.5	25mm Bosal Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	300	R	-
		Install	m	300	R	-
6.3.6	32mm Bosal Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	0		Rate Only
		Install	m	0		Rate Only
	TOTAL - BILL NO 6 CARRIED TO FINAL SUMMARY PAGE				R	-
	BILL NO. 7					
	ELECTRONIC INSTALLATIONS					
7.1	PVC/Bosal conduit fittings.					
7.1.1	63mm PVC Round Box	Supply	No	292	R	-
	Recessed or surface with white cover plate	Install	No	292	R	-
7.1.2	2x4 PVC Box	Supply	No	115	R	-
	50x100 Recessed or surface Box	Install	No	115	R	-
7.1.3	4x4 PVC Box	Supply	No	244	R	-
	100x100 Recessed or surface Box	Install	No	244	R	-
7.2	PVC/Bosal conduit complete with bends, joints, adaptors, couplings, saddles, cutting, etc.					
7.2.1	20mm PVC Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	0		Rate Only
		Install	m	0		Rate Only
7.2.2	25mm PVC Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	2 190	R	-
		Install	m	2 190	R	-
7.2.3	25mm PVC Conduit With Metal Saddles mounted every 500mm For Fire Detection	Supply	m	738	R	-
		Install	m	738	R	-
7.2.4	20mm Bosal Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	0		Rate Only
		Install	m	0		Rate Only
7.2.5	25mm Bosal Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	300	R	-
		Install	m	300	R	-
7.2.6	32mm Bosal Conduit cast in concrete built into or chased into brickwork or surface mounted	Supply	m	0		Rate Only
		Install	m	0		Rate Only
7.2.7	Draw wire for electronic Services	Supply	m	4 196	R	-
		Install	m	4 196	R	-
	TOTAL - BILL NO 7 CARRIED TO FINAL SUMMARY PAGE				R	-

SANSa MATJIESFONTEIN

ELECTRICAL INSTALLATION - LOW VOLTAGE INSTALLATION + UPS

PART C1.2.2

BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
	BILL NO. 8					
	UPS					
8.1	Supply, Store, Install and Commissioning of UPS's					
	<i>Cost for supply and installation to include rigging, training, Preparation of As Built drawings, Commissioning, O&M Manuals, Cost of protection of machines during construction.</i>					
8.1.1	UPS 1 - SANSa Equipment Room - UPS only excluding batteries	Supply	each	1	R	-
	Batteries and Battery enclosure including DC cabling	Supply	each	1		
	Stand per UPS and Battery Enclosure	Supply	each	1		
	12 Month maintenance	Supply	each	1		
	12 Month maintenance	Supply	each	1		
	<i>80kVA Riello Multi Sentry 3:3 with 30mins backup @ 100% as per specification. Network Adaptor for BMS Communications.</i>	Install	each	1	R	-
8.1.2	UPS 2 - SANSa Gate House	Supply	each	1	R	-
	Batteries and Battery enclosure including DC cabling	Supply	each	1		
	12 Month maintenance	Supply	each	1		
	12 Month maintenance	Supply	each	1		
	<i>10kVA 3:3 with 15mins backup @100% as per specification. Network Adaptor for BMS Communications.</i>	Install	each	1	R	-
8.1.3	UPS 1 - NASA Equipment Room	Supply	each	0		NA
	<i>60kVA 3:3 Free Issued by NASA. Installation Only by Electrical Contractor</i>	Install	each	1	R	-
8.1.4	UPS 2 - NASA Equipment Room	Supply	each	0		NA
	<i>60kVA 3:3 Free Issued by NASA. Installation Only by Electrical Contractor</i>	Install	each	1	R	-
8.1.5	UPS 3 - NASA LEGS Antenna	Supply	each	0		NA
	<i>60kVA 3:3 Free Issued by NASA. Installation Only by Electrical Contractor</i>	Install	each	1	R	-
	TOTAL - BILL NO 8 CARRIED TO FINAL SUMMARY PAGE				R	-
	BILL NO. 9					
	PC SUMS					
9.1	None	Item	Sum			Rate Only
	TOTAL - BILL NO 9 CARRIED TO FINAL SUMMARY PAGE				R	-

SANSA MATJIESFONTEIN ELECTRICAL INSTALLATION - LOW VOLTAGE INSTALLATION + UPS PART C1.2.2 BILL OF QUANTITIES						
ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL	
	FINAL SUMMARY PAGE					
	BILL NO. 1					
	PRELIMINARIES AND GENERAL			R	-	
	BILL NO. 2					
	LOW VOLTAGE INSTALLATION			R	-	
	BILL NO. 3					
	MEDIUM VOLTAGE INSTALLATION				Under Infrastructure BoQ	
	BILL NO. 4					
	POWER INSTALLATION FITTINGS AND ACCESSORIES			R	-	
	BILL NO. 5					
	LIGHTING INSTALLATION FITTINGS AND ACCESSORIES			R	-	
	BILL NO. 6					
	HVAC INSTALLATION			R	-	
	BILL NO. 7					
	ELECTRONIC INSTALLATIONS			R	-	
	BILL NO. 8					
	UPS			R	-	
	BILL NO. 9					
	PC SUMS			R	-	
	Any other items tenderers may wish to add of a Technical nature not specifically mentioned above in order to comply with the specification and contract conditions. Please add below:					
	TOTAL CARRIED TO BILL NO. 16 ELECTRICAL INSTALLATION - LOW VOLTAGE INSTALLATION + UPS PART C1.2.2			R	-	

Specialist Bills of Quantities (carried to Main Contract Bills of Quantities)
Part C1.2.3

Electrical Installation - INFRASTRUCTURE INSTALLATION

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - INFRASTRUCTURE INSTALLATION
PART C1.2.3
BILL OF QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
1.0	BILL NO. 1				
	PRELIMINARIES AND GENERAL				
	CONDITIONS OF CONTRACT				
	Provisional and General items in order to comply with the Conditions of Contract associated with the works contained in this document.				
1.1	Test, Commission and prepare As-Built drawings	Item	1	R	-
1.2	Laminated drawings for all Plant rooms and Network rooms	Item	1	R	-
1.3	Insurances	Item	1	R	-
1.4	Mobilisation	Item	1	R	-
1.5	Project Management	Item	1	R	-
1.6	Site Tools and Instrumentation	Item	1	R	-
1.7	Maintenance and Guarantee for 12 months after practical completion	Item	1	R	-
1.8	Site Establishment	Item	1	R	-
1.9	Site Running Costs	Item	1	R	-
1.10	Demobilisation	Item	1	R	-
1.11	Vehicles	Item	1	R	-
1.12	Allowance to fix price for the duration of the contract	Sum	1	R	-
	<i>The rates in the remainder of the Bill of Quantities (BOQ) must exclude these costs, as they are to be priced under this item.</i>				
1.13	Remote Location Overhead Costs	Sum	1	R	-
	<i>Provide a lump sum cost for all additional expenses associated with working at the remote project site, located approximately 230 km from Cape Town and 5 km south of Matjiesfontein. This includes transportation of materials and personnel, accommodation, site establishment, and any other costs related to the remote nature of the location. The rates in the remainder of the Bill of Quantities (BOQ) must exclude these costs, as they are to be priced under this item.</i>				
1.14	OTHER ITEMS				
	Any other items tenderers may wish to add of a preliminary and general nature not specifically mentioned above in order to comply with the specification and contract conditions. Please add below:				
1.14.1	All underground cables to be added to As Build Drawings with surveyed GPS coordinates included on the drawings. GPS coordinate to be included at 10m intervals along the entire cable trench(s).	Sum	1	R	-
1.14.2		Item	1	R	-
1.14.3		Item	1	R	-
	TOTAL - BILL NO 1 CARRIED TO FINAL SUMMARY PAGE			R	-

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - INFRASTRUCTURE INSTALLATION
PART C1.2.3
BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
2.0	BILL NO. 2					
	LOW VOLTAGE INSTALLATION					
	LOW VOLTAGE DISTRIBUTION BOARDS					
	Supply and installation of low voltage electrical distribution boards					
2.1.1	Antenna Kiosk	Supply	m	2	R	-
	<i>IP43 Polycarbonate Kiosk with wooden backboard, front and back padlock lockable doors, Mains Isolator, Busbars, DIN rail and MCB's for general circuits. 1 x 350A 20kA TP Isolator for antenna supply cable termination</i>	Install	m	2	R	-
2.1.2		Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.1.3		Supply	m	0		Rate Only
		Install	m	0		Rate Only
	BULK LV CABLING AND BUSBAR					
2.2	600/1000V PVC/PVC/SWA/PVC/ Cu cable in shaft, sleeve, trench, on cable rack or on surface, including strapping or clamping, supports etc. Terminations and connections of 600/1000V PVC/PVC/SWA/PVC/ Cu cable including drilling, bolting, lugs, number tags, core markers, gland, shroud, etc					
2.2.1	1,5mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.2	2,5mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.3	4mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.4	6mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.5	10mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.6	16mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.7	25mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.8	35mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.9	50mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.10	70mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.11	95mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.12	120mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.13	150mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.14	185mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.15	240mm² 4C SWA Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.2.16	2,5mm² 12C Multicore Copper Cable	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.3	600/1000V PVC/PVC/SWA/PVC/ Alu cable in shaft, sleeve, trench, on cable rack or on surface, including strapping or clamping, supports etc. Terminations and connections of 600/1000V PVC/PVC/SWA/PVC/ Alu cable including drilling, bolting, lugs, number tags, core markers, gland, shroud, etc					
2.3.1	25mm² 4C SWA Alu	Supply	m	160	R	-
		Install	m	160	R	-
2.3.2	35mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.3.3	50mm² 4C SWA Alu	Supply	m	95	R	-
		Install	m	95	R	-
2.3.4	70mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - INFRASTRUCTURE INSTALLATION
PART C1.2.3
BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
2.3.5	95mm² 4C SWA Alu	Supply	m	190	R	-
		Install	m	190	R	-
2.3.6	120mm² 4C SWA Alu	Supply	m	510	R	-
		Install	m	510	R	-
2.3.7	150mm² 4C SWA Alu	Supply	m	870	R	-
		Install	m	870	R	-
2.3.8	185mm² 4C SWA Alu	Supply	m	320	R	-
		Install	m	320	R	-
2.3.9	240mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.4	<u>Cable terminations</u>					
	Terminate and connect 600/1000V PVC/PVC/SWA/PVC/Cu cable including drilling, bolting, lugs, number tags, core markers, gland, shroud, etc					
2.4.1	1,5mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.2	2,5mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.3	4mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.4	6mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.5	10mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.6	16mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.7	25mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.8	35mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.9	50mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.10	70mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.11	95mm² 4C SWA Cu	Supply	each	10	R	-
		Install	each	10	R	-
2.4.12	120mm² 4C SWA Cu	Supply	each	8	R	-
		Install	each	8	R	-
2.4.13	150mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.14	185mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.15	240mm² 4C SWA Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.4.16	2,5mm² 12C Multicore Copper Cable	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.5	<u>Cable terminations</u>					
	Terminate and connect 600/1000V PVC/PVC/SWA/PVC/ALU cable including drilling, bolting, lugs, number tags, core markers, gland, shroud, etc					
2.5.1	25mm² 4C SWA Alu	Supply	m	4	R	-
		Install	m	4	R	-
2.5.2	35mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.5.3	50mm² 4C SWA Alu	Supply	m	2	R	-
		Install	m	2	R	-
2.5.4	70mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.5.5	95mm² 4C SWA Alu	Supply	m	2	R	-
		Install	m	2	R	-

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - INFRASTRUCTURE INSTALLATION
PART C1.2.3
BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
2.5.6	120mm² 4C SWA Alu	Supply	m	12	R	-
		Install	m	12	R	-
2.5.7	150mm² 4C SWA Alu	Supply	m	14	R	-
		Install	m	14	R	-
2.5.8	185mm² 4C SWA Alu	Supply	m	16	R	-
		Install	m	16	R	-
2.5.9	240mm² 4C SWA Alu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.6	<u>Earth conductors</u>					
	Copper earth conductor in trench or sleeve, on racking, steelwork or strapped to cable.					
2.6.1	1,5mm² 1C BLACK Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.6.2	2,5mm² 1C BLACK Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.6.4	4mm² 1C BLACK Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.6.5	6mm² 1C BLACK Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.6.6	10mm² 1C BLACK Cu	Supply	m	160	R	-
		Install	m	160	R	-
2.6.7	16mm² 1C BLACK Cu	Supply	m	95	R	-
		Install	m	95	R	-
2.6.8	25mm² 1C BLACK Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.6.9	35mm² 1C BLACK Cu	Supply	m	190	R	-
		Install	m	190	R	-
2.6.10	50mm² 1C BLACK Cu	Supply	m	350	R	-
		Install	m	350	R	-
2.6.11	70mm² 1C BLACK Cu	Supply	m	2 540	R	-
		Install	m	2 540	R	-
2.6.12	95mm² 1C BLACK Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.6.13	120mm² 1C BLACK Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only
2.6.14	150mm² 1C BLACK Cu	Supply	m	80	R	-
		Install	m	80	R	-
2.6.15	185mm² 1C BLACK Cu	Supply	m	430	R	-
		Install	m	430	R	-
2.6.16	240mm² 1C BLACK Cu	Supply	m	0		Rate Only
		Install	m	0		Rate Only

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - INFRASTRUCTURE INSTALLATION
PART C1.2.3
BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
2.7	Earth conductors Terminations					
	Terminate and connect earth conductor including lug, bolt, nut, etc.					
2.7.1	1,5mm² 1C BLACK Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.7.2	2,5mm² 1C BLACK Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.7.4	4mm² 1C BLACK Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.7.5	6mm² 1C BLACK Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.7.6	10mm² 1C BLACK Cu	Supply	each	4	R	-
		Install	each	4	R	-
2.7.7	16mm² 1C BLACK Cu	Supply	each	2	R	-
		Install	each	2	R	-
2.7.8	25mm² 1C BLACK Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.7.9	35mm² 1C BLACK Cu	Supply	each	2	R	-
		Install	each	2	R	-
2.7.10	50mm² 1C BLACK Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.7.11	70mm² 1C BLACK Cu	Supply	each	20	R	-
		Install	each	20	R	-
2.7.12	95mm² 1C BLACK Cu	Supply	each	6	R	-
		Install	each	6	R	-
2.7.13	120mm² 1C BLACK Cu	Supply	each	10	R	-
		Install	each	10	R	-
2.7.14	150mm² 1C BLACK Cu	Supply	each	6	R	-
		Install	each	6	R	-
2.7.15	185mm² 1C BLACK Cu	Supply	each	6	R	-
		Install	each	6	R	-
2.7.16	240mm² 1C BLACK Cu	Supply	each	0		Rate Only
		Install	each	0		Rate Only

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - INFRASTRUCTURE INSTALLATION
PART C1.2.3
BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
2.8	Aluminium Busbar					
	<i>3C+N+E, 400V, Encapsulated Cast Resin. Busbar to be painted RED. Rates to include all joints, hangers suspension rods, installation, testing and signoff</i>					
	MLV-A to Transformer A					
2.8.1	3200A Busbar - Straight	Supply	m	10	R	-
		Install	m	10	R	-
2.8.2	3200A Busbar - Joint	Supply	m	4	R	-
		Install	m	4	R	-
2.8.3	3200A Busbar - 90° Bend	Supply	each	4	R	-
		Install	each	4	R	-
2.8.4	3200A Busbar - Panel Entry	Supply	each	1	R	-
		Install	each	1	R	-
2.8.5	3200A Busbar - Transformer Entry	Supply	each	1	R	-
		Install	each	1	R	-
2.8.6	3200A Busbar - Support Structure and Trapeze Brackets	Supply	each	1	R	-
		Install	each	1	R	-
2.8.7	3200A Busbar - Installation, Commissioning and related P&G		Sum	1	R	-
	MLV-B to Transformer B					
2.8.8	3200A Busbar - Straight	Supply	each	14	R	-
		Install	each	14	R	-
2.8.9	3200A Busbar - Joint	Supply	m	6	R	-
		Install	m	6	R	-
2.8.10	3200A Busbar - 90° Bend	Supply	each	4	R	-
		Install	each	4	R	-
2.8.11	3200A Busbar - Panel Entry	Supply	each	1	R	-
		Install	each	1	R	-
2.8.12	3200A Busbar - Transformer Entry	Supply	each	1	R	-
		Install	each	1	R	-
2.8.13	3200A Busbar - Support Structure and Trapeze Brackets	Supply	each	1	R	-
		Install	each	1	R	-
2.8.14	3200A Busbar - Installation, Commissioning and related P&G		Sum	1	R	-
	Generator Sync Panel A to MLV-A					
2.8.15	3200A Busbar - Straight	Supply	each	3	R	-
		Install	each	3	R	-
2.8.16	3200A Busbar - Joint	Supply	m	2	R	-
		Install	m	2	R	-
2.8.17	3200A Busbar - 90° Bend	Supply	each	2	R	-
		Install	each	2	R	-
2.8.18	3200A Busbar - Panel Entry	Supply	each	2	R	-
		Install	each	2	R	-
2.8.19	3200A Busbar - Transformer Entry	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.8.20	3200A Busbar - Support Structure and Trapeze Brackets	Supply	each	1	R	-
		Install	each	1	R	-
2.8.21	3200A Busbar - Installation, Commissioning and related P&G		Sum	1	R	-

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - INFRASTRUCTURE INSTALLATION
PART C1.2.3
BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
	Generator Sync Panel B to MLV-B					
2.8.15	3200A Busbar - Straight	Supply	each	3	R	-
		Install	each	3	R	-
2.8.16	3200A Busbar - Joint	Supply	m	2	R	-
		Install	m	2	R	-
2.8.17	3200A Busbar - 90° Bend	Supply	each	2	R	-
		Install	each	2	R	-
2.8.18	3200A Busbar - Panel Entry	Supply	each	2	R	-
		Install	each	2	R	-
2.8.19	3200A Busbar - Transformer Entry	Supply	each	0		Rate Only
		Install	each	0		Rate Only
2.8.20	3200A Busbar - Support Structure and Trapeze Brackets	Supply	each	1	R	-
		Install	each	1	R	-
2.8.21	3200A Busbar - Installation, Commissioning and related P&G		Sum	1	R	-
	TOTAL - BILL NO 2 CARRIED TO FINAL SUMMARY PAGE				R	-

SANS MATJESFONTEIN

ELECTRICAL INSTALLATION - INFRASTRUCTURE INSTALLATION

PART C1.2.3

BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
3.0	BILL NO. 3					
	MEDIUM VOLTAGE INSTALLATION					
3.1	TRANSFORMER AND CABLING					
	11kV XLPE cable complete including labelling, core markers, etc.					
	Termination and connection of 11kV XLPE cable complete with approved termination kit, including labelling, core markers, etc.					
	Earth conductor in trench or sleeve on racking, steelwork or strapped to cable					
3.1.1	2000kVA 400:11kV Step-up Transformer including T154 Controller	Supply	No	2	R	-
	Enclosure	Supply	No	2	R	-
	Drytype transformer including enclosure. No IP rating required. Protection to be wired out to terminals for interfacing with RMU and MLV	Install	No	2	R	-
3.1.2	11kV Ring Main Unit as per Specification	Supply	No	2	R	-
	SF6 or Vacuum RMU installed in substation with Plinth for cable entry from below. Inclusive of self powered Protection Relay. 20kA (3s) Short Circuit Withstand. 2 x 630A Isolators + 1 x 200A Circuit Breakers	Install	No	2	R	-
3.1.3	BTU (battery Tripping Unit) for transformer protection	Supply	No	1	R	-
	3A 230V:30Vdc. Include all cabling between BTU and RMU's	Install	No	1	R	-
3.1.4	70mm ² x 3 core XLPE Copper - TX-A to RMU-A and TX-B to RMU-B	Supply	m	20	R	-
	Installed from Transformer to RMU on floor mounted cable ladder with top hat	Install	m	20	R	-
3.1.5	70mm ² x 3 core XLPE Copper	Supply	m	1 700	R	-
	Installed in ground as per detail drawing for underground cables	Install	m	1 700	R	-
3.1.6	Termination of 70mm ² , 3core XLPE Copper	Supply	No	18	R	-
		Install	No	18	R	-
3.1.7	70mm ² Copper earth conductor	Supply	m	1 550	R	-
		Install	m	1 550	R	-
3.1.8	Earth Termination of 70mm ² earth conductor	Supply	m	18	R	-
		Install	m	18	R	-
3.1.9	Concrete Cable Markers	Supply	Each	110	R	-
		Install	Each	110	R	-
3.1.9	Minisub 1 - 200kVA	Supply	m	1	R	-
	Minisub with RMU, Transformer, LV circuit breakers, Pre-Cast Plinth	Install	m	1	R	-
	SF6 or Vacuum RMU - 2 x Isolators 1 x Circuit Breaker					
	Transformer - 200kVA, 11kV:400V					
	LV Circuit Breaker 1 - 160A, 3P, 10kA					
	LV Circuit Breaker 2 - 63A, 3P, 10kA					
	LV Circuit Breaker 3 - 63A, 3P, 10kA					
	LV Circuit Breaker 4 - 20A, 1P, 10kA (Street Lighting)					
3.1.10	Minisub 2 - 630kVA	Supply	m	1	R	-
	Minisub with RMU, Transformer, LV circuit breakers, Pre-Cast Plinth	Install	m	1	R	-
	SF6 or Vacuum RMU - 2 x Isolators 2 x Circuit Breaker					
	Transformer - 400kVA, 11kV:400V					
	LV Circuit Breaker 1 - 500A, 3P, 30kA					
	LV Circuit Breaker 2 - 20A, 1P, 10kA (Street Lighting)(Cascade)					
3.1.11	Minisub 3 - 630kVA	Supply	m	1	R	-
	Minisub with RMU, Transformer, LV circuit breakers, Pre-Cast Plinth	Install	m	1	R	-
	SF6 or Vacuum RMU - 2 x Isolators 2 x Circuit Breaker					
	Transformer - 630kVA, 11kV:400V					
	LV Circuit Breaker 1 - 160A, 3P, 30kA					
	LV Circuit Breaker 2 - 500A, 3P, 30kA					
	LV Circuit Breaker 3 - 20A, 1P, 10kA (Street Lighting) (Cascade)					
3.1.12	Minisub 4 - 400kVA	Supply	m	1	R	-
	Minisub with RMU, Transformer, LV circuit breakers, Pre-Cast Plinth	Install	m	1	R	-
	SF6 or Vacuum RMU - 2 x Isolators 1 x Circuit Breaker					
	Transformer - 630kVA, 11kV:400V					
	LV Circuit Breaker 1 - 400A, 3P, 15kA					
	LV Circuit Breaker 2 - 350A, 3P, 15kA with Schneider PM3250 Meter					
	LV Circuit Breaker 3 - 63A, 3P, 15kA					
	LV Circuit Breaker 4 - 20A, 1P, 15kA (Street Lighting)					
3.1.13	Minisub 5 - 400kVA	Supply	m	1	R	-
	SF6 or Vacuum RMU - 2 x Isolators 1 x Circuit Breaker	Install	m	1	R	-
	RMU - 2 x Isolators 1 x Circuit Breaker					
	Transformer - 400kVA, 11kV:400V					
	LV Circuit Breaker 1 - 350A, 3P, 15kA with Schneider PM3250 Meter					
	LV Circuit Breaker 2 - 20A, 1P, 15kA (Street Lighting)					

SANSA MATJIESFONTEIN

ELECTRICAL INSTALLATION - INFRASTRUCTURE INSTALLATION

PART C1.2.3

BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
3.2	<u>MV ACCESSORIES AND MISCELLANEOUS EQUIPMENT</u>					
3.2.1	All notices as required by the law on occupational and safety	Item	Sum	1	R	-
3.2.2	9kg Dry powder fire extinguisher to complete with SANS 1152	Supply	No	0		Rate Only
		Install	No	0		Rate Only
3.2.3	First aid kit complete including mounting brackets, etc.	Supply	No	0		Rate Only
		Install	No	0		Rate Only
3.2.4	Nameplates for all Energy Centre Rooms as well as Consumer's Substations as per specification	Supply	No	1	R	-
		Install	No	1	R	-
	<u>TOTAL - BILL NO 3 CARRIED TO FINAL SUMMARY PAGE</u>				R	-

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - INFRASTRUCTURE INSTALLATION
PART C1.2.3
BILL OF QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
	FINAL SUMMARY PAGE				
	BILL NO. 1				
	PRELIMINARIES AND GENERAL			R	-
	BILL NO. 2				
	LOW VOLTAGE INSTALLATION			R	-
	BILL NO. 3				
	MEDIUM VOLTAGE INSTALLATION			R	-
	Any other items tenderers may wish to add of a Technical nature not specifically mentioned above in order to comply with the specification and contract conditions. Please add below:				
	TOTAL CARRIED TO BILL NO. 16 ELECTRICAL INSTALLATION - INFRASTRUCTURE INSTALLATION PART C1.2.3			R	-

Specialist Bills of Quantities (carried to Main Contract Bills of Quantities)
Part C1.2.4

Electrical Installation - STANDBY GENERATOR INSTALLATION

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - STANDBY GENERATOR INSTALLATION
PART C1.2.4
BILL OF QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
1.0	BILL NO. 1				
	<u>PRELIMINARIES AND GENERAL</u>				
	CONDITIONS OF CONTRACT				
	Provisional and General items in order to comply with the Conditions of Contract associated with the works contained in this document.				
1.1	Test, Commission and prepare As-Built drawings	Item	1	R	-
1.2	Laminated drawings for all Plant rooms and Network rooms	Item	1	R	-
1.3	Insurances	Item	1	R	-
1.4	Mobilisation	Item	1	R	-
1.5	Project Management	Item	1	R	-
1.6	Site Tools and Instrumentation	Item	1	R	-
1.7	Maintenance and Guarantee for 12 months after practical completion	Item	1	R	-
1.8	Site Establishment	Item	1	R	-
1.9	Site Running Costs	Item	1	R	-
1.10	Demobilisation	Item	1	R	-
1.11	Vehicles	Item	1	R	-
1.12	Allowance to fix price for the duration of the contract	Sum	1	R	-
	<i>The rates in the remainder of the Bill of Quantities (BOQ) must exclude these costs, as they are to be priced under this item.</i>				
1.13	Remote Location Overhead Costs	Sum	1	R	-
	<i>Provide a lump sum cost for all additional expenses associated with working at the remote project site, located approximately 230 km from Cape Town and 5 km south of Matjiesfontein. This includes transportation of materials and personnel, accommodation, site establishment, and any other costs related to the remote nature of the location. The rates in the remainder of the Bill of Quantities (BOQ) must exclude these costs, as they are to be priced under this item.</i>				
1.14	OTHER ITEMS				
	Any other items tenderers may wish to add of a preliminary and general nature not specifically mentioned above in order to comply with the specification and contract conditions. Please add below:				
1.14.1		Item	1	R	-
1.14.2		Item	1	R	-
1.14.3		Item	1	R	-
	TOTAL - BILL NO 1 CARRIED TO FINAL SUMMARY PAGE			R	-

SANS MATJESFONTEIN

ELECTRICAL INSTALLATION - STANDBY GENERATOR INSTALLATION

PART C1.2.4

BILL OF QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
2.0	BILL NO. 2				
	GENERATOR INSTALLATION				
2.1.1	630KVA Prime rated generator	Supply	2	R	-
	<i>Close Coupled diesel driven generator in weather proof mild steel powder coated canopy inclusive of sound attenuation as per the specification to achieve 70 dB @ 7m. 314 Stainless steel exhaust section outside canopy. Lockable doors. Light inside the canopy.</i>	Install	2	R	-
2.1.1.1	Extra over cost for 3CR12 Canopy.	Supply	2	R	-
2.1.2	Set mounted circuit breaker control panel with motorised alternator protection circuit breaker and control equipment.	Supply	2	R	-
	<i>Controls to be allowed to achieve the functionality as required by the specification. Allowance is to be made for an appropriate size enclosure for the termination of the applicables as specified in the cable schedule</i>	Install	2	R	-
2.1.3	Rigging as required	Supply	2	R	-
	<i>Rigging to place all equipment into position as per the drawing SMFN-CAI-EE-C-DR-002_01 - Generator Building Equipment & Diesel Reticulation Layout</i>				
2.1.4	Control Wiring and Equipment	Supply	2	R	-
	<i>Control equipment as required in the MLV to achieve the functionality required as per the specification. Remote Monitoring, BMS Communications Interface, Load test switch, Audible alarm and flashing beacon.</i>	Install	2	R	-
2.1.5	Commissioning of Generators	Supply	2	R	-
	<i>Complete to achieve functionality as required by the technical specification.</i>				
2.1.6	Extended Maintenance of twenty-four[24] months on Generators	Supply	2	R	-
2.1.7	Extended Guarantee for twenty-four[24] months	Supply	2	R	-
2.1.8	Main MLV panel - Refer to drawings	Supply	0		
	<i>SMFN-CAI-EE-XX-DR-005_01 - MLV Single Line Diagram</i>	Install	0		
2.1.9	Generator Sync Panel A	Supply	1	R	-
	<i>SMFN-CAI-EE-XX-DR-005_22 - GSP-A Generator Sync Panel A</i>	Install	1	R	-
2.1.10	Generator Sync Panel A	Supply	1	R	-
	<i>SMFN-CAI-EE-XX-DR-005_23 - GSP-A Generator Sync Panel B</i>	Install	1	R	-
2.1.1	Other items the tenderer may consider necessary to complete the installation				
2.1.11.1		Supply	1	R	-
		Install	1	R	-
2.1.11.2		Supply	1	R	-
		Install	1	R	-
TOTAL - BILL NO 2 CARRIED TO FINAL SUMMARY PAGE					
				R	-

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - STANDBY GENERATOR INSTALLATION
PART C1.2.4
BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
3.0	BILL NO. 3					
	DIESEL FUEL SUPPLY SYSTEM AND BULK STORAGE					
3.1	1000L base/belly tank	Supply	Each	2	R	-
	<i>Double skin base tank per generator</i>	Install	Each	2	R	-
3.2	Fuel pipes and hoses	Supply	Sum	1	R	-
	<i>All pipes, valves, sensors, solenoids, etc to achieve the required system performance as per the specification.</i>	Install	Sum	1	R	-
3.3	Filling Kiosk	Supply	Each	1	R	-
	<i>Filling kiosk with bulk tank level gauges, low and high level alarms, pump start/stop controls, selector switches, etc</i>	Install	Each	1	R	-
3.4	Diesel Filler Connection at filling kiosk	Supply	Each	4	R	-
	<i>Filling point with non return nozzle for bowser connection inclusive of all pipework from filling kiosk to bulk tank.</i>	Install	Each	4	R	-
3.5	Sump Drain Connection at filling kiosk	Supply	Each	4	R	-
	<i>Connection for pumping out diesel from bulk diesel storage sump inclusive of all pipework. Sump drain to terminate at the bottom of a sump pit and on the outside the bund wall.</i>	Install	Each	4	R	-
3.6	Bulk Diesel Storage - 23000L	Supply	Each	4	R	-
	<i>Above Ground bulk tank as per the specification</i>	Install	Each	4	R	-
3.7	Pumps and auxiliary equipment for fuel system	Supply	Sum	1	R	-
	<i>All pumps, valves, level switches, and pipe connection not already allowed.</i>	Install	Sum	1	R	-
3.8	Duvalco Diesel Polishing/Filtering Sytem or equal	Supply	Each	4	R	-
	<i>System per bulk tank inclusive of all components required.</i>	Install	Each	4	R	-
3.9	Other items not included above that are not of a preliminary nature and have not been covered in any other sections of the tender document. Note : Items included under this section shall be of a technical nature and be applicable to the context of this section					
3.9.1		Supply	Each	1	R	-
		Install	Each	1	R	-
3.9.2		Supply	Each	1	R	-
		Install	Each	1	R	-
	TOTAL - BILL NO 3 CARRIED TO FINAL SUMMARY PAGE				R	-

SANSA MATJIESFONTEIN ELECTRICAL INSTALLATION - STANDBY GENERATOR INSTALLATION PART C1.2.4 BILL OF QUANTITIES						
ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
4.0	BILL NO. 4					
	REMOTE MONITORING					
4.1	Monitoring for Generators	Supply	Each	2	R	-
	<i>Allowance for all communication equipment to allow for the generator parameters and alarms to be communicated to a web interface. Sim cards to be procured by the client.</i>	Install	Each	2	R	-
4.2	Other items not included above that are not of a preliminary nature and have not been covered in any other sections of the tender document. Note : Items included under this section shall be of a technical nature and be applicable to the context of this section					
4.2.1		Supply	Each	1	R	-
		Install	Each	1	R	-
4.2.1		Supply	Each	1	R	-
		Install	Each	1	R	-
TOTAL - BILL NO 4 CARRIED TO FINAL SUMMARY PAGE					R	-
5.0	BILL NO. 5					
	MISCELLANEOUS					
5.1	Signage for plantroom as per specification	Supply	Each	2	R	-
	<i>"Automatic start-up" signage on each generator</i>	Install	Each	2	R	-
5.2	Signage for filling kiosk as per specification	Supply	Sum	1	R	-
	<i>Bulk tank size notification</i>	Install	Sum	1	R	-
	<i>Identification of filling nozzle</i>					
	<i>Identification of sump drain</i>					
	<i>Identification of earth bar</i>					
5.3	Signage for Bulk Storage as per specification	Supply	Sum	1	R	-
	<i>Tank Number Identification</i>	Install	Sum	1	R	-
	<i>Identification of earth bar</i>					
	<i>"No Smoking"</i>					
	<i>"No Open Flames"</i>					
5.4	Provision of hearing protection	Supply	Sum	1	R	-
	<i>Supply and install a wall mounted rack housing four (2) off SABS approved ear muffs</i>	Install	Sum	1	R	-
TOTAL - BILL NO 5 CARRIED TO FINAL SUMMARY PAGE					R	-

SANS MATJESFONTEIN

ELECTRICAL INSTALLATION - STANDBY GENERATOR INSTALLATION

PART C1.2.4

BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
6.0	BILL NO. 6					
	GENERAL					
6.1	Protection of equipment during construction	Supply	No	1	R	-
		Install	No	1	R	-
6.2	Other items not included above that are not of a preliminary nature and have not been covered in any other sections of the tender document. Note : Items included under this section shall be of a technical nature and be applicable to the context of this section	Supply	No	1	R	-
		Install	No	1	R	-
6.3	Council electrical department, pollution and noise control approvals	Supply	No	1	R	-
		Install	No	1	R	-
6.4	Allowance for air travel, rental car and accommodation for one night for the engineer to witness the FAT. (If the FAT is in Cape Town this is not applicable)	Supply	No	1	R	-
		Install	No	1	R	-
	TOTAL - BILL NO 6 CARRIED TO FINAL SUMMARY PAGE				R	-
7.0	BILL NO. 7					
	ADDITIONAL ITEMS					
7.1	Other items the tenderer may consider necessary to complete the installation					
7.1.1		Supply	Each	1	R	-
		Install	Each	1	R	-
7.1.2		Supply	Each	1	R	-
		Install	Each	1	R	-
7.1.3		Supply	Each	1	R	-
		Install	Each	1	R	-
	TOTAL - BILL NO 7 CARRIED TO FINAL SUMMARY PAGE				R	-

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - STANDBY GENERATOR INSTALLATION
PART C1.2.4
BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QTY	RATE	TOTAL
	FINAL SUMMARY PAGE					
	BILL NO. 1					
	PRELIMINARIES AND GENERAL				R	-
	BILL NO. 2					
	GENERATOR INSTALLATION				R	-
	BILL NO. 3					
	DIESEL FUEL SUPPLY SYSTEM AND BULK STORAGE				R	-
	BILL NO. 4					
	REMOTE MONITORING				R	-
	BILL NO. 5					
	MISCELLANEOUS				R	-
	BILL NO. 6					
	GENERAL				R	-
	BILL NO. 7					
	ADDITIONAL ITEMS				R	-
	Any other items tenderers may wish to add of a Technical nature not specifically mentioned above in order to comply with the specification and contract conditions. Please add below:					
	TOTAL CARRIED TO BILL NO. 16 ELECTRICAL INSTALLATION - STANDBY GENERATOR INSTALLATIONPART C1.2.4				R	-

Specialist Bills of Quantities (carried to Main Contract Bills of Quantities)
Part C1.2.5

Electrical Installation - EARTHING AND LIGHTNING PROTECTION INSTALLATION

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - EARTHING AND LIGHTNING PROTECTION INSTALLATION
PART C1.2.5
BILL OF QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
1.0	BILL NO. 1				
	PRELIMINARIES AND GENERAL				
	CONDITIONS OF CONTRACT				
	Provisional and General items in order to comply with the Conditions of Contract associated with the works contained in this document.				
1.1	Test, Commission and prepare As-Built drawings	Item	1	R	-
1.2	Laminated drawings for all Plant rooms and Network rooms	Item	1	R	-
1.3	Insurances	Item	1	R	-
1.4	Mobilisation	Item	1	R	-
1.5	Project Management	Item	1	R	-
1.6	Site Tools and Instrumentation	Item	1	R	-
1.7	Maintenance and Guarantee for 12 months after practical completion	Item	1	R	-
1.8	Site Establishment	Item	1	R	-
1.9	Site Running Costs	Item	1	R	-
1.10	Demobilisation	Item	1	R	-
1.11	Vehicles	Item	1	R	-
1.12	Allowance to fix price for the duration of the contract	Sum	1	R	-
	<i>The rates in the remainder of the Bill of Quantities (BOQ) must exclude these costs, as they are to be priced under this item.</i>				
1.13	Remote Location Overhead Costs	Sum	1	R	-
	<i>Provide a lump sum cost for all additional expenses associated with working at the remote project site, located approximately 230 km from Cape Town and 5 km south of Matjiesfontein. This includes transportation of materials and personnel, accommodation, site establishment, and any other costs related to the remote nature of the location. The rates in the remainder of the Bill of Quantities (BOQ) must exclude these costs, as they are to be priced under this item.</i>				
1.14	OTHER ITEMS				
	Any other items tenderers may wish to add of a preliminary and general nature not specifically mentioned above in order to comply with the specification and contract conditions. Please add below:				
1.14.1		Item	1	R	-
1.14.2		Item	1	R	-
1.14.3		Item	1	R	-
	TOTAL - BILL NO 1 CARRIED TO FINAL SUMMARY PAGE			R	-

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - EARTHING AND LIGHTNING PROTECTION INSTALLATION
PART C1.2.5
BILL OF QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
2.0	BILL NO. 2				
	EARTHING & LIGHTNING PROTECTION				
	THE WORK DETAILED BELOW AS WELL AS IN ALL OF THE SUBSEQUENT BILLS IN THIS EARTHING AND LIGHTNING PROTECTION INSTALLATION IS FOR THE COMPLETE SUPPLY, DELIVERY ON SITE AND CONSTRUCTION OF THE FOLLOWING MATERIAL AND EQUIPMENT AND THE GUARANTEE THEREOF, AS SPECIFIED				
	All prices listed below must make provision for the delivery to site and must include all materials deemed necessary for commissioning of equipment in full, including all handling costs, insurance and any other costs involved in the delivery of material and equipment to complete installation.				
	Note: All material quantities are to be ordered according to drawings and not this BOQ				
2.1.1	Bonding of Structural Columns				
	Supply and install 50mm ² steel earth strap from structural steel to 100x100x50 cast in earth test joint box with galvanised steel cover plate. Connect test joint box to 1500mm x 16mm earth spike via a 95mm ² PVC insulated conductor. Earth spike to be driven into the ground to a depth of 1200mm or deeper.				
	Refer to the detail "TYPICAL DETAIL FOR BONDING COLUMN STEEL TO EARTH STRAP" on drawing J2700-001-EL-01 EARTHING AND LIGHTING PROTECTION LAYOUT.				
	Supply	Each	30	R	-
	Install	Each	30	R	-
2.1.2	Bonding of Roof Structure				
	Supply and install 50mm ² steel earth strap from structural steel to 100x100x50 cast in earth test joint box with galvanised steel cover plate. Connect test joint box to roof structure via 70mm ² ICEC.				
	Refer to the detail "TYPICAL LIGHTNING PROTECTION DRAWBOX DETAIL - BONDING TO ROOF" on drawing J2700-001-EL-01 EARTHING AND LIGHTING PROTECTION LAYOUT.				
	Supply	Each	14	R	-
	Install	Each	14	R	-
2.2	Supply and install 70mm ² BCEC at 500mm below ground to connect all earth spikes. Include all terminations and trenching. All below ground terminations to be exothermically welded.				
	Supply	m	665	R	-
	Install	m	665	R	-
	Termination	Each	30	R	-

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - EARTHING AND LIGHTNING PROTECTION INSTALLATION
PART C1.2.5
BILL OF QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
2.3	Supply and install Earth Matt to achieve a <1ohm earth measurement. Earth matt tails to be connected to the earth bar in the location where it has been installed. All below ground terminations to be exothermically welded.				
2.3.1	Energy Centre - LV				
	Supply	Each	1	R	-
	Install	Each	1	R	-
2.3.2	Energy Centre - MV				
	Supply	Each	1	R	-
	Install	Each	1	R	-
2.3.3	Main Operations Building - LV				
	Supply	Each	1	R	-
	Install	Each	1	R	-
2.3.4	Gatehouse Building - LV				
	Supply	Each	1	R	-
	Install	Each	1	R	-
2.3.5	Minisub 1-5				
	Supply	Each	5	R	-
	Install	Each	5	R	-
2.4	Supply and install Copper Earth Bar on insulators mounted on wall - 300mmx50mmx6mm				
2.4.1	Energy Centre - LV				
	Supply	Each	1	R	-
	Install	Each	1	R	-
2.4.2	Energy Centre - MV				
	Supply	Each	1	R	-
	Install	Each	1	R	-
2.4.3	Main Operations Building - LV, NASA Equipment Room, SANSA Equipment Room				
	Supply	Each	3	R	-
	Install	Each	3	R	-
2.4.4	Gatehouse				
	Supply	Each	1	R	-
	Install	Each	1	R	-
2.5	15m Lightning protection mast with own earth matt bonded to the structure earth. All below ground terminations to be exothermically welded.				
	Supply	Each	1	R	-
	Install	Each	1	R	-
TOTAL - BILL NO 2 CARRIED TO FINAL SUMMARY PAGE				R	-

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - EARTHING AND LIGHTNING PROTECTION INSTALLATION
PART C1.2.5
BILL OF QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
3.0	BILL NO. 3				
	NASA LEGS ANTENNA EARTHING AND LIGHTNING PROTECTION				
3.1	Site				
3.1.1	IP54 Polycarbonate Kiosk with wooden backboard inclusive of 300mm x 50mm x 6mm copper earth bar mounted on insulators. Kiosk to be mounted on precast concrete plinth with sleeves for incoming cables.				
	Supply	Each	1	R	-
	Install	Each	1	R	-
3.1.2	Earth Matt with <10 Ohm resistance. Earth matt tails to be connected to earth bar in kiosk. All below ground terminations to be exothermically welded.				
	Supply	Each	1	R	-
	Install	Each	1	R	-
3.1.3	Supply and install 70mm ² BCEC at 500mm below ground level from Minisub earth bar to kiosk Include all terminations and trenching. All below ground terminations to be exothermically welded.				
	Supply	m	130	R	-
	Install	m	130	R	-
	Termination	Each	2	R	-
3.2	Antenna Level 1				
3.2.1	Supply and install 120mm ² BCEC at 500mm below ground level around antenna base and terminate to base structural steel. All below ground terminations to be exothermically welded.				
	Supply	m	50	R	-
	Install	m	50	R	-
	Termination	Each	2	R	-
3.2.2	Link ground earth conductor to level 3 via 120mm ² BCEC and exothermic weld - allow 10m length of cable per point. All below ground terminations to be exothermically welded.				
	Supply	each	4	R	-
	Install	each	4	R	-
	Termination	Each	8	R	-
3.2.3	Ground Test Point. All below ground terminations to be exothermically welded.				
	Supply	each	1	R	-
	Install	each	1	R	-
3.2.1	600mm x 50mm x 6mm Copper earth bar mounted on insulators with connection to earth conductor				
	Supply	Each	1	R	-
	Install	Each	1	R	-
	Termination	Each	2	R	-
3.3	Antenna Level 3				
3.3.1	Connect support ring to bonding conductor from 1st floor via 120mm ² ICEC <i>Refer to the detail "CONCRETE TOWER SUPPORT RING CONNECTION" on drawing J2700-001-EL-01 EARTHING AND LIGHTNING PROTECTION LAYOUT.</i>				
	Supply	each	4	R	-
	Install	each	4	R	-
3.3.2	600mm x 50mm x 6mm Copper earth bar mounted on insulators with connection to earth conductor				
	Supply	Each	1	R	-
	Install	Each	1	R	-
	Termination	Each	2	R	-
3.4	Power Fence				
3.4.1	Supply and install 70mm ² BCEC at 500mm below ground level and connect to power fence and antenna earth. All below ground terminations to be exothermically welded.				
	Supply	m	100	R	-
	Install	m	100	R	-
	Termination	Each	2	R	-
TOTAL - BILL NO 3 CARRIED TO FINAL SUMMARY PAGE					R -

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - EARTHING AND LIGHTNING PROTECTION INSTALLATION
PART C1.2.5
BILL OF QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
	BILL NO. 4				
	ADDITIONAL ITEMS				
4.1	Other items the tenderer may consider necessary to complete the installation				
4.1.1		No	1	R	-
		No	1	R	-
4.1.2		No	1	R	-
		No	1	R	-
4.1.3		No	1	R	-
		No	1	R	-
	TOTAL - BILL NO 4 CARRIED TO FINAL SUMMARY PAGE			R	-

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - EARTHING AND LIGHTNING PROTECTION INSTALLATION
PART C1.2.5
BILL OF QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
	FINAL SUMMARY PAGE				
	BILL NO. 1				
	PRELIMINARIES AND GENERAL			R	-
	BILL NO. 2				
	EARTHING & LIGHTNING PROTECTION			R	-
	BILL NO. 3				
	NASA LEGS ANTENNA EARTHING AND LIGHTING PROTECTION			R	-
	BILL NO. 4				
	ADDITIONAL ITEMS			R	-
	Any other items tenderers may wish to add of a Technical nature not specifically mentioned above in order to comply with the specification and contract conditions. Please add below:				
	TOTAL CARRIED TO BILL NO. 16 ELECTRICAL INSTALLATION - EARTHING & LIGHTNING PROTECTION PART C1.2.5			R	-

Specialist Bills of Quantities (carried to Main Contract Bills of Quantities)
Part C1.2.6

Electrical Installation - BMS INSTALLATION

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - BMS INSTALLATION
PART C1.2.6
BILL OF QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
1.0	BILL NO. 1				
	PRELIMINARIES AND GENERAL				
	CONDITIONS OF CONTRACT				
	Provisional and General items in order to comply with the Conditions of Contract associated with the works contained in this document.				
1.1	Test, Commission and prepare As-Built drawings	Item	1	R	-
1.2	Laminated drawings for all Plant rooms and Network rooms	Item	1	R	-
1.3	Insurances	Item	1	R	-
1.4	Mobilisation	Item	1	R	-
1.5	Project Management	Item	1	R	-
1.6	Site Tools and Instrumentation	Item	1	R	-
1.7	Maintenance and Guarantee for 12 months after practical completion	Item	1	R	-
1.8	Site Establishment	Item	1	R	-
1.9	Site Running Costs	Item	1	R	-
1.10	Demobilisation	Item	1	R	-
1.11	Vehicles	Item	1	R	-
1.12	Allowance to fix price for the duration of the contract	Sum	1	R	-
	<i>The rates in the remainder of the Bill of Quantities (BOQ) must exclude these costs, as they are to be priced under this item.</i>				
1.13	Remote Location Overhead Costs	Sum	1	R	-
	<i>Provide a lump sum cost for all additional expenses associated with working at the remote project site, located approximately 230 km from Cape Town and 5 km south of Matjiesfontein. This includes transportation of materials and personnel, accommodation, site establishment, and any other costs related to the remote nature of the location. The rates in the remainder of the Bill of Quantities (BOQ) must exclude these costs, as they are to be priced under this item.</i>				
1.14	OTHER ITEMS				
	Any other items tenderers may wish to add of a preliminary and general nature not specifically mentioned above in order to comply with the specification and contract conditions. Please add below:				
1.14.1		Item	1	R	-
1.14.2		Item	1	R	-
1.14.3		Item	1	R	-
	TOTAL - BILL NO 1 CARRIED TO FINAL SUMMARY PAGE			R	-

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - BMS INSTALLATION
PART C1.2.6
BILL OF QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
2.0	BILL NO. 2				
	GENERATOR BUILDING - BMS INSTALLATION				
	Price to include for all equipment, cabling, terminations, enclosures, communications equipment to implement a full cloud based BMS system.				
	All prices listed below must make provision for the delivery to site and must include all materials deemed necessary for commissioning of equipment in full, including all handling costs, insurance and any other costs involved in the delivery of material and equipment to complete installation.				
2.1	Generator Building and Site - BMS Infrastructure	Supply	310	R	-
	<i>Refer to the BMS points list for details</i>	Install	310	R	-
2.2	Allow for items not included in bill of quantities but deemed necessary to complete installation as per tender drawings. Clarify in detail.				
2.2.1		Sum	1	R	-
2.2.2		Sum	1	R	-
2.2.3		Sum	1	R	-
	TOTAL - BILL NO 2 CARRIED TO FINAL SUMMARY PAGE			R	-
3.0	BILL NO. 3				
	MAIN OPERATIONS BUILDING - BMS INSTALLATION				
	Price to include for all equipment, cabling, terminations, enclosures, communications equipment to implement a full cloud based BMS system.				
	All prices listed below must make provision for the delivery to site and must include all materials deemed necessary for commissioning of equipment in full, including all handling costs, insurance and any other costs involved in the delivery of material and equipment to complete installation.				
3.1	Main Operations Building - BMS Infrastructure	Supply	190	R	-
	<i>Refer to the BMS points list for details</i>	Install	190	R	-
3.2	Allow for items not included in bill of quantities but deemed necessary to complete installation as per tender drawings. Clarify in detail.				
3.2.1		Sum	1	R	-
3.2.2		Sum	1	R	-
3.2.3		Sum	1	R	-
	TOTAL - BILL NO 3 CARRIED TO FINAL SUMMARY PAGE			R	-

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - BMS INSTALLATION
PART C1.2.6
BILL OF QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
4.0	BILL NO. 4				
	GATEHOUSE BUILDING - BMS INSTALLATION				
	Price to include for all equipment, cabling, terminations, enclosures, communications equipment to implement a full cloud based BMS system.				
	All prices listed below must make provision for the delivery to site and must include all materials deemed necessary for commissioning of equipment in full, including all handling costs, insurance and any other costs involved in the delivery of material and equipment to complete installation.				
4.1	Gatehouse Building - BMS Infrastructure	Supply	35	R	-
	<i>Refer to the BMS points list for details</i>	Install	35	R	-
4.2	Allow for items not included in bill of quantities but deemed necessary to complete installation as per tender drawings. Clarify in detail.				
4.2.1		Sum	1	R	-
4.2.2		Sum	1	R	-
4.2.3		Sum	1	R	-
	TOTAL - BILL NO 4 CARRIED TO FINAL SUMMARY PAGE			R	-
5.0	BILL NO. 5				
	LEGS ANTENNA - BMS INSTALLATION				
	Price to include for all equipment, cabling, terminations, enclosures, communications equipment to implement a full cloud based BMS system.				
	All prices listed below must make provision for the delivery to site and must include all materials deemed necessary for commissioning of equipment in full, including all handling costs, insurance and any other costs involved in the delivery of material and equipment to complete installation.				
5.1	LEGS ANTENNA - BMS Infrastructure	Supply	24	R	-
	<i>Refer to the BMS points list for details</i>	Install	24	R	-
5.2	Allow for items not included in bill of quantities but deemed necessary to complete installation as per tender drawings. Clarify in detail.				
5.2.1		Sum	1	R	-
5.2.2		Sum	1	R	-
5.2.3		Sum	1	R	-
	TOTAL - BILL NO 5 CARRIED TO FINAL SUMMARY PAGE			R	-

SANSA MATJIESFONTEIN
ELECTRICAL INSTALLATION - BMS INSTALLATION
PART C1.2.6
BILL OF QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
	FINAL SUMMARY PAGE				
	BILL NO. 1				
	PRELIMINARIES AND GENERAL				R -
	BILL NO. 2				
	GENERATOR BUILDING - BMS INSTALLATION				R -
	BILL NO. 3				
	MAIN OPERATIONS BUILDING - BMS INSTALLATION				R -
	BILL NO. 4				
	GATEHOUSE BUILDING - BMS INSTALLATION				R -
	BILL NO. 5				
	LEGS ANTENNA - BMS INSTALLATION				R -
	Any other items tenderers may wish to add of a Technical nature not specifically mentioned above in order to comply with the specification and contract conditions. Please add below:				
	TOTAL CARRIED TO BILL NO. 16 ELECTRICAL INSTALLATION - BMS INSTALLATION PART C1.2.6				R -

Specialist Bills of Quantities (carried to Main Contract Bills of Quantities)
Part C1.2.7

Electronic Installation



Due to the specialized nature of this work, tenderers must demonstrate, as part of the evaluation criteria, that the following specialist trades will be carried out by subcontractors with a proven track record in successfully completing similar contracts of comparable size, complexity, greenfield conditions, remoteness, and project requirements.

All submissions must adhere to the specified requirements outlined in the BOQ and align with the project's standards and specifications.

SANSA Matjiesfontein



Date: 4 December 2024

Project Name: SANSA Matjiesfontein

Project Number: C468

Scope: Passive Network - Fibre Reticulation and Data Cabling

EES Live (Pty) Ltd
Email: info@eeslive.com | www.eeslive.com
Office number : +27 21 200 5939

Notes

1. This Price Schedule (Bill of Quantities (BOQ)) forms part of the Contract Documents and is to be read in conjunction therewith. It shall be fully completed and returned upon the closing date.
2. All prices or tariffs must be given against each item of the Price Schedule irrespective of any quantities given. The cost of items, not priced shall be taken as included in other prices or tariffs in the Price Schedule.
3. Reference shall be made to the project and standard specifications for the full meaning and description of work to be done and material/equipment to be used.
4. Preliminary amount of costs shall be treated as described in the Conditions of Contract and the Specification.
5. A rate shall be given for each item in the Price Schedule, irrespective whether a quantity has been measured for tender purposes or not. Such rates may be used for variations.
6. The unit rates entered in the Price Schedule shall include the cost of all smaller items necessary for complete installation according to the Specification.
7. If any requirements of the Specification are not covered by items in the Price Schedule the Tenderer shall allow therefore in the penultimate item of the Schedule.
8. Since the Specification is for a complete operational system, the rates submitted shall cover the cost of associated items not specifically listed, but which are required for a complete installation in terms of the Specification.
9. The quantities in the Price Schedule are approximate and it shall not be taken as an increase or decrease in the quantity of equipment to be supplied or installed.
10. No orders shall be placed on the basis of the quantities in the Schedule, but shall be verified on site.
11. The Contractor will be paid according to the nett final measurement. The Contractor must allow in the rates for all cutting and waste.
12. No alterations, addition or erasure may be made to the text of the Schedule. If such an alteration, addition or erasure is made it shall not be acknowledged and the original wording of the text shall apply.
13. The unit prices entered against each item shall be accepted as being the correct unit price Tendered for, for the completion of the Work. Should any difference appear between the sum total of the scheduled item prices and that of the Tender price, the Client shall have the right to adjust the individual prices as he may deem necessary in order that the sum total of the unit prices and that of the Tender price agrees.
14. Prices and items submitted, which are not requested in the tender BOQ, will not be considered as contractually binding.
15. The final Contract price shall be measured to the actual installed materials and work done and priced to the unit rates as stated in the Price Schedule.
16. All rates shall include supply, delivery, erection, waste, testing, commissioning and guarantee of material or equipment. Unless otherwise stated.
17. Any assumptions made, or non-compliant attributes are to be raised by tenderer and clarified in bid document
18. The contractor is responsible for ensuring the highest standard of quality in construction and installation of all relevant BOQ items

ELECTRONIC INSTALLATION - Passive Network - Fibre Reticulation and Data Cabling Part C1.2.7

Project SANSA Matjiesfontein

Scope Passive Network - Fibre Reticulation and Data Cabling



Item	Description	Units	Quantity	Supply Rate	Install Rate	Total
0100	Preliminary & General - Fixed					
0101	Contractual Requirements	Sum	1	R0.00	R0.00	R0.00
0102	Insurances	Sum	1	R0.00	R0.00	R0.00
0103	Temporary Offices & Storage	Sum	1	R0.00	R0.00	R0.00
0104	Portable Water	Sum	1	R0.00	R0.00	R0.00
0105	Electrical Power	Sum	1	R0.00	R0.00	R0.00
0106	Compressed Air	Sum	1	R0.00	R0.00	R0.00
0107	Cranage	Sum	1	R0.00	R0.00	R0.00
0108	Sanitary Facilities	Sum	1	R0.00	R0.00	R0.00
0109	Telephone Facilities	Sum	1	R0.00	R0.00	R0.00
0110	Scaffolding	Sum	1	R0.00	R0.00	R0.00
0111	Employee Accommodation	Sum	1	R0.00	R0.00	R0.00
0112	Equipment & Small Tools	Sum	1	R0.00	R0.00	R0.00
0113	Head office Staff	Sum	1	R0.00	R0.00	R0.00
0114	Site Staff	Sum	1	R0.00	R0.00	R0.00
0115	Safety Conditions, Site Rules & Regulations	Sum	1	R0.00	R0.00	R0.00
0116	Medical Examination	Sum	1	R0.00	R0.00	R0.00
0117	Security Clearance	Sum	1	R0.00	R0.00	R0.00
0118	Site Meetings	Sum	1	R0.00	R0.00	R0.00
0119	Programme, Project Planning & Control	Sum	1	R0.00	R0.00	R0.00
0120	Weather Conditions	Sum	1	R0.00	R0.00	R0.00
0121	Freight and Duties	Sum	1	R0.00	R0.00	R0.00
0122	Travel	Sum	1	R0.00	R0.00	R0.00
0123	Testing Authority	Sum	1	R0.00	R0.00	R0.00
0124	Remote Location Overhead Costs In addition to the item above provide a lump sum cost for any additional expenses associated with working at the remote project site, located approximately 230 km from Cape Town and 5 km south of Matjiesfontein. This includes transportation of materials and personnel, accommodation, site establishment, and any other costs related to the remote nature of the location. Note: The rates in the remainder of the Bill of Quantities (BOQ) must exclude these costs, as they are to be priced under this item.	Sum	1	R0.00	R0.00	R0.00
Sub Total (carried forward to summary)						R0.00

**ELECTRONIC INSTALLATION - Passive Network -
Fibre Reticulation and Data Cabling
Part C1.2.7**

Project SANSA Matjiesfontein

Scope Passive Network - Fibre Reticulation and Data Cabling



Item	Description	Units	Quantity	Supply Rate	Install Rate	Total
0400	Quality Systems					
0401	Quality Systems	Sum	1	R0.00	R0.00	R0.00
0500	Testing & Commissioning					
0501	Testing & Commissioning	Sum	1	R0.00	R0.00	R0.00
0600	12 Month Guarantee and Maintenance					
	Monthly Costs	Sum	1	R0.00	R0.00	R0.00
	Fixed Costs	Sum	1	R0.00	R0.00	R0.00
0700	Training & Handover Documentation					
0701	Training	Sum	1	R0.00	R0.00	R0.00
0702	Operation & Maintenance Manuals	Sum	1	R0.00	R0.00	R0.00
	Sub Total (carried forward to summary)					R0.00

ELECTRONIC INSTALLATION - Passive Network - Fibre Reticulation and Data Cabling
Part C1.2.7
Project SANSA Matjiesfontein
Scope Passive Network - Fibre Reticulation and Data Cabling



Item	Description	Part Number	Units	Quantity	Supply Rate	Install Rate	Total
1700	Fibre Reticulation						
1701	Backbone Fibre Cable - OS2 - 24C - SM - unarmoured - HDPE sheath		m	2000	R0.00	R0.00	R0.00
1702	Backbone Fibre Cable - OS2 - 12C - SM - unarmoured - HDPE sheath		m	1000	R0.00	R0.00	R0.00
1703	Splice Closure - 24F - Passthrough splicing capability- water sealed containment		Qty	10	R0.00	R0.00	R0.00
1704	Backbone 12 -Way HDPE Microduct Bundle		m	2000	R0.00	R0.00	R0.00
1705	Distribution 4 -Way HDPE Microduct Bundle		m	1000	R0.00	R0.00	R0.00
1706	Fibre Testing		Sum	1	R0.00	R0.00	R0.00
	DIT testing		Sum	1	R0.00	R0.00	R0.00
	Splicing		Qty	100	R0.00	R0.00	R0.00
	Labelling		Qty	20	R0.00	R0.00	R0.00
	Sundries - Any Sundries required to complete the Installation		Sum	1	R0.00	R0.00	R0.00
	Sub Total (carried forward to summary)						R0.00

Final order lengths to be confirmed with EES before purchase

ELECTRONIC INSTALLATION - Passive Network - Fibre Reticulation and Data Cabling
Part C1.2.7
Project SANSA Matjiesfontein
Scope Passive Network - Fibre Reticulation and Data Cabling



Item	Description	Part Number	Units	Quantity	Supply Rate	Install Rate	Total
1700	Main Building						
1701	Backbone Fibre Cable - OS2 - Z4C - SM - unarmoured - HDPE sheath		m	200	R0.00	R0.00	R0.00
1703	Splice Closure - Z4F - Passthrough splicing capability- water sealed containment		Qty	0	R0.00	R0.00	R0.00
1706	Fibre Testing		Sum	1	R0.00	R0.00	R0.00
1711	24 Port CAT6A fully loaded patch panel		Qty	9	R0.00	R0.00	R0.00
1712	CAT6A Cable - U/UTP		m	13920	R0.00	R0.00	R0.00
1713	CAT6A 1.5m Patch lead		Qty	464	R0.00	R0.00	R0.00
1714	CAT6A data outlet		Qty	232	R0.00	R0.00	R0.00
1715	Fibre splice/patch panel - 144 core - SM - fully loaded - with pigtails		Qty	1	R0.00	R0.00	R0.00
1716	Fibre splice/patch panel - 48 core - SM - fully loaded - with pigtails		Qty	2	R0.00	R0.00	R0.00
1717	Fibre patch lead - SM -1.5m - LC/APC		Qty	36	R0.00	R0.00	R0.00
1718	Cat6A Cable Testing		Sum	1	R0.00	R0.00	R0.00
	Splicing		Qty	96	R0.00	R0.00	R0.00
	Labelling		Sum	1	R0.00	R0.00	R0.00
	Slack management		Sum	3	R0.00	R0.00	R0.00
	Sundries - Any Sundries required to complete the Installation		Sum	1	R0.00	R0.00	R0.00
	Sub Total (carried forward to summary)						R0.00

Final order lengths to be confirmed with EES before purchase

ELECTRONIC INSTALLATION - Passive Network - Fibre Reticulation and Data Cabling Part C1.2.7
 Project SANSa Matjiesfontein
 Scope Passive Network - Fibre Reticulation and Data Cabling



Item	Description	Part Number	Units	Quantity	Supply Rate	Install Rate	Total
1700	Gatehouse						
1701	Backbone Fibre Cable - OS2 - 24C - 5M - unarmoured - HDPE sheath		m	0	R0.00	R0.00	R0.00
1703	Splice Closure - 24F - Passthrough splicing capability- water sealed containment		Qty	0	R0.00	R0.00	R0.00
1706	Fibre Testing		Sum	0	R0.00	R0.00	R0.00
1711	24 Port CAT6A fully loaded patch panel		Qty	2	R0.00	R0.00	R0.00
1712	CAT6A Cable - U/UTP		m	3300	R0.00	R0.00	R0.00
1713	Cat6A 1.5m Patch lead		Qty	110	R0.00	R0.00	R0.00
1714	CAT6A data outlet		Qty	55	R0.00	R0.00	R0.00
1716	Fibre splice/patch panel - 48 core - 5M - fully loaded - with pigtails		Qty	1	R0.00	R0.00	R0.00
1717	Fibre patch lead - 5M -1.5m - LC/APC		Qty	4	R0.00	R0.00	R0.00
1718	Cat6A Cable Testing		Sum	1	R0.00	R0.00	R0.00
	Splicing			0	R0.00	R0.00	R0.00
	Labelling		Sum	1	R0.00	R0.00	R0.00
	Slack management		Sum	1	R0.00	R0.00	R0.00
	Sundries - Any Sundries required to complete the Installation		Sum	1	R0.00	R0.00	R0.00
Sub Total (carried forward to summary)							R0.00

Final order lengths to be confirmed with EES before purchase

ELECTRONIC INSTALLATION - Passive Network - Fibre Reticulation and Data Cabling Part C1.2.7
 Project SANSA Matjiesfontein
 Scope Passive Network - Fibre Reticulation and Data Cabling



Item	Description	Part Number	Units	Quantity	Supply Rate	Install Rate	Total
1700	Generator Building						
1701	Backbone Fibre Cable - OS2 - 24C - SM - unarmoured - HDPE sheath		m	0	R0.00	R0.00	R0.00
1703	Splice Closure - 24F - Passthrough splicing capability- water sealed containment		Qty	0	R0.00	R0.00	R0.00
1706	Fibre Testing		Sum	0	R0.00	R0.00	R0.00
1711	24 Port CAT6A fully loaded patch panel		Qty	2	R0.00	R0.00	R0.00
1712	CAT6A Cable - U/UTP		m	3300	R0.00	R0.00	R0.00
1713	Cat6A 1.5m Patch lead		Qty	110	R0.00	R0.00	R0.00
1714	CAT6A data outlet		Qty	55	R0.00	R0.00	R0.00
1716	Fibre splice/patch panel - 48 core - SM - fully loaded - with pigtails		Qty	1	R0.00	R0.00	R0.00
1717	Fibre patch lead - SM - 1.5m - LC/APC		Qty	4	R0.00	R0.00	R0.00
1718	Cat6A Cable Testing		Sum	1	R0.00	R0.00	R0.00
	Splicing		Sum	0	R0.00	R0.00	R0.00
	Labelling		Sum	1	R0.00	R0.00	R0.00
	Slack management		Sum	1	R0.00	R0.00	R0.00
	Sundries - Any Sundries required to complete the Installation		Sum	1	R0.00	R0.00	R0.00
Sub Total (carried forward to summary)							R0.00

Final order lengths to be confirmed with
EES before purchase

ELECTRONIC INSTALLATION - Passive Network -
Fibre Reticulation and Data Cabling Part C1.2.7

Project SANSA Matjiesfontein
Scope Passive Network - Fibre Reticulation and Data Cabling



Item	Description	Units	Quantity	Supply Rate	Install Rate	Total
	PC Sums					
0801	PC Sum	Sum	1	R0.00	R0.00	R0.00
Sub Total (carried forward to summary)						R0.00

ELECTRONIC INSTALLATION - Passive Network - Fibre Reticulation and Data Cabling Part C1.2.7

Project SANSa Matjiesfontein
Scope Passive Network - Fibre Reticulation and Data Cabling



Item	Description	Total
	Price Summary	
0100	Preliminary & General - Fixed	R0.00
0400 - 0700	Quality Systems, Testing & Commissioning, Guarantee and Maintenance, Training & Handover	R0.00
1700	Complex Fibre Reticulation	R0.00
1700	Passive Network - Main Building	R0.00
1700	Passive Network - Gate House Building	R0.00
1700	Passive Network - Generator Building	R0.00
0800	PC Sums	R0.00
	Total ex VAT carried to BILL NO.17 ELECTRONIC INSTALLATION - PASSIVE NETWORK - FIBRE RETICULATION AND DATA CABLING Part C1.2.7	R0.00

Specialist Bills of Quantities (carried to Main Contract Bills of Quantities)
Part C1.2.8

Mechanical Installation



Due to the specialized nature of this work, tenderers must demonstrate, as part of the evaluation criteria, that the following specialist trades will be carried out by subcontractors with a proven track record in successfully completing similar contracts of comparable size, complexity, greenfield conditions, remoteness, and project requirements.

All submissions must adhere to the specified requirements outlined in the BOQ and align with the project's standards and specifications.

C1.2.8 Mechanical Installation - Bill NO.18: PRICING SUMMARY - SANSA MATJIESFONTEIN

- 1 All rates are considered supplied, installed, tested, commissioned and handover of all equipment, including verification of equipment functionality, including 12 months guarantee and maintenance.
- 2 All values in this BoQ are to be exclusive of 15% VAT, unless otherwise indicated.
- 3 Pricing summary to be read in conjunction with drawings P3589-M-01 and P3589-M-04 including tender specification.
- 4 Canvas Collars to be allowed for between all fan / attenuators (if applicable).
- 5 All AC units return air grilles curved blade, hinged type with viledon filter, complete and fully functional with GSM plenum boxes internally insulated with 25mm thick sonic liner (if required)
- 6 All product specific items (fans and attenuators) specified could be supplied as such, or the approved alternative.
- 7 Main Offer: Ducted Hide-Aways/ Midwall Splits/ Cassettes to be either Daikin or Samsung DX type inverter split units R410A.
- 8 Main Offer: CRAC's to be either **Stulz, Carrier or Inramech**.
- 9 All High Static indoor units supply air duct work must be internally insulated with 25mm thick sonic liner: Hide-Away AC units systems (if required).
- 10 Return air plenums on Hide-Away AC units to be internally insulated for break-out noise.
- 11 Indoor units to be supplied with hard wire remote controller. Ø75 draw box with 25mm conduit.
- 12 All remote Condensing units heat exchanger coils are to be Bluchem treated.
- 13 All refrigeration piping, are to be selected by the equipment suppliers to suit the installation application requirements.
- 14 All indoor equipment selections must be based on on-coil of **24°C DB / 17.1°C WB** and meet the sensible load requirements.
- 15 Allowance for condensate drain piping with clear hose to within 1000mm of AC unit to be allowed for by AC Contractor
- 16 Condensate drain point will be provided by Plumber adjacent to AC units at both indoor and outdoor units
- 17 Power Supply to Local isolator are to be provided complete and fully functional with overload protection by site electrician at the indoor and outdoor units, and at each of the mechanical ventilation fan system as well as at each HVAC Electrical DB Panels as shown on the drawings.
- 18 Flashing around weather louvres is by others: Roofing Contractor
- 19 Duty/Standby controls to be allowed for in areas where indicated. Units to automatically switch between duty and standby without any interruptions - controls to allow for this
- 20 NASA equipment room temperature to be maintained between 18°C -23°C DB with humidity range between 45-55% RH. CRAC unit configuration to allow for N+1 control and equal run time between units. CRAC units to be selected with on-board dehumidification and humidification control. CRAC units to be compatible with external ATS (provided by site electrician).
- 21 SANSA equipment room and NOC temperature to be maintained between 18°C -23°C DB with humidity range between 45-55% RH. CRAC unit configuration to allow for N+1 control and equal run time between units. CRAC units to be selected with on-board dehumidification and humidification control. CRAC units to be compatible with external ATS (provided by site electrician).

MECHANICAL INSTALLATION

PART C1.2.8: BILL NO.18

Item	Location	Reference	Description	Unit	Qty	Rate R (Excl 15% VAT)	Total R (Excl 15% VAT)
4.1	MAIN BUILDING		PRELIMINARIES (Carried Forward from Annexure)	no	1	R	R
4.2			AIR-CONDITIONING & MECHANICAL VENTILATION				
4.2.1			<u>AIR-CONDITIONING: GROUND FLOOR</u>				
4.2.1.1		AC-G.01	3kW Midwall Split Unit, <i>(Supply and installation of the indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves and fittings; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, remote controller and condensate drain)</i>	no	1	R	R
		AC-G.02	3kW Midwall Split Unit, <i>(Supply and installation of the indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves and fittings; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, remote controller and condensate drain)</i>	no	1	R	R
		AC-G.03	3kW Midwall Split Unit, <i>(Supply and installation of the indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves and fittings; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, remote controller and condensate drain)</i>	no	1	R	R
		AC-G.04	3kW Midwall Split Unit, <i>(Supply and installation of the indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves and fittings; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, remote controller and condensate drain)</i>	no	1	R	R
		AC-G.05	5kW Midwall Split Unit, <i>(Supply and installation of the indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves and fittings; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, remote controller and condensate drain)</i>	no	1	R	R
		AC-G.06	5kW Midwall Split Unit, <i>(Supply and installation of the indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves and fittings; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, remote controller and condensate drain)</i>	no	1	R	R
		AC-G.07	5kW Midwall Split Unit, <i>(Supply and installation of the indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves and fittings; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, remote controller and condensate drain)</i>	no	1	R	R
		AC-G.08	5kW Midwall Split Unit, <i>(Supply and installation of the indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves and fittings; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, remote controller and condensate drain)</i>	no	1	R	R
		AC-G.09	10kW Ducted Hide Away Split Unit, <i>(Supply and installation of the indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves and fittings; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, remote controller and condensate drain; ducting, transformation pieces, plenum boxes, stop ends, canvas collars, spigots, flexibles and air-terminals)</i>	no	1	R	R
		AC-G.10	10kW Ducted Hide Away Split Unit, <i>(Supply and installation of the indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves and fittings; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, remote controller and condensate drain; ducting, transformation pieces, plenum boxes, stop ends, canvas collars, spigots, flexibles and air-terminals)</i>	no	1	R	R

MECHANICAL INSTALLATION
PART C1.2.8: BILL NO.18

[illegible]

MECHANICAL INSTALLATION
PART C1.2.8: BILL NO.18

4.2.1.2	NASA EQUIPMENT ROOM	AC-G.28	5kW Cassette Split Unit, (Supply and installation of the indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves and fittings; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, remote controller and condensate drain)	no	1	R	R
		AHU-G.01	42kW Ducted Air Handling Split Unit, (Supply and installation of the indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves and fittings; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, remote controller and condensate drain; ducting, transformation pieces, plenum boxes, stop ends, canvas collars, spigots, flexibles, weather louvres and air-terminals)	no	1	R	R
		CRAC-01	34.1kW Computer Room Air-Conditioning Unit, (Supply and installation of indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves, fittings, P-traps and oil separator; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, on-board controller, N+1 control and condensate drain; floor stand, anti-vibration mounts, plenum box, on-board humidifier, temperature sensors and air-terminals)	no	1	R	R
		CRAC-02	34.1kW Computer Room Air-Conditioning Unit, (Supply and installation of indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves, fittings, P-traps and oil separator; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, on-board controller, N+1 control and condensate drain; floor stand, anti-vibration mounts, plenum box, on-board humidifier, temperature sensors and air-terminals)	no	1	R	R
		CRAC-03	34.1kW Computer Room Air-Conditioning Unit, (Supply and installation of indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves, fittings, P-traps and oil separator; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, on-board controller, N+1 control and condensate drain; floor stand, anti-vibration mounts, plenum box, on-board humidifier, temperature sensors and air-terminals)	no	1	R	R
	SANSa EQUIPMENT ROOM	AC-G.29	7kW Midwall Split Unit, (Supply and installation of the indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves and fittings; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, remote controller and condensate drain)	no	1	R	R
		AC-G.30	7kW Midwall Split Unit, (Supply and installation of the indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves and fittings; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, remote controller and condensate drain)	no	1	R	R
		CRAC-04	15.9kW Computer Room Air-Conditioning Unit, (Supply and installation of indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves, fittings, P-traps and oil separator; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, on-board controller, N+1 control and condensate drain; floor stand, anti-vibration mounts, plenum box, on-board humidifier, temperature sensors and air-terminals)	no	1	R	R
		CRAC-05	15.9kW Computer Room Air-Conditioning Unit, (Supply and installation of indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves, fittings, P-traps and oil separator; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, on-board controller, N+1 control and condensate drain; floor stand, anti-vibration mounts, plenum box, on-board humidifier, temperature sensors and air-terminals)	no	1	R	R
		CRAC-06	15.9kW Computer Room Air-Conditioning Unit, (Supply and installation of indoor and outdoor unit; inclusive of copper refrigerant piping, bends, valves, fittings, P-traps and oil separator; cable trays, supports, fixing and insulation; power and control cabling, wiring to local isolator, on-board controller, N+1 control and condensate drain; floor stand, anti-vibration mounts, plenum box, on-board humidifier, temperature sensors and air-terminals)	no	1	R	R
		<u>VENTILATION: GROUND FLOOR</u>					
4.2.2 4.2.2.1	MAIN BUILDING	FA-G.01	Mechanical Fresh Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, plenum boxes, stop ends, filter boxes, spigots, balancing dampers, flexibles, weather louvre and air-terminals; system complete and fully functional)	no	1	R	R
		FA-G.02	Mechanical Fresh Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, plenum boxes, stop ends, filter boxes, spigots, balancing dampers, flexibles, weather louvre and air-terminals; system complete and fully functional)	no	1	R	R
		FA-G.03	Mechanical Fresh Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, plenum boxes, stop ends, filter boxes, spigots, balancing dampers, flexibles, weather louvre and air-terminals; system complete and fully functional)	no	1	R	R
		FA-G.04	Mechanical Fresh Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, plenum boxes, stop ends, filter boxes, spigots, balancing dampers, flexibles, weather louvre and air-terminals; system complete and fully functional)	no	1	R	R
		FA-G.05	Mechanical Fresh Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, plenum boxes, stop ends, filter boxes, spigots, balancing dampers, flexibles, weather louvre and air-terminals; system complete and fully functional)	no	1	R	R
		FA-G.06	Mechanical Fresh Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, plenum boxes, stop ends, filter boxes, spigots, balancing dampers, flexibles, cross-talk sound attenuators, weather louvre and air-terminals; system complete and fully functional)	no	1	R	R
		FA-G.07	Mechanical Fresh Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, plenum boxes, stop ends, filter boxes, spigots, balancing dampers, flexibles, weather louvre and air-terminals; system complete and fully functional)	no	1	R	R

MECHANICAL INSTALLATION
PART C1.2.8: BILL NO.18

RATES ONLY	FA-G.08	Mechanical Fresh Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, plenum boxes, stop ends, filter boxes, spigots, balancing dampers, flexibles, weather louvre and air-terminals; system complete and fully functional)	no	1	R	R
	FA-G.09	Mechanical Fresh Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, plenum boxes, stop ends, filter boxes, spigots, balancing dampers, flexibles, weather louvre and air-terminals; system complete and fully functional)	no	1	R	R
	FA-G.10	Mechanical Fresh Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, plenum boxes, stop ends, filter boxes, spigots, balancing dampers, flexibles, weather louvre and air-terminals; system complete and fully functional)	no	1	R	R
	FA-G.11	Mechanical Fresh Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, plenum boxes, stop ends, filter boxes, spigots, balancing dampers, flexibles, weather louvre and air-terminals; system complete and fully functional)	no	1	R	R
	FA-G.12	Mechanical Fresh Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, plenum boxes, stop ends, filter boxes, spigots, balancing dampers, flexibles, weather louvre and air-terminals; system complete and fully functional)	no	1	R	R
	EA-G.01	Mechanical Extract Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, stop ends, spigots, flexibles, cowl, air-terminals and door grilles; system complete and fully functional)	no	1	R	R
	EA-G.02	Mechanical Extract Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, stop ends, spigots, flexibles, cowl, air-terminals and door grilles; system complete and fully functional)	no	1	R	R
	EA-G.04	Mechanical Extract Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, stop ends, spigots, flexibles, weather louvre, air-terminals and door grilles; system complete and fully functional)	no	1	R	R
	EA-G.05	Mechanical Extract Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, stop ends, spigots, flexibles, weather louvre, air-terminals and door grilles; system complete and fully functional)	no	1	R	R
	EA-G.06	Mechanical Extract Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, stop ends, spigots, flexibles, weather louvre, air-terminals and door grilles; system complete and fully functional)	no	1	R	R
	EA-G.07	Mechanical Extract Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, stop ends, spigots, flexibles, cowl, and air-terminals; system complete and fully functional)	no	1	R	R
	EA-G.08	Mechanical Extract Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, stop ends, spigots, flexibles, cowl, and air-terminals; system complete and fully functional)	no	1	R	R
	EA-G.09	Mechanical Extract Air, (Supply and installation of axial flow fan, sound attenuators, canvas collars, anti-vibration mounts and wiring to local isolator; ducting, transformation pieces, stop ends, spigots, flexibles, cowl, and air-terminals; system complete and fully functional)	no	1	R	R
	Ducting (Including supports and fixings)					
	<u>Galvanised sheet metal ducting</u>					
		GSM category 1 (< 750mm with semiperimeter <= 1150mm)	m	1	R	
		GSM category 2 (< 750mm with semiperimeter >= 1150mm)	m	1	R	
		GSM category 3 (from 750mm to 1350mm)	m	1	R	
		GSM round ducting, Ø150mm	m	1	R	
		GSM round ducting, Ø200mm	m	1	R	
		GSM round ducting, Ø250mm	m	1	R	
		GSM round ducting, Ø300mm	m	1	R	
		GSM round ducting, Ø350mm	m	1	R	
	<u>Galvanised sheet metal ducting bends</u>					
		GSM duct bend, category 1	no	1	R	
		GSM duct bend, category 2	no	1	R	
		GSM duct bend, category 3	no	1	R	
		GSM duct bend, Ø150mm	no	1	R	
		GSM duct bend, Ø200mm	no	1	R	
		GSM duct bend, Ø250mm	no	1	R	
		GSM duct bend, Ø300mm	no	1	R	
		GSM duct bend, Ø350mm	no	1	R	
	<u>Galvanised sheet metal ducting transformations & offsets (Largest size)</u>					
		GSM duct transformation, category 1	no	1	R	
		GSM duct transformation, category 2	no	1	R	
		GSM duct transformation, category 3	no	1	R	
		GSM duct transformation, Ø150mm	no	1	R	
		GSM duct transformation, Ø200mm	no	1	R	
		GSM duct transformation, Ø250mm	no	1	R	
		GSM duct transformation, Ø300mm	no	1	R	
		GSM duct transformation, Ø350mm	no	1	R	

MECHANICAL INSTALLATION
PART C1.2.8: BILL NO.18

			Galvanised sheet metal ducting stop ends	no	1	R			
			GSM duct stop end, category 1	no	1	R			
			GSM duct stop end, category 2	no	1	R			
			GSM duct stop end, category 3	no	1	R			
			GSM duct stop end, Ø150mm	no	1	R			
			GSM duct stop end, Ø200mm	no	1	R			
			GSM duct stop end, Ø250mm	no	1	R			
			GSM duct stop end, Ø300mm	no	1	R			
			GSM duct stop end, Ø350mm	no	1	R			
			Galvanised sheet metal ducting spigots						
			GSM duct spigot, Ø100mm	no	1	R			
			GSM duct spigot, Ø150mm	no	1	R			
			GSM duct spigot, Ø200mm	no	1	R			
			GSM duct spigot, Ø250mm	no	1	R			
			GSM duct spigot, Ø300mm	no	1	R			
			GSM duct spigot, Ø350mm	no	1	R			
			Flexible Ducting <i>(Including supports and fixings)</i>						
			Acoustic flexible ducting (1500 mm long)						
			Acoustic flexible ducting, Ø100mm	no	1	R			
			Acoustic flexible ducting, Ø150mm	no	1	R			
			Acoustic flexible ducting, Ø200mm	no	1	R			
			Acoustic flexible ducting, Ø250mm	no	1	R			
			Acoustic flexible ducting, Ø300mm	no	1	R			
			Acoustic flexible ducting, Ø350mm	no	1	R			
			Canvas duct collars						
			Standard duct collars						
			Flexible canvas collars, category 1	no	1	R			
			Flexible canvas collars, category 2	no	1	R			
			Flexible canvas collars, category 3	no	1	R			
			Flexible canvas collars, Ø100mm	no	1	R			
			Flexible canvas collars, Ø150mm	no	1	R			
			Flexible canvas collars, Ø200mm	no	1	R			
			Flexible canvas collars, Ø250mm	no	1	R			
			Flexible canvas collars, Ø300mm	no	1	R			
			Flexible canvas collars, Ø350mm	no	1	R			
			Terminals <i>(constant volume)</i>						
			Diffusers						
			CRD round, Ø100mm	no	1	R			
			CRD round, Ø150mm	no	1	R			
			CRD round, Ø200mm	no	1	R			
			CRD round, Ø250mm	no	1	R			
			CRD square, Ø100mm	no	1	R			
			CRD square, Ø150mm	no	1	R			
			CRD square, Ø200mm	no	1	R			
			CRD square, Ø250mm	no	1	R			
			Krantz radial, Ø250mm	no	1	R			
			Krantz radial, Ø300mm	no	1	R			
			Grilles						
			400mm × 200mm c/w OBD	no	1	R			
			450mm × 250mm c/w OBD	no	1	R			
			500mm × 300mm c/w OBD	no	1	R			
			600mm × 300mm c/w OBD	no	1	R			
			Disc Valves						
			VLK/VLI, Ø100mm	no	1	R			
			VLK/VLI, Ø150mm	no	1	R			
			VLK/VLI, Ø200mm	no	1	R			
			Door Grilles						
			Non-vision type door grille, 450mm × 250mm						
4.3			Provisional Sum:	sum	1	R	-	R	-
4.4			Testing and commissioning	sum	1	R		R	
4.5			Scaffolding and Rigging	sum	1	R		R	
4.6			Operating and Maintenance Manuals	sum	1	R		R	
4.7			12 Month Maintenance & Guarantee	sum	1	R		R	
4.8			TOTAL EX VAT CARRIED TO BILL NO. 18 MECHANICAL INSTALLATION PART C1.2.8						

Specialist Bills of Quantities (carried to Main Contract Bills of Quantities)
Part C1.2.9
Fire Detection Installation



Due to the specialized nature of this work, tenderers must demonstrate, as part of the evaluation criteria, that the following specialist trades will be carried out by subcontractors with a proven track record in successfully completing similar contracts of comparable size, complexity, greenfield conditions, remoteness, and project requirements.

All submissions must adhere to the specified requirements outlined in the BOQ and align with the project's standards and specifications.

C1.2.9 Fire Detection Installation - Bill NO.19					
PRICING SUMMARY - SANSA MATJIESFONTEIN					
Item	Description	Unit	Qty	Rate R (Excl 15% VAT)	Total R (Excl 15% VAT)
	<p>All Rates Below are considered supplied and installed.</p> <p>Pricing summary sheet to be correlated against the drawings</p> <p>Supply, install and connect inclusive of all fixing materials, wastage and sundries. CLASS A wiring method.</p> <p>The buildings shall be equipped with a category L2/M category fire detection system, and alarm system designed by a competent (registered SAQCC designer), installed and commissioned in accordance with SANS 10139-2021:</p> <p>Audible and visual alarms to be positioned throughout all accessible areas of the building as per SANS 10139:2021. The tenderer to ensure that a DB level of between 60 and 65 DB is achieved, positions indicated on the drawing is only advisory, final positions to be determined on site dependant on tenant layouts and DB levels achieved</p> <p>Floor voids in the equipment rooms to have detection installed complete with remote LED</p> <p>Conduits and wireways are supplied by the site electrician</p> <p>Design, installation and commissioning certificates are required to be issued upon completion by the registered SAQCC installer</p> <p>10.1 PRELIMINARIES (Carried Forward from Annexure)</p> <p>10.2 Main Building Fire Detection (P3589-FD-00 Rev B)</p> <p>a Addressable 2 Loop fire panel, standby batteries, local sounder, logbook and holder</p> <p>b Addressable Ceiling Optical smoke detector, including base</p> <p>c Addressable Void & Floor smoke detector, including base & remote LED</p> <p>d Addressable Rate-of-Rise heat detector, including base</p> <p>e Addressable Rate-of-Rise heat detector, including base, beacon sounder combination</p> <p>f NASA Equipmnet room Vesda system 1 pipe - system to interface with main panel</p> <p>g SANSA Equipmnet room Vesda system 1 pipe - system to interface with main panel</p> <p>h Addressable Manual Call point (RED), including back box</p> <p>i Conventional Manual Call point (Green), including back box (door release)</p> <p>j Addressable Combination detector/beacon sounder, base mount for tenancy spaces</p> <p>k Addressable Wall mount combination beacon sounder</p> <p>l Line Isolators, CLASS A wiring method</p> <p>m Output units (Mains) for auxiliary shutdowns and interfacing</p> <p>n Output units for auxiliary signalling - door release</p> <p>o 24VDC power supplies plus batteries Vesda Unit</p> <p>p Fire retardant field wiring, 1.0mm² PH30</p> <p>q Mapping, programming, testing and commissioning</p> <p>r 220v AC Isolator points</p> <p>s Training of staff and personnel</p> <p>t Operation and Maintenance manuals, As-built drawings - 3 Sets</p> <p>u 12 month service and maintenance contract</p>				
		no	1		
		no	22		
		no	35		
		no	0		
			1		
		sum	1		
		sum	1		
		no	15		
		no	2		
		no	9		
		no	6		
		sum	4		
		no	10		
		no	2		
		no	2		
		sum	1		
		sum	1		
		no			
		sum	1		
		no	3		
		sum	1		

10.3 Generator Building Fire Detection (P3589-FD-00 Rev B)					
a	Addressable fire panel 1 Loop, standby batteries, local sounder, logbook and holder	no	1		
b	Addressable Ceiling Optical smoke detector, including base	no	9		
c	Addressable Void Ceiling Optical smoke detector, including base & remote LED		4		
d	Interface for detection panel to link and send signal to main fire panel at Main building. Radio link fire & fault capabilities due to distances between buildings	no	1		
e	Addressable Rate-of-Rise heat detector, including base	no	1		
f	Addressable Manual Call point (RED), including back box	no	3		
g	Addressable Manual Call point (Green), including back box	no	0		
h	Addressable Combination beacon sounder, base mount for tenancy spaces	no	0		
i	Addressable Wall mount combination beacon sounder	no	3		
j	Line Isolators, CLASS A wiring method	sum	2		
k	Output units Mains for auxiliary shutdowns and interfacing	no	3		
l	Input units for auxiliary signalling - rate only	no	0		
m	24VDC power supplies plus batteries	no			
n	Fire retardant field wiring, 1.0mm² PH30	sum	1		
o	Mapping, programming, testing and commissioning	sum	1		
p	220v AC Isolator points	no			
q	Training of staff and personnel	sum	1		
r	Operation and Maintenance manuals, As-built drawings - 3 Sets	no	3		
s	12 month service and maintenance contract	sum	1		
10.3 Gatehouse Building Fire Detection (P3589-FD-00 Rev B)					
a	Addressable fire panel, standby batteries, local sounder, logbook and holder	no	1		
b	Addressable Ceiling Optical smoke detector, including base	no	5		
c	Addressable Void Ceiling Optical smoke detector, including base & remote LED		3		
d	Interface for detection panel to link and send signal to main fire panel at Main building. Allow for wifi capabilities due to distances between buildings	no	1		
e	Addressable Rate-of-Rise heat detector, including base	no	1		
f	Addressable Manual Call point (RED), including back box	no	1		
g	Addressable Manual Call point (Green), including back box	no	0		
h	Addressable Combination beacon sounder, base mount for tenancy spaces	no			
i	Addressable Wall mount combination beacon sounder	no	1		
j	Line Isolators, CLASS A wiring method	sum	2		
k	Output units Mains for auxiliary shutdowns and interfacing	no	1		
l	Input units for auxiliary signalling - rate only	no	0		
m	24VDC power supplies plus batteries	no			
n	Fire retardant field wiring, 1.0mm² PH30	sum	1		
o	Mapping, programming, testing and commissioning	sum	1		
p	220v AC Isolator points	no			
q	Training of staff and personnel	sum	1		
r	Operation and Maintenance manuals, As-built drawings - 3 Sets	no	3		
s	12 month service and maintenance contract	sum	1		
t	Other items required but not listed above - Contractor to specify Labour, Travel, Transport, Accommodation, Meals, Tolls		1		R -
10.4 Total ex VAT carried to BILL NO.19 FIRE DETECTION INSTALLATION Part C1.2.9					

C.1.3.1 Annexure A - Model Preambles

Available in Electronic Format upon request

GENERAL PREAMBLES FOR TRADES 2017

ISBN: 978-0-620-74577-2



**The Association of
South African
Quantity Surveyors**

C1.3.2 Annexure B - Health and Safety

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		



CONSTRUCTION HEALTH AND SAFETY SPECIFICATION

October 2024

SOUTH AFRICAN NATIONAL SPACE AGENCY
MATJIESFONTEIN GROUND STATION

Rev1: SANSA Amendments (16 March 2025)

SCOPE OF WORK SUMMARY:

NEW BUILD STRUCTURES
CIVIL INSTALLATION GREENFIELD

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

CONSTRUCTION HEALTH AND SAFETY SPECIFICATION

1. Introduction & Background
 - 1.1 Objective
 - 1.2 Scope
 - 1.3 Definitions
 - 1.4 Application
 - 1.5 Incentives and Penalties
 - 1.6 Legal requirements
 - 1.7 Principal Contractor
 - 1.8 Principal Contractor and Contractor Supervision
 - 1.9 Contractors and their contractors Written Agreements
 - 1.10 General Occupational Health & Safety provisions
2. Minimum Administrative Requirements
 - 2.1 Notification of Construction Work (CR 4)/Construction Work Permit (CR 3)
 - 2.2 Occupational Health and Safety Policy
 - 2.3 Alcohol and other Drugs Policy
 - 2.4 HIV / AIDS Policy
 - 2.5 Assignment of Contractor's Responsible Persons to Supervise Health and Safety on Site
 - 2.6 Health and Safety Representative(s)
 - 2.7 Health and Safety Committees (Where more than one Health and Safety Representative is Appointed)
 - 2.8 First Aid Boxes and First Aid Equipment – General Safety Regulations 3
 - 2.9 Accident / Incident Reporting and Investigation – Section 24
 - 2.10 Hazard Identification and Risk Assessment
 - 2.11 Permits
 - 2.12 Health and Safety Training
 - 2.13 Emergency Procedures – ERW 9 / Construction Regulations 29
 - 2.14 Health & Safety Audits, Monitoring and Reporting – Construction Regulations 5(1)(o)
 - 2.15 Site Safety File (General Record Keeping)

Client: South African National Space Agency Project: Matjiesfontein Ground Station	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
---	--	---

- 2.16 Inspection of Equipment and Tools
- 2.17 Personal Protective Equipment (PPE) and Clothing – General Safety Regulations
- 2
- 2.18 Rules of conduct
- 3. Physical Requirements
- 4. Occupational Health, Hygiene and Environmental Management
- 5. The Designer
- 6. Annexure 1 - Health and Safety Costing

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

1. Introduction & Background

1.1 Objective

- 1.1.1 The objective of this Health and Safety Specification is to provide an outline for achieving compliance with specific health and safety controls, the requirements of the Occupational Health and Safety Act 85 / 1993 and associated Regulations, with specific reference to the Construction Regulations (GNR.84 of 7 February 2014). The Principal Contractor is to commit to maintaining excellence in their activities to the benefit of the Client/s, employees, communities, the environment and is to utilise Health and Safety management principles as part of their normal operations.

1.2 Scope

- 1.2.1 Compliance with this document does not absolve the Principal Contractor from complying with minimum legal requirements and the Principal Contractor remains responsible for the health and safety of his employees and those of his Mandataries.
- 1.2.2 This Health & Safety Specification shall act as the basis for the drafting of the construction phase Health & Safety plan.
- 1.2.3 This Health and Safety specification is designed to assist in the development of a Health and Safety program addressing all aspects of Occupational Health and Safety as affected by this project.
- 1.2.4 It provides the requirements Principal Contractors and other Contractors shall comply with in order to reduce the risks associated with this project which may lead to incidents causing injury and/or ill health or pose any danger to the environment.
- 1.2.5 The scope addresses legal compliance, hazard identification and risk assessment, risk control and promoting a health and safety culture amongst those working on the project.
- 1.2.6 The specification makes provision for the protection of those persons other than employees.
- 1.2.7 All Contractors engaged by the Principal Contractor are to receive and acknowledge receipt of the relevant sections and adhere to this Health and Safety specification.
- 1.2.8 Principal and other Contractors should therefore insist this part of the Specification form part of any contract they may have with other Contractors and/or Suppliers.

1.3 Definitions

- 1.3.1 The definitions as listed in the Occupational Health and Safety Act 85 / 1993 and Relevant Regulations shall apply unless otherwise stipulated.
- 1.3.2 Any reference to "The Contractor" includes - the Principal Contractor and Contractor unless otherwise stipulated.

1.4 Application

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

- 1.4.1 This Health & Safety Specification is as far as is reasonable practicable based on the applicable legislative requirements as required.
- 1.4.2 The Client or his/her duly appointed representative reserves the right to stop any contractor from working whenever Safety, Health or Environmental requirements are being violated.
- 1.4.3 Any resultant costs of such work stoppages will be for the Contractor's account.
- 1.4.4 The requirements as specified by the Client or his/her duly appointed representative, in this document must not be deemed to be exhaustive and the Client or his/her duly appointed representative reserves the right to make changes as may be required from time to time.
- 1.4.5 Any such changes shall be communicated to the Principal Contractor as soon as is reasonable practicable in any recognised manner possible.
- 1.4.6 The Client will not entertain any claim of any nature whatsoever which has resulted in costs incurred or delays being experienced due to the Contractor not complying with the requirements of this document or any other applicable legislative requirements imposed on the Contractor.

1.5 Incentives and Penalties

- 1.5.1 Any incentive scheme/s are left to the discretion of the Principal Contractor / Contractor.
- 1.5.2 Non-compliance with this Health & Safety Specifications may result in work stoppages and possible expulsion from site until the required remedial action has been affected.
- 1.5.3 Costs of any work stoppage being issued will be for the account of the Principal Contractor / Contractor.
- 1.5.4 Non-Conformance Reports (NCR) will be issued by the Client to the Principal Contractor for ongoing non-compliance findings during the monthly site OHS audits and document review i.e. to the provisions of the construction-phase Health and Safety Plan as submitted by the Principal Contractor. The Principal Contractor will be required to show evidence within **7 days** that these have been addressed in the form of a Corrective Action report (CAR).
- 1.5.5 *It is the at the discretion of the Client as/when penalties will be imposed. The scope of this will be agreed upon at project outset in consultation with the Principal Contractor*

1.6 Legal requirements

1.6.1 The Principal Contractor shall, as a minimum, comply with:

- 1.6.1.1 The Occupational Health and Safety Act 85/1993 and the Construction Regulations, the latest up-to-date copies thereof shall be available on site at all times
- 1.6.1.2 Hazardous Substances Act, Act No 85 of 1973
- 1.6.1.3 National Road Traffic Act, Act No 93 of 1996
- 1.6.1.4 Prevention of Environmental Pollution Ordinance 21 of 1981
- 1.6.1.5 Water Services Act, Act No 108 of 1997
- 1.6.1.6 Or any other Act passed in substitution of the abovementioned
- 1.6.1.7 All Contractors shall comply with the "Integration Labour Law Act" and regulations
- 1.6.1.8 All relevant Municipal bylaws and National Building Regulations

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

- 1.6.1.9 The Immigrations Act 2002 as amended and shall further ensure that no illegal aliens are employed on the construction site.
- 1.6.1.10 The Compensation for Occupational Injuries and Diseases Act (Act 130 of 1993).
 - 1.6.1.10.1 The Principal Contractor warrants his and all his workmen are fully covered in terms of the Compensation of Occupational Injuries and Diseases Act 130 of 1993 and such cover shall remain in force for the duration of the contractual relationship with the Client or whilst working on the Client's premises or premises under the Client's control.
 - 1.6.1.10.2 The Principal Contractor shall supply proof of such insurance cover to the Client with his / her tender submission.
 - 1.6.1.10.3 Proof of Good Standing will be maintained in the onsite Health & Safety file by means of a duplicate letter from the relevant insurer
 - 1.6.1.10.4 The Principal Contractor undertakes to ensure all Contractors appointed by him / her will be fully covered in terms of the Compensation of Occupational Injuries and Diseases Act 130 of 1993 and such cover shall remain in force for the duration of their contractual relationship with the Contractor
 - 1.6.1.10.5 The Principal Contractor shall ensure he / she has additional insurance cover which will adequately make provisions for any losses and / or his / her employee's acts and / or omissions whilst working on the Client's premises or on premises under the Client's control?
- 1.6.1.11 Relevant National and or Provincial Environmental Legislation as applicable to the project and scope of work.
- 1.6.1.12 Relevant Municipal bylaws and or other requirements which are applicable.
- 1.6.1.13 All other requirements as may be applicable from time to time.

1.7 Principal Contractor

The Principal Contractor carries prime accountability & responsibility for the health and safety of his/her employees & his/her contractors within his/her working area, as contemplated by Section 37(2) of the OHS Act. None of the additional safety requirements specified by the Client/Agent reduces the Principal Contractor's accountability and responsibility for the health and safety of his employees and Sub-contractor employees within his working area. The Principal Contractor remains an employer in their own right and consequently responsible for the implementation and management of all requirements as per the applicable legislations.

1.8 Principal Contractor and Contractor Supervision

A Principal Contractor must— Provide and demonstrate to the Client a suitable, sufficiently documented and coherent site specific Health and Safety Plan, based on the Client's documented Health and Safety Specifications contemplated in regulation 5(1)(b), which plan must be applied from the date of commencement of and for the duration of the construction work and which must be reviewed and updated by the Principal Contractor as work progresses;

Open and keep on site a health and safety file, which must include all documentation required in terms of the Act and these Regulations, which must be made available on request to an inspector, the Client, the Client's Agent or a Contractor; and

Client: South African National Space Agency Project: Matjiesfontein Ground Station	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
---	--	---

- On appointing any other Contractor, in order to ensure compliance with the provisions of the Act—
- Provide Contractors who are tendering to perform construction work for the Principal Contractor, with the relevant sections of the Health and Safety Specifications contemplated in regulation 5(1)(b) pertaining to the construction work which has to be performed;
- Ensure that potential Contractors submitting tenders have made sufficient provision for health and safety measures during the construction process;
- Ensure that no Contractor is appointed to perform construction work unless the Principal Contractor is reasonably satisfied that the Contractor that he or she intends to appoint, has the necessary competencies and resources to perform the construction work safely;
- Ensure prior to work commencing on the site that every Contractor is registered and in good standing with the Compensation Fund or with a licensed compensation insurer as contemplated in the Compensation for Occupational Injuries and Diseases Act, 1993;
- Appoint each Contractor in writing for the part of the project on the construction site under CR 5(1)(k) or CR 7(1)(c)(v);
- Take reasonable steps to ensure that each Contractor's health and safety plan contemplated in sub-regulation (2)(a) is implemented and maintained on the construction site;
- Ensure that the periodic site audits and document verification are conducted at intervals mutually agreed upon between the Principal Contractor and any Contractor, but at least once every 30 days;
- Stop any Contractor from executing construction work which is not in accordance with the Client's Health and Safety Specification and the Principal Contractor's Health and Safety Plan for the site or which poses a threat to the health and safety of persons
- Where changes are brought about to the design and construction, make available sufficient health and safety information and appropriate resources to the Contractor to execute the work safely; and
- Discuss and negotiate with the Contractor the contents of the Health and Safety Plan contemplated in sub-regulation (2)(a), and must thereafter finally approve that plan for implementation;
- Ensure that a copy of his or her health and safety plan contemplated in paragraph (a), as well as the Contractor's Health and Safety Plan contemplated in sub-regulation (2)(a), is available on request to an employee, an inspector, a Contractor, the Client or the Client's Agent;
- Hand over a consolidated health and safety file to the Client upon completion of the construction work and must, in addition to the documentation referred to in sub-regulation(2)(b), include a record of all drawings, designs, materials used and other similar information concerning the completed structure;
- In addition to the documentation required in the health and safety file in terms of paragraph (c)(v) and sub-regulation (2)(b), include and make available a comprehensive and updated list of all the Contractors on site accountable to the Principal Contractor, the agreements between the parties and the type of work being done; and
- Ensure that all his or her employees have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner in the form of Annexure 3.

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

- Any specific task which poses a high risk such as ropes access, mobile plant e.g.: cranes, cherry pickers, scissor lifts, scaffold erecting, excavation, lifting operations etc, provide competencies and are retained in the health and safety file for the duration of the project.

The appointed Contractor must prior to performing any construction work —

- Provide and demonstrate to the Principal Contractor a suitable and sufficiently documented health and safety plan, based on the relevant sections of the Client's Health and Safety Specification contemplated in regulation 5(1)(b) and provided by the Principal Contractor in terms of sub-regulation (1)(a), which plan must be applied from the date of commencement of and for the duration of the construction work and which must be reviewed and updated by the Contractor as work progresses;
- Open and keep on site a health and safety file, which must include all documentation required in terms of the Act and these Regulations, and which must be made available on request to an inspector, the Client, the Client's Agent or the Principal Contractor;
- Before appointing another Contractor to perform construction work, be reasonably satisfied that the Contractor that he or she intends to appoint has the necessary competencies and resources to perform the construction work safely;
- Co-operate with the Principal Contractor as far as is necessary to enable each of them to comply with the provisions of the Act; and
- As far as is reasonably practicable, promptly provide the Principal Contractor with any information which might affect the health and safety of any person at work carrying out construction work on the site, any person who might be affected by the work of such a person at work, or which might justify a review of the Health and Safety Plan.
- (3) Where a Contractor appoints another Contractor to perform construction work, the duties determined in sub-regulation (1)(b) to (g) that apply to the Principal Contractor apply to the Contractor as if he or she were the Principal Contractor.
- A Contractor must take reasonable steps to ensure co-operation between all Contractors appointed by the Principal Contractor to enable each of those Contractors to comply with these Regulations.
- No Contractor may allow or permit any employee or person to enter any site, unless that employee or person has undergone health and safety induction training pertaining to the hazards prevalent on the site at the time of entry.
- A Contractor must ensure that all visitors to a construction site undergo health and safety induction pertaining to the hazards prevalent on the site and must ensure that such visitors have the necessary personal protective equipment.
- A Contractor must at all times keep on his or her construction site records of the health and safety induction training contemplated in sub-regulation (6) and such records must be made available on request to an inspector, the Client, the Client's Agent or the Principal Contractor;
- A Contractor must ensure that all his or her employees have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner in the form of Annexure 3.
- Description of the objective / scope of work
- Sequence of work / safe work method statements
- Hazard identification & risk assessment (prior to commencement of work)
- Precautionary / preventative measures that are to be taken.
- Identification of sensitive features that may be impacted upon by the project.

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

Management and Supervision for this Project

A Principal Contractor must in writing appoint one full-time competent person as the construction manager with the duty of managing all the construction work on a single site, including the duty of ensuring occupational health and safety compliance, and in the absence of the construction manager an alternate must be appointed by the Principal Contractor.

(2) A Principal Contractor must upon having considered the size of the project, in writing appoint one or more assistant construction managers for different sections thereof: Provided that the designation of any such person does not relieve the construction manager of any personal accountability for failing in his or her management duties in terms of this regulation.

(3) Where the construction manager has not appointed assistant construction managers as contemplated in sub-regulation (2), or, in the opinion of an inspector, a sufficient number of such assistant construction managers have not been appointed, that inspector must direct the construction manager in writing to appoint the number of assistant construction managers indicated by the inspector, and those assistant construction managers must be regarded as having been appointed under sub-regulation (2).

(4) No construction manager appointed under sub-regulation (1) may manage any construction work on or in any construction site other than the site in respect of which he or she has been appointed.

(5) A Contractor must, after consultation with the Client and having considered the size of the project, the degree of danger likely to be encountered or the accumulation of hazards or risks on the site, appoint a full-time or part-time construction health and safety officer in writing to assist in the control of all health and safety related aspects on the site: Provided that, where the question arises as to whether a construction health and safety officer is necessary, the decision of an inspector is decisive.

(6) No Contractor may appoint a construction health and safety officer to assist in the control of health and safety related aspects on the site unless he or she is reasonably satisfied that the construction health and safety officer that he or she intends to appoint is registered with a statutory body approved by the Chief Inspector and has necessary competencies and resources to assist the Contractor

(7) A construction manager must in writing appoint construction supervisors responsible for construction activities and ensuring occupational health and safety compliance on the construction site.

(8) A Contractor must, upon having considered the size of the project, in writing appoint one or more competent employees for different sections thereof to assist the construction supervisor contemplated in sub-regulation (7), and every such employee has, to the extent clearly defined by the Contractor in the letter of appointment, the same duties as the construction supervisor: Provided that the designation of any such employee does not relieve the construction supervisor of any personal accountability for failing in his or her supervisory duties in terms of this regulation.

(9) Where the Contractor has not appointed an employee as contemplated in sub-regulation (8), or, in the opinion of an inspector, a sufficient number of such employees have not been appointed, that inspector must instruct the employer to appoint the number of employees indicated by the inspector, and those employees must be regarded as having been appointed under sub-regulation (8).

(10) No construction supervisor appointed under sub-regulation (7) may supervise any construction work on or in any construction site other than the site in respect of which he or she has been appointed: Provided that if a sufficient number of competent employees have been appropriately designated under sub-regulation (7) on all the relevant construction sites, the appointed construction supervisor may supervise more than one site.

Client: South African National Space Agency Project: Matjiesfontein Ground Station	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
---	--	---

Principal Contractor and Contractor Safety Officer

The contractor shall appoint a full-time Health and Safety Officer for the duration of the contracted work.

The Contractor's Health and Safety Officer shall be in possession of a valid registration certificate with the Regulatory Body –South African Council for the Project and Construction Management Professions (SACPCMP) as a CHSO–, hold a Diploma/Degree/Btech in Safety Management/Environmental Health and have 5 years' experience as a construction Health & Safety Officer. CV & formal qualification certificates and a valid SACPCMP certificate should be provided and copies to be retained thereof in the Contractor's health and safety file and made available on request by the client.

The Contractor's Health and Safety Officer shall assist and support the Contractor's Construction Manager as well as Construction Supervisor to ensure that the Contractors Health and Safety responsibilities are fulfilled and compliance to the Health and Safety specifications and OHS Act 85 Of 1993 and regulations.

Principal Contractor / Contractor - Competency

The Principal Contractor must demonstrate that it has a suitable and sufficiently documented OHS Plan and that its Contractors have the necessary competencies and resources to perform the construction work safely.

The Principal Contractor and Contractors must therefore submit the following documentation for verification by the Client and Principal Contractor respectively:

- Organogram (Site Specific)
- Registration with the Compensation Commissioner or FEM;
- Proof of management training on the Occupational Health & Safety Act and other related training;
- Any previous convictions under the OHS-Act;
- Your Company's previous two years injury claims as reported to your workman's compensation insurer;

The Principal Contractor and all Trade Contractors' competent persons for the various risk management portfolios will provide proof of competencies, attached to the appointment letter. A short CV is a good example of proof of competency.

The Principal Contractor as well as subcontractors shall ensure that all their appointees are made aware of their accountabilities & responsibilities in terms of their appointment, and to advise and assist these appointees in the execution of their duties.

Costs for OHS -Compliance (CR 7) All parties bidding to work on this construction project must ensure that they have made adequate provision for the cost of complying with these specifications as well as with the OHS-Act 1993 and incorporated Regulations as a minimum requirement in their tender documentation. It must also be taken into consideration that time is money. That implies that sufficient time must be allowed for the implementation of the minimum OHS standards. No additional claims will be entertained at a later stage if a compliance requirement was prescribed in the OHS-Act, 1993 and incorporated regulations or this specifications document. Refer to OHS Bill of Quantities template herewith for a breakdown of possible safety costs. This is to be submitted with tender.

1.9 Contractors and their contractors Written Agreements

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

- 1.9.1 All contractors and service providers are employers in their own right and must therefore comply with all relevant legislation.
- 1.9.2 The Principal Contractor shall ensure all Contractors under their control comply with this Health & Safety Specification, the Occupational Health & Safety Act 85 / 1993 and associated Regulations and all other relevant legislation relating to their activities directly or indirectly.
- 1.9.3 **A letter of approval in terms of Construction Regulation 7(1)c MUST be submitted to the Client prior to the sub-contractor coming onto site.**
- 1.9.4 The Contractor, when appointing other Contractors as 'Sub-contractors', shall *mutatis mutandis* ensure compliance.
- 1.9.5 The Principal Contractor shall ensure written agreements are in place which shall ensure both parties comply with terms and conditions of all relevant legislation.
- 1.9.6 The written agreement will include the requirements of Section 37(2) of the Occupational Health & Safety Act 85 / 1993 and the Construction Regulations 7(1)(c)(v) contained within the Occupational Health & Safety Act 85 / 1993; ensuring both parties fully understand their obligations under the terms of the legislation.
- 1.9.7 The agreements will be in writing and signed by both the Competent person/s of the organisations or their appointed representatives.
- 1.9.8 The agreements will be kept on record at the location where the work is to be carried out.
- 1.9.9 No work may commence until a written agreement and associated documentation is in place.
- 1.9.10 On completion of the project copies of all agreements will be included in a consolidated Health and Safety File to be submitted to the client.
- 1.9.11 Originals will be returned to the Offices of The Principal Contractor, and stored for a period as stipulated by contractual conditions.

1.10 General Occupational Health & Safety provisions

- 1.10.1 As required by Construction Regulation 7(1)(b) & 7(2)(b), the Principal Contractor and other Contractors shall each keep an OH&S file on site.
- 1.10.2 The following list is not exhaustive and shall only be used as a guide to ensure all applicable documentation is available in the site OH&S file:
 - Notification of construction work (Construction Regulation 4)
 - Proof of registration and good standing with COLD Insurer (Construction Regulation 5(1)(j))
 - OH&S plan and Fall Protection/Rescue Plan agreed with the Client including the underpinning risk assessment/s and safe work method statements (Construction regulation 7(1)(a))
 - Copies of OH&S committee and other relevant minutes
 - Approved Designs/drawings (Construction Regulation 6(1) & 6(2))
 - A list of Contractors including copies of the agreements between the parties and the scope of work being done by each Contractor (Construction Regulation 7(1)(f))
 - Appointment/designation forms together with all relevant competencies.
 - Compliance registers or inspection checklists.
 - SDS's for relevant hazardous chemical substances.
 - Hand over certificate after any scaffold declared safe for use (according to the SANS 10085 standards).

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

- Pull or load test certificates of anchor points.
- Hot works permit (Client and PC agreement).
- Pavement Permit (as required).
- Detailed Load chart for lifting operations.

2. Minimum Administrative Requirements

2.1 Notification of Construction Work (CR 4)/Construction Work Permit (CR 3)

- 2.1.1 The Principal Contractor shall, where the contract meets the requirements, notify the Department of Labour in the area in which this work will be conducted, of the intention to carry out construction work.
- 2.1.2 A copy of said Notification (Annexure 2 in the Construction Regulations) shall be made available in the on-site Health & Safety file together with proof of transmission and receipt to the local Department of Labour.
- 2.1.3 A copy shall be forwarded to the Client for record keeping purposes.
- 2.1.4 Where the Client has provided for a Construction Work Permit, a copy must be retained in the Principal Contractor's site safety file and the number as issued by the DoEL must be displayed conspicuously at the main entrance to the site for which the number is assigned.

2.2 Occupational Health and Safety Policy

- 2.2.1 The Principal Contractor and all Sub Contractors shall submit a Health and Safety Policy signed and dated by their Chief Executive Officer.
- 2.2.2 The Policy must outline objectives and how they will be achieved and implemented by the Company / Contractor.
- 2.2.3 A copy of such policy must be included in the Site Safety Plan and the Site Health and Safety File.
- 2.2.4 This Policy must be communicated with the staff and is to be signed by everyone as proof of training and retained in safety file on site.

2.3 Alcohol and other Drugs Policy

- 2.3.1 The Principal Contractor and all Sub Contractors shall submit a Policy signed by their Chief Executive Officer outlining the stance on alcohol and other drugs.
- 2.3.2 No alcohol and / or any other drugs will be allowed on site. No person may be under the influence of alcohol or any other drugs while on the construction site.
- 2.3.3 Any person on prescription drugs must inform his/her superior, who shall in turn report this to the Principal Contractor forthwith. Any person suffering from any illness/condition which may have a negative effect on his/her safety performance must report this to his/her superior, who shall in turn report, this to the Principal Contractor forthwith.
- 2.3.4 Any person suspected of being under the influence of alcohol or other drugs must immediately be removed from site. A full disciplinary procedure may be conducted by the Principal Contractor or Sub Contractor in terms of the necessary Labour Legislation and a copy of the disciplinary action must be forwarded to the Principal Contractor for his records.

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

- 2.3.5 This Policy must be communicated with the staff and is to be signed by everyone as proof of training and retained in safety file on site.

2.4 HIV / AIDS Policy

- 2.4.1 The Principal Contractor and all Contractors are to outline their Policy as regards the understanding and support offered to all employees who may be affected by HIV / AIDS.
- 2.4.2 This Policy is to be signed by their Chief Executive Officer.
- 2.4.3 This Policy must be communicated with the staff and is to be signed by everyone as proof of training and retained in safety file on site.

2.5 Assignment of Contractor's Responsible Persons to Supervise Health and Safety on Site

- 2.5.1 The Principal Contractor shall appoint designated competent employees and/or other competent persons as required by the Act and Regulations to assist in the management of Health, Safety and Environmental control.
- 2.5.2 These appointments are to form part of the onsite Health & Safety file.
- 2.5.3 Any appointments shall be in writing and the responsibilities clearly stated. This information shall be communicated to and agreed to with the appointees. All changes shall also be communicated to the Client or the duly appointed Agent.
- 2.5.4 In the absence of a mandatory appointment, appointments will be made to ensure Health, Safety and Environmental control is effectively maintained.
- 2.5.5 Contractor's competent persons for the various Health, Safety and Environmental management portfolios shall fulfil the criteria as stipulated under the definition of "competent person" as outlined in the Construction Regulations 2014.
- 2.5.6 Proof of competency as required by the Act and Regulations shall be included in the Principal Contractor's H&S file.
- 2.5.7 The Principal Contractor shall be responsible for ensuring all relevant training is undertaken. Only accredited Service Providers shall be used for OH&S training.
- 2.5.8 In the event of there being no requirement in terms of the definition of "competency" the employer will issue a certificate / letter confirming the appointee is competent based on knowledge, training and experience specific to the work or task being performed.
- 2.5.9 It is acknowledged the Contractor may need to allocate more than one appointment to certain staff members. This is acceptable only if Safety, Health and Environmental Standards would not be negatively affected.
- 2.5.10 The Principal Contractor shall ensure his and other Contractors' appointed personnel are competent and all training required to do the work safely and without risk to health, has been completed before work commences. The Principal Contractor shall ensure follow-up and refresher training is conducted as the contract work progresses and the work situation changes.
- 2.5.11 The Principal Contractor shall provide an organogram, outlining the Health and Safety Site Management Structure including the relevant appointments / competent persons.
- 2.5.12 In cases where appointments have not been made, the organogram shall reflect the intended positions. The organogram shall be updated when there are any changes in the Site

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

Management Structure.

This organogram shall form part of the onsite Health & Safety file.

- 2.5.13 The Principal Contractor shall, furthermore, provide an organogram of all Contractors who have been appointed or intends to appoint and keep this list updated and prominently displayed on site.

2.6 Health and Safety Representative(s)

- 2.6.1 The Principal Contractor and all Contractors shall ensure Health and Safety Representative(s) are appointed under consultation, and trained to conduct their functions.
- 2.6.2 Legislative requirements as applicable to the nomination and election of Health and Safety Representative(s) shall apply.
- 2.6.3 The appointed Health and Safety Representative must have completed a recognized Health and Safety Representative course.
- 2.6.4 The appointment must be formalised in writing.
- 2.6.5 The Health and Safety Representative shall carry out regular inspections, keep records and report all findings to the Responsible Person forthwith and at Health & Safety Committee meetings.

2.7 Health and Safety Committees (Where more than one Health and Safety Representative is Appointed)

- 2.7.1 Legislative requirements as applicable to the Health and Safety Committee (s) shall apply.
- 2.7.2 The Principal Contractor shall ensure project Health & Safety Committee meetings are held monthly and minutes are kept on record.
- 2.7.3 Meetings must be organised and chaired by the Principal Contractor's Responsible Person.
- 2.7.4 All Contractors' Responsible Persons and Health & Safety Representatives shall attend the monthly Health & Safety Committee meetings.
- 2.7.5 Other Contractors shall also have their own internal Health & Safety Committee in accordance with the Occupational Health & Safety Act 85 / 1993 and minutes of their meetings shall be forwarded to the Principal Contractor on a monthly basis.
- 2.7.6 These minutes will be made available for review by the Client or his/her duly appointed representative.
- 2.7.7 Contractors may form part of the Principal Contractors Health & Safety Committee.
- 2.7.8 Minutes of each meeting are to reflect such.

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

2.8 First Aid Boxes and First Aid Equipment – General Safety Regulations 3

- 2.8.1 The Principal Contractor and all Sub Contractors shall where applicable, appoint in writing a competent person as a First Aider(s).
- 2.8.2 The appointed First Aider(s) will have undergone training with a recognised first aid training institution as specified in the General Safety Regulations 3 of the Occupational Health & Safety Act 85 / 1993.
- 2.8.3 A copy of the valid competency certificates are to be maintained on the site Health & Safety file.
- 2.8.4 The Principal Contractor shall provide an on-site First Aid Station with first aid facilities, including first aid boxes which are to always remain maintained – first aid signage to be displayed at designated area/established site office or store.
- 2.8.5 Over and above GSR 3, all Contractors shall supply their own first aid box, and shall have a trained, certified first aider on site at all times. Where Contractors are not able to comply, they can enter into a written agreement with the Principal Contractor, allowing the Contractors to use the PC's facilities and trained first aiders.
- 2.8.6 In the event of hazardous chemical substances being present on site, first aiders shall be trained to address any incidents of accidental exposure and their first aid kits stocked accordingly.
- 2.8.7 In the event of any work at height taking place on-site, first aiders shall be trained to address any resultant incidents or injuries, and their first aid kits must be stocked accordingly and recorded on a first aid kit register that will be maintained in the site health and safety file.

2.9 Accident / Incident Reporting and Investigation – Section 24

Injuries are to be categorized into first aid; medical; lost time injury (LTI); and fatal injuries. When reporting injuries to the Client, these categories shall be used.

The Principal Contractor must investigate all injuries, with an annexure 1 report being completed and filed. All Contractors must report on the 4 categories of injuries to the Principal Contractor at least monthly. Contractors must investigate injuries and incidents involving their employees and forward a copy of the annexure 1 investigation report to the Principal Contractor forthwith. The Principal Contractor must report all injuries to the Client in the form of an injury report, at least monthly. The contractor must submit his incident reporting and investigation protocols for review by the client.

All incidents reportable in terms of the provisions of Section 24 of the OHS Act, 1993 must be reported to the local Dept. of Labour in the prescribed manner within 14 days. (Note: No reports will be made to third parties without the client being notified of such intentions)

All Contractors must immediately report all incidents where an employee is injured on duty to the extent that he/she

- dies
- becomes unconscious

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

- loses a limb or part of a limb
- is injured or becomes ill to such a degree that he/she is likely either to die or to suffer a permanent physical defect or likely to be unable for a period of at least 14 days either to work or continue with the activity for which he/she was usually employed

Or where:

- an environmental incident occurred
- a security incident occurred
- a major incident occurred
- the health or safety of any person was endangered
- where a dangerous substance was spilled
- the uncontrolled release of any substance under pressure took place
- machinery or any part of machinery fractured or failed resulting in flying, falling or uncontrolled moving objects
- machinery ran out of control
- exposed to ionising radiation
- inhalation of airborne solids hazardous to health

The Contractor is required to within 12 hours of an incident/accident onsite provide the client with a “flash report” detailing a summary of what is known to have occurred and subsequently copies of all internal and external accident/incident investigation reports including the reports contemplated above within 7 days of the incident occurring.

2.10 Hazard Identification and Risk Assessment

- 2.10.1 Every Principal Contractor performing construction work shall, before the commencement of any construction work or work associated with the aforesaid construction work and during such work, cause a risk assessment to be performed by a competent person, appointed in writing, and the risk assessment shall form part of the OH&S plan and be implemented and maintained.
- 2.10.2 All risks identified by the Principal Contractor will be transferred into the necessary Risk Assessment profile.
- 2.10.3 The risk assessment shall include, at least:
- the identification of the risks and hazards to which persons may be exposed to;
 - an analysis and evaluation of the risks and hazards identified based on a documented method;
 - A monitor and review plan
 - CR8.1, CR8.7, SHE Rep, CR9.1 and SHE Representative all to form part of the risk assessment team
 - The above mentioned appointees to sign and date the risk assessment
 - a documented plan and applicable safe work procedures to mitigate, reduce or control the risks and hazards that have been identified;
 - a monitoring plan, and
 - a review plan
- 2.10.4 Based on the risk assessment, the Principal Contractor shall develop a set of site-specific OH&S rules which shall be applied to regulate the OH&S aspects of the construction project.
- 2.10.5 The risk assessment, together with the site-specific OH&S rules shall be submitted to the Client before construction on site commences.

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

- 2.10.6 The risk assessment shall further include the standard working procedures and the applicable method statements based on the risk assessments.
- 2.10.7 All variations to the scope of work shall similarly be subjected to a risk assessment process.
- 2.10.8 The Principal Contractor shall ensure all their employees are informed, instructed and trained by a competent person regarding any hazards, risks and related Safe Work Procedures prior to any work commencing and thereafter at regular intervals as the risks change and as new risks develop.
- 2.10.9 Proof of training must be maintained on the relevant Health & Safety file.
- 2.10.10 The Principal Contractor shall be responsible for ensuring all persons who could negatively be affected by its operations are informed and trained according to the hazards and risks and are conversant with the safe working procedures, control measures and other related rules (tool box talk strategy to be implemented).
- 2.10.11 **Daily Safety Task Instructions (DSTI) / continuous Risk Assessments will be conducted by the Principal Contractor and records shall be maintained as to training conducted.**
- 2.10.12 Once all personnel have been made aware of the Risks involved and have received training on the various Risk Assessments and Written Safe Working procedures the employer will conduct regular Planned Job Observation.
- 2.10.13 The purpose of the Planned Job Observation is to ensure employees perform work according to the Work Instructions / Written Safe Working procedures.
- 2.10.14 Records of these Planned Task Observations are to be maintained on the site Health & Safety file.
- 2.10.15 The Principal Contractor shall ensure all Contractors engaged cause a hazard identification to be performed by a competent person before commencement of construction work, and the assessed risks shall form part of the Contractors construction phase Health & Safety Plan submitted for approval by the Principal Contractor or his/her duly appointed representative.
- 2.10.16 The Risk Assessment must include:
- a list of hazards identified as well as potentially hazardous tasks;
 - a documented risk assessment based on the list of hazards and tasks;
 - a set of safe working procedures to eliminate, reduce and/or control the risks assessed;
 - a monitoring and review procedure of the risk assessments as the risks change.
- 2.10.17 The Principal Contractor shall ensure all Contractor's employees are informed, instructed and trained by a competent person regarding any hazards, risks and related Safe Work Procedures prior to any work commencing and thereafter at regular intervals as the risks change and as new risks develop. Proof of training must be maintained on the relevant Health & Safety file.

The Client Agent has Identified the follow Hazards for this Project must be incorporated in the Principal Contractor's site-specific Risk Assessments;

- Excavations
- Wind and dust. (Site is in a built-up area)
- Working in and around the bulk excavation
- Formwork for concrete columns, floors, lift shafts, stair wells, bases, ring beams and other
- Support work for formwork
- Stripping of formwork
- Working with, around and above other Contractors
- Working on and from scaffolding and ladders

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

- Working at Heights
- Edge Barricading (Deck Edges and openings)
- Roof work – structural and roof covering. Placement of roof sheeting.
- Tower crane erection and dismantling (Where applicable)
- Lifting operations including mobile plant use, lifting tackle and other fixtures
- Pouring concrete by means of tower or mobile crane
- Electrical installation (temporary and permanent)
- Interface with the public – roads and pavements
- Portable electrical tools and extension leads
- Explosive actuated fastening devices
- Power tools (jackhammers, core drilling, high pressure air and water jets, etc.)
- Operating batch plants
- Hazardous Chemical Agents handled
- Radiation – ionising & non-ionising
- Fire Hazards
- Confined space
- Physical Hazards (Sharps, etc.)
- Ergonomic factors – manual handling of bulk materials or loads

2.11 Permits

2.11.1 The Principal Contractor shall draft and implement where required; permits which may include the following:

- Work for which a fall prevention plan is required – working at elevated positions
- Permits and wayleaves
- Permit to work night shift
- Demolition Permit
- Excavation – (Geotechnical report issued by competent person where required)
- Confined space entry
- Hot work permits

2.11.2 No hot work may be undertaken unless authorised by the Principal Contractor's Construction Manager (CR 8(1) appointed person) or as may be the case the Client or Landlord of the building in-which the work is being undertaken. Hot work will be seen to include arc welding and cutting, gas welding and cutting, grinding / cutting where sparks may result, use of handy gas, any other operation resulting in an open flame or sparking.

The Principal Contractor will ensure where permits are required, they are obtained and adhered to.

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

2.12 Health and Safety Training

2.12.1 Induction

- 2.12.1.1 The Principal Contractor shall ensure all site personnel undergo risk-specific Health & Safety induction training prior to commencing work on site.
- 2.12.1.2 A record of attendance shall be kept in the site Health & Safety file.
- 2.12.1.3 A suitable venue must be provided – as far as is reasonable possible - to conduct this training.
- 2.12.1.4 All employees will be in possession of proof of having received induction training.
- 2.12.1.5 All visitors to the site will be subject to site-specific induction training highlighting items such as steps to follow in the event of emergency, restricted areas, use of PPE, etc.
- 2.12.1.6 Proof of such training will be made available.
- 2.12.1.7 Before any commencement of work, all employees, including contracting employees, shall attend mandatory Client Safety, Health and Environmental Induction, prior to Site access.

2.12.2 Awareness

- 2.12.2.1 The Principal Contractor shall ensure, on site, toolbox talks take place at least once per week or more frequently than once per week – risk dependent.
- 2.12.2.2 These talks should deal with risks relevant to the construction work at hand.
- 2.12.2.3 A record of attendance shall be maintained in the site Health & Safety file.
- 2.12.2.4 All Contractors will comply with this minimum requirement.
- 2.12.2.5 At least 2 (two) Toolbox talks shall be on an environmental related issue.
- 2.12.2.6 The Principal Contractor shall conduct toolbox talks upon request by the Client/Client Agent and the proof thereof retained in site safety file.

2.13 Emergency Procedures – ERW 9 / Construction Regulations 29

- 2.13.1 The Principal Contractor shall submit a detailed Emergency Procedure for approval by the Client or his/her duly appointed representative.
- 2.13.2 The procedure shall detail the response plan including the following key elements:
 - List of key competent personnel;
 - Details of emergency services;
 - Method to be made use of to indicate to personnel on site an emergency evacuation is required.
 - This may take the form of a hand-held emergency air horn or a suitable whistle.
 - All personnel on site are to be made aware of the method which may be used to indicate an emergency evacuation.

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

- Actions or steps to be taken in the event of the specific types of emergencies;
 - The nearest safe assembly point;
 - Information on hazardous material/situations.
- 2.13.3 Emergency procedure(s) shall include, but shall not be limited to, fire, spills, accidents to employees, use of hazardous substances, major incidents/accidents, etc.
- 2.13.4 The Principal Contractor shall advise the Client or his/her duly appointed representative in writing forthwith, of any emergencies, together with a record of action taken.
- 2.13.5 An Information contact list of all emergency services (Fire Department, Ambulance, Police, Medical and Hospital, etc.) must be maintained and available to site personnel.
- 2.13.6 A full site emergency evacuation exercise will be required to be conducted no less than within 1 week after site establishment.
- 2.13.7 Further emergency evacuation exercises will be required to be conducted at no less than 3 months intervals as circumstances dictate.
- 2.13.8 Further emergency evacuation exercises may be required to be conducted as indicated by the Client or his/her duly appointed representative.
- 2.13.9 This exercise will be to indicate the state of readiness of personnel on site to react to an emergency situation which may develop.
- 2.13.10 Records of such exercise will be maintained on the site Health & Safety file.
- 2.13.11 Where the project is with a client's buildings, office park, office premises, warehouse or any other area which can be reasonable not viewed as a construction project, it will be the responsibility of the Principal Contractor to ensure all of his / her employees and or contractors are fully informed of the above-mentioned premises.
- 2.13.12 The Principal Contractor shall ensure all such correspondence and or records regarding this Emergency Evacuation Plan/s within the above-mentioned premises is maintained the site Health & Safety file.

2.14 Health & Safety Audits, Monitoring and Reporting – Construction Regulations 5(1)(o)

- 2.14.1 The Client or his/her duly appointed representative shall conduct Health & Safety compliance audits - on an *ad hoc* basis as may be required.
- 2.14.2 The purpose of the audit will be to identify the risk exposures incidental to the building operations and to evaluate progress made with regards to the implementation of previously suggested risk improvement recommendations; to identify risk exposures (both real and anticipated) and to offer additional suggestions for risk improvements where considered applicable.
- 2.14.3 The audit will include a review of the current risk control related documentation and records in addition to an inspection of the respective operation, services and utilities.
- 2.14.4 The Principal Contractor will be required to conduct audits on all Sub Contractors appointed by them.
- 2.14.5 Detailed reports of the audit findings and results shall be reported on at all levels of project management meetings / forums.
- 2.14.6 Copies of the Client or his/her duly appointed representative audit reports shall be maintained in the Principal Contractors Health & Safety File.
- 2.14.7 All contractor audit reports will be acknowledged by the competent person/s and shall be maintained on site.

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

2.14.8 Contractors will audit any other contractors appointed and keep records of these audits in their Health & Safety files, which will be available on request.

2.15 Site Safety File (General Record Keeping)

2.15.1 The Principal Contractor and all Sub Contractors shall keep and maintain Health and Safety records to demonstrate compliance with this Specification, the Occupational Health and Safety Act 85 of 1993 and with the Construction Regulations 2014.

2.15.2 The Principal Contractor shall ensure all records of incidents / accidents, training, inspections, audits, etc. are maintained in a site Health & Safety file held in the site office.

2.15.3 The contents of the **Site Safety File** can include:

- Scope and summary of the project as well as any scope changes.
- CR 4(1) - Notification of Construction Work to DoEL / Copy of Work Permit
- Proof of COIDA registration (Letter of Good Standing)
- Contractor Health and Safety Policy statement signed by management.
- Mandatory Agreement – OH&S Act 37.2 (Between Employer and Principal Contractor)
- Signed Client Health and Safety specification.
- Latest copy of the OHS Act and Regulations.
- Company Project Specific Organogram depicting Health and Safety Responsibilities, including subcontractors.
- Employee list including copy of IDs and valid medicals.
- Project specific Health and Safety Management Plan
- Relevant OH&S Legal appointments which includes duties and responsibilities as well as
- competencies (training certificates)
- Copies of minutes of meetings - OH&S committee and other relevant OH&S meeting minutes
- Designs/drawings (Construction Regulation 7(1)e)
- Site specific Fall Protection/Rescue Plan (if applicable)
- Risk Assessments.
- Contractor Induction material.
- Waste management Plan.
- Emergency preparedness (first aid, firefighting, emergency plan, etc.)
- Emergency Contact Telephone numbers.
- HIV Policy, Substance Misuse Policy, HSE Company Policy.
- List of hazardous chemical substances used on site.
- Material Safety Data Sheets of hazardous chemicals on site.
- List of plant & equipment to be used on site.
- Inspection Checklists/Registers of plant & equipment and emergency equipment.
- List of contractors including type of work.
- Contractor 37.2 Mandatory Agreements.
- CR 7(1)c.v - Contractor appointments.
- DSTI's - Pre-task Risk Assessments.
- Permits (Where applicable).

2.16 Inspection of Equipment and Tools

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

2.16.1 The following items shall be inspected, and appropriate records maintained as is necessary to this project which shall include, but shall not be limited to the following:

- First Aid dressing registers
- Fire equipment
- Portable electrical equipment and battery operated equipment
- Stacking and storage inspections
- Explosive actuated fastening devices
- Materials hoist (where applicable)
- Pressure Vessels (e.g. Compressors, etc)
- Ladders
- Excavations
- Safety harnesses/ Fall Arrest/Preventative equipment
- Scaffold - static and mobile.
- Pneumatic tools
- Construction vehicles and mobile plant.
- Hand tools
- Generators
- Arc welding/ gas cylinders
- Housekeeping/ Welfare facilities

2.17 Personal Protective Equipment (PPE) and Clothing – General Safety Regulations 2

- 2.17.1 The Principal Contractor shall ensure all personnel required to conduct work on site, are in possession and at all times wear hard hats, safety footwear (e.g.: steel toe boots) and overalls whilst on site.
- 2.17.2 The Principal Contractor and all Contractors shall make provision to ensure adequate quantities of approved PPE is readable available as required.
- 2.17.3 Where it is deemed necessary all persons on site may be expected to wear full reflective vests / bibs whilst on site.
- 2.17.4 A comprehensive, site specific PPE needs analysis for all tasks on site requiring PPE shall be available on site.
- 2.17.5 Employees are to be made conversant with the purpose of PPE and where and when it is required to be used by the employee. A comprehensive record where personnel on site have acknowledged receipt of and indicate they fully understand the need for all the PPE issued, must be maintained in the Site Health & Safety File.
- 2.17.6 The Principal Contractor shall clearly outline procedures to be taken when PPE or Clothing is:
- Lost or stolen
 - Worn out or damaged.
- 2.17.7 No person may enter the Site without the required Personal Protective Equipment:
- 2.17.8 Visitors to the Site are to be provided with the required PPE as required which may include but not limited to hard hats, earmuffs and eye protection.
- 2.17.9 Safety belts are not to be allowed on site due to their associated potential of injury to the user; only double lanyard safety harnesses are permitted.
- 2.17.10 Suitable eye protection must at all times be worn whilst personnel are performing grinding, chipping, chasing and other associated activities.
- 2.17.11 In the event onlookers may be exposed to possible flying objects as a result of work being performed, suitable screens must be erected.

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

- 2.17.12 Any person performing welding or brazing work must wear suitable eye protection, gloves (e.g.: leather gauntlets), aprons, and spats.
- 2.17.13 Suitable screens are to be provided to protect onlookers from the harmful exposure associated with such activities.
- 2.17.14 Where employees are required to work with corrosive liquids, suitable eye protection, gloves and acid resistant overalls and impermeable gloves must be provided.
- 2.17.15 Ear protection must be worn in designated noise zones (in excess of 85dB)
- 2.17.16 Suitable respirators must be provided to all employees and visitors required to be working in or entering areas where toxic vapours or dust concentrations could be present or the activities may result in toxic vapours being released. .
- 2.17.17 All staff working where a fall-risk exists; and where the Fall Protection Plan caters for such a requirement, such person/s will be provided with a double lanyard safety harness.
- 2.17.18 Any person refusing to wear Personal Protective Equipment must be instructed to wear such equipment and in the event of such person continuing to not wear such equipment he/she must be removed from the premises.
- 2.17.19 The Principal Contractor shall take the necessary steps in accordance with Hazardous Chemical Agent Regulation – Section 11: Personal protective equipment and facilities.

2.18 Rules of conduct

- 2.18.1 Principal Contractors, their contractors and all employees under their control, including any visitor brought onto site must adhere to the following Rules of conduct on site.
- 2.18.2 No person on site may:
 - Partake, possess or sell dependence producing drugs or alcoholic beverages on site.
 - Any employee or visitor whose action and / or demeanour display symptoms of possible narcosis or intoxication shall be removed from site.
 - Indulge in practical jokes, horseplay, fighting or gambling.
 - Destroy or tamper with safety devices, symbolic signs or wilfully and unnecessarily discharge fire extinguishers.
 - Bring onto site or have in your possession a firearm or lethal weapon.
 - Assault, intimidate or abuse any other person.
 - Operate construction equipment (vehicles or plant) without the necessary training and authorisation.
 - Commit any theft.
 - Display insubordination toward any supervisor, foreman or Manager in respect of carrying out of properly issued instructions or orders as regards Health and Safety.
 - Enter any area unless authorised to do so by the person in charge.
 - Negligently, carelessly or wilfully cause damage to property of others.
 - Refuse to give evidence or deliberately make false statements during investigations.
- 2.18.3 All contractor personnel MUST wear, at all times, ID tag or badge clearly visible for inspection at all times.

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

3. Physical Requirements

3.1 Hazards and Potential Situations

- 3.1.1 The Principal Contractor shall immediately notify other Sub Contractors as well as the Client of any hazardous or potentially hazardous situations which may arise during the performance of construction activities.
- 3.1.2 Should a hazardous situation require work stoppages the work must be stopped and corrective steps taken.

3.2 Occupational Health and Safety Signage – General Safety Regulations

2B

- 3.2.1 The Contractor shall provide adequate on-site OHS signage, including but not limited to 'no unauthorised entry', 'report to site office', 'site office', 'beware of overhead work', 'hard hat area', 'no-smoking', 'no open flames', 'Mandatory PPE', 'fire extinguisher', 'first aid', and any relevant signage of hazard concerned in a particular area.
- 3.2.2 Signage shall be posted up at all entrances to the site as well as on site in strategic locations e.g. access routes, stairways, entrances to structures and buildings, scaffolding, and other potential risk areas/operations.
- 3.2.3 Separate vehicle and pedestrian access routes shall be provided, maintained, controlled, and enforced as far as possible.
- 3.2.4 Signage to be SABS approved.

3.3 Plant and Machinery - Construction Regulation 23

- 3.3.1 Construction Plant
 - 3.3.1.1 "Construction Plant" includes all types of plant including but not limited to, cranes, piling rigs, excavators, road vehicles, and all lifting equipment.
 - 3.3.1.2 The Principal Contractor shall ensure all such plant complies with the requirements of the Occupational Health & Safety Act 85 / 1993 and associated Regulations.
 - 3.3.1.3 The Principal Contractor and all relevant Sub Contractors shall inspect and maintain records of inspections of the construction plant used on site.
 - 3.3.1.4 Only authorized / competent persons are to use machinery under proper supervision.
 - 3.3.1.5 Proof of medical testing as required is to be available for inspection by the Client or his/her duly appointed representative.
 - 3.3.1.6 Appropriate PPE and clothing must be provided and maintained in good condition at all times.
 - 3.3.1.7 All earth moving equipment and or mobile plant as required shall be operated in accordance with good safety practice so as to protect the safety of the operator and other workers or persons in the area.
 - 3.3.1.8 All earth moving equipment and or mobile plant as required shall be equipped with a reverse siren and rotating orange warning light.
- 3.3.2 Vehicles shall not enter site with:
 - Defective exhaust systems
 - Serious oil or fuel leaks
 - Unsafe bodywork or loads
 - Nonstandard equipment fitted.
 - Improperly seated passengers

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

- Any obvious mechanical defects.
- 3.3.3 Hired Plant and Machinery
- 3.3.3.1 The Principal Contractor shall ensure any hired plant and machinery used on site is safe for use.
- 3.3.3.2 The necessary requirements as stipulated by the Occupational Health & Safety Act 85 / 1993 and Associated Regulations shall apply to any hired plant and machinery.
- 3.3.3.3 The Principal Contractor shall ensure operators hired with machinery are deemed to be competent and valid copies of competency certificates and or medical certificates are made available on site in the Health & Safety file.
- 3.3.3.4 All Sub Contractors are to ensure compliance in this regard.

3.4 Bulk Earthworks and Haulage of Ground

3.4.1 PPE Requirements

- Hardhat
- Overall (non-supervisory)
- Steel cap Safety Boots / shoes
- Dust masks when required
- Dust goggles
- Reflective vest displaying company name
-

3.4.2 Traffic Control

- A points-man / controller shall be placed at all road intersections, with a Stop / Go sign to control traffic.
- Ripple strips shall be placed at all road intersections and railway crossings
- During night driving, flashing lights shall be placed at crossings and intersections
- Adherence to all traffic signs is of vital importance
- All haul trucks, LDV's and Excavation Equipment will be operated with headlights on at all times
- Following distances – 3 truck lengths must be kept between the trucks at all times
- Speed limit on site will be 10 Km per hour.
- Reversing of vehicles will only take place under the guidance of a spotter.
- Heavy vehicles / equipment will always have the right of way.
- A signal system will be in place between driver of haul truck and loader operator.
- To enter : 1 blow of hooter
- To stop : 2 blows of hooter
- To pull off : 3 blows of hooter
- No overtaking will take place on site by haul trucks.
- In case of a vehicle break-down on site road or haul road :
- The vehicle must be removed ASAP
- Warning signs must be placed (during Day time : Red Triangular)
- (During night time : flashing lights)
- Traffic controller in front and back of vehicle
- Pavement permit in place (where applicable)

3.4.3 Haul Roads

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

- Pedestrians will not be allowed to access the haul roads unnecessarily; however drivers of Plant and Haul Trucks must be alert for pedestrians.
- Haul roads will be wetted by water cart at regular intervals and if and when required.
- Any large rocks and / or spillages will be removed and cleaned from roads immediately.
- Ground pollution such as oil, diesel and hydraulic fluid will not be tolerated. If it occurs on the haul road or any other portion on the Site, the ground will be dug out, back filled and compacted.

3.4.4 Vehicles and Equipment

- All vehicles will be roadworthy at all times
- Pre-use check will be done against any approved checklist; all faulty items will be attended to.
- Brakes
- Lights
- Air / Hydraulic
- Oil leaks
- The vehicles / Equipment will be withdrawn from service for repairs.
- Brake testing will be done every shift before use (Brake testing method to be submitted)
- No major repairs or services will be carried out on Site.

3.4.2.1 Vehicles and mobile equipment will be supplied with: -

- Sufficient Fire Extinguisher
- Reflector's / Reflective tape:
- Sides
- Front
- Back
- Reversing alarm
- Sufficient lighting

3.4.5 Operators/Drivers

- A relief driver will be available for every 4 dump trucks and operators / drivers will be rotated should the need arise or physical exertion of the operator take place.
- A supervisor or appointed person will drive around from on-loading to off-loading points and ensure that drivers get out of the vehicle and walk around for 5 minutes and if required allow the person to relieve himself or to drink water or cold drink which will be available on the LDV.
- Random alcohol / drug test must be done and results to be submitted.
- All drivers / operators will be appointed under OHS Act Construction Regulation 21, in addition a competent person must also be appointed in writing to inspect the plant, refer to OHS Act Construction Regulation 21
- If driver / operator does not adhere to rules and regulations, his appointment will be cancelled and he will not be able to carry on his duty.
- No driver / operator will be appointed without proof of training, Driver's license and valid medical certificate.
- No training of drivers / operators on site.
- No passengers on Dump trucks, Loaders, TLB's or Excavators

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004
Project: Matjiesfontein Ground Station		Date: 01.04.2024 Rev.no. #3

- No eating or drinking allowed while operating Plant

3.5 Fire Extinguishers and Fire Fighting Equipment – Construction Regulations 29

- 3.5.1 The Principal Contractor and Contractors shall provide adequate, regularly serviced fire-fighting equipment located at strategic points on site, specific to the classes of fire likely to occur.
- 3.5.2 The appropriate notices and signs must be posted up as required to indicate location of fire-fighting equipment.
- 3.5.3 A full Fire risk survey must be conducted by a competent person; proof of survey must be kept in the Site Health & Safety File.
- 3.5.4 Contractors may not utilize fire protection equipment belonging to the Client without prior consent. This will not be applicable in the event of an emergency whereby the non-use of this equipment may result in damage or loss.
- 3.5.5 The Principal Contractor will ensure his/her employees are trained on the minimum required firefighting - PASS methodology and proof thereof kept in the safety file.

3.6 Edge Protection and Penetrations

- 3.6.1 The Principal Contractor will ensure all unprotected openings in floors, edges, slabs, hatchways and stairways are adequately guarded, fenced or barricaded or that similar means are used to safeguard any person from falling through such openings; Please note, barricade must be solid.
- 3.6.2 The Principal Contractor's risk assessment shall include items, e.g. protection of decking edges, finished floor slab edges, stairways, floor penetrations, lift shafts, and all other openings and areas where a person may fall.
- 3.6.3 **Barricading tape will not be deemed to be suitable** as a barricade and may only be used to indicate the possibility of an open edge or other.

3.7 Fall Protection / Scaffolding / Working at Heights – Construction Regulation 10 / 16 / General Safety Regulations 6 / SANS 10085/Rope Access.

- 3.7.1 Working at heights includes any work which takes place from an elevated position.
- 3.7.2 For the purpose of these Specifications elevated work shall be determined as any person having to work where a fall-risk exists.
- 3.7.3 All employees working in an elevated position as described shall be in the possession of a medical certificate of fitness as defined in the Construction Regulations 2014.
- 3.7.4 CR 10(1) - The Principal Contractor / Contractors appointed shall ensure a competent person has been designated and is responsible for the preparation of a Fall Protection Plan.
- 3.7.5 The Fall Protection Plan is to be implemented, amended where and when necessary and maintained as required.
- 3.7.6 Steps are to be taken in order to ensure the continued adherence to the Fall Protection Plan.
- 3.7.7 The Fall Protection Plan shall include:

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

- a risk assessment of all work carried out from a fall risk position and the procedures and methods used to address all the risks identified per location;
 - the processes for evaluation of the employees medical fitness necessary to work at a fall risk position and the records thereof;
 - the programme for the training of employees working from fall risk positions and records thereof; and
 - the procedure addressing the inspection, testing and maintenance of all fall protection equipment.
- 3.7.8 A rescue plan detailing the necessary procedure, personnel and suitable equipment required to affect a rescue of a person in the event of a fall incident to ensure that the rescue procedure is implemented immediately following the incident.
- 3.7.9 The Principal Contractor / Contractors will cause the necessary training to be conducted on this rescue plan and ensure competent persons are trained in the execution of this rescue plan. (rescuers are to be competent and trained in line with Unit Standard 229995).
- 3.7.10 Proof of training will be made available on the site Health & Safety file.
- 3.7.11 Contractors shall ensure the Construction Manager appointed under Construction Regulation 8(1) is in possession of the most recently updated version of the Fall Protection Plan.
- 3.7.12 The Principal Contractor / Contractors shall ensure:
- all unprotected openings in floors, edges, slabs, hatchways and stairways are adequately guarded, fenced or barricaded or similar means are used to safeguard any person from falling through such openings;
 - no person works in a fall risk position, unless such work is performed safely as contemplated in '3.7' above;
 - notices are conspicuously placed at all openings where the possibility exists a person might fall through such openings;
 - The Principal Contractor / Contractors shall ensure fall prevention and fall arrest equipment is:
 - suitable and of sufficient strength i.e. - from a reputable source, CE marked, or SABS approved - for the purpose or purposes for which it is being used having regard to the work being carried out and the load, including any person, it is intended to bear;
 - securely attached to a structure or plant and the structure or plant and the means of attachment thereto is suitable and of sufficient strength and stability for the purpose of safely supporting the equipment and any person who is liable to fall. *All anchor points will be certified by a person competent to do so and record of this maintained site safety file.*
- 3.7.13 Fall arrest equipment shall only be used where it is not reasonably practicable to use fall prevention equipment; and suitable and sufficient steps are taken to ensure, as far as is reasonably practicable, in the event of a fall by any person, the fall arrest equipment or the surrounding environment does not cause injury to the person.
- 3.7.14 Where roof work is being performed on a construction site, the contractor shall ensure in addition to the requirements set out as above, it is furthermore indicated in the Fall Protection Plan:
- the roof work has been properly planned;
 - the roof erectors are competent to carry out the work;
 - no employees are permitted to work on roofs during inclement weather conditions or if weather conditions are a hazard to the health and safety of the employees;

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

- prominent warning notices are to be placed where all covers to openings are not of sufficient strength to withstand any imposed loads and where fragile material exists;
 - areas mentioned as above are to be barricaded off to prevent persons from entering;
 - suitable and sufficient platforms, coverings or other similar means of support have been provided to be used in such a way; the weight of any person passing across or working on or from fragile material is supported; and
 - there is suitable and sufficient guard-rails or barriers and toe-boards or other similar means of protection to prevent, so far as is reasonably practicable, the fall of any person, material or equipment.
- All scaffolding shall be erected in accordance with "SANS 10085" meaning the South African National Standard Code of Practice entitled "The Design, Erection, Use and Inspection of Access Scaffolding". A copy of this document will be available on site at all times.
 - Scaffolding shall be erected by a competent person who has been appointed in this regard.
 - All scaffolding will be inspected on a weekly basis or immediately after inclement weather, and the results of these inspections shall be maintained in the site Health & Safety file.
 - Inspections will be conducted by a competent person who has been appointed in this regard.
 - All scaffolding will be indicated by signage whether it is classified as "safe to use" or "unsafe to use". Signage will be distinct so as not to cause confusion amongst the work force, especially if a language barrier or illiteracy may be present.
 - All staff is to be made aware of the signage and record of this training is to be maintained in the site Health & Safety file.

3.7.15 The Client or his/her duly appointed representative must approve the Fall Prevention / Protection Plan before work may commence.

Rope Access

- 3.7.16 All rope access work must be planned and executed in accordance with Construction Regulation 18.
- 3.7.17 A level 3 rope access supervisor with requisite proof of current competency must be appointed in writing to oversee the work being performed and sign off on any and all rigging arrangements used by the Contractor.
- 3.7.18 All rope access technicians must be in deemed competent and licenced to carry out their work.]
- 3.7.19 The design, selection, use of equipment, and anchors comply with safety standards, specifically SANS 50795, SANS 50352-part1 and part 2.

3.8 Lifting Machines, Tackle and Lifting Operations/ (DMR 18 / CR 22)

The Principal Contractor and all contractors shall ensure that lifting machinery and tackle are inspected before use and thereafter in accordance with the Driven Machinery Regulations and the Construction Regulations (Regulation 22).

Client: South African National Space Agency Project: Matjiesfontein Ground Station	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
---	--	---

There must be a competent lifting machines inspector (registered with the Department of Labour,

Gazette number 27305) and a competent lifting tackle inspector who must inspect the equipment, taking into account that:

- All lifting machinery and tackle has a safe working load clearly indicated;
- Regular inspection and servicing is carried out (3-monthly inspections and records for tackle and 6-monthly inspections and records for lifting machines);
- Records are kept of inspections and of service certificates;
- There is proper supervision in terms of guiding the loads that includes a trained banks man to direct lifting operations and check lifting tackle and attachments daily;
- Rigging of loads to be done in accordance with acceptable safe work practices;
- Tower crane bases have been designed and finally approved by an engineer before loading such base;
- Annual load test certificates for lifting machines are in place;
- Tower cranes are fitted with wind speed meters and audible alarm/warning lights, crane hooters, and that the crane's load chart is posted up in the crane cab;
- The operators are certified to operate the specific machine (valid certificate to be on site);
- The operators are physically and psychologically fit to work and in possession of a medical certificate of fitness to be available on site.

The Principal Contractor must ensure that safe lifting operations are adhered to. This must include the following:

- Pallets of bricks being lifted by a tower crane or mobile crane may only be lifted when secured in a brick cage or brick net, securing the entire load of bricks to the crane hook;
- Mortar bins, waste bins and any other receptacle must be deemed to be a lifting attachment and must be designed to carry the required load. Such attachments must be on register and inspected every 3 months by the competent lifting tackle inspector;
- Temporary Works may only be lifted by using purpose designed and manufactured lifting tackle – eight-gauge wire and the like is prohibited;
- A competent banks man must be in control of all rigging, slinging and lifting operations and must wear a high visibility vest, be in possession of a two-way radio and make use of a
- Whistle, warning persons of overhead loads. The crane operator may only take commands and signals from the designated bank men;
- Guide ropes (tag lines) must be used when lifting large shutters, long bundles of re-bar and other similar loads. This must be detailed in the Principal Contractor's and Contractors' fall prevention plans.
- Detailed Load Chart must be conducted by a competent person and be in possession prior to lifting operations, for cranes and lifting booms in this regard.

Lifting operations must be re-evaluated once wind speeds reach 40 km/h unless otherwise specified by the lifting machine manufacturer

3.9 Materials Hoists (CR 19)

Client: South African National Space Agency Project: Matjiesfontein Ground Station	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
---	--	---

A contractor shall ensure that every material hoist and its tower have been constructed of sound material in accordance with the generally accepted technical standards.

Each contractor shall cause the tower of every material hoist to be-

- Erected on firm foundations and secured to the structure or braced by steel wire guy ropes, and to ensure that the highest landing has an unobstructed space of 900 mm for over travel.
- enclosed on all sides at the bottom, and at all floors
- Provided with a door or gate at least 2100 mm in height at each landing and such door or gate shall be kept closed, except when the platform is at rest at such a landing.
 - A contractor shall cause-
 - the platform of every material hoist to be designed in such a manner that it shall safely contain the loads being conveyed and that the combined weight of the platform and the load does not exceed the designed lifting capacity of the hoist;
- the hoisting rope of every material hoist which has a remote winch to be effectively protected from damage
- The material hoist to be provided with an efficient brake capable of holding the platform with its maximum load in any position when the power is not being supplied to the hoisting machinery.
- A load Test to be conducted on all cranes or hoists to be used on site & the certificates to be retained in the site Health & Safety file and provided on request by the client.

The contractor is to ensure that wherever building tools and equipment are conveyed that these have been tied down and secured so as to prevent uncontrolled movement.

A contractor shall cause a notice, indicating the maximum mass MML load which may be carried at any one time and the prohibition of persons from riding on the platform of the material hoist, to be affixed around the base of the tower and at each landing.

A contractor of a material hoist shall not require or permit any person to operate such a hoist, unless the person is competent (Has proof of training which should be retained on the site Health and Safety File) in the operation thereof.

No contractor shall require or permit any person to ride on a material hoist unless certified otherwise.

A contractor shall cause every material hoist-

- to be inspected on a daily basis by a competent person who has been appointed in writing and has the experience pertaining to the erection and maintenance of material hoists or similar machinery;
- inspection contemplated in paragraph (a), to include the determination of the serviceability of the entire material hoist including guides, ropes and their connections, drums, sheaves or pulleys and all safety devices;
- inspection results to be entered and signed in a register, which shall be kept on the site safety file C.R. 7 for that purpose;
- to be properly maintained and that the maintenance records in this regard are kept on the site safety file C.R.7

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

Temporary works for Structures – Construction Regulations 12

3.10 Temporary Works for Structures

The Principal Contractor shall ensure the provisions of the Construction Regulations 12 are adhered to as a minimum.

3.11 Ladders and Ladder Work – General Safety Regulations 13A

- 3.11.1 The Principal Contractor shall ensure all ladders are inspected monthly, are in good safe working order, are the correct height for the task, extend at least 1m above the landing, fastened and secured, and at a safe angle.
- 3.9.1 Inspections are to be conducted by a competent person who has been appointed in writing.
- 3.9.2 Records of inspections are to be maintained in a register in the site Health & Safety file.
- 3.9.3 Contractors using their own ladders must ensure compliance in this regard.
- 3.9.4 Ladders shall not be used as horizontal walkways or as scaffolding. Tools or equipment must be carried in suitable slung containers or hoisted up to the working position.

3.11.2 General Machinery

The Principal Contractor and relevant Sub Contractors shall ensure compliance with the Driven Machinery Regulations, which will include:

- inspecting machinery regularly,
- appointing a competent person to inspect and ensure maintenance,
- issuing PPE or clothing, and
- training those who use machinery

3.12 Portable Electrical Tools and Explosive Actuated Fastening Devices

- 3.12.1 The Principal Contractor shall ensure the use and storage of all explosive actuated fastening devices and portable electrical tools is done in accordance with Construction Regulation 21 and 24 respectively.
- 3.12.2 The Principal Contractor shall ensure all-electrical tools, electrical distribution boards, extension leads, and plugs are kept in safe working order.
- 3.12.3 **The Principal Contractor shall consider the following:**
 - A competent person undertakes routine inspections and records are kept;
 - Only authorised trained persons use the tools;
 - The safe working procedures apply;
 - Awareness training is carried out and compliance is enforced at all times; and
 - PPE and clothing is provided and maintained.
 - A register indicating the issue and return of all explosive round;
 - Ensure cartridges and explosive tool/s are locked up separately.

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

- Signs to be posted up in the areas where explosive powered tools are being used.

3.13 Transport of Workers – Construction Regulations 23

- 3.13.1 The Principal Contractor and other Sub Contractors shall ensure:
- 3.13.1.1 No persons shall be transported together with goods or tools unless there is an appropriate area or section to store them;
 - 3.13.1.2 No persons shall be transported in a non-enclosed vehicle, e.g., truck; there must be a proper canopy (properly covering the back and top) with a suitable seating area.
 - 3.13.1.3 Workers shall not be permitted to stand or sit at the edge of the transporting vehicle.
 - 3.13.1.4 No persons may be transported in LDV's unless they are closed/covered and have the correct number of seats for the passengers.
 - 3.13.1.5 The driver of any LDV may not permit more than 2 passengers to occupy the cab of any LDV.
- 3.13.2 All vehicles operated on the site will in all aspects comply with the requirements of the National Road Traffic Act, Act No 93 of 1996.
- 3.13.3 Drivers of such vehicles must have a valid driver's license for the code of vehicle being driven by them.
- 3.13.4 No servicing of vehicles on a Construction Site, which is occupied by staff working for the Client.
- 3.13.5 In the event of an emergency breakdown authority may be granted for the repairs to be made.
- 3.13.6 Servicing or repairs of vehicles on site may only take place if such activities are performed with the necessary procedures in place to prevent any harmful effects to the environment.
- 3.13.7 All waste generated from servicing vehicles must be disposed of in accordance with relevant Environmental legislation.
- 3.13.8 In the event where Earth Moving Equipment is present on site the following must be adhered to:
- Drivers of vehicles must be instructed to avoid parking behind earth moving vehicles to ensure their vehicle is visible to the operator of earth moving vehicles.
 - Right of way must be afforded to earth moving machinery at all times.
 - Vehicles must only be permitted to park where possible in designated areas
 - The necessary wheel chocks are applied once the Earth Moving Equipment is stationary and unoccupied.

3.14 Stacking of Materials – Construction Regulations 28

- 3.14.1 The Contractor/Employer must ensure that a competent person is appointed in writing to supervise all stacking and storage on a construction site.
- 3.14.2 Adequate storage areas are provided and demarcated.
- 3.14.3 The base of any stack is level and capable of sustaining the weight exerted on it by the stack.
- 3.14.4 The items in the lower layers can support the weight exerted by the top layers.

<p>Client: South African National Space Agency</p> <p>Project: Matjiesfontein Ground Station</p>	<p>Construction Project Health and Safety Specifications</p>	<p>Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3</p>
--	---	---

- 3.14.5 Cartons and other containers that may become unstable due to wet conditions are kept dry.
- 3.14.6 Pallets and containers are in good condition and no material is allowed to spill out.
- 3.14.7 The height of any stack does not exceed 3X the base unless stepped back at least half the depth of a single container at least every fifth tier or the approval of an inspector has been obtained to build the stacks higher with the aid of an appropriate machine.
- 3.14.8 The articles that make up a single tier are consistently of the same size, shape and mass.
- 3.14.9 Structures for supporting stacks are structurally sound and able to support the mass of the stack.
- 3.14.10 No articles are removed from the bottom of the stack, but from the top tier first.
- 3.14.11 Anybody climbing onto a stack can and does so safely and that the stack is sufficiently stable to support him/her.
- 3.14.12 Stacks that are in danger of collapsing are broken down and restacked.
- 3.14.13 Stability of stacks are not threatened by vehicles or other moving plant and machinery.
- 3.14.14 Stacks are built in a header and stretcher fashion and that corners are securely bonded .
- 3.14.15 Persons climbing onto stacks do not approach unguarded moving machinery or electrical installations.
- 3.14.16 Stack material in authorized areas, never near doorways, access ways, in front of fire appliances or emergency exits or on fire escape routes.
- 3.14.17

3.15 Pressure Equipment Regulations (PER) and Gas Cylinders

- 3.15.1 The Principal Contractor and all Sub Contractors shall comply with the Pressure Equipment Regulations, including:
 - Providing competency and awareness training to the operators;
 - Providing PPE or clothing;
 - Inspect equipment regularly and keep records of inspections;
 - Ensuring appropriate fire-fighting equipment is on hand.
 - Ensure special manufactured soap tests are present to check for tell-tale bubbles that are indicative of any gas leakage (i.e.: pipes, hoses, valves, gauges, arrestors).
 - Ensure no potential ignition sources are present, E.g., Oil near Oxygen cylinders.
 - Gas cylinders are secured in appropriate gas cylinder trolleys.
 - Manufactured hose-connectors, connecting gas hoses with steel wire or insulation tape is prohibited.

3.16 Hazardous Chemical Substances – Hazardous Chemical Agent Regulations

- 3.16.1 Personnel who may be required to use Hazardous Chemical Substances or maybe exposed to a Hazardous Chemical Substances are to be adequately trained with regard to the requirements of the Hazardous Chemical Substances Regulations as amended.
- 3.16.2 In addition to the abovementioned, Material Safety Data Sheets are to be maintained on site for all hazardous chemical substances.

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

- 3.16.3 First Aiders are to be made aware of the MSDS and how to treat HCS incidents appropriately.

Please Note: "HSA" or "hazardous chemical agent" means a GHS aligned chemical agent as provided for in in Annexure 1 of the regulations.

3.17 Demolition Work – Construction Regulations 14

- 3.17.1 All Demolition work shall comply with Construction Regulation 14 as a minimum, acceptable standard.
- 3.17.2 3.18.2 The disposal of rubble and other waste from elevated positions may only be conducted under controlled conditions. Waste chutes must be secured to a scaffold structure, which must in turn be secured to the main building. A person must be designated to take control of waste chute operations, which must include the inspection of the chute on a daily basis. Waste must discharge into an enclosed area (ready fence panels to be used), eliminating the risk of persons being struck by waste material.

3.18 Earthworks (Incl. Trenching and Excavations) – Construction Regulation 13

- 3.18.1 The Principal Contractor and relevant Contractors must make provision in their tender for the shoring of excavations where the soil conditions warrant it or if this is not possible cut it back – excavation walls must be battered back to a safe angle, termed the safe angle of repose. The Principal Contractor has the following options: first option is to shore or brace the excavation, should this not be practical then such excavation must be battered back to the safe angle of repose (second option). Should the first two options not be deemed necessary by the contractor, then permission must be given in writing by the appointed competent excavation supervisor (third option). Where uncertainty pertaining to the stability of the soil exists, the decision of a professional engineer or professional technologist competent in excavations shall be decisive. Such permission must be in writing.
- 3.18.2 The following is relevant to excavations:
- Excavations/trenches are inspected by a competent person before every shift and a record of these inspections is kept;
 - Safe work procedures have been communicated to the workers;
 - The safe work procedures are enforced and maintained by the Principal Contractor's and Contractors' responsible persons at all times.
 - Excavations next to permanent or temporary roadways -ensure that no load, material, plant or equipment is placed or moved near the edge of any excavation where it is likely to cause its collapse and thereby endangering the safety of any person, unless precautions such as the provision of sufficient and suitable shoring or bracing are taken to prevent the sides from collapsing;
 - Ensure that where the stability of an adjoining building, structure or road is likely to be affected by the making of an excavation, steps are taken that may be necessary to ensure the stability of such building, structure or road as well as the safety of persons;
 - Cause convenient and safe means of access to be provided into every excavation in which persons are required to work and such access shall not be

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

further than 6m from the point where any worker within the excavation is working;

- Ascertain as far as is reasonably practicable, the location and nature of electricity, water, gas or other similar services which may in any way be affected by the work to be performed. The necessary steps must then be taken to render the circumstances safe for all persons involved;
- Cause every excavation which is accessible to the public or which is adjacent to public roads or thoroughfares, or where the safety of persons may be endangered, to be
 - adequately protected by a barrier or fence of at least one meter in height and as close to the excavation as is practicable;
 - and provided with warning illuminates or any other clearly visible boundary indicators at night or when visibility is poor;
- Cause warning signs to be positioned next to an excavation within which persons are working or carrying out inspections or tests.

3.19 Public and Site Visitor Health & Safety – OHSACT Section 9

- 3.19.1 The Principal Contractor shall ensure every person working on or visiting the site, as well as the public in general, is made aware of the dangers likely to arise from site activities, including the precautions to be taken to avoid or minimise those dangers.
- 3.19.2 Appropriate health and safety notices and signs shall be posted up, but shall not be the only measure taken.
- 3.19.3 Both the Client and the Principal Contractor have a duty in terms of the Occupational Health & Safety Act 85 of 1993 to do everything reasonably practicable to prevent members of the public and site visitors from being negatively affected by the construction activities.
- 3.19.4 Site visitors must be briefed on the hazards and risks they may be exposed to and what measures are in place or should be taken to control these hazards and risks. All hoarding layout drawings are to be strictly adhered to.
- 3.19.5 Traffic Diversions
- 3.19.6 Provision by means of a method statement must be made for any traffic diversions to conduct your construction activities as well as any loading and off-loading of materials and waste.
- 3.19.7 The method statement must include a drawing indicating traffic signage and the like.
- 3.19.8 Traffic flow to and from the may not be obstructed by construction vehicles without express written permission from the client.
- 3.19.9 Road and walkways must be kept clean and tidy at all times
- 3.19.10 Roads and pavements must be swept continuously throughout the day
- 3.19.11 If work is to be carried out on the road or walkways this may only take place with written consent from the client together with a pavement permit (where required) in place prior to work commencing.

3.20 Erection of Hoarding

- 3.20.1 All hoarding operations on site are to comply. Contractor must ensure that the site is hoarded off to prevent unauthorized access to site.
- 3.20.2 Hoarding separating the new areas that have been handed over to the client are to be solid wooden fencing.
- 3.20.3 Securely bound together with NO gaps or holes between the panels.

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

- 3.20.4 The footing of the hoarding must be of such a nature it is capable of staying upright during high winds and inclement weather. Along long sections bracing must be placed on the inside of the project to ensure the integrity of the hoarding.
- 3.20.5 The hoarding must be inspected daily to ensure that they are in an acceptable condition both for security and an aesthetics perspective.
- 3.20.6 **Hazard tape is NOT considered an effective method of hoarding or barricading.**
- 3.20.7 Hoarding must have warning signs such as "No Trespassing" as well as emergency contact details for site management in the event of an emergency posted every 10 meters.
- 3.20.8 Hoarding must have sufficient and suitable mandatory PPE signs, to communicate the required compulsory PPE for the specific site upon entrance.

4. Occupational Health, Hygiene and Environmental Management

4.1 Occupational Health and Hygiene

- 4.1.1 Exposure of workers to occupational health hazards and risks is very common in any work environment, especially in construction.
- 4.1.2 Occupational exposure is a major problem, and the Principal Contractor is to ensure correct health and hygiene measures are put in place to prevent exposure to these hazards.
- 4.1.3 Prevent inhalation, ingestion, and absorption of any hazardous chemical substance and ensure personnel who are exposed to high noise level are adequately informed of such and all necessary safe guards have been taken prior to issuing PPE.
- 4.1.4 Site-specific health risks maybe as a result of cement dust, wet cement, wood-dust, noise, etc.
- 4.1.5 Noise induced Hearing Loss (GNR 307 7 March 2003)
 - Occupational noise emitted by construction machinery and power tools must be controlled as far as possible by implementing engineering solutions such as noise dampening, regular maintenance, servicing and inspection, screening off the noise, and reducing the number of persons exposed. It is generally accepted that all employees on a construction site will be exposed to varying degrees of noise.

In view of this, the contractor shall ensure full compliance with the above-mentioned regulation; furthermore, provide proof of the relative management process. The contractor is advised to pay particular attention to section 12 of the "Noise-Induced Hearing Loss Regulation".

- 4.1.6 Ergonomics
 - Ergonomics is the study of how workers relate to their workstations. We advise the Principal Contractor and Contractors to take this into consideration when conducting risk assessments, thereby improving the worker-task relationship, which will in turn improve productivity and reduce chronic conditions such as back strains, joint problems and mental fatigue, amongst others.
- 4.1.7 Occupational Health Medicals
 - The contractor shall ensure that all his/her employees are subjected to medical screening in accordance with the occupational Exposures as prescribed by the OHS Act. These medical tests shall be performed by a

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

qualified Occupational Management Practitioner & A valid medical fitness certificate must be issued as per Annexure 3 document. These certificates are to be retained in the Health and Safety file and made available on request by the client.

4.1.8 Dust Exposure

The Principal Contractor shall ensure to take all reasonably practicable steps to ensure that dust exposure is limited and controlled on a daily basis. By means of a watercart or any other practicable and safe method of suppressing dust exposure during site operations and issuing FFP1 dust masks to workers exposed to potential airborne dust.

4.1.9 Lighting

The contractor is to ensure that wherever work is performed where the lighting conditions are less than the minimum requirement as defined in ER Regulation 3 and relative schedules, that this is supplemented with additional lighting capacity to ensure that all works contemplated can be conducted safely. Portable Lights must be fitted with a robust non-hygroscopic non-conducting handle and the lamp must be protected by a robust and weather proof guard. The cable lead-in must withstand rough handling. Registers must be maintained for each piece of equipment and findings of regular inspections must be entered into a register. Inspections must concentrate on plug, cord, switch and any obvious faults.

4.1.10 Hours of Work

Approval shall be subject to:

- Competent supervision being on site throughout the duration of the weekend/after-hours work.
- The contractor having a demonstrated history of adequate, problem free control and supervision of the work during normal working hours.

4.2 Construction Employees' Facilities – Facilities Regulations / Construction Regulations 30

4.2.1 **The Principal Contractor must supply and make available;**

- sufficient toilets (1 toilet per 30 workers)
- gender specific showers (1 for every 15 workers)
- gender specific changing facilities
- hand washing facilities, soap, toilet paper, and hand drying material
- Waste bins must be strategically placed and regularly emptied
- Safe, clean storage areas must be provided for workers to store personal belongings and personal protective equipment, separate lockers to be provided for personal wear and contaminated work wear/PPE.
- Workers should not be exposed to hazardous materials/substances while eating and must be provided with uncontaminated sheltered eating areas e.g. ensure segregation between hazardous chemical substance store and eating facilities.
- At all times it must be ensured these areas remain well maintained and screened off to provide necessary privacy due to possible close proximity to residential / commercial buildings, pedestrians and public roadways.

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004
Project: Matjiesfontein Ground Station		Date: 01.04.2024 Rev.no. #3

4.3 Environmental Management

4.3.1 The Principal Contractor shall fulfil all the requirements prescribed by the National Environmental Management Acts 108 of 1998 and its applicable specific environmental management Acts (SEMA's), National, Regional, local regulations and clients approved EMPr. The Contractor shall obtain all necessary environmental permits prescribed, develop and comply to an environmental management plan inclusive of but not limited to the following: This EMP must be submitted well before commencement of planned works, and must include, but shall not be limited to the following aspects:

- a) Method Statement as per scope of work.
- b) Description of appointments, roles and responsibilities of relevant staff that will ensure implementation of environmental management during execution of planned works.
- c) Management and communication (reporting, etc.) arrangements during execution of planned works.
- d) Site establishment arrangements, explained in a proper method statement, including details on facilities and equipment to be installed/used.
- e) Waste management during execution of planned works (identification, handling and disposal of general and hazardous waste).
- f) Environmental Aspects & Impacts Management.
- g) Refuelling of plant and equipment
- h) Water management.
- i) Groundwater management/prevention of contamination.
- j) Hazardous substances management (identification, handling, storage and disposal of hazardous waste).
- k) Effluent monitoring.
- l) Spill response measures.
- m) Dust control/management
- n) Noise control/management
- o) Rehabilitation measures.
- p) Oil & Hydrocarbon spills management
- q) Archaeological & Heritage management
- r) Flora & Fauna management
- s) Alien & Invasive species management
- t) Environmental Incident Reporting
- u) Inspection, auditing and monitoring measures to be implemented during execution of planned works.

4.3.2 The **Principal Contractor shall appoint a full-time Environmental Officer** responsible for ensuring compliance with environmental regulations, monitoring project activities for potential environmental impacts, and implementing appropriate mitigation measures in the duration of contracted work.

The appointed Environmental Officer must be registered with the South African Council for Natural Scientific Professions (SACNASP) and hold a Diploma/Degree, or B-Tech in Environmental Management/Environmental Science. Furthermore, the candidate must have a minimum of five (5) years of experience as an Environmental Officer, CV & Certificates should be provided and copies to be retained thereof in the Contractor's health and safety file and made available on request by the client.

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

5. The Designer

5.1 Duties of the Designer

The designer of a structure must—

- ensure that the applicable safety standards incorporated into these Regulations under section 44 of the Act are complied with in the design.
- take into consideration the health and safety specification submitted by the client.
- before the contract is put out to tender, make available in a report to the client— all relevant health and safety information about the design of the relevant structure that may affect the pricing of the construction work, the geotechnical-science aspects, where appropriate and the loading that the structure is designed to withstand.
- inform the client in writing of any known or anticipated dangers or hazards relating to the construction work, and make available all relevant information required for the safe execution of the work upon being designed or when the design is subsequently altered.
- refrain from including anything in the design of the structure necessitating the use of dangerous procedures or materials hazardous to the health and safety of persons, which can be avoided by modifying the design or by substituting materials.
- take into account the hazards relating to any subsequent maintenance of the relevant structure and must make provision in the design for that work to be performed to minimize the risk;
- when mandated by the client to do so, carry out the necessary inspections at appropriate stages to verify that the construction of the relevant structure is carried out in accordance with his design: Provided that if the designer is not so mandated, the client's appointed agent in this regard is responsible to carry out such inspections;
- when mandated, stop any contractor from executing any construction work which is not in accordance with the relevant design's health and safety aspects: Provided that if the designer is not so mandated, the client's appointed agent in that regard must stop that contractor from executing that construction work;
- when mandated, in his or her final inspection of the completed structure in accordance with the National Building Regulations, include the health and safety aspects of the structure as far as reasonably practicable, declare the structure safe for use, and issue a completion certificate to the client and a copy thereof to the contractor; and
- during the design stage, take cognisance of ergonomic design principles in order to minimize ergonomic related hazards in all phases of the life cycle of a structure.

5.2 Temporary Works Designer

The designer of temporary works must ensure that—

- all temporary works are adequately designed so that it will be capable of supporting all anticipated vertical and lateral loads that may be applied.
- the designs of temporary works are done with close reference to the structural design drawings issued to the contractor, and in the event of any uncertainty consult the temporary works designer.
- all drawings and calculations pertaining to the design of temporary works are kept at the office of the temporary works designer and are made available on request by an inspector.
- the loads caused by the temporary works and any imposed loads are clearly

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

indicated in the design.

- A geo-science technical report where appropriate
- The loading of the structure is designed to withstand all anticipated vertical and lateral loads that could be applied to them.

6. Annexure 1 - Health and Safety Costing

As part of the tender submission, Contractors are required to submit a detailed breakdown as to the expenditure requirements with regards to the implementation and maintenance of the health and safety programme. This check sheet serves as a guideline to the compilation of such costs and must be completed by the contractor.

ITEMS COSTED		ESTIMATED COST
1.	PERSONAL PROTECTIVE EQUIPMENT	
	Overalls	R
	Hard hats and safety glasses	R
	Safety boots / shoes	R
	Visors / gloves	R
	Other	R
TOTAL		R
2.	FIRE FIGHTING	
	Fire extinguishers	R
	Training	R
	Surveys	R
	Other	R
TOTAL		R
3.	HEALTH AND SAFETY PERSONNEL	
	Safety Manager	R
	Safety Officer	R
	Full Time Safety Representatives if required	R
	Fire Watchers	R
	First Aiders	R
	External Auditors Costs	R

Client: South African National Space Agency	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
Project: Matjiesfontein Ground Station		

	Other	R
TOTAL		R

Annexure 1

4.	FACILITIES	
	Provision of ablution facilities	R
	Service and maintenance of ablution facilities	R
	Provision of eating areas	R
	Cleaning of lay down and other storage areas	R
	Other	R
TOTAL		R
5.	FALL PREVENTION AND PROTECTION	
	Safety harnesses with double lanyards	R
	Lanyard extenders	R
	Scaffold hooks	R
	Lifelines and vertical fall arrest systems	R
	Other	R
TOTAL		R
6.	FIRST AID	
	First Aid Boxes	R
	Rescue Equipment and Stretchers	R
	Replenishment of boxes and other supplies	R
	Other	R
TOTAL		R
7.	TRAINING	
	Health and Safety Representatives	R
	Health and Safety Supervisor Training	R

Client: South African National Space Agency Project: Matjiesfontein Ground Station	Construction Project Health and Safety Specifications	Form: FRM-SPEC-004 Date: 01.04.2024 Rev.no. #3
---	--	--

	First Aid Training	R
	Firefighting Training	R
	Legal Liability Training	R
	Risk Assessment Training	R
	Other	R
TOTAL		R

8.	SIGNAGE	
	All signage as required by law: regulatory, warning and information	R
	Posters for Awareness	R
	Other	R
TOTAL		R
9.	ELECTRICAL	
	Locks Required for Lockouts	R
	Tags	R
	Permit Books	R
	Calipers	R
	Key Safes	R
	Other	
TOTAL		R
GRAND TOTAL WHICH COULD BE USED IN THE TENDER		R

SOUTH AFRICAN NATIONAL SPACE AGENCY

PROJECT: MATJIESFONTEIN GROUND STATION

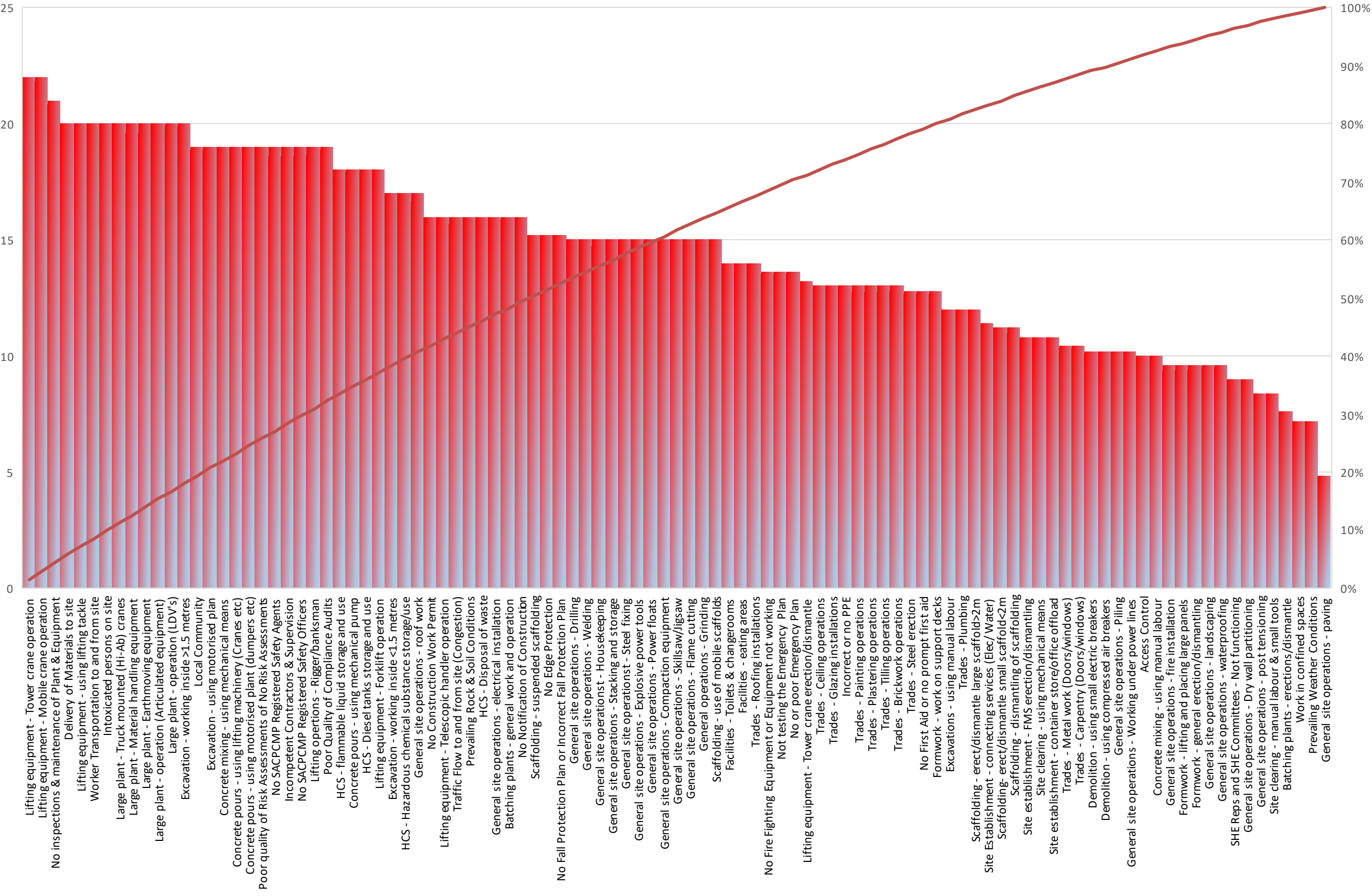
BASELINE RISK ASSESSMENT


Revision: 0

Date 07/10/2024

[illegible]

Project Risk Profile (Pareto Indication)



PROJECT BASELINE RISK ASSESSMENT														
PROJECT: SANSA MTJ GROUND STATION		<div><div>MITIGATING CONTROLS</div><div>1. No evidence of control measures 2. Verbal instructions/procedures 3. Documented instructions/procedures 4. Documented instructions/procedures approved</div></div> <div></div>												
COMPILED BY: JB CHANDLER														
DATE: 07 OCTOBER 2024														
SCOPE: NEW BUILD														
REVISION: 00														
ACTIVITIES BASED ON PROGRAMME OF WORK	KEY SHE HAZARDS & UNWANTED EVENTS	FREQUENCY	SEVERITY	PURE RISK RATING	Mitigating	Residual Risk	Severity Categories						Additional Actions or More Detailed Assessments (TRA - Task Risk Assessment) SWMS - Safe Work Method Statement	Responsible
		1 - 5	1 - 5		1 - 5		F	BI	II	FI	LI	EI		
Delivery of Materials to site	Motor vehicle accident, property damage, dropped loads, impact with power lines - injuries/fatalities.	5	4	20	5	4.00	5	4	5	4	3	4	Site establishment TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Access Control	Unauthorised, unprotected access - injuries.	5	2	10	5	2.00	5	2	2	2	3	1	Access control TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Site clearing - manual labour & small tools	Snakes, Insects, musculo-skeletal Injuries.	3	2.8	8.4	5	1.68	3	2	4	3	3	2	Access control TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Site clearing - using mechanical means	Moving machinery, contact with underground services, Motor vehicle accident, exhaust fumes, collapse of ground.	3	3.6	10.8	5	2.16	3	4	4	4	4	2	Access control TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Site establishment - FMS erection/dismantling	Snakes, insects, musculo-skeletal injuries, hand tools (hand injuries), sharp objects.	3	3.6	10.8	5	2.16	3	4	4	4	4	2	Access control TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Site establishment - container store/office offload	Motor vehicle accident, property damage, dropped loads, impact with power lines - injuries/ fatalities.	3	3.6	10.8	5	2.16	3	4	4	4	4	2	Access control TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Site Establishment - connecting services (Elec/ Water)	Motor vehicle accident, property damage, dropped loads, impact with power lines - injuries/ fatalities.	3	3.8	11.4	5	2.28	3	4	5	4	4	2	Access control TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Facilities - Toilets & changerooms	Biological agents (Ecoli/ Staph), no water or cleaning products.	5	2.8	14	5	2.80	5	3	3	2	3	3	Facilities TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Facilities - eating areas	Biological agents (Ecoli/ Staph) ,no water or cleaning products, smoking of lack of hygiene.	5	2.8	14	5	2.80	5	3	3	2	3	3	Facilities TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Excavations - using manual labour	Musculo-skeletal injuries, hit by hand tools, impact services(water, electricity).	5	2.4	12	5	2.40	5	1	4	2	2	3	Excavations TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Excavation - using motorised plan	Motor vehicle accident, property damage, dropped loads, impact with power lines - injuries/ fatalities.	5	3.8	19	5	3.80	5	4	4	4	4	3	Excavations TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Excavation - working inside <1.5 metres	Moving machinery, contact with underground services, motor vehicle accident, exhaust fumes, collapse of ground.	5	3.4	17	5	3.40	5	3	4	4	3	3	Excavations TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Excavation - working inside >1.5 metres	Moving machinery, contact with underground services, motor vhicle accident, exhaust fumes, collapse of ground.	5	4	20	5	4.00	5	4	5	4	4	3	Excavations TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Batching plants - erections/dismantle	Dropped loads, hand tools, falls from height, lifting equipment.	2	3.8	7.6	5	1.52	2	4	4	4	4	3	Batching TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Batching plants - general work and operation	Moving machinery, dust, noise, vehicles, live electricity, flammable fuels, exhaust fumes.	5	3.2	16	5	3.20	5	3	4	3	3	3	Batching TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Concrete mixing - using manual labour	Musculo-skeletal injuries, impact with hand tools, cementicious products.	5	2	10	5	2.00	5	2	2	2	2	2	Concrete Mixing TRA's & SWMS + Training	S 16(2) R 8(1) & 8(5)
Concrete mixing - using mechanical means	Moving machinery, dust, noise, vehicles, live electricity, flammable fuels, exhaust fumes, cementicious products.	5	3.8	19	5	3.80	5	4	4	4	4	3	Concrete mixing TRA's & SWMS + training.	S 16(2) R 8(1) & 8(5)
Concrete pours - using lifting machinery (Cranes etc)	Dropped loads, impacts with lifting equipment, nip points on cement buckets, cementicious products.	5	3.8	19	5	3.80	5	4	5	4	4	2	Concrete mixing TRA's & SWMS + training.	S 16(2) R 8(1) & 8(5)
Concrete pours - using motorised plant (dumpers etc)	Moving machinery, dust, noise, vehicles, flammable fuels, exhaust fumes, cementicious products.	5	3.8	19	5	3.80	5	4	5	4	4	2	Concrete mixing TRA's & SWMS + training.	S 16(2) R 8(1) & 8(5)
Concrete pours - using mechanical pump	Moving machinery, dust, noise, vehicles, flammable fuels, exhaust fumes, cementicious products.	5	3.6	18	5	3.60	5	4	3	4	4	3	Concrete mixing TRA's & SWMS + training.	S 16(2) R 8(1) & 8(5)
Lifting equipment - Tower crane erection/dismantle	Dropped loads, impacts with lifting equipment, fall from height, live electricity, exhaust fumes.	3	4.4	13.2	5	2.64	3	5	5	5	4	3	Tower crane TRA's & SWMS + training.	S 16(2) R 8(1) & 8(5)
Lifting equipment - Tower crane operation	Dropped loads, impacts with lifting equipment, fall from height, live electricity, exhaust fumes .	5	4.4	22	5	4.40	5	5	5	5	4	3	Tower crane TRA's & SWMS + training.	S 16(2) R 8(1) & 8(5)
Lifting equipment - Mobile crane operation	Dropped loads, impacts with lifting equipment, fall from height, live electricity, exhaust fumes.	5	4.4	22	5	4.40	5	5	5	5	4	3	Mobile crane TRA's & SWMS + training.	S 16(2) R 8(1) & 8(5)

ACTIVITIES BASED ON PROGRAMME OF WORK	KEY SHE HAZARDS & UNWANTED EVENTS	FREQUENCY	SEVERITY	PURE RISK RATING	Mitigating	Residual Risk	Severity Categories						Additional Actions or More Detailed Assessments (TRA - Task Risk Assessment) SWMS - Safe Work Method Statement	Responsible
		1 - 5	1 - 5		1 - 5		F	BI	II	FI	LI	EI		
Lifting equipment - Telescopic handler operation	Motor vehicle accident, property damage, dropped loads, impact with power lines - injuries/fatalities, exhaust fumes.	5	3.2	16	5	3.20	5	3	4	3	3	3	Telehandler TRA's & SWMS + training.	S 16(2) R 8(1) & 8(5)
Lifting equipment - Forklift operation	Motor vehicle accident, property damage, dropped loads, impact with power lines - injuries/fatalities, exhaust fumes.	5	3.6	18	5	3.60	5	4	5	4	3	2	Forklift TRA's & SWMS + training.	S 16(2) R 8(1) & 8(5)
Lifting equipment - using lifting tackle	Dropped loads, impacts with lifting equipment & tackle, sharp equipment, nip points.	5	4	20	5	4.00	5	4	5	4	4	3	Lifting tackle TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Lifting operations - Rigger/banksman	Dropped loads, impacts with lifting equipment & tackle, sharp equipment, nip points.	5	3.8	19	5	3.80	5	4	4	4	4	3	Rigger/ banksman TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Formwork - general erection/dismantling	Lifting equipment, dropped loads, fall from height, hand tools, collapse of Formwork/scaffolding, shutter oil.	3	3.2	9.6	5	1.92	3	3	5	3	3	2	Formwork TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Formwork - lifting and placing large panels	Lifting equipment, dropped loads, fall from height, hand tools, collapse of Formwork/scaffolding, shutter oil.	3	3.2	9.6	5	1.92	3	3	5	3	3	2	Formwork TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Formwork - work on support decks	Lifting equipment, dropped loads, fall from height, hand tools, collapse of Formwork/scaffolding, shutter oil.	4	3.2	12.8	5	2.56	4	3	5	3	3	2	Formwork TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Scaffolding- erect/dismantle small scaffold<2m	Musculo-skeletal Injuries, hit by hand tools, fall from height, scaffold collapse.	4	2.8	11.2	5	2.24	4	2	4	3	3	2	Scaffolding TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Scaffolding - erect/dismantle large scaffold>2m	Musculo-skeletal Injuries, hit by hand tools, fall from height, scaffold collapse.	4	3	12	5	2.40	4	3	4	3	3	2	Scaffolding TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Scaffolding - use of mobile scaffolds	Musculo-skeletal Injuries, hit by hand tools, fall from height, scaffold collapse.	5	3	15	5	3.00	5	2	5	3	3	2	Scaffolding TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Scaffolding - dismantling of scaffolding	Musculo-skeletal Injuries, hit by hand tools, fall from height, scaffold collapse.	4	2.8	11.2	5	2.24	4	3	5	2	2	2	Scaffolding TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Scaffolding - suspended scaffolding	Musculo-skeletal Injuries, hit by hand tools, fall from height, scaffold collapse.	4	3.8	15.2	5	3.04	4	4	3	4	4	4	Scaffolding TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Demolition - using small electric breakers	Structure collapse, dust, vibration, noise, flying debris, live electricity.	3	3.4	10.2	5	2.04	3	3	5	3	3	3	Demolition TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Demolition - using compressed air breakers	Structure collapse, dust, vibration, noise, flying debris, exhaust fumes.	3	3.4	10.2	5	2.04	3	3	5	3	3	3	Demolition TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Trades - Brickwork operations	Musculo-skeletal injuries, hit by hand tools, fall from height, scaffold collapse, hit by brick being dropped.	5	2.6	13	5	2.60	5	3	4	2	2	2	Brickwork TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Trades - Plastering operations	Musculo-skeletal Injuries, hit by hand tools, fall from height, scaffold collapse, dust, contact dermatitis.	5	2.6	13	5	2.60	5	3	4	2	2	2	Plastering TRA & SWMS + Training	S 16(2) R 8(1) & 8(5)
Trades - Painting operations	Musculo-skeletal injuries, hit by hand tools, fall from height, scaffold collapse, hazardous chemicals.	5	2.6	13	5	2.60	5	3	4	2	2	2	Painting TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Trades - Ceiling operations	Musculo-skeletal injuries, hit by hand tools, fall from height, scaffold collapse, dropped tools and materials.	5	2.6	13	5	2.60	5	3	4	2	2	2	Ceiling TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Trades - Roofing installations	Musculo-skeletal injuries, hit by hand tools, fall from height, scaffold collapse, dropped tools and materials.	5	2.8	14	5	2.80	5	3	5	2	2	2	Roofing TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Trades - Glazing installations	Musculo-skeletal injuries, hit by hand tools, fall from height, scaffold collapse, dropped tools and materials.	5	2.6	13	5	2.60	5	3	4	2	2	2	Glazing TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Trades - Tiling operations	Musculo-skeletal injuries, hit by hand tools, fall from height, scaffold collapse, dropped tools and materials.	5	2.6	13	5	2.60	5	3	4	2	2	2	Tiling TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Trades - Carpentry (Doors/windows)	Musculo-skeletal injuries, hit by hand tools, fall from height, scaffold collapse, dust, noise, live electricity.	4	2.6	10.4	5	2.08	4	3	4	2	2	2	Carpentry TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Trades - Metal work (Doors/windows)	Musculo-skeletal injuries, hit by hand tools, fall from height, scaffold collapse, dust, noise, live electricity.	4	2.6	10.4	5	2.08	4	3	4	2	2	2	Ironmongery TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Trades - Steel erection	Lifting Equipment, dropped loads, fall from height, hand tools, collapse of scaffolding, welding.	4	3.2	12.8	5	2.56	4	3	5	3	3	2	Steel erection TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)

ACTIVITIES BASED ON PROGRAMME OF WORK	KEY SHE HAZARDS & UNWANTED EVENTS	FREQUENCY	SEVERITY	PURE RISK RATING	Mitigating	Residual Risk	Severity Categories						Additional Actions or More Detailed Assessments (TRA - Task Risk Assessment) SWMS - Safe Work Method Statement	Responsible
		1 - 5	1 - 5		1 - 5		F	BI	II	FI	LI	EI		
Trades - Plumbing	Musculo-skeletal injuries, hit by hand tools, fall from height, scaffold collapse, dust, noise, live electricity, hazardous chemicals / hazardous biological agents.	4	3	12	5	2.40	4	3	4	3	2	3	Brickwork TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
Large plant - operation (LDV's)	Moving vehicles, contact with powerlines, motor vehicle accidents, exhaust fumes, collapse of ground.	5	4	20	5	4.00	5	4	5	4	4	3	Vehicle TRA's & SWMS + training.	S 16(2) R 8(1) & 8(5)
Large plant - operation (Articulated equipment)	Moving vehicles, contact with powerlines, motor vehicle accidents, exhaust fumes, collapse of ground.	5	4	20	5	4.00	5	4	5	4	4	3	Vehicle TRA's & SWMS + training.	S 16(2) R 8(1) & 8(5)
Large plant - Earthmoving equipment	Moving vehicles, contact with powerlines, motor vehicle accidents, exhaust fumes, collapse of ground.	5	4	20	5	4.00	5	4	5	4	4	3	Vehicle TRA's & SWMS + training.	S 16(2) R 8(1) & 8(5)
Large plant - Material handling equipment	Moving vehicles, contact with powerlines, motor vehicle accidents, exhaust fumes, collapse of ground, dropped load.	5	4	20	5	4.00	5	4	5	4	4	3	Vehicle TRA's & SWMS + training.	S 16(2) R 8(1) & 8(5)
Large plant - Truck mounted (Hi-Ab) cranes	Moving vehicles, contact with powerlines, motor vehicle accidents, exhaust fumes, collapse of ground.	5	4	20	5	4.00	5	4	5	4	4	3	Vehicle TRA's & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operations - Welding	Ultra violet radiation, welding fumes, explosives, welding gases, live electricity, sharp/hot product.	5	3	15	5	3.00	5	3	4	3	3	2	Welding TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General operations - Grinding	Noise, dust, fumes, vibration, live electricity, sharp/hot product, sparks & shards.	5	3	15	5	3.00	5	3	4	3	3	2	Grinding TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operations - Flame cutting	Ultra violet radiation, welding fumes, explosives, welding gases, live electricity, sharp/hot product.	5	3	15	5	3.00	5	3	4	3	3	2	Flame cutting TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operations - Skillsaw/Jigsaw	Noise, dust, fumes, vibration, live electricity, sharp/hot product, sparks & shards, sharp blade.	5	3	15	5	3.00	5	3	4	3	3	2	Skillsaw TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operations - Drilling	Noise, dust, fumes, vibration, live electricity, sharp/hot product, sparks & shards, sharp drill bits.	5	3	15	5	3.00	5	3	4	3	3	2	Drilling TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operations - Compaction equipment	Noise, dust, fumes, vibration, live electricity, or exhaust fumes.	5	3	15	5	3.00	5	3	4	3	3	2	Compaction TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operations - Power floats	Noise, dust, fumes, vibration, live electricity, or exhaust fumes.	5	3	15	5	3.00	5	3	4	3	3	2	Power Float TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operations - Explosive power tools	Noise, dust, fumes, vibration, explosive cartridges, deflected projectiles.	5	3	15	5	3.00	5	3	4	3	3	2	Explosive power tools TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operationst - Steel fixing	Lifting equipment, dropped loads, fall from height, hand tools, collapse of scaffolding, welding, sharp product.	5	3	15	5	3.00	5	3	4	3	3	2	Steel fixing TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operations - Stacking and storage	Collapse of stacking & storage, manual handling , lifting equipment.	5	3	15	5	3.00	5	3	4	3	3	2	Stacking & storage TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operationst - Housekeeping	Poor housekeeping, slips, trips, falls, cuts.	5	3	15	5	3.00	5	3	4	3	3	2	Hosuekeeping TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operations - Working under power lines	Live electricity.	3	3.4	10.2	5	2.04	3	3	5	3	3	3	Power lines TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operations - Piling	Noise, dust, exhaust fumes, moving machinery, moving vehicle, hydraulics, pneumatics.	3	3.4	10.2	5	2.04	3	3	5	3	3	3	Piling TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operations - Dry wall partitioning	Noise, dust, fumes, vibration, live electricity, hand & power tools, manual handling.	3	3	9	5	1.80	3	3	4	3	3	2	Dry wall/ partitioning TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operations - electrical installation	Live electricity.	5	3.2	16	5	3.20	5	3	5	3	3	2	Electrical installations TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operations - paving	Noise, dust, manual handling, hand Tools.	3	1.6	4.8	5	0.96	3	1	4	1	1	1	Paving TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operations - landscaping	Manual handling, fertilizer, hand tools, lawn mowers, brush cutters .	3	3.2	9.6	5	1.92	3	3	4	3	3	3	Landscaping TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operations - roof work	Manual handling, fall from heights, dropped tools and materials.	5	3.4	17	5	3.40	5	5	5	3	3	1	Roof work TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operations - fire installation	Musculo-skeletal injuries, hit by hand tools, fall from height, scaffold collapse, dropped tools and materials.	3	3.2	9.6	5	1.92	3	3	5	3	3	2	Fire instalations TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
General site operations - waterproofing	Musculo-skeletal Injuries, hit by hand tools, fall from height, scaffold collapse, dropped tools and materials, hot tools .	3	3.2	9.6	5	1.92	3	3	5	3	3	2	Waterproofing TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)

ACTIVITIES BASED ON PROGRAMME OF WORK	KEY SHE HAZARDS & UNWANTED EVENTS	FREQUENCY	SEVERITY	PURE RISK RATING	Mitigating	Residual Risk	Severity Categories						Additional Actions or More Detailed Assessments (TRA - Task Risk Assessment) SWMS - Safe Work Method Statement	Responsible
		1 - 5	1 - 5		1 - 5		F	BI	II	FI	LI	EI		
General site operations - post tensioning	Snapped cables, hydraulic & pneumatic pressure, noise.	3	2.8	8.4	5	1.68	3	3	5	2	2	2	Post tensioning TRA & SWMS + training.	S 16(2) R 8(1) & 8(5)
HCS - flammable liquid storage and use	Fires, explosions, hazardous substances exposure & spills.	5	3.6	18	5	3.60	5	4	5	3	3	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
HCS - Diesel tanks storage and use	Fires, explosions, hazardous substances exposure & spills.	5	3.6	18	5	3.60	5	4	5	3	3	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
HCS - Hazardous chemical substance storage/use	Fires, explosions, hazardous substances exposure & spills.	5	3.4	17	5	3.40	5	4	4	3	3	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
HCS - Disposal of waste	Manual handling, moving vehicles, lifting equipment, sharp material, hazardous substances.	5	3.2	16	5	3.20	5	3	4	3	3	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
Work in confined spaces	Low oxygen environment, hazardous substances, explosions , fires, entrapment.	2	3.6	7.2	5	1.44	2	4	5	4	4	1	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
Prevailing Rock & Soil Conditions	High groundwater levels - ingress into excavations.	4	4	16	5	3.20	4	4	5	4	4	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
Prevailing Weather Conditions	Area known for severe storm activity (wind and rain).	2	3.6	7.2	5	1.44	2	4	5	3	3	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
Traffic Flow to and from site (Congestion)	Significant congestion and impedement of traffic at peak times.	5	3.2	16	5	3.20	5	4	4	3	3	2	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
Incompetent Contractors & Supervision	Project stopped - unsafe acts & conditions.	5	3.8	19	5	3.80	5	3	5	4	4	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
No Construction Work Permit	Project stopped.	5	3.2	16	5	3.20	5	3	2	4	4	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
No Notification of Construction	Project stopped.	5	3.2	16	5	3.20	5	3	2	4	4	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
Poor Quality of Compliance Audits	Unsafe acts & conditions.	5	3.8	19	5	3.80	5	3	5	4	4	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
No SACPCMP Registered Safety Officers	Project stopped - unsafe acts & conditions.	5	3.8	19	5	3.80	5	3	5	4	4	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
No SACPCMP Registered Safety Agents	Project stopped - unsafe acts & conditions.	5	3.8	19	5	3.80	5	3	5	4	4	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
Intoxicated persons on site	Fall from height, injury to workers, motor vehicle accident.	5	4	20	5	4.00	5	4	5	4	4	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
SHE Reps and SHE Committees - Not functioning	Unsafe acts & conditions.	3	3	9	5	1.80	3	3	4	3	3	2	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
No First Aid or no prompt first aid	Injuries become worse of infected.	4	3.2	12.8	5	2.56	4	3	4	3	3	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
Poor quality of Risk Assessments of No Risk Assessments	Project stopped - unsafe acts & conditions.	5	3.8	19	5	3.80	5	3	5	4	4	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
No or poor Emergency Plan	Unsafe acts & conditions.	4	3.4	13.6	5	2.72	4	3	5	3	3	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
Not testing the Emergency Plan	Workers unaware of how to respond.	4	3.4	13.6	5	2.72	4	3	5	3	3	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
No Fire Fighting Equipment or Equipment not working	Fire and explosions - fire spread.	4	3.4	13.6	6	2.27	4	3	5	3	3	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
No inspections & maintenance of Plant & Equipment	Unsafe acts & conditions.	5	4.2	21	5	4.20	5	4	5	4	4	4	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
Incorrect or no PPE	Injuries to workers ,incorrect disposal of contaminated PPE.	5	2.6	13	5	2.60	5	2	4	2	2	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
No Edge Protection	Fall from height , materials dropped from height.	4	3.8	15.2	5	3.04	4	4	5	4	4	2	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
No Fall Protection Plan or Incorrect Fall Protection Plan	Fall from height , materials dropped from height.	4	3.8	15.2	5	3.04	4	4	5	4	4	2	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
Worker Transportation to and from site	Motor vehicle accident, multiple fatalities.	5	4	20	5	4.00	5	4	5	4	4	3	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)
Local Community	BMF demand for work, violence, fires emergencies.	5	3.8	19	5	3.80	5	5	5	4	3	2	Task risk assessment & SWMS + training.	S 16(2) R 8(1) & 8(5)

RISK RATING MATRIX

HIGH
17 - 25

MEDIUM
8 - 16

LOW
1 - 7

					SEVERITY CATEGORIES							
					RATING	IMPACT ON BUSINESS ACTIVITIES (BI)	NATURE OF INCIDENT (PAST AND FUTURE POTENTIAL) (II)	NATURE OF LOSS / DAMAGE (FINANCIAL) (FI)	LEGAL/SAG IMPACT (LEGAL) (LI)	NATURE OF ECOLOGICAL IMPACT (ENVIRONMENTAL). (EI)		
FREQUENCY	5	10	15	20		25	5	CATASTROPHIC DOWN TIME PROCESS DELAY >MONTH	FATAL INJURY/ SEVERAL INJURIES	DEVASTATING DAMAGE/LOSS >R10 MIL	INTER- NATIONAL PRESSURE	IRREVERSIBLE ECOLOGICAL AND/OR SOCIAL DAMAGE
	4	8	12	16		20	4	CRITICAL DOWN TIME PROCESS DELAY < MONTH	DISABLING INJURY >3 DAYS	WIDESPREAD DAMAGE/LOSS BETWEEN R1 - R10 MIL	NATIONAL GOVERNMENT PRESSURE	MAJOR INCIDENT, POTENTIAL REVERSIBLE WITH LONG TERM ECOLOGICAL DAMAGE AND PERMANENT IMPACT ON COMMUNITY
	3	6	9	12		15	3	SERIOUS DOWN TIME PROCESS DELAY (>WEEK)	DISABLING INJURY <3 DAYS	WIDESPREAD DAMAGE/LOSS <R1 MIL	PROVINCIAL GOVERNMENT PRESSURE	POTENTIAL REVERSIBLE WITH LONG TERM ECOLOGICAL DAMAGE AND SIGNIFICANT IMPACT ON COMMUNITY
	2	4	6	8		10	2	MEDIUM DOWN TIME PROCESS DELAY (>DAY)	MINOR INJURY	MINOR DAMAGE/LOSS <R50 000	LOCAL AUTHORITIES REACTION (ORGANISED)	SHORT-TERM ECOLOGICAL DISTURBANCE AND/OR RESTRICTED IMPACT ON COMMUNITY
	1	2	3	4		5	1	MINIMAL OR ZERO DOWN TIME PROCESS DELAY (<DAY)	NO INJURY	INSIGNIFICANT DAMAGE OR ZERO LOSS	INDIVIDUAL COMPLAINTS (LITTLE OR NO REACTION)	MINIMAL OR ZERO ENVIRONMENTAL CONSEQUENCES, ECOLOGICAL STRESS AND/OR NUISANCE TO THE COMMUNITY
SEVERITY				FREQUENCY OF EXPOSURE	DESCRIPTION	Rare	LOW LIKELIHOOD	CAN HAPPEN	PROBABLE	REGULAR		
					PROBABILITY	COULD HAPPEN ONCE IN 5 YEARS	COULD HAPPEN ONCE A YEAR	COULD HAPPEN ONCE A MONTH	COULD HAPPEN ONCE A WEEK	COULD HAPPEN ONCE A DAY		
					FREQUENCY	1/5 YEARS	1/YEAR	1/MONTH	1/WEEK	1/DAY		
					RATING	1	2	3	4	5		

C1.3.3 Annexure C - Design Indemnity Form

JBCC EDITION 6.2

DOCUMENT/S

Principal Building Agreement

Nominated/Selected Subcontract Agreement

7.0 DESIGN RESPONSIBILITY – “N/S Subcontract Agreement”

7.1 Unless otherwise stated [CD], the **subcontractor** shall not be responsible for the design of the **subcontract works** other than the **subcontractor's** temporary works. The **subcontractor** shall not be responsible for the coordination of design elements

7.2 Where the **subcontractor** is appointed to design, supply and install an element [CD]:

7.2.1 The **subcontractor** shall submit design documentation to suit the dates in the **programme** to the **contractor** for review by the **principal agent** or relevant **agent** for conformity with this **subcontract agreement**

7.2.2 The **principal agent** and/or **agents** shall be responsible for review and coordination of design documentation [23.2.8]

7.2.3 The **subcontractor** indemnifies the **contractor** for consequences of such design and shall cede such indemnity, warranties, and other rights to the **employer** [9.1; 12.3.20 & 22]

7.2.4 The **subcontractor** shall provide proof of professional insurance, where required [CD] [10.1.5]

**FORM OF INDEMNITY BY SELECTED SUBCONTRACTOR
UNDERTAKING DESIGN RESPONSIBILITY**

[refer to Clauses 7.2 of the JBCC Edition 6.2 May 2018 2000 N/S Subcontract Agreement)]

EMPLOYER : _____

PROJECT : _____

CONTRACTOR (PRINCIPAL) : _____

SELECTED SUB-CONTRACTOR : _____

RESPONSIBLE ENGINEER / DESIGNER : _____

DESCRIPTION OF SUBCONTRACT WORKS : _____

We (Selected Subcontractor) :

hereby indemnify and hold free:

- the architect : _____

- the contractor (principal) : _____

from responsibility for any claim or proceeding whatsoever due to fault in the design, detailing, calculations, manufacturing and erection of the work to the extent that such design is undertaken by us. With regard to the assumption of such design responsibility, we undertake, in addition, to provide professional indemnity cover to the extent as may reasonably be required by the Employer.

Signed at _____ on this _____ day of _____ 20 _____

Selected Subcontractor _____

As Witness _____ As Witness _____

Responsible Designer / Engineer _____

As Witness _____ As Witness _____

JBCC EDITION 6.2

DOCUMENT/S
Principal Building Agreement
Nominated/Selected Subcontract Agreement

Proof of Professional Insurance [7.2.4]

FORM OF DESIGN INDEMNITY BY SUB-CONTRACTOR

PROJECT : SANSANASA data center, Matjiesfontein
CONTRACTOR : TBD
EMPLOYER : SANSANASA
CONTRACT DATE : _____

DESCRIPTION OF WORK :

DESIGN, SUPPLY AND INSTALLATION OF THE

Access flooring

I/We the undersigned, hereby

1. Warrant and undertake unto and in favour of the Building owner, the Architect, the Consulting Engineer and the Principal Contractor that:
 - a) I/We, insofar as the sub-contract works relating to my/our foregoing tender have been or will be designed by me/us, have exercised and shall exercise due and proper skill and care in such design; and
 - b) I/We insofar as any part of the materials or goods for the sub-contract works relating to my/our foregoing tender have been or will be selected by me/us, have exercised and shall exercise due and proper skill and care in such selection of materials or goods; and
 - c) I/We shall comply with and satisfy any performance specification or requirement insofar as such performance specification or requirement is included or referred to in my/our foregoing tender; and
2. Undertake and shall be obliged to pay and make good to the Building Owner all damages which the Building Owner may suffer as a result of my/our non-compliance with the warranties as set out in paragraph 1. above; and
3. Indemnify the Architect, the Consulting Engineer and the Principal Contractor and hold them blameless and free of claims and proceedings of whatsoever nature, instituted against them or any one more of them by any person whatsoever (including the Building Owner) in respect of or arising from the design of the sub-contract works relating to my/our foregoing tender, insofar as such design has or shall be made by me/us, or from the use or any materials or goods for the sub-contract work relating to my/our foregoing tender insofar as such materials or goods have been or shall be selected by me/us, or from my/our failure to comply with and satisfy any performance specification or requirement as is included or referred to in my/our foregoing tender.

For purposes of the Warranty and indemnity the terms Building Owner, Architect, Consulting Engineer and Principal Contractor shall mean the persons indicated as such under the heading CONTRACTING AND OTHER PARTIES in the foregoing tender document.

Except to the extent as set out in the Warranty and Indemnity, nothing herein contained shall create any privity of contract between the Building Owner and myself/ourselves. This Warranty and Indemnity shall become of force and effect in the event of my/our foregoing tender being accepted by the Principal Contractor with or without any modification, and shall in such an event for all purposes be deemed to have been accepted by the Building Owner, the Architect, the Consulting Engineer and the Principal Contractor.

Date : _____

Signature : _____

Name of Signatory : _____

Name of firm represented
By Signatory : _____

FORM OF DESIGN INDEMNITY BY SUB-CONTRACTOR

PROJECT : SANSANASA data center, Matjiesfontein
.....
CONTRACTOR : TBD
.....
EMPLOYER : SANSANASA
.....
CONTRACT DATE : _____

DESCRIPTION OF WORK :

DESIGN, SUPPLY AND INSTALLATION OF THE

Balustrades
.....

I/We the undersigned, hereby

1. Warrant and undertake unto and in favour of the Building owner, the Architect, the Consulting Engineer and the Principal Contractor that:
 - a) I/We, insofar as the sub-contract works relating to my/our foregoing tender have been or will be designed by me/us, have exercised and shall exercise due and proper skill and care in such design; and
 - b) I/We insofar as any part of the materials or goods for the sub-contract works relating to my/our foregoing tender have been or will be selected by me/us, have exercised and shall exercise due and proper skill and care in such selection of materials or goods; and
 - c) I/We shall comply with and satisfy any performance specification or requirement insofar as such performance specification or requirement is included or referred to in my/our foregoing tender; and
2. Undertake and shall be obliged to pay and make good to the Building Owner all damages which the Building Owner may suffer as a result of my/our non-compliance with the warranties as set out in paragraph 1. above; and
3. Indemnify the Architect, the Consulting Engineer and the Principal Contractor and hold them blameless and free of claims and proceedings of whatsoever nature, instituted against them or any one more of them by any person whatsoever (including the Building Owner) in respect of or arising from the design of the sub-contract works relating to my/our foregoing tender, insofar as such design has or shall be made by me/us, or from the use of any materials or goods for the sub-contract work relating to my/our foregoing tender insofar as such materials or goods have been or shall be selected by me/us, or from my/our failure to comply with and satisfy any performance specification or requirement as is included or referred to in my/our foregoing tender.

For purposes of the Warranty and indemnity the terms Building Owner, Architect, Consulting Engineer and Principal Contractor shall mean the persons indicated as such under the heading CONTRACTING AND OTHER PARTIES in the foregoing tender document.

Except to the extent as set out in the Warranty and Indemnity, nothing herein contained shall create any privity of contract between the Building Owner and myself/ourselves. This Warranty and Indemnity shall become of force and effect in the event of my/our foregoing tender being accepted by the Principal Contractor with or without any modification, and shall in such an event for all purposes be deemed to have been accepted by the Building Owner, the Architect, the Consulting Engineer and the Principal Contractor.

Date : _____

Signature : _____

Name of Signatory : _____

Name of firm represented
By Signatory : _____

FORM OF DESIGN INDEMNITY BY SUB-CONTRACTOR

PROJECT : SANSANASA data center, Matjiesfontein
CONTRACTOR : TBD
EMPLOYER : SANSANASA
CONTRACT DATE : _____

DESCRIPTION OF WORK :

DESIGN, SUPPLY AND INSTALLATION OF THE
Drywall Partitioning & Ceilings

I/We the undersigned, hereby

1. Warrant and undertake unto and in favour of the Building owner, the Architect, the Consulting Engineer and the Principal Contractor that:
 - a) I/We, insofar as the sub-contract works relating to my/our foregoing tender have been or will be designed by me/us, have exercised and shall exercise due and proper skill and care in such design; and
 - b) I/We insofar as any part of the materials or goods for the sub-contract works relating to my/our foregoing tender have been or will be selected by me/us, have exercised and shall exercise due and proper skill and care in such selection of materials or goods; and
 - c) I/We shall comply with and satisfy any performance specification or requirement insofar as such performance specification or requirement is included or referred to in my/our foregoing tender; and
2. Undertake and shall be obliged to pay and make good to the Building Owner all damages which the Building Owner may suffer as a result of my/our non-compliance with the warranties as set out in paragraph 1. above; and
3. Indemnify the Architect, the Consulting Engineer and the Principal Contractor and hold them blameless and free of claims and proceedings of whatsoever nature, instituted against them or any one more of them by any person whatsoever (including the Building Owner) in respect of or arising from the design of the sub-contract works relating to my/our foregoing tender, insofar as such design has or shall be made by me/us, or from the use or any materials or goods for the sub-contract work relating to my/our foregoing tender insofar as such materials or goods have been or shall be selected by me/us, or from my/our failure to comply with and satisfy any performance specification or requirement as is included or referred to in my/our foregoing tender.

For purposes of the Warranty and indemnity the terms Building Owner, Architect, Consulting Engineer and Principal Contractor shall mean the persons indicated as such under the heading CONTRACTING AND OTHER PARTIES in the foregoing tender document.

Except to the extent as set out in the Warranty and Indemnity, nothing herein contained shall create any privity of contract between the Building Owner and myself/ourselves. This Warranty and Indemnity shall become of force and effect in the event of my/our foregoing tender being accepted by the Principal Contractor with or without any modification, and shall in such an event for all purposes be deemed to have been accepted by the Building Owner, the Architect, the Consulting Engineer and the Principal Contractor.

Date : _____

Signature : _____

Name of Signatory : _____

Name of firm represented
By Signatory : _____

FORM OF DESIGN INDEMNITY BY SUB-CONTRACTOR

PROJECT : SANSANASA data center, Matjiesfontein
CONTRACTOR : TBD
EMPLOYER : SANSANASA
CONTRACT DATE : _____

DESCRIPTION OF WORK :

DESIGN, SUPPLY AND INSTALLATION OF THE
Ironmongery

I/We the undersigned, hereby

1. Warrant and undertake unto and in favour of the Building owner, the Architect, the Consulting Engineer and the Principal Contractor that:
 - a) I/We, insofar as the sub-contract works relating to my/our foregoing tender have been or will be designed by me/us, have exercised and shall exercise due and proper skill and care in such design; and
 - b) I/We insofar as any part of the materials or goods for the sub-contract works relating to my/our foregoing tender have been or will be selected by me/us, have exercised and shall exercise due and proper skill and care in such selection of materials or goods; and
 - c) I/We shall comply with and satisfy any performance specification or requirement insofar as such performance specification or requirement is included or referred to in my/our foregoing tender; and
2. Undertake and shall be obliged to pay and make good to the Building Owner all damages which the Building Owner may suffer as a result of my/our non-compliance with the warranties as set out in paragraph 1. above; and
3. Indemnify the Architect, the Consulting Engineer and the Principal Contractor and hold them blameless and free of claims and proceedings of whatsoever nature, instituted against them or any one more of them by any person whatsoever (including the Building Owner) in respect of or arising from the design of the sub-contract works relating to my/our foregoing tender, insofar as such design has or shall be made by me/us, or from the use of any materials or goods for the sub-contract work relating to my/our foregoing tender insofar as such materials or goods have been or shall be selected by me/us, or from my/our failure to comply with and satisfy any performance specification or requirement as is included or referred to in my/our foregoing tender.

For purposes of the Warranty and indemnity the terms Building Owner, Architect, Consulting Engineer and Principal Contractor shall mean the persons indicated as such under the heading CONTRACTING AND OTHER PARTIES in the foregoing tender document.

Except to the extent as set out in the Warranty and Indemnity, nothing herein contained shall create any privity of contract between the Building Owner and myself/ourselves. This Warranty and Indemnity shall become of force and effect in the event of my/our foregoing tender being accepted by the Principal Contractor with or without any modification, and shall in such an event for all purposes be deemed to have been accepted by the Building Owner, the Architect, the Consulting Engineer and the Principal Contractor.

Date : _____

Signature : _____

Name of Signatory : _____

Name of firm represented
By Signatory : _____

FORM OF DESIGN INDEMNITY BY SUB-CONTRACTOR

PROJECT : SANSANASA data center, Matjiesfontein
CONTRACTOR : TBD
EMPLOYER : SANSANASA
CONTRACT DATE : _____

DESCRIPTION OF WORK :

DESIGN, SUPPLY AND INSTALLATION OF THE
Joinery

I/We the undersigned, hereby

1. Warrant and undertake unto and in favour of the Building owner, the Architect, the Consulting Engineer and the Principal Contractor that:
 - a) I/We, insofar as the sub-contract works relating to my/our foregoing tender have been or will be designed by me/us, have exercised and shall exercise due and proper skill and care in such design; and
 - b) I/We insofar as any part of the materials or goods for the sub-contract works relating to my/our foregoing tender have been or will be selected by me/us, have exercised and shall exercise due and proper skill and care in such selection of materials or goods; and
 - c) I/We shall comply with and satisfy any performance specification or requirement insofar as such performance specification or requirement is included or referred to in my/our foregoing tender; and
2. Undertake and shall be obliged to pay and make good to the Building Owner all damages which the Building Owner may suffer as a result of my/our non-compliance with the warranties as set out in paragraph 1. above; and
3. Indemnify the Architect, the Consulting Engineer and the Principal Contractor and hold them blameless and free of claims and proceedings of whatsoever nature, instituted against them or any one more of them by any person whatsoever (including the Building Owner) in respect of or arising from the design of the sub-contract works relating to my/our foregoing tender, insofar as such design has or shall be made by me/us, or from the use or any materials or goods for the sub-contract work relating to my/our foregoing tender insofar as such materials or goods have been or shall be selected by me/us, or from my/our failure to comply with and satisfy any performance specification or requirement as is included or referred to in my/our foregoing tender.

For purposes of the Warranty and indemnity the terms Building Owner, Architect, Consulting Engineer and Principal Contractor shall mean the persons indicated as such under the heading CONTRACTING AND OTHER PARTIES in the foregoing tender document.

Except to the extent as set out in the Warranty and Indemnity, nothing herein contained shall create any privity of contract between the Building Owner and myself/ourselves. This Warranty and Indemnity shall become of force and effect in the event of my/our foregoing tender being accepted by the Principal Contractor with or without any modification, and shall in such an event for all purposes be deemed to have been accepted by the Building Owner, the Architect, the Consulting Engineer and the Principal Contractor.

Date : _____

Signature : _____

Name of Signatory : _____

Name of firm represented
By Signatory : _____

FORM OF DESIGN INDEMNITY BY SUB-CONTRACTOR

PROJECT : SANSANASA data center, Matjiesfontein
.....
CONTRACTOR : TBD
.....
EMPLOYER : SANSANASA
.....
CONTRACT DATE : _____

DESCRIPTION OF WORK :

DESIGN, SUPPLY AND INSTALLATION OF THE
Metalworks
.....

I/We the undersigned, hereby

1. Warrant and undertake unto and in favour of the Building owner, the Architect, the Consulting Engineer and the Principal Contractor that:
 - a) I/We, insofar as the sub-contract works relating to my/our foregoing tender have been or will be designed by me/us, have exercised and shall exercise due and proper skill and care in such design; and
 - b) I/We insofar as any part of the materials or goods for the sub-contract works relating to my/our foregoing tender have been or will be selected by me/us, have exercised and shall exercise due and proper skill and care in such selection of materials or goods; and
 - c) I/We shall comply with and satisfy any performance specification or requirement insofar as such performance specification or requirement is included or referred to in my/our foregoing tender; and
2. Undertake and shall be obliged to pay and make good to the Building Owner all damages which the Building Owner may suffer as a result of my/our non-compliance with the warranties as set out in paragraph 1. above; and
3. Indemnify the Architect, the Consulting Engineer and the Principal Contractor and hold them blameless and free of claims and proceedings of whatsoever nature, instituted against them or any one more of them by any person whatsoever (including the Building Owner) in respect of or arising from the design of the sub-contract works relating to my/our foregoing tender, insofar as such design has or shall be made by me/us, or from the use or any materials or goods for the sub-contract work relating to my/our foregoing tender insofar as such materials or goods have been or shall be selected by me/us, or from my/our failure to comply with and satisfy any performance specification or requirement as is included or referred to in my/our foregoing tender.

For purposes of the Warranty and indemnity the terms Building Owner, Architect, Consulting Engineer and Principal Contractor shall mean the persons indicated as such under the heading CONTRACTING AND OTHER PARTIES in the foregoing tender document.

Except to the extent as set out in the Warranty and Indemnity, nothing herein contained shall create any privity of contract between the Building Owner and myself/ourselves. This Warranty and Indemnity shall become of force and effect in the event of my/our foregoing tender being accepted by the Principal Contractor with or without any modification, and shall in such an event for all purposes be deemed to have been accepted by the Building Owner, the Architect, the Consulting Engineer and the Principal Contractor.

Date : _____

Signature : _____

Name of Signatory : _____

Name of firm represented
By Signatory : _____

FORM OF DESIGN INDEMNITY BY SUB-CONTRACTOR

PROJECT : SANSA/NASA data center, Matjiesfontein
.....
CONTRACTOR : TBD
.....
EMPLOYER : SANSA
.....
CONTRACT DATE : _____

DESCRIPTION OF WORK :

DESIGN, SUPPLY AND INSTALLATION OF THE
Paint
.....

I/We the undersigned, hereby

1. Warrant and undertake unto and in favour of the Building owner, the Architect, the Consulting Engineer and the Principal Contractor that:
 - a) I/We, insofar as the sub-contract works relating to my/our foregoing tender have been or will be designed by me/us, have exercised and shall exercise due and proper skill and care in such design; and
 - b) I/We insofar as any part of the materials or goods for the sub-contract works relating to my/our foregoing tender have been or will be selected by me/us, have exercised and shall exercise due and proper skill and care in such selection of materials or goods; and
 - c) I/We shall comply with and satisfy any performance specification or requirement insofar as such performance specification or requirement is included or referred to in my/our foregoing tender; and
2. Undertake and shall be obliged to pay and make good to the Building Owner all damages which the Building Owner may suffer as a result of my/our non-compliance with the warranties as set out in paragraph 1. above; and
3. Indemnify the Architect, the Consulting Engineer and the Principal Contractor and hold them blameless and free of claims and proceedings of whatsoever nature, instituted against them or any one more of them by any person whatsoever (including the Building Owner) in respect of or arising from the design of the sub-contract works relating to my/our foregoing tender, insofar as such design has or shall be made by me/us, or from the use of any materials or goods for the sub-contract work relating to my/our foregoing tender insofar as such materials or goods have been or shall be selected by me/us, or from my/our failure to comply with and satisfy any performance specification or requirement as is included or referred to in my/our foregoing tender.

For purposes of the Warranty and indemnity the terms Building Owner, Architect, Consulting Engineer and Principal Contractor shall mean the persons indicated as such under the heading CONTRACTING AND OTHER PARTIES in the foregoing tender document.

Except to the extent as set out in the Warranty and Indemnity, nothing herein contained shall create any privity of contract between the Building Owner and myself/ourselves. This Warranty and Indemnity shall become of force and effect in the event of my/our foregoing tender being accepted by the Principal Contractor with or without any modification, and shall in such an event for all purposes be deemed to have been accepted by the Building Owner, the Architect, the Consulting Engineer and the Principal Contractor.

Date : _____

Signature : _____

Name of Signatory : _____

Name of firm represented
By Signatory : _____

FORM OF DESIGN INDEMNITY BY SUB-CONTRACTOR

PROJECT : SANSANASA data center, Matjiesfontein
.....
CONTRACTOR : TBD
.....
EMPLOYER : SANSANASA
.....
CONTRACT DATE : _____

DESCRIPTION OF WORK :

DESIGN, SUPPLY AND INSTALLATION OF THE
Roofs
.....

I/We the undersigned, hereby

1. Warrant and undertake unto and in favour of the Building owner, the Architect, the Consulting Engineer and the Principal Contractor that:
 - a) I/We, insofar as the sub-contract works relating to my/our foregoing tender have been or will be designed by me/us, have exercised and shall exercise due and proper skill and care in such design; and
 - b) I/We insofar as any part of the materials or goods for the sub-contract works relating to my/our foregoing tender have been or will be selected by me/us, have exercised and shall exercise due and proper skill and care in such selection of materials or goods; and
 - c) I/We shall comply with and satisfy any performance specification or requirement insofar as such performance specification or requirement is included or referred to in my/our foregoing tender; and
2. Undertake and shall be obliged to pay and make good to the Building Owner all damages which the Building Owner may suffer as a result of my/our non-compliance with the warranties as set out in paragraph 1. above; and
3. Indemnify the Architect, the Consulting Engineer and the Principal Contractor and hold them blameless and free of claims and proceedings of whatsoever nature, instituted against them or any one more of them by any person whatsoever (including the Building Owner) in respect of or arising from the design of the sub-contract works relating to my/our foregoing tender, insofar as such design has or shall be made by me/us, or from the use of any materials or goods for the sub-contract work relating to my/our foregoing tender insofar as such materials or goods have been or shall be selected by me/us, or from my/our failure to comply with and satisfy any performance specification or requirement as is included or referred to in my/our foregoing tender.

For purposes of the Warranty and indemnity the terms Building Owner, Architect, Consulting Engineer and Principal Contractor shall mean the persons indicated as such under the heading CONTRACTING AND OTHER PARTIES in the foregoing tender document.

Except to the extent as set out in the Warranty and Indemnity, nothing herein contained shall create any privity of contract between the Building Owner and myself/ourselves. This Warranty and Indemnity shall become of force and effect in the event of my/our foregoing tender being accepted by the Principal Contractor with or without any modification, and shall in such an event for all purposes be deemed to have been accepted by the Building Owner, the Architect, the Consulting Engineer and the Principal Contractor.

Date : _____

Signature : _____

Name of Signatory : _____

Name of firm represented
By Signatory : _____

FORM OF DESIGN INDEMNITY BY SUB-CONTRACTOR

PROJECT : SANSANASA data center, Matjiesfontein
CONTRACTOR : TBD
EMPLOYER : SANSANASA
CONTRACT DATE : _____

DESCRIPTION OF WORK :

DESIGN, SUPPLY AND INSTALLATION OF THE
Sanitaryware

I/We the undersigned, hereby

1. Warrant and undertake unto and in favour of the Building owner, the Architect, the Consulting Engineer and the Principal Contractor that:
 - a) I/We, insofar as the sub-contract works relating to my/our foregoing tender have been or will be designed by me/us, have exercised and shall exercise due and proper skill and care in such design; and
 - b) I/We insofar as any part of the materials or goods for the sub-contract works relating to my/our foregoing tender have been or will be selected by me/us, have exercised and shall exercise due and proper skill and care in such selection of materials or goods; and
 - c) I/We shall comply with and satisfy any performance specification or requirement insofar as such performance specification or requirement is included or referred to in my/our foregoing tender; and
2. Undertake and shall be obliged to pay and make good to the Building Owner all damages which the Building Owner may suffer as a result of my/our non-compliance with the warranties as set out in paragraph 1. above; and
3. Indemnify the Architect, the Consulting Engineer and the Principal Contractor and hold them blameless and free of claims and proceedings of whatsoever nature, instituted against them or any one more of them by any person whatsoever (including the Building Owner) in respect of or arising from the design of the sub-contract works relating to my/our foregoing tender, insofar as such design has or shall be made by me/us, or from the use of any materials or goods for the sub-contract work relating to my/our foregoing tender insofar as such materials or goods have been or shall be selected by me/us, or from my/our failure to comply with and satisfy any performance specification or requirement as is included or referred to in my/our foregoing tender.

For purposes of the Warranty and indemnity the terms Building Owner, Architect, Consulting Engineer and Principal Contractor shall mean the persons indicated as such under the heading CONTRACTING AND OTHER PARTIES in the foregoing tender document.

Except to the extent as set out in the Warranty and Indemnity, nothing herein contained shall create any privity of contract between the Building Owner and myself/ourselves. This Warranty and Indemnity shall become of force and effect in the event of my/our foregoing tender being accepted by the Principal Contractor with or without any modification, and shall in such an event for all purposes be deemed to have been accepted by the Building Owner, the Architect, the Consulting Engineer and the Principal Contractor.

Date : _____

Signature : _____

Name of Signatory : _____

Name of firm represented
By Signatory : _____

FORM OF DESIGN INDEMNITY BY SUB-CONTRACTOR

PROJECT : SANSANASA data center, Matjiesfontein
CONTRACTOR : TBD
EMPLOYER : SANSANASA
CONTRACT DATE : _____

DESCRIPTION OF WORK :

DESIGN, SUPPLY AND INSTALLATION OF THE
Shopfronts

I/We the undersigned, hereby

1. Warrant and undertake unto and in favour of the Building owner, the Architect, the Consulting Engineer and the Principal Contractor that:
 - a) I/We, insofar as the sub-contract works relating to my/our foregoing tender have been or will be designed by me/us, have exercised and shall exercise due and proper skill and care in such design; and
 - b) I/We insofar as any part of the materials or goods for the sub-contract works relating to my/our foregoing tender have been or will be selected by me/us, have exercised and shall exercise due and proper skill and care in such selection of materials or goods; and
 - c) I/We shall comply with and satisfy any performance specification or requirement insofar as such performance specification or requirement is included or referred to in my/our foregoing tender; and
2. Undertake and shall be obliged to pay and make good to the Building Owner all damages which the Building Owner may suffer as a result of my/our non-compliance with the warranties as set out in paragraph 1. above; and
3. Indemnify the Architect, the Consulting Engineer and the Principal Contractor and hold them blameless and free of claims and proceedings of whatsoever nature, instituted against them or any one more of them by any person whatsoever (including the Building Owner) in respect of or arising from the design of the sub-contract works relating to my/our foregoing tender, insofar as such design has or shall be made by me/us, or from the use or any materials or goods for the sub-contract work relating to my/our foregoing tender insofar as such materials or goods have been or shall be selected by me/us, or from my/our failure to comply with and satisfy any performance specification or requirement as is included or referred to in my/our foregoing tender.

For purposes of the Warranty and indemnity the terms Building Owner, Architect, Consulting Engineer and Principal Contractor shall mean the persons indicated as such under the heading CONTRACTING AND OTHER PARTIES in the foregoing tender document.

Except to the extent as set out in the Warranty and Indemnity, nothing herein contained shall create any privity of contract between the Building Owner and myself/ourselves. This Warranty and Indemnity shall become of force and effect in the event of my/our foregoing tender being accepted by the Principal Contractor with or without any modification, and shall in such an event for all purposes be deemed to have been accepted by the Building Owner, the Architect, the Consulting Engineer and the Principal Contractor.

Date : _____

Signature : _____

Name of Signatory : _____

Name of firm represented
By Signatory : _____

FORM OF DESIGN INDEMNITY BY SUB-CONTRACTOR

PROJECT : SANSANASA data center, Matjiesfontein
CONTRACTOR : TBD
EMPLOYER : SANSANASA
CONTRACT DATE : _____

DESCRIPTION OF WORK :

DESIGN, SUPPLY AND INSTALLATION OF THE
Signage

I/We the undersigned, hereby

1. Warrant and undertake unto and in favour of the Building owner, the Architect, the Consulting Engineer and the Principal Contractor that:
 - a) I/We, insofar as the sub-contract works relating to my/our foregoing tender have been or will be designed by me/us, have exercised and shall exercise due and proper skill and care in such design; and
 - b) I/We insofar as any part of the materials or goods for the sub-contract works relating to my/our foregoing tender have been or will be selected by me/us, have exercised and shall exercise due and proper skill and care in such selection of materials or goods; and
 - c) I/We shall comply with and satisfy any performance specification or requirement insofar as such performance specification or requirement is included or referred to in my/our foregoing tender; and
2. Undertake and shall be obliged to pay and make good to the Building Owner all damages which the Building Owner may suffer as a result of my/our non-compliance with the warranties as set out in paragraph 1. above; and
3. Indemnify the Architect, the Consulting Engineer and the Principal Contractor and hold them blameless and free of claims and proceedings of whatsoever nature, instituted against them or any one more of them by any person whatsoever (including the Building Owner) in respect of or arising from the design of the sub-contract works relating to my/our foregoing tender, insofar as such design has or shall be made by me/us, or from the use or any materials or goods for the sub-contract work relating to my/our foregoing tender insofar as such materials or goods have been or shall be selected by me/us, or from my/our failure to comply with and satisfy any performance specification or requirement as is included or referred to in my/our foregoing tender.

For purposes of the Warranty and indemnity the terms Building Owner, Architect, Consulting Engineer and Principal Contractor shall mean the persons indicated as such under the heading CONTRACTING AND OTHER PARTIES in the foregoing tender document.

Except to the extent as set out in the Warranty and Indemnity, nothing herein contained shall create any privity of contract between the Building Owner and myself/ourselves. This Warranty and Indemnity shall become of force and effect in the event of my/our foregoing tender being accepted by the Principal Contractor with or without any modification, and shall in such an event for all purposes be deemed to have been accepted by the Building Owner, the Architect, the Consulting Engineer and the Principal Contractor.

Date : _____

Signature : _____

Name of Signatory : _____

Name of firm represented
By Signatory : _____

FORM OF DESIGN INDEMNITY BY SUB-CONTRACTOR

PROJECT : SANSANASA data center, Matjiesfontein
CONTRACTOR : TBD
EMPLOYER : SANSANASA
CONTRACT DATE : _____

DESCRIPTION OF WORK :

DESIGN, SUPPLY AND INSTALLATION OF THE

Tiles

I/We the undersigned, hereby

1. Warrant and undertake unto and in favour of the Building owner, the Architect, the Consulting Engineer and the Principal Contractor that:
 - a) I/We, insofar as the sub-contract works relating to my/our foregoing tender have been or will be designed by me/us, have exercised and shall exercise due and proper skill and care in such design; and
 - b) I/We insofar as any part of the materials or goods for the sub-contract works relating to my/our foregoing tender have been or will be selected by me/us, have exercised and shall exercise due and proper skill and care in such selection of materials or goods; and
 - c) I/We shall comply with and satisfy any performance specification or requirement insofar as such performance specification or requirement is included or referred to in my/our foregoing tender; and
2. Undertake and shall be obliged to pay and make good to the Building Owner all damages which the Building Owner may suffer as a result of my/our non-compliance with the warranties as set out in paragraph 1. above; and
3. Indemnify the Architect, the Consulting Engineer and the Principal Contractor and hold them blameless and free of claims and proceedings of whatsoever nature, instituted against them or any one more of them by any person whatsoever (including the Building Owner) in respect of or arising from the design of the sub-contract works relating to my/our foregoing tender, insofar as such design has or shall be made by me/us, or from the use or any materials or goods for the sub-contract work relating to my/our foregoing tender insofar as such materials or goods have been or shall be selected by me/us, or from my/our failure to comply with and satisfy any performance specification or requirement as is included or referred to in my/our foregoing tender.

For purposes of the Warranty and indemnity the terms Building Owner, Architect, Consulting Engineer and Principal Contractor shall mean the persons indicated as such under the heading CONTRACTING AND OTHER PARTIES in the foregoing tender document.

Except to the extent as set out in the Warranty and Indemnity, nothing herein contained shall create any privity of contract between the Building Owner and myself/ourselves. This Warranty and Indemnity shall become of force and effect in the event of my/our foregoing tender being accepted by the Principal Contractor with or without any modification, and shall in such an event for all purposes be deemed to have been accepted by the Building Owner, the Architect, the Consulting Engineer and the Principal Contractor.

Date : _____

Signature : _____

Name of Signatory : _____

Name of firm represented
By Signatory : _____

FORM OF DESIGN INDEMNITY BY SUB-CONTRACTOR

PROJECT :

CONTRACTOR :

EMPLOYER :

CONTRACT DATE :

DESCRIPTION OF WORK :

DESIGN, SUPPLY AND INSTALLATION OF THE

.....

I/We the undersigned, hereby

1. Warrant and undertake unto and in favour of the Building owner, the Architect, the Consulting Engineer and the Principal Contractor that:
 - a) I/We, insofar as the sub-contract works relating to my/our foregoing tender have been or will be designed by me/us, have exercised and shall exercise due and proper skill and care in such design; and
 - b) I/We insofar as any part of the materials or goods for the sub-contract works relating to my/our foregoing tender have been or will be selected by me/us, have exercised and shall exercise due and proper skill and care in such selection of materials or goods; and
 - c) I/We shall comply with and satisfy any performance specification or requirement insofar as such performance specification or requirement is included or referred to in my/our foregoing tender; and
2. Undertake and shall be obliged to pay and make good to the Building Owner all damages which the Building Owner may suffer as a result of my/our non-compliance with the warranties as set out in paragraph 1. above; and
3. Indemnify the Architect, the Consulting Engineer and the Principal Contractor and hold them blameless and free of claims and proceedings of whatsoever nature, instituted against them or any one more of them by any person whatsoever (including the Building Owner) in respect of or arising from the design of the sub-contract works relating to my/our foregoing tender, insofar as such design has or shall be made by me/us, or from the use of any materials or goods for the sub-contract work relating to my/our foregoing tender insofar as such materials or goods have been or shall be selected by me/us, or from my/our failure to comply with and satisfy any performance specification or requirement as is included or referred to in my/our foregoing tender.

For purposes of the Warranty and indemnity the terms Building Owner, Architect, Consulting Engineer and Principal Contractor shall mean the persons indicated as such under the heading CONTRACTING AND OTHER PARTIES in the foregoing tender document.

Except to the extent as set out in the Warranty and Indemnity, nothing herein contained shall create any privity of contract between the Building Owner and myself/ourselves. This Warranty and Indemnity shall become of force and effect in the event of my/our foregoing tender being accepted by the Principal Contractor with or without any modification, and shall in such an event for all purposes be deemed to have been accepted by the Building Owner, the Architect, the Consulting Engineer and the Principal Contractor.

Date : _____

Signature : _____

Name of Signatory : _____

Name of firm represented
By Signatory : _____

C1.3.4 Annexure D – Environmental

ENVIRONMENTAL MANAGEMENT PROGRAMME

THE PROPOSED CONSTRUCTION OF RADIO ANTENNAE ON PORTION 8 OF FARM 148, NEAR MATJIESFONTEIN, LOCAL MUNICIPALITY, WESTERN CAPE PROVINCE

Prepared for:



The South African National Space Agency
SANSA Space Operations, PO Box 484, Silverton, 0127
Tel: 012 334 5118

Prepared by:



CES

**Elta House, 3 Caledonian Road, Mowbray, 7700
Cape Town**

Also in Grahamstown, Port Elizabeth, East London, Johannesburg and
Maputo (Mozambique)

www.cesnet.co.za

OCTOBER 2020

REVISIONS TRACKING TABLE

CES Report Revision and Tracking Schedule

Document Title:	Environmental Management Programme: The proposed construction of radio antennae on portion 8 of farm 148, near Matjiesfontein, Laingsburg Local Municipality, Western Cape Province, Coastal and Environmental Services (CES), October 2020, Cape Town.		
Client Name & Address:	The South African National Space Agency SANSa Space Operations, PO Box 484, Silverton, 0127 Tel: 012 334 5118		
Status:	DRAFT		
Issue Date:			
Lead Author:	Ms Skye Clarke-Mcleod		
Reviewer:	Ms Tarryn Martin (Pri. Sci. Nat)		
Study Leader/ Registered Environmental Assessment Practitioner – Approval:	Dr Anthony (Ted) Mark Avis		
Report Distribution	<i>Circulated to</i>	<i>No. of hard copies</i>	<i>No. electronic copies</i>
	George Baloyi Raoul Hodges		
Report Version	<i>Date</i>		

This document has been prepared in accordance with the scope of CES's appointment and contains intellectual property and proprietary information that is protected by copyright in favour of CES. The document may therefore not be reproduced, used or distributed to any third party without the prior written consent of CES. This document is prepared exclusively for use by CES's client. CES accepts no liability for any use of this document other than by its client and only for the purposes for which it was prepared. No person other than the client may copy (in whole or in part) use or rely on the contents of this document, without the prior written permission of CES. The document is subject to all confidentiality, copyright and trade secrets rules, intellectual property law and practices of South Africa.



Info@cesnet.co.za
www.cesnet.co.za

LIST OF ACRONYMS

BAR	Basic Assessment Report
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EMS	Environmental Management System
GN	Government Notice
I&AP	Interested and Affected Parties
KPI	Key Performance Indicator
SOP	Standard Operating Procedure

TABLE OF CONTENTS

1. INTRODUCTION.....	6
1.1. CONSTRUCTION EMPR	6
1.2. OPERATIONAL AND MAINTENANCE EMPR	7
2. CONTENTS OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)	8
3. BACKGROUND INFORMATION	10
3.1. PROJECT DESCRIPTION.....	10
3.2. ENVIRONMENTAL OBJECTIVES AND TARGETS	17
3.3. ENVIRONMENTAL LEGISLATION AND GUIDELINES	17
3.4. DETAILS OF EAP.....	17
4. IMPACT ASSESSMENT AND MITIGATION SUMMARY	18
4.1. SUMMARY OF IMPACTS ASSOCIATED WITH THE DEVELOPMENT	18
4.2. SUMMARY OF MITIGATION MEASURES	18
5. ENVIRONMENTAL MANAGEMENT SYSTEM	23
5.1. REPORTING	23
5.1.1. Administration.....	23
5.1.2. Record keeping	23
5.1.3. Document control.....	24
5.2. CONSTRUCTION PHASE	24
5.2.1. Clearing of the Site.....	24
5.2.2. Excavation, hauling and placement.....	24
5.2.3. Construction Activities and Equipment.....	24
5.2.4. Good housekeeping.....	25
5.2.5. SOLID WASTE MANAGEMENT	25
5.2.6. WATER USE	25
5.2.7. CONTAMINATED WATER	25
5.2.8. HAZARDOUS SUBSTANCES.....	26
5.2.9. CEMENT AND MIXING OF CONCRETE	26
5.2.10. FUEL (PETROL AND DIESEL) AND OIL	26
Fuel Storage.....	26
Refuelling.....	27
Used oil and hydrocarbon contaminated materials.....	27
5.2.11. ABLUTION FACILITIES	28
5.2.12. EATING AREAS.....	28
5.2.13. SITE STRUCTURES	28
5.2.14. LIGHTS	28
5.2.15. NOISE.....	28
5.2.16. DUST CONTROL	29
5.2.17. ENVIRONMENTAL AWARENESS TRAINING	29
Construction personnel information posters.....	29
5.2.18. FIRE CONTROL	30
5.2.19. EMERGENCY PROCEDURES	30
Accidental leaks and spillages	30
5.2.20. PROTECTION OF NATURAL FEATURES	31
5.2.21. PROTECTION OF FLORA AND FAUNA	31
5.2.22. PROTECTION OF HERITAGE FEATURES	31
5.2.23. VEGETATION CLEARANCE.....	31
5.2.24. ALIEN VEGETATION CLEARANCE.....	32
5.2.25. REVEGETATION.....	32
5.2.26. TOPSOIL STRIPPING AND STOCKPILING	32
5.2.27. STORMWATER MANAGEMENT	33
5.2.28. EROSION AND SEDIMENTATION CONTROL.....	33
5.2.29. AESTHETICS.....	33
5.2.30. COMMUNITY RELATIONS.....	33

5.3.	OPERTION PHASE	33
5.3.1.	EMERGENCY PROCEDURES	33
	<i>Fire</i>	33
5.3.2.	AESTHETICS.....	34
6.	ENVIRONMENTAL MANAGEMENT PROTOCOL.....	35
6.1.	ROLES AND RESPONSIBILITIES	35
6.1.1.	APPLICANT/DEVELOPER	35
6.1.2.	CONTRACTOR	35
6.1.3.	ENVIRONMENTAL CONTROL OFFICER	35
6.2.	ADDITIONAL MITIGATION MEASURES	36
6.2.1.	PRE-CONSTRUCTION.....	36
6.2.2.	CONSTRUCTION PHASE.....	36
6.2.3.	OPERATIONAL PHASE	36
7.	ENVIRONMENTAL AWARENESS	37
8.	CONCLUSION	38
	ANNEXURE 1: METHOD STATEMENTS	39
	ANNEXURE 2: BASIC ENVIRONMENTAL EDUCATION COURSE OUTLINE	42
	ANNEXURE 3: DETAILS AND CVS OF THE PROJECT TEAM	45
	ANNEXURE 4: SITE SENSITIVITY MAP: ECOLOGICAL SUPPORT AREAS	46

1. INTRODUCTION

An Environmental Management Programme (EMPr) must consist of a set of mitigation, monitoring and institutional measures to be taken during implementation and operation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The plan also includes the actions needed to implement these measures.

An EMPr can be defined as, “*an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the project are enhanced*”. The EMPr is an important tool used to ensure the sound environmental management of projects, provided the specifications are implemented and the user understands the contents of the report and the reasons for the implementation of certain specifications.

The EMPr has the following objectives:

- To state standards and guidelines which are required to be achieved in terms of environmental legislation;
- To set out the mitigation measures and environmental specifications which are required to be implemented for all phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts and where possible to improve the condition of the environment;
- To provide guidance regarding method statements which are required to be implemented to achieve the environmental specifications;
- To define corrective actions, this must be taken in the event of non-compliance with the specifications; and
- To prevent long-term or permanent environmental degradation.

There are four broad categories of EMPrs: Design EMPr, Construction EMPr, Operational EMPr and Decommissioning EMPr. The objectives of these EMPrs are all the same and include identifying the possible environmental impacts of the proposed activity and developing measures to minimise, mitigate and manage the negative impacts while enhancing the positive ones. The difference between these EMPrs is related to the different mitigation measures required for the different stages of the project life cycle.

The proposed radio antennae will not be decommissioned in the foreseeable future, and thus the decommissioning phase for this development is not assessed further in this report. Each remaining category of the EMPr is discussed in more detail below.

1.1. CONSTRUCTION EMPr

The Construction EMPr details the environmental management system/framework within which construction activities will be governed for the Construction Phase. The Construction EMPr consists of various actions, initiatives and systems (such as a Standard Operating Procedure – SOP, or a Method Statement) that the contractor will have to ensure are in place and are implemented and complied with. The Construction EMPr consists of both a management system (in so far as it explains responsibilities and lines of reporting), and environmental specifications which contain detailed specifications related to achieving specific mitigation measures that will need to be undertaken or adhered to by the contractor.

The Construction EMPr must be developed in parallel with the final design stages, and constructive input must be invited from the selected contractor. This is required not to soften the document, but rather to ensure that the requirements in the Construction EMPr are practical, cost effective and implementable. Sound environmental management is orientated around pragmatic, unambiguous but enforceable guidelines and specifications, and for this reason it is imperative that the contractor, while being bound by the EMPr, fully understands it and has had input into its final development. For this reason the final construction EMPr will need to be signed off after input from the selected contractor, and prior to the initiation of construction activities. It should, however, be noted that the contractor must tender on the existing document and that in areas of uncertainty, a precautionary approach to the environmental guidelines and specifications must be adopted (by, for example, providing Prime Cost and Provisional Sum amounts).

1.2. OPERATIONAL AND MAINTENANCE EMPR

The operational phase EMPr provides specific guidance related to operational activities associated with a particular development. Operational EMPrs are sometimes referred to as an Environmental Management System (EMS). Impacts during the operational phase of a development of this nature (i.e. Radio Antennae) will be few in number and low in intensity. By taking proactive measures during the construction phase, potential operational phase environmental impacts will be minimised. Monitoring of certain issues, such as the stormwater runoff, erosion control and waste management will be necessary in the operational phase. The final Operational EMPr must be developed in conjunction with any other relevant stakeholders prior to the adoption thereof.

2. CONTENTS OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

The contents of the *Environmental Management Programme (EMPr)*, as defined the 2014 Environmental Impact Assessment (EIA) Regulations published as Government Notice (GN) No R. 982 (amended in 2017 in GN R 326) and Chapter 5 of the National Environmental Management Act (NEMA) (Act No. 107 of 1998, as amended) is presented in Table 1 below.

TABLE 1: Contents of an EMPr

EMPr REQUIREMENTS ACCORDING TO APPENDIX 4 OF THE 2014 EIA REGULATIONS (AS AMENDED IN APRIL 2017)	SECTION OF REPORT
<i>An EMPr must comply with section 24N of the Act and include-</i>	Section 3.5 and Annexure 3
<i>a. Details of:</i>	Annexure 3
<i>i. the EAP who prepared the EMPr; and</i>	
<i>ii. the expertise of that EAP to prepare an EMPr, including a curriculum vitae.</i>	Annexure 3
<i>b. a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;</i>	Chapter 3
<i>c. a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;</i>	Annexure 4
<i>d. a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-</i>	Chapter 4
<i>i. Planning and design</i>	
<i>ii. Pre-construction activities</i>	
<i>iii. Construction activities</i>	
<i>iv. rehabilitation of the environment after construction and where applicable post closure; and</i>	
<i>v. where relevant, operation activities;</i>	
<i>f. description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to -</i>	Section 3.2 – Section 3.4 and Chapter 5
<i>a. avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;</i>	
<i>b. comply with any prescribed environmental management standards or practices;</i>	
<i>c. comply with any applicable provisions of the Act regarding closure, where applicable; and</i>	
<i>d. comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;</i>	
<i>g. the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);</i>	Chapter 5 and Chapter 6
<i>h. the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);</i>	Chapter 6
<i>i. an indication of the persons who will be responsible for the implementation of the impact management actions;</i>	
<i>j. the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;</i>	
<i>k. the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);</i>	
<i>l. a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;</i>	
<i>m. an environmental awareness plan describing the manner in which-</i>	Section 5.2.17
<i>a. the applicant intends to inform his or her employees of any environmental risk which may result from their work; and</i>	
<i>b. risks must be dealt with in order to avoid pollution or the degradation of the environment; and</i>	

<p><i>n. any specific information that may be required by the competent authority.</i></p>	<p>Nothing specified at this stage</p>
--	--

3. BACKGROUND INFORMATION

3.1. PROJECT DESCRIPTION

Two areas within portion 8 of Farm 148 Koenie Kraal have been selected for the development and will be referred to as Site A and Site B (Figure 3-1).

The infrastructure within Site A (Figure 3-2) will consist of 4, large Deep Space Navigation (**DSN 1-4**) antennae which will not exceed 45m in height. Each of these are anticipated to have a physical footprint of 360m² (Plate 3-1) as well as 3 smaller planned radio antennae up to 12m in height (**SANSA 1,2,3**) (Plate 3-3 and 3-4). Each of these antennae are expected to have a physical footprint of 100m². There will also be an 18 m Ka Band antenna (**LGS 18**) which will be up to 30m in height and have a footprint of 400m² (20mX20m) seen in Plate 3-2 below.

Other associated infrastructure will consist of a guard house at the site entrance, signal processing building which will house the signal processor room, operations and control room, lobby, reception, kitchen and ablution facility and is anticipated to have a physical footprint of 525m², with an accompanying 900m² curbed, gravel parking area.

Alongside the main building will be a 70 000l water storage tank as part of a fire management system and a conservancy tank for temporary wastewater and sewerage storage which will be serviced regularly by a licenced waste hauling company.

On the western edge of the site, a power station is planned which will be of similar size to the main building on the eastern edge. The power station will consist of the stores, workshop, generators and fuel storage and will also have an accompanying 900m², curbed parking area. An overhead powerline (not exceeding 22kv), 750m in length is planned to connect the power station to the existing Eskom substation outside the site. The generators will be installed in phases as the site expands. The first generator of four will be 1200 KVA and be housed in the generator room (Total capacity 4800KVA)

Electricity will be distributed within the site through underground cables from the power station to the antennas and buildings, these will be at a depth of 1m with a 200mm covering of river sand, a layer of danger tape and backfilled with the original soil.

The diesel storage at the power station has a combined storage capacity of 280 000lt. This will be stored above ground in self-bunded, moveable systems. Each bunded tank holds 70 000lt and will be connected to one another as the site grows and the power capacity needed increases.

Water will be sourced from a municipal water point approximately 2km from the site and will need connection via underground pvc piping 50mm in diameter. It is expected that between 50 and 100 kilo litres of water will be needed daily during the civil work phase of construction and for dust suppression and 3000 litres will be needed for the general operations. SANSA also intends on drilling a borehole to supplement water provisions.

New access roads will need to be constructed within the site and are anticipated to be 4m wide, graded and compacted with overlain gravel.

PVC ducting will be laid to connect the fibre to the control room and to each antennae. This will be laid at 600mm below ground surface, consisting of 4x100mm PVC pipes with a PVC manhole at 50m intervals for maintenance.

The entire site will be fenced, with either diamond mesh with flatwrap on top or clearvu fencing. All construction spoil, including excavation and clearing will be taken to the Matjiesfontein solid waste disposal site

Site B will house 2 scientific instruments known as short/long laser rangers (S/LLR), each with a footprint of 14.2m² (the size of a Shipping container) (Plate 3-5) and an administration booth with a footprint of 9m² (3mX3m). Solar panels will form part of the roofing of the infrastructure in order to supply power to the equipment. The scientific instruments will each be individually fenced by a standard 3m high, 10m x10 diamond mesh fence with flat rap at the top. The existing access roads to this site will remain unchanged, however new internal gravel roads, 4m wide, will be needed to access the infrastructure

It is expected that the project infrastructure will be constructed in a phased manner. Within the first 3 years, the buildings, S/LLR's, utilities, roads and one DSN antenna will be constructed. For every two years which proceed, one additional antenna will be constructed. The maximum time expected for the completion of the project is estimated at 17 years.

Project infrastructure maps and images of proposed infrastructure are presented below.

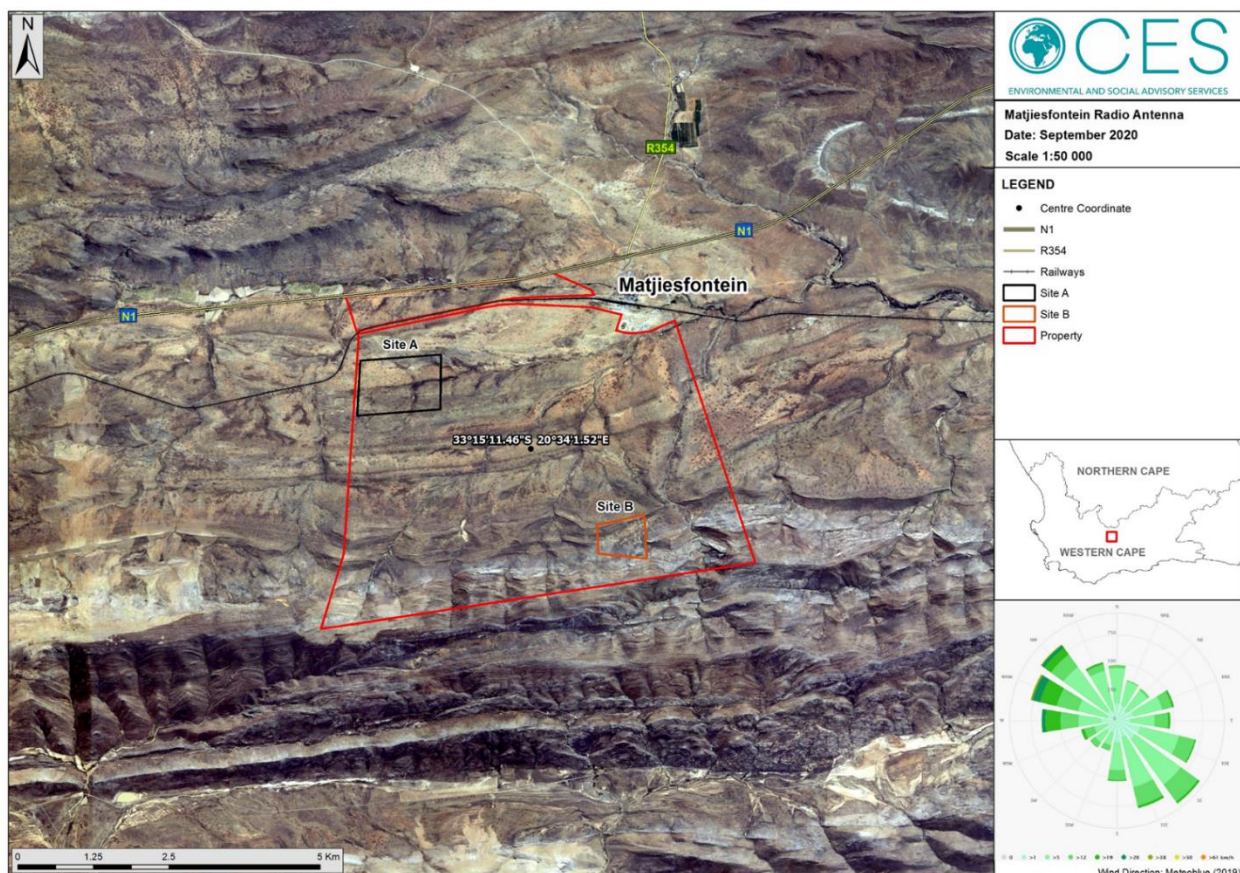


Figure 3-1: Locality map of proposed project area showing Site A and Site B in relation to the N1 and the town of Matjiesfontein

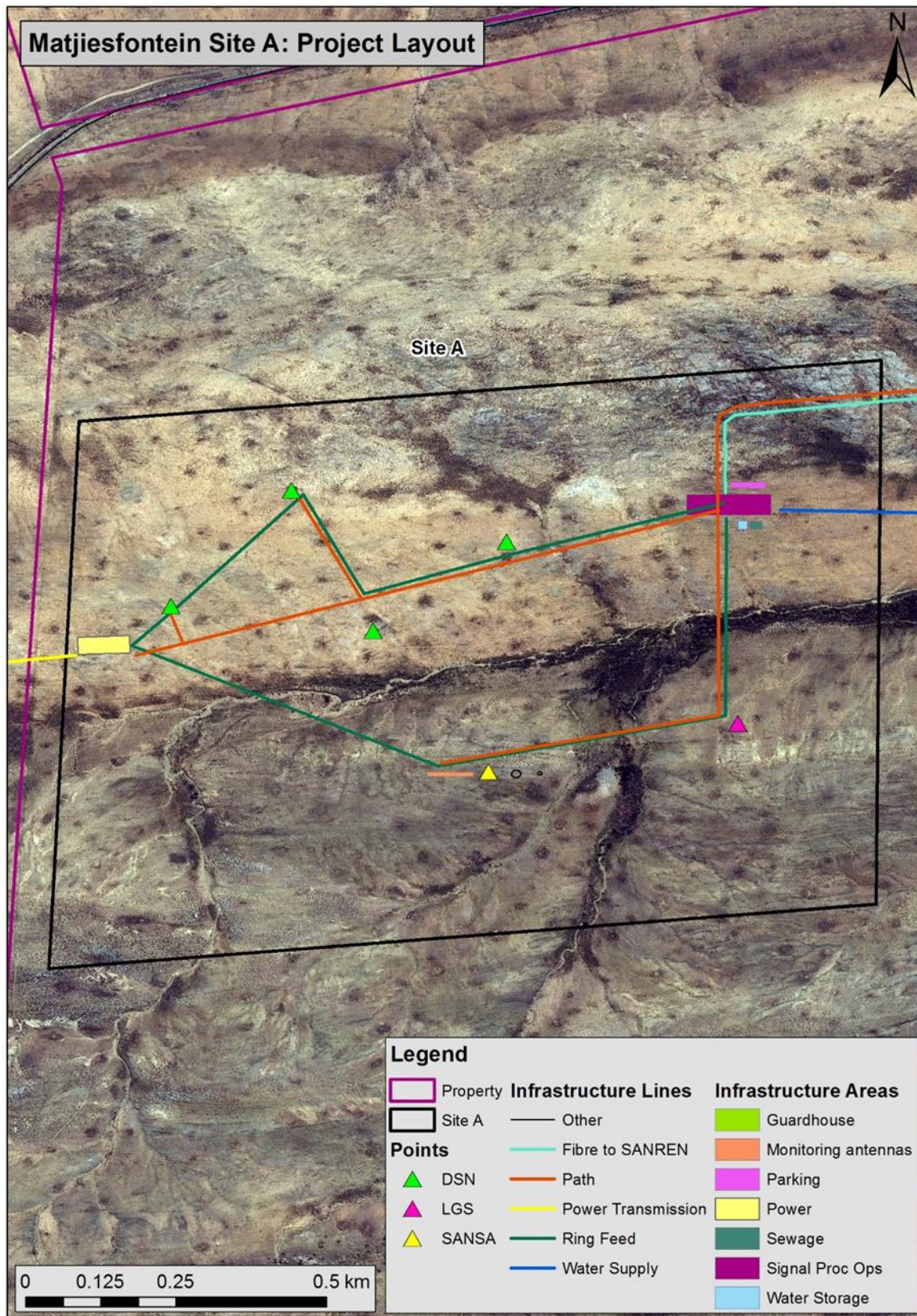


Figure3--: Proposed infrastructure layout at Site A (Perimeter fence- black rectangle enclosing site)

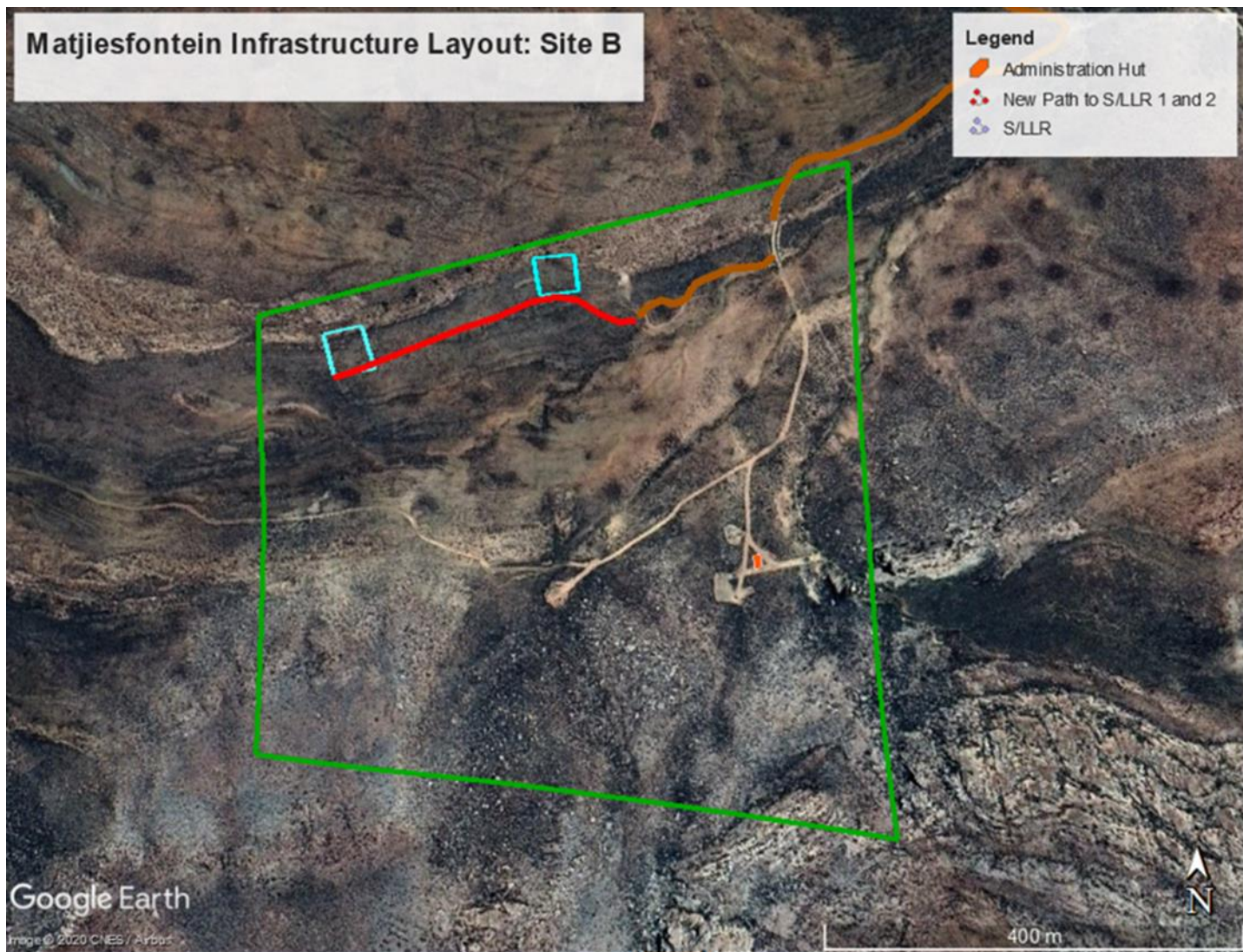


Figure 3-3: Proposed infrastructure on Site B (S/LLRs individually fenced, light blue)



Plate 3-1: Deep Space Navigation (DSN) Antennae, up to 45m.



Plate 3-2: LGS18, Ka Antennae, 18m wide dish, 30m height.



Plate 3-3: SANSA (1,2,3) This is a typical 6m antenna with a height of up to 12m.



Plat 3-4: SANSA(1,2,3) Typical 2,4m to 3,3 m antenna with a concrete base



Plate 3-5: Short/Long Laser Ranger (S/LLR).

3.2. ENVIRONMENTAL OBJECTIVES AND TARGETS

In order to meet the commitments detailed within the Environmental Management Policy, as well as those included within the environmental specifications of this EMP, the contractor shall develop environmental objectives and targets. The objectives and targets must conform to, and comply with, the following criteria:

- The objectives and targets shall constitute the overall goals for environmental performance identified in the environmental policy and strategy;
- When establishing objectives and targets, the contractor shall take into account the identified environmental aspects and associated environmental impacts, as well as the relevant findings from environmental reviews and/or audits;
- The targets must be set to achieve objectives within a specified timeframe;
- Targets must be specific and measurable;
- When the objectives and targets are set, the contractor must establish measurable Key Performance Indicators (KPIs). The latter will be used by the contractor as the basis for an Environmental Performance Evaluation System, and can provide information on both the environmental management and the operational systems. Objectives and targets need to apply broadly across the contractor's operations, as well as to site-specific and individual activities; and
- Objectives and targets must be reviewed from time to time in view of changed operational circumstances and/or changes in environmental legal requirements, and need to take into consideration the views of the Interested and Affected Parties (I&APs).

3.3. ENVIRONMENTAL LEGISLATION AND GUIDELINES

The Contractor must ensure that all South African legislation concerning the natural environment, pollution and the built environment is strictly enforced. Such legislation must include, but is not limited to the:

- The Constitution of the Republic of South Africa Act No. 108 of 1996;
- National Environmental Management Act No. 107 of 1998 as amended;
- National Heritage Resources Act, No 25 of 1999;
- National Environmental Management: Biodiversity Act 10 of 2004;
- National Environmental Management: Waste Management Act 59 of 2008;
- National Environmental Management: Air Quality Act 39 of 2004;
- The Environment Conservation Act No 73 of 1989;
- National Water Act, No 36 of 1998;
- Occupational Health and Safety Act 85 of 1993;
- National Environmental Management: Biodiversity Act, 2004 (Act no. 10 of 2004) – Alien and Invasive Species (AIS) Regulations; and
- All relevant provincial legislation, Municipal by-laws and ordinances.

3.4. DETAILS OF EAP

Environmental Assessment Practitioner (EAP): Dr Ted Avis

Company: Coastal and Environmental Services (CES)

Contact Person: Ms Skye Clarke-Mcleod

Elta House, 3 Caledonian Road, Mowbray, 7700

Telephone: +27 21 045 0900

Website: www.cesnet.co.za

Email: cesct@cesnet.co.za

Please refer to Annexure 3 for the Curricula Vitae of the EAP and the project team.

4. IMPACT ASSESSMENT AND MITIGATION SUMMARY

This section provides a summary of the pre-mitigation significance as well as the post-mitigation significance of the social and environmental impacts that may result from the major activities associated with the development.

4.1. SUMMARY OF IMPACTS ASSOCIATED WITH THE DEVELOPMENT

The table below shows the significance of the impacts after mitigation is taken into account:

Table 4-1: Summary of impacts and their post mitigation significance

Impacts			Significance rating of impacts after mitigation (Low, Medium, Medium-High, High, Very High):
Planning, design and construction phases			
1.	General	Soil Compaction and Erosion	Low -
2.		Air pollution/Dust	Low
3.		Noise	Low -
4.		Traffic	Moderate-
5.		Health and safety Risks	Low -
6.		Hazardous Substances	Low -
7.		Construction Waste & Litter	Low -
8.		Sanitation	Low -
9.		Creation of temporary jobs	Moderate +
	Ecological	Loss of Natural Vegetation	
10.		Loss of Shale Fynbos	Moderate-
11.		Loss of Shale Renosterveld	Moderate-
12.		Loss of Species of Conservation Concern (Flora)	Low-
13.		Loss of Extent of Faunal Habitat for Species of Conservation Concern	Low-
14.		Disruption of Ecosystem Function and Process/Habitat Fragmentation	Moderate-
15.		Effects on Drainage Lines and Riparian Habitat due to Road Crossings	Low-
16.		Invasion of Invasive Alien Plant Species	Low -
17.	Palaeontological	Palaeontological Resources	Low -
18.	Archaeological	Archaeological Resources	Low -
19.	Cultural/Visual	Aesthetic/ Sense of Place	Moderate -
Operation phases			
1	General	Visual impacts	Moderate-
2		Increased storm water runoff and erosion	Low-
3		Sewerage and wastewater generation	Low-
4		Solid waste generation	Low-
5		Noise	Low-
6		Employment Creation	Moderate +
7	Ecological	Invasion of Alien Species	Low-

4.2. SUMMARY OF MITIGATION MEASURES

Table 4-2 below shows the mitigation measures which must be applied in order to negate and/or reduce each of the various impacts:

Table 4-2: Mitigation measures associated with each impact

Planning, Design and Construction Phases	
IMPACT	MITIGATION MEASURES
Loss of Biodiversity	<ul style="list-style-type: none"> • Clearing must be kept to a minimum; • Top soil (20 cm, where possible) must be collected and used elsewhere on the property and for the rehabilitation of lay down areas and other impacted areas no longer required during the operational phase; • Employees must be prohibited from making fires; • An alien management plan must be designed and implemented to prevent the spread of alien species; • Alien invasive species should be removed from the areas where development will not occur. The area should be actively managed to prevent the return of alien invasive species; • Prohibit all employees from harvesting plants; • Prohibit open fires; • An ECO must be employed to demarcate areas for use during construction, and to ensure that the construction activities remain within the designated area and that no unauthorised activities occur outside of the construction footprint.
Invasion of Invasive Alien Plant Species	<ul style="list-style-type: none"> • An invasive alien plant management plan must be designed and implemented. This plan must designate management units and prescribe the most effective method of removing the species.
Erosion	<ul style="list-style-type: none"> • Take measures to counter erosion. • Roads and stormwater gulleys must be maintained. • Cleared areas should be exposed for the minimum amount of time possible. • Any erosion sites should be rehabilitated as soon as possible, and water run-off directed to a safe collection point should erosion become evident on site.
Air Quality and Dust Control	<ul style="list-style-type: none"> • Dust levels should be kept to a minimum to avoid smothering of sensitive areas by windblown sediments. • During windy periods un-surfaced and un-vegetated areas should be dampened down. • Vegetation should be retained where possible as this will reduce dust travel. • Excavations and other clearing activities must only take place during agreed working times and permitted weather conditions to avoid drifting of sand and dust into neighbouring areas.
Noise	<ul style="list-style-type: none"> • During construction, activities which include the movement of construction vehicles and the operation of machinery should be restricted to normal working hours (07:00am – 17:00pm).
Visual	<ul style="list-style-type: none"> • The development must be strategically placed behind environmental features so as to minimise the amount seen from the N1. • Where practical and feasible, the visible parts of the development must be painted a light colour, grey or camouflage so as to best blend in with the natural surroundings • The perimeter treatment and fencing must be sensitive to the natural context and must be appropriately coloured to blend into the surrounding vegetation- silver and bright green fencing should not be used. • Where safety and technical standards permit, colours that blend into the natural environment and vegetation must be used for the antennae and associated infrastructure. These should be darker, duller colours that can disguise the infrastructure in the landscape. In the case of the reflective areas of the four large antennae, a naturally coloured tint should be considered for the working surface. • Buildings must be made from local materials where possible and should draw from existing building traditions. • A landscape plan should be developed for avenue or block planting of gum trees or similar that fit into the cultural landscape to screen the proposed infrastructure from the Provincial Heritage Site. This planting should be focused on the south and eastern side of the railway line. • Wanton stripping of vegetation that causes scarring on the landscape must be avoided.

	<ul style="list-style-type: none"> • Lighting must be minimised and carefully controlled and must be developed with sensitivity to the rural landscape. • Waterwise and indigenous planting and green-start building practices must be used. • Equipment must not be placed on the upper southern slopes of the perched valley in Site B that have a long distance view of Matjiesfontein.
On-Site Fire Risk	<ul style="list-style-type: none"> • All flammable substances must be stored in dry areas which do not pose an ignition risk to the flammable substances. • Smoking must only be permitted in a designated smoking area and must not be permitted near flammable substances. • All cooking must be done in demarcated areas with a low fire risk. • No open fires will be allowed on site, unless in a demarcated area. • All construction personnel and contractors must be educated regarding fires and fire management. • Fire extinguishers and other firefighting equipment deemed suitable must be available on site at all times.
Site Contamination due to hazardous Substances	<ul style="list-style-type: none"> • During the construction phase all oils, fuel and other maintenance equipment and supplies must be stored in a secure, bunded area with a compacted surface. • Maintenance of vehicles or machinery should not take place within 50 m of any watercourse and drip trays must be used. Ideally all maintenance should take place off site, where such maintenance is normally done. • Spill kits must be kept on-site and maintained. • Cement and concrete must only be mixed in designated areas and on an impermeable surface. No concrete mixing must take place within 32 m of any watercourse.
Health and Safety	<ul style="list-style-type: none"> • All relevant Health and Safety legislation as required in South Africa should be strictly adhered to, including but not limited to the Occupational Health and Safety Act, 1993 (No. 85 of 1993); • Smoking must only be permitted in a designated smoking area and must not be permitted near flammable substances Any welding or other sources of heating of materials should be done in a controlled environment and under appropriate supervision; • Ensure availability of fire extinguishers; • All employees must be aware of emergency/ contingency plans to ensure an understanding of the hazards and procedures required during an emergency situation; • An emergency preparedness and response protocol must be developed by the appointed contractor to be implemented for the duration of construction; • Records of environmental and/or health and safety related incidents should be maintained and communicated to the relevant persons; • The Contractor shall ensure that signage, which should be pictorial and, in the vernacular, is erected to warn against entering the construction area; • Traffic calming and speed control measures for access to construction sites shall be instigated in consultation with the local authorities.
Construction Waste and Litter	<ul style="list-style-type: none"> • Rubble and other construction waste produced should be re-used if possible and, where it is not possible, must be disposed of at the nearest registered waste disposal facility; • Rubble, which will not be reused, must be removed from site on a regular basis; • If rubble is stored on site, it should be stored on designated portions of land away from any sensitive areas; • Litter must be controlled during construction – adequate bins must be made available on site at all times. These must be made scavenger and weatherproof and must be emptied on a regular basis; • Construction materials stored at the site camp must be secured – i.e. plastics must be covered to prevent being blown off site; • The construction area must remain litter free and regular inspections for litter must be conducted. The activity should not contribute to any surrounding windblown litter; • Waste skips must be covered and emptied regularly; • Waste manifests must be provided by the Contractor to prove legal disposal; • Empty cement bags must be kept in a sealed waste container;

	<ul style="list-style-type: none"> Waste must not to be buried or burned.
Sanitation	<ul style="list-style-type: none"> During the construction phase adequate sanitary facilities must be provided for construction workers. The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution. Sanitation facilities must not be located within 100 metres of any watercourse.
Creation of temporary jobs	<ul style="list-style-type: none"> Where feasible, priority for unskilled labour should be given to people living in Matjiesfontein It is recommended that, where possible, the labour force required during construction must be sourced from the local communities; the construction of buildings, antennae and associated infrastructure will increase employment opportunities at the local level providing much needed income for families living in Matjiesfontein. Skills development in the form of training must be implemented where possible.
Contamination from Pollutants	<ul style="list-style-type: none"> Strict management of hazardous chemicals must be implemented. Prevention of hydrocarbon spills from machinery and vehicles by the use of drip-trays and permanent bunded areas for overnight parking. This should include any temporary workshops envisaged for the project. In addition, workshops should be fitted with oil traps and sumps to ensure that no contaminated water/hydrocarbons are allowed to escape. Domestic effluent from the construction camps should be stored temporarily in a safe manner (unlikely to leak or be breached) and should be removed by approved contractors weekly. All contaminated water run-off from the site must be contained and treated prior to discharge.
Purchasing of Materials from Local Businesses	<ul style="list-style-type: none"> Where feasible, building materials, hardware, sand, concrete and so forth should be sourced from the immediate community at Laingsburg.
Heritage	<ul style="list-style-type: none"> The heritage Western Cape Chance Finds Procedure must be adopted during the construction phase due to the high palaeontological sensitivity of the areas <p>Procedure to follow if it is likely that the material identified is a fossil:</p> <ol style="list-style-type: none"> The ECO or site agent must ensure that all work ceases immediately in the vicinity of the area where the fossil or fossils have been found; The ECO or site agent must inform HWC of the find immediately. This information must include photographs of the findings and GPS co-ordinates; The ECO or site agent must compile a Preliminary Report and fill in the Fossil Discoveries: HWC Preliminary Record Form within 24 hours without removing the fossil from its original position. The Preliminary Report records basic information about the find including: <ul style="list-style-type: none"> The date A description of the discovery A description of the fossil and its context (e.g. position and depth of find) Where and how the find has been stored Photographs to accompany the preliminary report (the more the better): <ul style="list-style-type: none"> → A scale must be used → Photos of location from several angles → Photos of vertical section should be provided → Digital images of hole showing vertical section (side); → Digital images of fossil or fossils. <p>Upon receipt of this Preliminary Report, HWC will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.</p> Exposed finds must be stabilised where they are unstable and the site capped, e.g. with a plastic sheet or sand bags. This protection should allow

	<p>for the later excavation of the finds with due scientific care and diligence. HWC can advise on the most appropriate method for stabilisation.</p> <p>v. If the find cannot be stabilised, the fossil may be collected with extreme care by the ECO or the site agent and put aside and protected until HWC advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove the all fossil material and any breakage of fossil material must be avoided at all costs. No work may continue in the vicinity of the find until HWC has indicated, in writing, that it is appropriate to proceed.</p>
Operational Phase	
IMPACT	MITIGATION MEASURES
Invasion of Alien Species	<ul style="list-style-type: none"> • An invasive alien management plan must be put in place if one doesn't already exist; • The site must be checked regularly for the presence of alien invasive species.
Increased Stormwater Runoff and Erosion Potential	<ul style="list-style-type: none"> • Flood attenuation and storm water control measures must be implemented; • Storm-water structures need to be implemented as part of the development and must link up with the current storm-water infrastructure in order to navigate stormwater and minimise soil erosion; • At the first signs of erosion, the correct procedures must be undertaken to manage, resolve and prevent it from occurring.
Solid Waste Generation	<ul style="list-style-type: none"> • Adequate waste disposal (litter) bins must be available on site. Bins located on the outside of the building must be properly secured and covered to prevent scavengers from tipping them; • A responsible person must be appointed to manage the solid waste generated at the proposed development in order to ensure that the waste is properly stored • Waste must regularly be disposed of at the municipal solid waste site. • Where possible, recycling should be instituted and different types of solid waste be kept in separate containers
Sewerage and Wastewater Generation	<ul style="list-style-type: none"> • Due to the proposed development requiring a conservancy tank for the temporary storage of waste water, the tank must be regularly emptied by a registered waste water carrier to ensure it does not overflow or leak; • Ablution facilities and associated piping must be adequately lined and checked for leaks on a regular basis.; and • Wastewater and effluent management must be implemented on site.
Noise	<ul style="list-style-type: none"> • Maintenance activities should be limited to hours between sunrise and sunset.
Employment Creation	<ul style="list-style-type: none"> • Ensure that bursaries are offered to South African students to continue South African' exploration and involvement in international space projects; • Where feasible, upskill South African students and researchers interested in this field of science.

5. ENVIRONMENTAL MANAGEMENT SYSTEM

5.1. REPORTING

5.1.1. Administration

Before the contractor begins construction in sensitive areas (e.g. river crossings and areas of indigenous vegetation), the Contractor must give the ECO and engineer a written method statement setting out the following:

- The type of construction activity;
- Locality where the activity will take place;
- Identification of impacts that might result from the activity;
- Identification of activities or aspects that may cause an impact;
- Methodology and/or specifications for impact prevention for each activity or aspect;
- Methodology and/or specific actions for impact containment for each activity or aspect;
- Emergency/disaster incident and reaction procedures; and
- Treatment and continued maintenance of impacted environment.

The contractor may provide such information in advance of any or all construction activities provided that new submissions shall be given to the ECO and/or engineer whenever there is a change or variation to the original. The ECO and/or engineer may provide comment on the methodology and procedures proposed by the Contractor but he shall not be responsible for the contractor's chosen measures of impact mitigation and emergency/disaster management systems. However, the contractor shall demonstrate at inception and at least once during the contract that the approved measures and procedures function properly. An example of a Method Statement is provided in Annexure 1.

5.1.2. Record keeping

The engineer and the ECO will monitor the contractor's adherence to the approved impact prevention procedures and the engineer shall issue to the contractor a notice of non-compliance whenever transgressions are observed. The ECO must document the nature and magnitude of the non-compliance in a designated register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. The non-compliance shall be documented and reported to the engineer in the monthly report. These reports shall be made available to the authorities when requested.

The Contractor shall ensure that an electronic filing system identifying all documentation related to the EMP is established. A list of reports likely to be generated during all phases of the project is provided below, and all applicable documentation must be included in the environmental filing system catalogue or document retrieval index:

- Environmental Management Programme;
- Final design documents and diagrams issued to and by the Contractor;
- All communications detailing changes of design/scope that may have environmental implications;
- Complaints register;
- Medical reports;
- Incident and accident reports;
- Emergency preparedness and response plans;
- Copies of all relevant environmental legislation;
- All relevant permits; and
- All method statements from the Contractor for all phases of the project.

5.1.3. **Document control**

The Contractor and resident engineer shall be responsible for establishing a procedure for electronic or hard copy document control. The document control procedure must comply with the following requirements:

- Documents must be identifiable by organisation, division, function, activity and contact person;
- Every document must identify the personnel and their positions, who drafted and compiled the document, who reviewed and recommended approval, and who finally approved the document for distribution; and
- All documents must be dated, provided with a revision number and reference number, filed systematically, and retained for a five year period.

The Contractor shall ensure that documents are periodically reviewed and revised, where necessary, and that current versions are available at all locations where operations essential to the functioning of the EMP are performed.

5.2. **CONSTRUCTION PHASE**

5.2.1. **Clearing of the Site**

In all areas where the contractor intends to, or is required to clear the natural vegetation and soil, either within the construction area, or at designated or instructed areas outside the construction area, a method statement shall first be submitted to the ECO for his approval. The EMP shall contain a photographic record and change/land reference of the areas to be disturbed. This shall be submitted to the engineer and ECO for their records before any disturbance/stockpiling may occur. The record shall be comprehensive and clear, allowing for easy identification during subsequent inspections.

The contractor shall be responsible for the re-vegetation within the development boundaries for all areas disturbed during construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for, or from, road construction has to be stored temporarily or otherwise within the construction area, or at designated or instructed areas outside the construction area. This responsibility shall extend until expiry of the defects notification period.

5.2.2. **Excavation, hauling and placement**

The contractor shall provide the engineer with detailed plans of his intended construction processes prior to starting any cut or fill or layer. The plans shall detail the number of personnel and plant to be used and the measures by which the impacts of pollution (noise, dust, litter, fuel, oil and sewage), erosion, vegetation destruction and deformation of landscape will be prevented, contained and rehabilitated. The contractor shall demonstrate his "good housekeeping", particularly with respect to closure at the end of every day so that the site is left in a safe condition from rainfall overnight, or over periods when there is no construction activity.

5.2.3. **Construction Activities and Equipment**

- Construction will be restricted to daytime working hours;
- All noise-making equipment shall be turned off when not in use;
- All equipment shall be kept in good working order;
- All equipment shall be operated within specifications and capacity (i.e. do not overload machines);
- Compliance with the appropriate legislation with respect to noise is mandatory;
- The Contractor will familiarise himself with, and adhere to, any local bylaws and regulations regarding the generation of noise;

- Construction staff must be given “noise sensitivity” training;
- The Contractor will endeavour to keep noise generating activities associated with construction activities to a minimum;
- Modern low noise emission vehicles and equipment shall be favoured on site; and
- A well planned and co-ordinated “fast track” procedure is implemented to complete the total construction process in the area in the shortest possible time.

5.2.4. **Good housekeeping**

The contractor shall undertake “good housekeeping” practices during construction. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole. Good housekeeping extends beyond the wise practice of construction methods that leave the area in a safe state and must also include the care for and preservation of the environment within which the site is situated.

5.2.5. **Solid waste management**

- No on-site burning, burying or dumping of any waste materials, litter or refuse shall occur.
- The Contractor shall provide vermin and weatherproof bins with lids of sufficient number and capacity to store the solid waste produced on a daily basis. The lids shall be kept firmly closed on the bins at all times.
- Bins shall not be allowed to become overfull and shall be emptied at least once a day.
- The waste from bins may be temporarily stored on site in a central waste area that is weatherproof and scavenger-proof, and which the ECO has approved.
- Recyclable waste shall be disposed of into separate skips/bins and removed off-site for recycling.
- All solid waste shall be disposed of at the existing waste site on the farm.
- Any hazardous waste will need to be disposed of off-site at an approved registered landfill site. The Contractor shall supply the ECO with the appropriate disposal certificates.
- The Contractor shall submit a solid waste management plan as part of the Pollution Control Method Statement to the ECO.

5.2.6. **Water use**

- All sources of water for construction purposes must be sourced from existing, approved water supply points located on the farm. It is recommended that borehole water be made available.
- Where possible all wash water will be recycled for use, as wash water again or for dust suppression where applicable.

5.2.7. **Contaminated water**

- Construction materials and chemicals that could be a potential pollutant of any kind and in any form shall be kept, stored, and used in such a manner that any escape can be contained and that the water table and surface water is not endangered. Water containing pollutants such as chemicals, washing detergents, sewerage, fuels, paints, solvents and hydrocarbons shall be contained and discharged into an impermeable storage facility for removal from the site or for recycling. This particularly applies to runoff from fuel depots/workshops/truck washing areas.
- Wash down areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted. The Contractor shall notify the ECO immediately of any pollution incidents on Site.
- As part of the Pollution Control Method Statement, the Contractor shall submit a plan to the ECO detailing how the contaminated water will be managed on site.

5.2.8. **Hazardous substances**

- The transportation and handling of hazardous substances must comply with the provisions of the Hazardous Substances Act (Act No.187 of 1993) and associated regulations as well as SABS 0228 and SABS 0229.
- The Contractor shall also comply with all other applicable regional and local legislation and regulations with regard to the transport, use and disposal of hazardous substances. Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) used during construction shall be stored in secondary containers. The relevant Material Safety Data Sheets (MSDS) shall be available on site. Procedures detailed in the MSDSs shall be followed in the event of an emergency situation.
- The Contractor shall be responsible for the training and education of all personnel who will be handling hazardous materials about their proper use, handling and disposal.
- If potentially hazardous substances are to be stored or used on site, the Contractor shall submit a Method Statement to the ECO detailing the substances / materials to be used, together with the transport, storage, handling and disposal procedures for the substances.

5.2.9. **Cement and mixing of concrete**

- The proposed location of cement mixing areas (including the location of cement stores and sand and aggregate stockpiles) shall be indicated on the site layout plan and approved by the ECO.
- All wastewater generated from the operation and cleaning of concrete mixing equipment and other sources of concrete shall be passed through a concrete wastewater settlement system. The water from this system shall not be allowed to flow into any “no go” area or water course but must permeate through the ground before it reaches any such water course. The accumulated sludge in the settlement system must be regularly cleaned out and appropriately disposed of as solid waste.
- The Contractor shall ensure that minimal water is used for washing of concrete and cement mixing equipment.
- Washing and cleaning of equipment must also be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion.
- Used cement bags shall be disposed of in weatherproof bins on site to prevent the generation of wind-blown cement dust, and the bags from blowing away.
- During construction, the contractor must ensure that concrete is mixed on mortar boards, and that all visible remains of concrete are removed and disposed of as waste, and that all surplus aggregate is removed.
- As part of the Pollution Control Method Statement, a plan detailing all actions to be taken to comply with these requirements shall be submitted to the ECO.

5.2.10. **Fuel (petrol and diesel) and oil**

Fuel Storage

- All fuels and oil must be stored in demarcated areas that are contained within berms / bunds to avoid spread of any contamination into nearby rivers or drainage lines. These sites must be re-vegetated after construction has been completed.
- The location of the fuel storage area will be approved by the ECO. All necessary approvals with respect to fuel storage and dispensing shall be obtained from the appropriate authorities. Symbolic safety signs depicting “No Smoking”, “No Naked Lights” and “Danger” conforming to the requirement of SABS 1186 shall be prominently displayed in and around the fuel storage area. There shall be adequate fire-fighting equipment at the fuel storage area.

- The Contractor shall ensure that all liquid fuels and oils are stored in tanks with lids, which are kept firmly shut and under lock and key at all times. The capacity of the tank shall be clearly displayed and the product contained within the tank clearly identified using the emergency information system detailed in SABS 0232 part 1. Fuel storage tanks shall have a capacity not exceeding 9 000 litres and shall be kept on site only for as long as fuel is needed for construction activities, on completion of which they shall be removed.
- Tanks on site shall not be linked or joined via any pipe work, but shall remain as separate entities. The tanks shall be situated on a smooth impermeable base with a bund. The volume inside the bund shall be 110% of the total capacity of the largest storage tank. The base may be constructed of concrete, or of plastic sheeting with impermeable joints with a layer of sand over to prevent perishing. The impermeable lining shall extend to the crest of the bund. The floor of the bund shall be sloped to enable any spilled fuel and/or fuel-contaminated water to be removed. Appropriate material, approved by the ECO that absorbs / breaks-down or encapsulates minor hydrocarbon spillage and which is effective in water shall be installed in the sump. Contaminated soil shall be taken off site to a disposal site approved by the ECO, and the material that absorbs / breaks-down or encapsulates minor hydrocarbon spillage shall be replenished.
- Only empty and externally clean tanks may be stored on the bare ground. Empty and externally dirty tanks shall be sealed and stored in an area where the ground has been protected.
- Adequate precautions shall be provided to prevent spillage during the filling of any tank and during the dispensing of the contents. The dispensing mechanism for the fuel storage tanks shall be stored in a waterproof container when not in use.
- As part of the required site layout for the construction camp, a plan shall be submitted to the ECO detailing the design, location and construction of the fuel storage area as well as for the filling and dispensing from storage tanks; and for the type of absorbing / breaking-down or encapsulating material to be used.

Refuelling

- Where reasonably practical, the plant shall be refuelled at a designated re-fuelling area/depot or at a workshop as applicable. If this is not reasonably practical then the surface under the refuelling area shall be protected and appropriately bunded against pollution to the reasonable satisfaction of the ECO prior to any refuelling activities.
- Mechanical plant and bowzers must not be refuelled or serviced within or directly adjacent to any drainage line or waterbody.
- If fuel is dispensed from 200 litre drums, the proper dispensing equipment shall be used, and the drum shall not be tipped in order to dispense fuel. The Contractor shall ensure that the appropriate fire-fighting equipment is present during refuelling operations.
The Contractor shall ensure that there is always a supply of absorbent material readily available to absorb/breakdown or where possible, be designed to encapsulate minor hydrocarbon spillages. The quantities of such materials shall be able to handle a minimum of 200 l of hydrocarbon liquid spill.

Used oil and hydrocarbon contaminated materials

- Used oil shall be stored at a central location on site prior to removal off site for disposal at an approved disposal or recycling site.
- Old oil filters and oil, petrol and diesel-soaked material shall be treated as hazardous waste. The Contractor shall remove all oil, petrol, and diesel-soaked sand immediately and shall dispose of it as hazardous waste or treat it on site with material that breaks-down or encapsulates such spillages, as approved by the ECO.

5.2.11. **Ablution facilities**

- Washing, whether of the person or of personal effects, and acts of excretion and urination are strictly prohibited other than at the facilities provided. The Contractor shall provide the necessary ablution facilities for all his personnel prior to the commencement of work and shall ensure that his personnel make use of the facilities.
- Toilet facilities shall be supplied by the Contractor for the workers at a ratio of at least 1 toilet per 20 workers in areas approved by the ECO. Every 1-man urinal will be taken as supplying the equivalent of 5 men in addition to the 20 men per toilet on site. No toilets will be erected within 20 m of any “no go” areas. Toilets shall be situated within 200m of any area where work is taking place in numbers sufficient to meet the ratio depicted above for the workers in the area.
- The facilities shall be maintained in a hygienic state and serviced regularly. Toilet paper shall be provided. Temporary / portable toilets shall be secured to the ground to prevent them toppling due to wind or any other cause, to the satisfaction of the ECO.
- Discharge into the environment and burial of waste is strictly prohibited. The Contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from the site. Toilets shall be emptied before the Contractors’ holidays or any other temporary site closure.

5.2.12. **Eating areas**

- The Contractor shall designate eating area(s), subject to the approval of the ECO. No cooking is allowed outside of the Contractor’s camp area on site.
- At meal times all workers must eat in designated eating areas. These areas shall have shade for the workers. The eating areas may be in existing structures or in temporary / transportable structures that shall be well constructed using wood or metal for the frame and screened on the top and sides with shade cloth/canvas or other material to the satisfaction of the ECO. These areas shall be well demarcated and in locations approved by the ECO, and shall not be within 20 m of any “no go” areas, on or adjacent to the site.
- Sufficient bins shall be present in these areas. All disposable food packaging must be disposed of in the bins after every meal.
- The area must be cleaned after every meal.
- The feeding or leaving of food for animals is strictly prohibited.

5.2.13. **Site structures**

- All site establishment components (as well as equipment) shall be positioned to limit visual intrusion on neighbours and the size of the land area disturbed. The type and colour of roofing and cladding materials to the Contractor’s temporary structures shall be selected to reduce reflection.
- The Contractor shall supply and maintain adequate and suitable sheds for the storage of materials. Sheds for the storage of materials that may deteriorate or corrode if exposed to the weather shall be weatherproof, adequately ventilated and provided with raised floors.

5.2.14. **Lights**

- The Contractor shall ensure that any lighting installed on the site for his activities does not cause a reasonably avoidable disturbance to the naturally occurring fauna.

5.2.15. **Noise**

- The Contractor shall take precautions to minimise noise generated on site (e.g. install and maintain silencers on machinery).

- The Contractor shall comply with the Noise Induced Hearing Loss Regulations published under the Occupational Health and Safety Act.
- Appropriate directional and intensity settings are to be maintained on all hooters and sirens.
- Work will be limited to daylight hours
- No amplified music shall be allowed on site. The Contractor shall not use sound amplification equipment on Site unless in emergency situations.

5.2.16. **Dust Control**

- The Contractor shall be responsible for the continued control of dust arising from his operations. The Contractor shall take all reasonable measures to minimize the generation of dust as a result of construction activities to the satisfaction of the ECO. Appropriate dust suppression measures include spraying or dampening with water, using a commercial dust binder (such as Hydropam or Dustex), rotovating straw bales, planting of open cleared space and the scheduling of dust-generating activities. If the conditions are such that the Contractor cannot satisfactorily dampen the dust, then the ECO may halt operations until such time as the conditions are more suitable for lower dust generating construction.
- Damping of all gravel haul and access roads (if constructed) with water must be ongoing. Should dust still be a problem on any specific road, the allowable speed will be reduced to 20km/h. If dust is still a problem the road must be treated with a commercial dust binder, as required, to form a cohesive layer that will control the dust on the road.
- Areas that are to have the topsoil stripped for construction purposes must be limited, and only stripped when work is about to take place.
- Other activities and situations that may result in a dust nuisance include: site clearance and other earth moving operations, open cleared space, stockpiles of topsoil or sand and activities associated with concrete mixing.
- The appropriate health and safety equipment (e.g. dust masks) must be worn by workers during the phases of dust-producing construction activity.
- During periods of strong winds, construction work which tends to produce large amounts of dust must be paused until such a time that the wind subsides.

5.2.17. **Environmental awareness training**

- An environmental awareness induction training course shall be run for all personnel on site (See Annexure 2 for a proposed Basic Environmental Education Course). The course shall be run in the morning during normal working hours at a suitable venue provided by the Contractor. All attendees shall remain for the duration of the course and sign an attendance register on completion that clearly indicates participant's names, a copy of which shall be handed to the ECO.
- The environmental awareness training course for site staff and labour shall be presented by the Contractor's SHE Officer from material provided by the ECO unless otherwise required by the Project Specification. The course will be approximately one-hour long.
- Notwithstanding the specific provisions of this clause it is incumbent upon the Contractor to convey the sentiments of the EMP to all personnel and Subcontractors involved with the Works.

Construction personnel information posters

- The Contractor shall erect and maintain information posters for the information of his employees depicting actions to be taken to ensure compliance with the Environmental EMP. Construction personnel information posters shall be laminated and erected in all eating areas, workshops and site offices. The Contractor shall ensure that the construction personnel information posters are not damaged in any way, and shall replace them if any part becomes illegible.
- Examples of these posters will be supplied to the Contractor by the ECO in electronic format.

5.2.18. **Fire control**

- The Contractor shall take all the necessary precautions to ensure that fires are not started as a result of his activities on site.
- No open fires shall be permitted on the site.
- Smoking shall not be permitted in those areas where there is a fire hazard. Such areas shall include the workshop and fuel storage areas and any areas where the vegetation or other material could support the rapid spreading of an initial flame.
- The Contractor shall appoint a Fire Officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedures to be followed. The Contractor shall forward the name of the Fire Officer to the ECO for his approval within 7 days of being on site.
- The Contractor shall ensure that there is basic fire-fighting equipment available on site at all times. This shall include at least rubber beaters when working in natural areas, at least one fire extinguisher of the appropriate type in the mess and cooking area, and at least one fire extinguisher of the appropriate type when welding or other “hot” activities are undertaken.
- The Contractor shall be liable for any expenses incurred by any organisations called to assist with fighting fires that were started as a result of his activities or personnel, and for any cost relating to the rehabilitation of burnt areas, or consequential damages.

5.2.19. **Emergency Procedures**

- Emergency procedures, including the names and contact details of responsible personnel and emergency services shall be made available to all staff and shall be clearly displayed at relevant locations at the site. The Contractor shall advise the ECO of any emergencies on site, together with a record of action taken, within 24 hours of the emergency occurring.
- Telephone numbers of emergency services shall also be posted conspicuously in the Contractor’s office near the telephone.
- The Contractor shall submit a Method Statement covering the procedures for the following emergencies:

Fire

- The Contractor shall advise the relevant authority of a fire as soon as one starts and shall not wait until he can no longer control it.
- The Contractor shall ensure that his employees are aware of the procedures to be followed in the event of a fire.

Accidental leaks and spillages

- The Contractor shall ensure that his employees are aware of the procedures to be followed for dealing with spills and leaks, which shall include notifying the ECO and the relevant authorities. The Contractor shall ensure that all the necessary materials and equipment for dealing with spills and leaks are available on site at all times. Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the ECO.
- In the event of a hydrocarbon spill, the source of the spillage shall be isolated and the spillage contained. The area shall be cordoned off and secured. The Contractor shall ensure that there is always a supply of absorbent material readily available to absorb/ breakdown or where possible, be designed to encapsulate minor hydrocarbon spillages. The quantities of such materials shall be able to handle a minimum of 200 l of hydrocarbon liquid spill.
- Any spills must be cleared and the contaminated soil/sludge disposed of in an appropriate manner, approved by the ECO, or at a licensed hazardous waste disposal site.

5.2.20. **Protection of natural features**

- The Contractor shall not deface, paint, damage or mark any natural features (e.g. rock formations) situated in or around the site for survey or other purposes unless agreed beforehand with the ECO. Any features affected by the Contractor in contravention of this clause shall be restored / rehabilitated to the satisfaction of the ECO.
- The Contractor shall not permit his employees to make use of any natural water sources for the purposes of swimming, personal washing and the washing of machinery or clothes.

5.2.21. **Protection of flora and fauna**

- All clearing activities must deploy search and rescue teams in-front of clearing machinery to assist in relocating slower moving faunal species e.g. tortoises.
- Protected plant species must be removed from the designated construction footprint and relocated to adjacent areas of similar habitat that will not be affected by construction and used in landscaping once construction is complete. The required permits must be obtained prior to moving any species.
- Except to the extent necessary for the carrying out of the works, flora shall not be removed, damaged or disturbed nor shall any vegetation be planted.
- The removal and stockpiling of topsoil must also be carried out in accordance with the EMPr.
- Trapping, poisoning and/or shooting of animals is strictly forbidden by employees and contractors.
- The use of chemicals of all forms must be carefully controlled and monitored to avoid contamination of areas.
- The environmental education programme must explain to staff why species of concern are of ecological significance.

5.2.22. **Protection of heritage features**

- Construction managers/foremen must be informed before construction starts regarding the possible types of heritage sites and cultural material they may encounter, and the procedures to follow when they find sites.
- If concentrations of palaeontological/archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the Heritage Western Cape (021 483 5959) and/or the South African Heritage Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation/ excavation can be undertaken.
- Any person who causes intentional damage to archaeological or historical sites and/or artefacts could be penalised or legally prosecuted in terms of the National Heritage Resources Act 25 of 1999.

5.2.23. **Vegetation Clearance**

- Vegetation clearing and trampling must be avoided in areas demarcated as no-go areas.
- Temporary infrastructure such as the site camp, lay down areas and storage areas must be placed outside the 32m buffer from the river.
- Vegetation clearing must occur in parallel with the construction progress to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the river.
- The Contractor must work according to a plan, which demarcates areas to be cleared. The plan must be part of the Project Layout Plan developed in the Site Design Phase.
- The minimum amount of vegetation clearance must take place.
- All plants not interfering with construction must be left undisturbed.

- Collection or wilful damage to any plants outside of the areas demarcated for clearing is not allowed.

5.2.24. **Alien Vegetation Clearance**

- The construction phase must employ eradication programmes to remove any new invasive species, especially those categorized as 1, 2 and 3 on the NEMBA list. This must be undertaken in accordance with the site-specific Alien Plant Management Plan
- Long-term operational eradication programs to eradicate invasive species must be implemented if possible.

5.2.25. **Revegetation**

- All areas disturbed during construction shall be reinstated to a state that approximates or better the state that they were in before construction.
- Cut and fill areas must be restored and reshaped.
- Areas compacted by vehicles during construction must be scarified to allow penetration of plant roots and the regrowth of natural vegetation.
- The revegetation programme must take cognisance of the climatic and seasonal conditions with the most favourable period being in spring and early summer.
- The rehabilitated areas will be weeded by the nominated rehabilitation contractor for a period of 1 year.
- Species indigenous and or endemic to the area, and suitable for rehabilitation, must be identified and used in preference to exotic species.
- Where possible, indigenous species cleared for construction, should be used to revegetate disturbed areas.
- It is also advised that the Environmental Control Officer, to be appointed during the construction phase, must have a good understanding of the local flora. The ECO must be able to make clear recommendations with regards to the re-vegetation of the newly completed / disturbed areas, using species selected by an appropriate botanist. All alien plant re-growth must be monitored and should it occur these plants must be eradicated.

5.2.26. **Topsoil stripping and stockpiling**

- Topsoil can only be stripped from the areas as indicated below:
 - Any area which is to be used for temporary storage of materials
 - Areas which could be polluted by any aspect of the construction activity and;
 - Areas designated for the dumping of soil.
- Stripping of topsoil will be undertaken in such a manner as to minimise erosion by wind or runoff.
- Outside of the development footprint, topsoil will be stripped to a depth not exceeding 150mm from the original ground level.
- Areas from which the topsoil is to be removed will be cleared of any foreign material including bricks, rubble, any waste material, litter, excess vegetation and any other material which could reduce the quality of the topsoil.
- The Contractor shall ensure that subsoil and topsoil are not mixed during stripping, excavation, reinstatement and rehabilitation. If mixed with clay sub-soil the usefulness of the topsoil for rehabilitation of the site will be lost.
- Soils must be exposed for the minimum time possible once cleared.
- Topsoil will be temporarily stockpiled, separately from (clay) subsoil and rocky materials.
- Topsoil will be stockpiled in areas designated by the ECO.
- Soil must not be stockpiled near the river without prior consent from the ECO.
- Stockpiles will either be vegetated with indigenous grasses or covered by a suitable fabric to prevent erosion and invasion of weeds.
- Stockpiled topsoil will not be compacted.

5.2.27. **Stormwater Management**

- Stormwater must be managed using suitable structures such as swales, gabions and rock rip-wrap so that any run-off from the development site is attenuated prior to discharge. Silt and sedimentation must be kept to a minimum, through the use of the above-mentioned structures.
- Natural run-off must be diverted to stormwater drains where these are available. The Contractor shall take appropriate measures to prevent sand, silt and silt-laden waters from entering the river.

5.2.28. **Erosion and sedimentation control**

- The Contractor shall take all reasonable measures to limit erosion and sedimentation due to construction activities.
- Re-vegetate areas that have been disturbed as soon as possible.
- Where erosion and/or sedimentation, whether on or off the site, occurs despite the Contractor complying with the foregoing, rectification shall be carried out in accordance with details specified by the ECO. Where erosion and/or sedimentation occur due to the fault of the Contractor, rectification shall be carried out to the reasonable requirements of the ECO and at the expense of the Contractor.

5.2.29. **Aesthetics**

- The Contractor shall take reasonable measures to ensure that construction activities do not have an unreasonable impact on the aesthetics of the area.

5.2.30. **Community relations**

- If so required by the Project Specification, the Contractor shall erect and maintain information boards in the positions, quantities, designs and dimensions specified. Such boards shall include contact details for complaints by members of the public in accordance with details provided by the ECO.
- The Contractor shall keep a "Complaints Register" on site. The Register shall contain all contact details of the person who made the complaint, and information regarding the complaint itself and note the date and time that the complaint was resolved.
- The ECO shall be responsible for responding to queries and/or complaints and may request assistance from the Contractor's Management Staff.
- Construction materials and other purchases relating to the project must be done, where possible, within the nearby community and at local shops.

5.3. **OPERATION PHASE**

5.3.1. **Emergency procedures**

- Emergency procedures, including the names and contact details of responsible personnel and emergency services shall be made available to all staff and shall be clearly displayed at relevant locations at the site.
- Telephone numbers of emergency services shall also be posted conspicuously in the office(s) near the telephone.
- The applicant shall undergo these procedures for the following emergencies:

Fire

- The applicant shall advise the relevant authority of a fire as soon as one starts and shall not wait until he can no longer control it.

The applicant shall ensure that his employees are aware of the procedures to be followed in the event of a fire.

5.3.2. **Aesthetics**

- The applicant shall take reasonable measures to ensure that operational activities do not have an unreasonable impact on the aesthetics of the area.

6. ENVIRONMENTAL MANAGEMENT PROTOCOL

6.1. ROLES AND RESPONSIBILITIES

6.1.1. Applicant/Developer

The applicant is the responsible entity for monitoring the implementation of the EMPr and compliance with the authorisation. However, if the applicant appoints a contractor to implement the project and hence implement the proposed mitigation measures documented in this EMPr on their behalf, then the successful contractor's responsibilities are outlined as per the section that follows.

6.1.2. Contractor

The successful contractor shall:

- Be responsible for the finalisation of the EMPr in terms of methodologies which are required to be implemented to achieve the environmental specifications contained herein, and the relevant requirements contained in the Environmental Authorisation (EA);
- Be responsible for the overall implementation of the EMPr in accordance with the requirements of the developer and the EA;
- Ensure that all third parties who carry out all or part of the contractor's obligations under the contract comply with the requirements of this EMPr; and
- Ensure that the appointments of the ECO are subject to the approval of the developer.

6.1.3. Environmental Control Officer

For the purposes of implementing the conditions contained herein, the contractor shall appoint an ECO for the contract. The ECO shall be the responsible person for ensuring that the provisions of the EMPr as well as the EA are complied with during the construction period. The ECO will be responsible for issuing instructions to the contractor and where environmental considerations call for action to be taken. The ECO shall submit regular written reports to the applicant and the environmental authority as required.

The ECO will be responsible for the monitoring, reviewing and verifying of compliance with the EMPr and conditions of the environmental authorisation by the contractor. The ECO's duties in this regard will include, *inter alia*, the following:

- Confirming that all the environmental authorisations and permits required in terms of the applicable legislation have been obtained prior to construction commencing;
- Monitoring and verifying that the EMPr, EA and contract are adhered to at all times, and taking action if specifications are not followed;
- Monitoring and verifying that environmental impacts are kept to a minimum;
- Reviewing and approving construction method statements with input from the engineer, where necessary, in order to ensure that the environmental specifications contained within this EMPr and EA are adhered to;
- Inspecting the site and surrounding areas on a regular basis regarding compliance with the EMPr, EA and contract;
- Monitoring the undertaking by the contractor of environmental awareness training for all new personnel on site;
- Ensuring that activities on site comply with all relevant environmental legislation;
- Ordering the removal of, or issuing spot fines for person/s and/or equipment not complying with the specifications of the EMPr and/or environmental authorisation;
- Undertaking a continual internal review of the EMPr and submitting any changes for applicant and authority review and approval as applicable;
- Checking the register of complaints kept on site and ensuring that the correct actions are/were taken in response to these complaints;

- Checking that the required actions are/were undertaken to mitigate the impacts resulting from non-compliance;
- Reporting all incidences of non-compliance;
- Conducting monthly environmental performance audits in respect of the activities undertaken relating to the project. The ECO shall also submit compliance audit reports to the competent authority, in accordance with the requirements of the environmental authorisation. Such reports shall be reviewed by the applicant, prior to submission;
- Keeping a photographic record of progress on site from an environmental perspective;
- Recommending additional environmental protection measures, should this be necessary; and
- Providing report back on any environmental issues at site meetings.

Given the relatively small scope of the construction activities, a full time ECO will not be required. It is anticipated that upfront activities would include defining laydown and no-go areas, assisting with the development of method statements, presenting the environmental awareness and training programmes and revising this EMPr if details on the construction programme necessitate such changes. Thereafter monthly site audits will likely be sufficient to ensure compliance with this EMPr, provided the developer's Resident Engineer has been capacitated to identify any non-compliances.

6.2. ADDITIONAL MITIGATION MEASURES

As part of the implementation and monitoring requirements, the employees involved in the proposed development must be trained in implementing and monitoring compliance with the EMPr and EA and to undertake the necessary monitoring and implementation of the prescribed mitigation measures detailed here.

6.2.1. Pre-Construction

Notice must be given to surrounding landowners and businesses informing them of the intended date of commencement of construction.

6.2.2. Construction Phase

- An ECO must be appointed to ensure that the construction activities remain within the designated area and that no unauthorised activities occur;
- The ECO must submit site audits detailing the applicant's compliance with the EMPr;
- An efficient stormwater management system must be implemented during construction; and
- Workers must be educated on environmental management aspects.

6.2.3. Operational Phase

- Eradication of the already established alien invasive species onsite within the demarcated construction footprint; and
- An ECO must be present during maintenance work

7. ENVIRONMENTAL AWARENESS

Contractors shall ensure that its employees and any third party who carries out all or part of the Contractor's obligations are adequately trained with regard to the implementation of the EMP, as well as regarding environmental legal requirements and obligations. Training shall be conducted by an independent person where necessary. Environment and health awareness training programmes must be targeted at two distinct levels of employment, i.e. management and labour. Environmental awareness training programmes shall contain the following information:

- The names, positions and responsibilities of personnel to be trained;
- The framework for appropriate training plans;
- The summarised content of each training course; and
- A schedule for the presentation of the training courses.

The person conducting training shall ensure that records of all training interventions are kept in accordance with the record keeping and documentation control requirements as set out in this EMP. The training records shall verify each of the targeted personnel's training experience.

The Developer shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness and the content of the EMP. The presentation needs to be conducted in the language of the employees to ensure it is understood. The environmental training shall, as a minimum, include the following:

- The importance of conformance with all environmental policies;
- The environmental impacts, actual or potential, of their work activities;
- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures, including emergency preparedness and response requirements;
- The potential consequences of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities;
- Environmental legal requirements and obligations;
- Details regarding floral/faunal species of special concern and protected species, and the procedures to be followed should these be encountered during the construction of the bridge, main access roads, approach roads or construction camps;
- The importance of not littering;
- The importance of using supplied toilet facilities;
- The need to use water sparingly;
- Details of and encouragement to minimise the production of waste and re-use, recover and recycle waste where possible; and
- Details regarding archaeological and/or historical sites which may be unearthed during construction and the procedures to be followed should these be encountered.

The Contractor must monitor the performance of construction workers to ensure that the points relayed during their introduction have been properly understood and are being followed. If necessary, a translator must be called to the site to further explain aspects of environmental or social behaviour that are unclear. An environmental training and awareness course has been provided in Annexure 2.

8. CONCLUSION

Although all foreseeable actions and potential mitigations or management actions are contained in this document, the EMPr must be seen as a day-to-day management document. The EMPr thus sets out the environmental standards that are required to minimise the negative impacts and maximise the positive benefits of the proposed construction of radio antennae and associated infrastructure, as detailed in the Basic Assessment Report (BAR). The EMPr is a “live document”, and if continuously reviewed and managed correctly can result in successful construction and operation of the proposed development.

All attempts must be made to have this EMPr available, as part of any tender documentation, so that the contractors are made aware of the potential cost and timing implications needed to fulfil the implementation of the EMPr, thus adequately costing for these. Further guidance must also be taken on any conditions contained in the EA, if the project is granted approval, and that these conditions must be incorporated into the final EMPr.

ANNEXURE 1: METHOD STATEMENTS

Method statements need to be compiled by the Contractor for approval by the ECO. For the purposes of the environmental specification, a method statement is defined as a written submission by the Contractor to the ECO setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, in such detail that the ECO is enabled to assess whether the Contractor's proposal is in accordance with the EMPr and / or will produce results in accordance with the EMPr.

The method statement shall cover applicable details with regard to:

- Construction procedures,
- Materials and equipment to be used,
- Transporting the equipment to and from site,
- How the equipment/ material will be moved while on site,
- How and where material will be stored,
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur,
- Timing and location of activities,
- Compliance/ non-compliance with the Specifications, and
- Any other information deemed necessary by the Engineer.

The Contractor shall abide by these approved method statements, and any activity covered by a method statement shall not commence until the ECO has approved the method statement. The method statement shall be submitted to the ECO not less than 20 days prior to the intended date of commencement of the activity, or as directed by the ECO.

METHOD STATEMENT

CONTRACT:..... **DATE:**.....

PROPOSED ACTIVITY (give title of method statement):

WHAT WORK IS TO BE UNDERTAKEN (give a brief description of the works):

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

Start Date:

End Date:

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

HOW ARE THE WORKS TO BE UNDERTAKEN (provide as much detail as possible, including annotated sketches and plans where possible):

* Note: please attach extra pages if more space is required

DECLARATIONS

1) ENVIRONMENTAL CONTROL OFFICER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm:

(Signed)

(Print name)

Dated: _____

2) PERSON UNDERTAKING THE WORKS

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to other signatories and that the ECO will audit my compliance with the contents of this Method Statement

(Signed)






(Print name)

Dated: _____





ANNEXURE 2: BASIC ENVIRONMENTAL EDUCATION COURSE OUTLINE


















Reasons why should we look after the environment

-  We have a right to a clean environment
-  A clean environment is essential to healthy living
-  All our basic needs come from the environment
-  A contract has been signed – development vs the environment
-  Penalties / fines could be issued

How to look after the environment

-  Report issues
-  Teamwork
-  Follow the set rules and guidelines (EA, EMPr, Method statements etc.)
-  Conserve, reuse and recycle

Tips and Guidelines

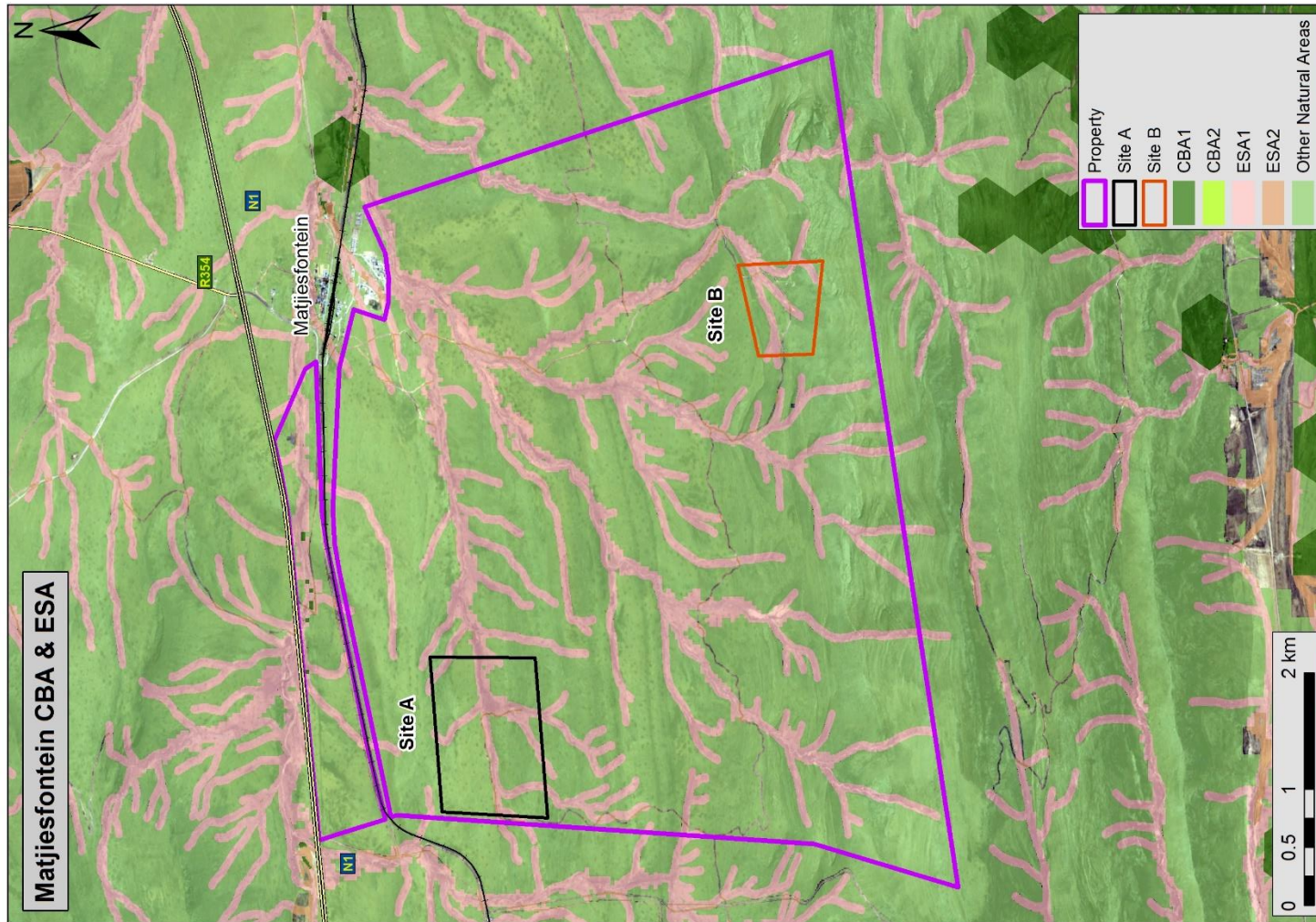
-  Workers and equipment should not be allowed outside demarcated areas
-  No swimming or polluting of water bodies allowed
-  No damage / disturbance to vegetation or water bodies without consent / permits
-  No disturbance allowed in no-go areas
-  No hunting of animals
-  Report all fires
-  No burning or burying of waste
-  No smoking near hazardous materials
-  Training on fire fighting equipment
-  Hazardous materials to be stored in designated and bunded areas
-  Spill kits and drip trays a must
-  Report all spills
-  Control dust and Noise
-  Maintain construction vehicles
-  Availability and maintenance of sanitation facilities



ANNEXURE 3: DETAILS AND CVS OF THE PROJECT TEAM

Please refer to the Basic Assessment Report for details and CVs of the project team.

ANNEXURE 4: SITE SENSITIVITY MAP: ECOLOGICAL SUPPORT AREAS





environment, forestry & fisheries

Department:
Environment, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA

Private Bag X 447· PRETORIA ·0001· Environment House ·473 Steve Biko Road, Arcadia· PRETORIA

DEFF Reference: 14/12/16/3/3/1/2267

Enquiries: Mr Herman Alberts

Telephone: (012) 399 9371 **E-mail:** HAlberts@environment.gov.za

Mr Raoul Hodges
South African National Space Agency
Farm No 502 JQ
Hartebeeshoek
KRUGERSDORP
1740

Telephone Number: (012) 334 5003
Email Address: rhodges@sansa.org.za

PER EMAIL / MAIL

Dear Mr Hodges

ENVIRONMENTAL AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, ACT NO. 107 OF 1998, AS AMENDED: FOR THE SOUTH AFRICAN NATIONAL SPACE AGENCY (SANSA) RADIO ANTENNAE AND SCIENTIFIC INSTRUMENTS FOR DEEP SPACE EXPLORATION, MATJIESFONTEIN, WESTERN CAPE

With reference to the above application, please be advised that the Department has decided to grant authorisation. The Environmental Authorisation (EA) and reasons for the decision are attached herewith.

In terms of Regulation 4(2) of the Environmental Impact Assessment Regulations, 2014, as amended (the EIA Regulations), you are instructed to notify all registered interested and affected parties, in writing and within 14 (fourteen) days of the date of the decision, of the Department's decision as well as the provisions regarding the submission of appeals that are contained in the Regulations.

In terms of the Promotion of Administrative Justice Act, Act No. 3 of 2000, you are entitled to the right to fair, lawful and reasonable administrative action; and to written reasons for administrative action that affects you negatively. Further your attention is drawn to the provisions of the Protection of Personal Information Act, Act No. 4 of 2013 which stipulates that the Department should conduct itself in a responsible manner when collecting, processing, storing and sharing an individual or another entity's personal information by holding the Department accountable should the Department abuses or compromises your personal information in any way.

Your attention is drawn to Chapter 2 of the National Environmental Management Act, Act No. 107 of 1998 National Appeal Regulations published under Government Notice R993 in Government Gazette No. 38303 dated 08 December 2014 (National Appeal Regulations, 2014), which prescribe the appeal procedure to be followed. Kindly include a copy of this document (National Appeal Regulations, 2014) with the letter of notification to interested and affected parties in this matter.

M.S

Should any person wish to lodge an appeal against this decision, he/she must submit the appeal to the appeal administrator, and a copy of the appeal to the applicant, any registered interested and affected party, and any organ of state with interest in the matter within 20 days from the date that the notification of the decision was sent to the registered interested and affected parties by the applicant; or the date that the notification of the decision was sent to the applicant by the Department, whichever is applicable.

Appeals must be submitted in writing in the prescribed form to:

The Director: Appeals and Legal Review of this Department at the below mentioned addresses.

By email: appeals@environment.gov.za;

By hand: Environment House
473 Steve Biko
Arcadia
Pretoria
0083; or

By post: Private Bag X447
Pretoria
0001

Please note that in terms of Section 43(7) of the National Environmental Management Act, Act No. 107 of 1998, as amended, the lodging of an appeal will suspend the environmental authorisation or any provision or condition attached thereto. In the instance where an appeal is lodged, you may not commence with the activity until such time that the appeal is finalised.

To obtain the prescribed appeal form and for guidance on the submission of appeals, please visit the Department's website at https://www.environment.gov.za/documents/forms#legal_authorisations or request a copy of the documents at appeals@environment.gov.za.

Yours faithfully


Mr Sabelo Malaza
Chief Director: Integrated Environmental Authorisations
Department of Environment, Forestry and Fisheries

Date: 31/03/2021

CC:	Adri La Meyer	WC: DEADP	E-mail: Adri.lameyer@westerncape.gov.za
	Abri du Toit	Central Karoo District Municipality	E-mail: abri@skdm.co.za
	Anthony Avis	Coastal and Environmental Services	E-mail: cesct@cesnet.co.za



environment, forestry & fisheries

Department:
Environment, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA

Environmental Authorisation

In terms of Regulation 25 of the Environmental Impact Assessment Regulations, 2014, as amended

The South African National Space Agency (SANSA) radio antennae and scientific instruments for deep space exploration, Matjiesfontein, Western Cape

Central Karoo District Municipality

Authorisation register number:	14/12/16/3/3/1/2267
Last amended:	First issue
Holder of authorisation:	South African National Space Agency
Location of activity:	Ward 1, Portion 8 of Farm Matjiesfontein 148, Matjiesfontein, Laingsburg Local Municipality, Central Karoo District Municipality, Western Cape Province

This authorisation does not negate the holder of the authorisation's responsibility to comply with any other statutory requirements that may be applicable to the undertaking of the activity.

MS

Decision

The Department is satisfied, on the basis of information available to it and subject to compliance with the conditions of this environmental authorisation, that the applicant should be authorised to undertake the activities specified below.

Non-compliance with a condition of this environmental authorisation may result in criminal prosecution or other actions provided for in the National Environmental Management Act, 1998, as amended and the EIA Regulations, 2014, as amended.

Details regarding the basis on which the Department reached this decision are set out in Annexure 1.

Activities authorised

By virtue of the powers conferred on it by the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014, as amended, the Department hereby authorises –

SOUTH AFRICAN NATIONAL SPACE AGENCY

(hereafter referred to as the **holder of the authorisation**)

with the following contact details –

Mr Raoul Hodges

Farm No 502 JQ

Hartebeeshoek

KRUGERSDORP

1740

Telephone Number: (012) 334 5003

Fax Number; (012) 334 5001

Email Address: rhodges@sansa.org.za

to undertake the following activities (hereafter referred to as "the activity") indicated in Listing Notice 1 and Listing Notice 3 of the EIA Regulations, 2014 as amended:

Activity number	Activity description
<p><u>Listing Notice 1, Item 12:</u></p> <p><i>"The development of –</i> <i>(ii) infrastructure or structures with a physical footprint of 100 square metres or more;</i> <i>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;"</i></p>	<p>The combined physical footprint of the development is approximately 33 738m² and some infrastructure, such as the fencing, will be located within 32m of a watercourse.</p>
<p><u>Listing Notice 1, Item 14:</u></p> <p><i>"The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres."</i></p>	<p>The proponent intends on storing 4 self-bunded containers of diesel, each with a capacity of 70 000l. Total of 280 cubic metres.</p>
<p><u>Listing Notice 1, Item 27</u></p> <p><i>"The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation."</i></p>	<p>It is anticipated that the facility infrastructure, construction of new roads and upgrading of existing roads will result in the clearance of approximately 3.37ha of indigenous vegetation.</p>
<p><u>Listing Notice 3, Item 3</u></p> <p><i>"The development of masts or towers of any material or type used for telecommunication broadcasting or radio transmission purposes where the mast or tower –</i> <i>(a) Is to be placed on a site not previously used for this purpose; and</i> <i>(b) Will exceed 15 metres in height</i> <i>(i) Western Cape</i> <i>(i) All areas outside urban areas"</i></p>	<p>The radio antenna will be up to 45m in height and located on a greenfields site.</p>

<p><u>Listing Notice 3, Item 4</u></p> <p><i>"The development of a road wider than 4 metres with a reserve less than 13,5 meters</i></p> <p><i>(i) Western Cape</i></p> <p><i>(ii) Areas outside urban areas;</i></p> <p><i>(aa) Areas containing indigenous vegetation"</i></p>	<p><i>New gravel roads are to be developed and existing roads are to be upgraded, they will be 4m in width. Compacted and covered in a layer of gravel.</i></p>
<p><u>Listing Notice 3, Item 18</u></p> <p><i>"The widening of a road by more than 4 metres or the lengthening of a road by more than 1km</i></p> <p><i>(i) Western Cape</i></p> <p><i>(ii) All areas outside urban areas</i></p> <p><i>(aa) areas containing indigenous vegetation"</i></p>	<p><i>Existing roads will be upgraded and lengthened by 5,548km.</i></p>

as described in the Basic Assessment Report (BAR) dated February 2021 at:

21 Digit SG Code

C	0	4	3	0	0	0	0	0	0	0	0	0	0	1	4	8	0	0	0	0	8
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

- for the South African National Space Agency (SANSA) radio antennae and scientific instruments for deep space exploration, Matjiesfontein, Western Cape, hereafter referred to as "the property".

Infrastructure associated with the project:

Site A:

- 4 large Deep Space Navigation (DSN 1-4) antennae which will not exceed 45m in height;
- 3 smaller planned radio antennae up to 12m in height (SANSA 1,2,3);
- 18m Ka Band antenna (LGS 18) which will be up to 30m in height;
- A guard house at the site entrance;
- Signal processing building which will house the signal processor room, operations and control room, lobby, reception, kitchen and ablution facility;
- 900m² curbed, gravel parking area;
- A 70 000l water storage tank as part of a fire management system, and
- A conservancy tank for temporary wastewater and sewerage storage.

Site B:

- 2 short/long laser rangers (S/LLR) and an administration booth with a footprint of 9m² (3mx3m);
- Solar panels will form part of the roofing of the infrastructure in order to supply power to the equipment;
- The scientific instruments will each be individually fenced by a standard 3m high, 10mx10m diamond mesh fence;
- New internal gravel roads, 4m wide; and
- The two 900m² parking areas will be used as the laydown areas for the construction period.

Conditions of this Environmental Authorisation

Scope of authorisation

1. Alternative 2 Site A and Site B for the South African National Space Agency (SANSA) radio antennae and scientific instruments for deep space exploration, Matjiesfontein, Western Cape, as described above is hereby approved.
2. Authorisation of the activity is subject to the conditions contained in this environmental authorisation, which form part of the environmental authorisation and are binding on the holder of the authorisation.
3. The holder of the authorisation is responsible for ensuring compliance with the conditions contained in this environmental authorisation. This includes any person acting on the holder's behalf, including but not limited to, an agent, servant, contractor, sub-contractor, employee, consultant or person rendering a service to the holder of the authorisation.
4. The activities authorised may only be carried out at the property as described above.
5. Any changes to, or deviations from, the project description set out in this environmental authorisation must be approved, in writing, by the Department before such changes or deviations may be effected. In assessing whether to grant such approval or not, the Department may request such information as it deems necessary to evaluate the significance and impacts of such changes or deviations and it may be necessary for the holder of the authorisation to apply for further environmental authorisation in terms of the regulations.
6. The holder of an environmental authorisation must apply for an amendment of the environmental authorisation with the competent authority for any alienation, transfer or change of ownership rights in the property on which the activity is to take place.
7. This activity must commence within a period of ten (10) years from the date of issue of this environmental authorisation. If commencement of the activity does not occur within that period, the authorisation lapses

and a new application for environmental authorisation must be made in order for the activity to be undertaken.

8. Construction must be completed within five (5) years of the commencement of the activity on site.
9. Commencement with one activity listed in terms of this environmental authorisation constitutes commencement of all authorised activities.

Notification of authorisation and right to appeal

10. The holder of the authorisation must notify every registered interested and affected party, in writing and within 14 (fourteen) calendar days of the date of this Environmental Authorisation, of the decision to authorise the activity.
11. The notification referred to must –
 - 11.1. specify the date on which the authorisation was issued;
 - 11.2. inform the interested and affected party of the appeal procedure provided for in the National Appeal Regulations, 2014;
 - 11.3. advise the interested and affected party that a copy of the authorisation will be furnished on request; and
 - 11.4. give the reasons of the Competent Authority for the decision.

Commencement of the activity

12. The authorised activity shall not commence until the period for the submission of appeals has lapsed as per the National Appeal Regulations, 2014, and no appeal has been lodged against the decision. In terms of Section 43(7), an appeal under Section 43 of the National Environmental Management Act, Act No. 107 of 1998, as amended will suspend the Environmental Authorisation or any provision or condition attached thereto. In the instance where an appeal is lodged you may not commence with the activity until such time that the appeal has been finalised.

Management of the activity

13. The Environmental Management Programme (EMPr) submitted as part of the BAR dated February 2021 is approved and must be implemented and adhered to.

14. The EMPr must be implemented and strictly enforced during all phases of the project. It shall be seen as a dynamic document and shall be included in all contract documentation for all phases of the development when approved.
15. Changes to the approved EMPr must be submitted in accordance to the EIA Regulations applicable at the time.
16. The Department reserves the right to amend the approved EMPr should any impacts that were not anticipated or covered in the BAR be discovered.

Frequency and process of updating the EMPr

17. The EMPr must be updated where the findings of the environmental audit reports, contemplated in Condition 28 below, indicate insufficient mitigation of environmental impacts associated with the undertaking of the activity, or insufficient levels of compliance with the environmental authorisation or EMPr.
18. The updated EMPr must contain recommendations to rectify the shortcomings identified in the environmental audit report.
19. The updated EMPr must be submitted to the Department for approval together with the environmental audit report, as per Regulation 34 of GN R. 982. The updated EMPr must have been subjected to a public participation process, which process has been agreed to by the Department, prior to submission of the updated EMPr to the Department for approval.
20. In assessing whether to grant approval of an EMPr which has been updated as a result of an audit, the Department will consider the processes prescribed in Regulation 35 of GN R.982 as amended. Prior to approving an amended EMPr, the Department may request such amendments to the EMPr as it deems appropriate to ensure that the EMPr sufficiently provides for avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity.
21. The holder of the authorisation may apply for an amendment of an EMPr, if such amendment is required before an audit is required. The amendment process is prescribed in Regulation 37 of GN R.982, as amended. The holder of the authorisation must request comments on the proposed amendments to the impact management outcomes of the EMPr or amendments to the closure objectives of the closure plan from potentially interested and affected parties, including the competent authority, by using any of the methods provided for in the Act for a period of at least 30 days.

Monitoring

22. The holder of the authorisation must appoint an experienced Environmental Control Officer (ECO) for the construction phase of the development that will have the responsibility to ensure that the mitigation/rehabilitation measures and recommendations referred to in this environmental authorisation are implemented and to ensure compliance with the provisions of the approved EMPr.
23. The ECO must be appointed before commencement of any authorised activities.
24. Once appointed, the name and contact details of the ECO must be submitted to the Director: Compliance Monitoring of the Department at Directorcompliance@environment.gov.za.
25. The ECO must keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
26. The ECO must remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site is ready for operation.

Recording and reporting to the Department

27. All documentation e.g. audit/monitoring/compliance reports and notifications, required to be submitted to the Department in terms of this environmental authorisation, must be submitted to the Director: Compliance Monitoring of the Department at Directorcompliance@environment.gov.za.
28. The holder of the environmental authorisation must, for the period during which the environmental authorisation and EMPr remain valid, ensure that project compliance with the conditions of the environmental authorisation and the EMPr are audited, and that the audit reports are submitted to the Director: Compliance Monitoring of the Department at Directorcompliance@environment.gov.za.
29. The frequency of auditing and of submission of the environmental audit reports must be as per the frequency indicated in the EMPr, taking into account the processes for such auditing as prescribed in Regulation 34 of GN R. 982, as amended.
30. The holder of the authorisation must, in addition, submit environmental audit reports to the Department within 30 days of completion of the construction phase (i.e. within 30 days of site handover) and a final environmental audit report within 30 days of completion of rehabilitation activities.
31. The environmental audit reports must be compiled in accordance with Appendix 7 of the EIA Regulations, 2014, as amended, and must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions as well as the requirements of the approved EMPr.

32. Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

Notification to authorities

33. A written notification of commencement must be given to the Department no later than fourteen (14) days prior to the commencement of the activity. Commencement for the purposes of this condition includes site preparation. The notice must include a date on which it is anticipated that the activity will commence, as well as a reference number.

Operation of the activity

34. A written notification of operation must be given to the Department no later than fourteen (14) days prior to the commencement of the activity operational phase.

Site closure and decommissioning

35. Should the activity ever cease or become redundant, the holder of the authorisation must undertake the required actions as prescribed by legislation at the time and comply with all relevant legal requirements administered by any relevant and competent authority at that time.

Specific conditions

36. The footprint of the development must be limited to the areas required for actual construction works and operational activities.
37. Areas outside of the footprint, including sensitive areas and buffer areas, must be clearly demarcated (using fencing and appropriate signage) before construction commences and must be regarded as "no-go" areas.
38. All areas of disturbed soil must be reclaimed using only indigenous grass and shrubs. Reclamation activities shall be undertaken according to the EMPr.
39. Topsoil from all excavations and construction activities must be salvaged and reapplied during reclamation.
40. An integrated waste management approach must be implemented that is based on waste minimisation and must incorporate reduction, recycling and re-use options where appropriate. Where solid waste is

disposed of, such disposal shall only occur at a landfill licensed in terms of section 20(b) of the National Environment Management Waste Act, 2008 (Act 59 of 2008).

41. The holder of this authorisation must take note that no temporary site camps will be allowed outside the footprint of the development area as the establishment of such structures might trigger a listed activity as defined in the Environmental Impact Assessment Regulations.
42. Borrow materials must be obtained only from authorised and permitted sites. Permits must be kept on site by the ECO.
43. Should any archaeological sites, artefacts, paleontological fossils or graves be exposed during construction work, work in the immediate vicinity of the find must be stopped, the South African Heritage Resources Agency (SAHRA) must be informed and the services of an accredited heritage professional obtained for an assessment of the heritage resources.
44. All declared aliens must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). There should be an alien species monitoring and eradication program to prevent encroachment of these problem plants for the duration of the operation.

General

45. The recommendations of the EAP in the BAR dated February 2021 and the specialist studies attached must be adhered to. In the event of any conflicting mitigation measures and conditions of the Environmental Authorisation, the specific condition of this Environmental Authorisation will take preference.
46. A copy of this environmental authorisation, the audit and compliance monitoring reports, and the approved EMP, must be made available for inspection and copying-
 - 46.1. at the site of the authorised activity;
 - 46.2. to anyone on request; and
 - 46.3. where the holder of the environmental authorisation has a website, on such publicly accessible website.
47. National government, provincial government, local authorities or committees appointed in terms of the conditions of this authorisation or any other public authority shall not be held responsible for any damages or losses suffered by the holder of the authorisation or his/her successor in title in any instance where construction or operation subsequent to construction be temporarily or permanently stopped for reasons of non-compliance by the holder of the authorisation with the conditions of authorisation as set out in this document or any other subsequent document emanating from these conditions of authorisation.

Date of environmental authorisation: 31/03/2021



Mr Sabelo Malaza

Chief Director: Integrated Environmental Authorisations

Department of Environment, Forestry and Fisheries



Annexure 1: Reasons for Decision

1. Information considered in making the decision

In reaching its decision, the Department took, *inter alia*, the following into consideration -

- a) The listed activities as applied for in the application form received on 18 November 2020.
- b) The information contained in the BAR dated February 2021.
- c) The comments received from interested and affected parties as included in the BAR dated February 2021.
- d) Mitigation measures as proposed in the BAR and the EMPr dated February 2021.
- e) The information contained in the specialist studies contained within the appendices of the BAR dated February 2021.

2. Key factors considered in making the decision

All information presented to the Department was taken into account in the Department's consideration of the application. A summary of the issues which, in the Department's view, were of the most significance is set out below.

- a) The findings of all the specialist studies conducted and their recommended mitigation measures.
- b) The need for the project stems from SANSA's fulfilment of their vision to coordinate and integrate national space science and technology programmes and conduct long-term planning and implementation of space-related activities in South Africa.
- c) The BAR dated February 2021 identified all legislations and guidelines that have been considered in the preparation of the BAR.
- d) The methodology used in assessing the potential impacts identified in the BAR dated February 2021 and the specialist studies have been adequately indicated.
- e) A sufficient public participation process was undertaken and the applicant has satisfied the minimum requirements as prescribed in the EIA Regulations, 2014, as amended for public involvement.

3. Findings

After consideration of the information and factors listed above, the Department made the following findings -

- a) The identification and assessment of impacts are detailed in the BAR dated February 2021 and sufficient assessment of the key identified issues and impacts have been completed.
- b) The procedure followed for impact assessment is adequate for the decision-making process.

- c) The information contained in the BAR dated February 2021 is deemed to be accurate and credible.
- d) The proposed mitigation of impacts identified and assessed adequately curtails the identified impacts.
- e) EMPr measures for the pre-construction, construction and rehabilitation phases of the development were proposed and included in the BAR dated February 2021 and will be implemented to manage the identified environmental impacts during the construction phase.


In view of the above, the Department is satisfied that, subject to compliance with the conditions contained in the environmental authorisation, the authorised activities will not conflict with the general objectives of integrated environmental management laid down in Chapter 5 of the National Environmental Management Act, Act No. 107 of 1998, as amended, and that any potentially detrimental environmental impacts resulting from the authorised activities can be mitigated to acceptable levels. The environmental authorisation is accordingly granted.

PERMIT TO PLUCK PROTECTED AND UNPROTECTED FLORA

Issued in terms of the provisions of the Nature Conservation Ordinance 1974, (Ord 19 of 1974)(Section 63(1)(b) & (c))
 Not Transferable

HOLDER			
Full Name:	Miss N Gumede	Identity No:	8501250509089
Trade Name:	South African National Space Agency	Registration No:	
Postal Address	Farm No. 502 JQ, Hartebeeshoek	Physical Address:	Farm No. 502 JQ,
City / Town:	Krugersdorp	City / Town:	Krugersdorp
Province / State:	Gauteng	Province / State:	Gauteng
Country:	South Africa	Country:	South Africa
Postal / Zip Code:	1740	Longitude:	
		Latitude:	

In terms of and to the provisions of the abovementioned Ordinance and the Regulations framed thereunder, the holder of this permit and persons specified on the attached addendum is authorised to pluck the protected flora as specified below on the properties mentioned below. See conditions on last page.

DETAILS		
Permit / License No:	CN37-28-27049	Stamp: 
Expiry Date:	06/11/2024	
Date Issued:	07/11/2023	
Amount Paid:	R 0.00	
Reference:		
File Code:	1/2/2/1/2/G	

DESCRIPTION	PROPERTY
Organization	South African National Space Ag
Full Name:	Miss N Gumede
Identity Number:	8501250509089
Postal Address	SANSA Radio Antenna Construction, Farm Matjiesfontein
City / Town:	Matjiesfontein
Province / State:	Western Cape
Country:	South Africa
Postal / Zip Code:	NA
Longitude:	
Latitude:	

SPECIES (SCIENTIFIC NAME)		QTY	NOTE
	(Haworthia mucronata)	0	For search and rescue purposes only.
	(Babiana sambucina)	0	For search and rescue purposes only.
A) None	(A) None)	0	See special conditions; Special conditions apply.
D. Hexensis	(Diascia hexensis)	0	For search and rescue purposes only.
G. Fimbriatula	(Gethyllis fimbriatula)	0	For search and rescue purposes only.
G. Heterostyla	(Geissorhiza heterostyla)	0	For search and rescue purposes only.
G. Venustus	(Gladiolus venustus)	0	For search and rescue purposes only.
H. Aspera	(Holothrix aspera)	0	For search and rescue purposes only.
I. Stolonifera	(Ixia stolonifera)	0	For search and rescue purposes only.
I. Trifolia	(Ixia trifolia)	0	For search and rescue purposes only.

C. Arendorf

07/11/2023

Issued By:	Approved on Behalf CEO	Effective Date:	Signature of Holder:
Carlo Arendorf	Western CapeNature Conservation Board		I acknowledge, accept and understand fully the permit conditions as described.

STANDARD CONDITIONS

1. The holder of this permit shall return it together with a return of the species flora and the number of each species which he/she plucked thereunder, to the Chief Executive Officer, Western Cape Nature Conservation Board, Private Bag X29, Gatesville, 7766, within fourteen days from the date of expiry thereof.
2. THIS PERMIT IS SUBJECT TO SPECIAL CONDITIONS.

SPECIAL CONDITIONS

This permit is issued subject to the following special conditions:

1. All recommendations of the Rehabilitation Management Plan must be adhered to.
2. A trained and qualified botanist must oversee all rehabilitation operations .
3. Plants removed from their original locations must be transplanted to a similar habitat.
4. A feedback report regarding the successes and challenges of the rehabilitation operations must be submitted to CapeNature within 1 year after issuing this permit, with updates in years two and three if relevant.
5. Data of all the specimens collected and replanted must be captured on the SOB datasheet and submitted electronically to CapeNature for inclusion in the SOB database.

Chief Executive Officer



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

Private Bag X3055, WORCESTER, 6849, Street Address 51 Baring Street, WORCESTER, 6850, www.dwa.gov.za

Enquiries: Mr Rudzani Makahane
Email: Rmakahane@bgcma.co.za
Ref. No: WU18447

Tel: +27233468031
Fax:
File No: 27/2/2/J511/2/1

DEPARTMENT OF ARTS CULTURE SCIENCE & TECHNOLOGY
16 Gordon Road
Observatory Gordon
7925

Dear Ms. SJ Clarke-Mcleod

REGISTRATION OF WATER USE IN TERMS OF SECTION 39 OF THE NATIONAL WATER ACT, NO 36 OF 1998: FOR DEVELOPMENT OF RADIO ANTENNA NEAR MATJIESFONTEIN IN QUATERNARY CATCHMENT J11E, Breede Gouritz - Worcester

Your request dated 10 February 2021 to be registered to use water in terms of General Authorisation no. 509 dated 26 August 2016 refers.

The Department is pleased to confirm that the intended water use falls within the ambit of the General Authorisation. Therefore, you may continue with the water uses as permissible in terms of Section 22 (1) (a) (iii) of the NWA. You are therefore requested to adhere to the conditions stipulated in the said General Authorisation.

Water use(s) registered:

Sub Sec	Description as per the Act	Existing Authorisation	Applied for	Licence Recommended or Not Recommended
a	Taking water from a water resource			
b	Storing water			
c	Impeding or diverting the flow of water in a watercourse		X	Recommended
i	Altering the bed, banks, course or characteristics of a watercourse		X	Recommended
d	Engaging in a stream flow reduction activity			
e	Engaging in a controlled activity			
f	Discharging waste or water containing waste into a water resource through a pipe, canal, sewer or other conduit			
g	Disposing of waste in a manner which may detrimentally impact on a water resource			
h	Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or			

	power generation process			
j	Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people			
k	Using water for recreational purposes			

Table 1: Details of the registered water use(s)

Water use activities	Purpose	Property details	Quaternary	Coordinates
Section 21 (c) & (i)	SANSA Development of Radio Antenna near Matjiesfontein, Laingsburg	Portion 8 of Land Parcel 148 of the Major Region LAINGSBURG	J11E	Lat: 33.241806 Lon: 20.557743

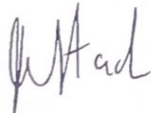
Attached herewith are the Registration Certificate and a copy of the General Authorisation for ease of reference.

You are required to comply with the conditions of the General Authorisation.

Yours sincerely

Recommend

Comments:



I, Mr Jan Van Staden (Acting CEO: BGCMA) herewith electronically sign this document.

Electronic Signature Key : 4653328374007074290

Director: Institutional Establishment

Date: Apr 7 2021 11:30AM

C1.3.5 Annexure E – Geotech



PeraGage
SPECIALIST GEOTECHNICAL ENGINEERS

Geotechnical Investigation Report

Lunar Exploration Ground Sites (LEGS) Communication Facility

Matjiesfontein, South Africa

Report no.: 23123G-02(0238-RP-Rev0)

July 2023

www.peragage.com



Report to: South African National Space Agency (SANSA)





Project name: SANSA LEGS Communication Facility, Matjiesfontein

Report title: Lunar Exploration Ground Sites (LEGS) Communication Facility Geotechnical Investigation

Report number: 23123G-02(0238-RP-Rev0)

Revision	Date	Comment	Prepared by	Reviewed by
F0	2023/07/21	Final Report for Client review	TJS	SB

Revision Details	N/A
------------------	-----

Report by	Reviewed by
 Theo John Stergianos Geotechnical Engineer BEng(Civil) MEng(Geotechnical)	 Steven Bok PrSciNat (SA) 4002279/07 Principal Engineering Geologist BSc(Hons) Geology

This document is copyrighted and remains the property of PeraGage (Pty) Ltd.

Table of Contents

Table of Contents	iii
Figures	v
Tables	v
1. Introduction	1
1.1 Terms of Reference	1
1.2 Objectives and Methodology	1
1.3 Proposed Development	2
1.4 Classification into Geotechnical Category (SANS10160-5)	3
1.5 Scope and Limitations of Assessment	3
1.6 Codes of Practice	3
1.7 Information Sources	3
2. Site Characterisation	4
2.1 Site Location and Description	4
2.2 Topography, Drainage, Existing Infrastructure and Site History	4
2.3 Climate	5
2.4 Geology and Engineering Geology	5
2.5 Seismicity	6
3. Investigation Methodology	8
3.1 Overview	8
3.2 Soil Profiles	10
3.3 Dynamic Cone Penetrometer (DCP) Test Results	11
3.4 Laboratory Testing	18
4. Geotechnical Interpretation	20
4.1 Overview	20
4.2 Founding Conditions – Building and Ancillary Structures	20



4.3	Founding Conditions – Antennae Structures	21
4.4	Founding Conditions – Solar PV Facilities	23
4.5	Subgrade Conditions	23
4.6	Excavatability	23
4.7	On-site Effluent Disposal	24
4.8	Further Works, Construction Quality Assurance and Validation	24
	References	26
Appendix A.	Test pit logging parameters	A
Appendix B.	Test pit logs	B
Appendix C.	Test pit photographs	C
Appendix D.	Laboratory test results	D
Appendix E.	DCP raw data	E



Figures

Figure 1-1 Proposed development	2
Figure 2-1 Locality plan of the LEGS communication facility	4
Figure 2-2 Extract from the 1:250 000 scale Geological Map 3320 Ladysmith	6
Figure 2-3 Extract from SANS 10160, Seismic Hazard Map of South Africa	7
Figure 3-1 Location of test pits along the proposed access road (SMTP01 to SMTP07)	9
Figure 3-2 Location of test pits within the LEGS communication facility area (SMTP08 to SMTP30a)	9
Figure 3-3 Scatter plot of N_{10L} versus depth for entire LEGS communication facility	13
Figure 3-4 Scatter plot of N_{10L} versus depth for DCPs executed for proposed structures	14
Figure 3-5 Scatter plot of N_{10L} versus depth for DCPs executed along the roads	15
Figure 3-6 In-situ CBR versus depth for DCPs executed for proposed structures	16
Figure 3-7 In-situ CBR versus depth for DCPs executed along the roads	17

Tables

Table 3-1 DCP N_{10L} consistency correlations for sands and gravels.....	12
Table 3-2 Sample list.....	18
Table 3-3 Summary of Road- and Foundation Indicator test results.....	18
Table 3-4 Summary of moisture/density relationship and California Bearing Ratio (CBR) results	19
Table 4-1 Bedrock depths and recommended founding levels for buildings and ancillary structures	20
Table 4-2 Bedrock depths for all major antennae	21
Table 4-3 Estimated founding bedrock parameters	22
Table 4-4 SANS 1200D Classes of Excavation.....	24



1. Introduction

PeraGage South Africa (Pty) Ltd has been appointed by the South African National Space Agency (SANS) to undertake geotechnical investigations for the proposed Lunar Exploration Ground Site (LEGS) Communication Facility in Matjiesfontein, South Africa. The geotechnical investigation is a specialist study required to inform the engineering design team of the ground conditions on site to assist with the detailed design phase of the project.

This report presents the results of the geotechnical investigation at the LEGS Communication Facility project site. The report is prepared in accordance with the requirements of the relevant Codes of Practice as noted below.

1.1 Terms of Reference

The scope of works was included in PeraGage's quotation referenced *Quote #23123G*, prepared in response to SANS's Request for Quotation (RFQ) referenced *SO/677/04/2023* dated 17th April 2023.

The report sets out the methodology, findings and recommendations for geotechnical and foundation works for the proposed development. The report is prepared in accordance with the requirements of the relevant Codes of Practice as noted below.

1.2 Objectives and Methodology

The investigation is aimed at assessing and classifying the ground conditions, specifically the founding conditions, and identifying any geotechnical constraints that may limit the development or result in increased risk or costs.

The objectives of the investigation were to:

- I. Analyse the geotechnical conditions prevalent on the site;
- II. Assess the founding conditions for the infrastructure and provide recommendations for foundation design
- III. Assess the excavation conditions for earthworks;
- IV. Expose and assess subgrade conditions along the site access road and internal roads and pavement works;
- V. Recover representative soil samples for laboratory testing;
- VI. Determine the in-situ soil consistencies through DCP testing and visual assessment;
- VII. Assess the groundwater conditions and the need for subsoil drainage;
- VIII. Assess the soil/rock parameters for foundation design, slope stability and retaining structure design; and
- IX. Comment on the geotechnical constraints that would result in increased risk or costs for foundation and pavement layerworks and to enable economic design and construction of the proposed development.

The following methodology was assumed to realise the aims of this study:



- I. A general site walk-over by a PeraGage Geotechnical Engineer and Engineering Geologist along with a review of available geological and geotechnical records;
- II. Geotechnical site investigations including the mechanical excavation and profiling of thirty (30 No.) test pits and undertaking DCP tests; and
- III. Laboratory testing of soils to establish geotechnical properties of the soils and to classify the materials in accordance with the COTO materials classification system.

1.3 Proposed Development

The proposed development of the LEGS Communication Facility in the Matjiesfontein area will comprise of:

- Operations building
- Power room building
- Approximately three (3 No.) telecommunications dishes of various sizes ranging between 10 m and 34 m in diameter
- Solar PV facility/s
- Associated infrastructure such as roads and pavement, underground and overhead transmission and communication lines and water infrastructure

The proposed communication facility layout is presented in Figure 1-1.

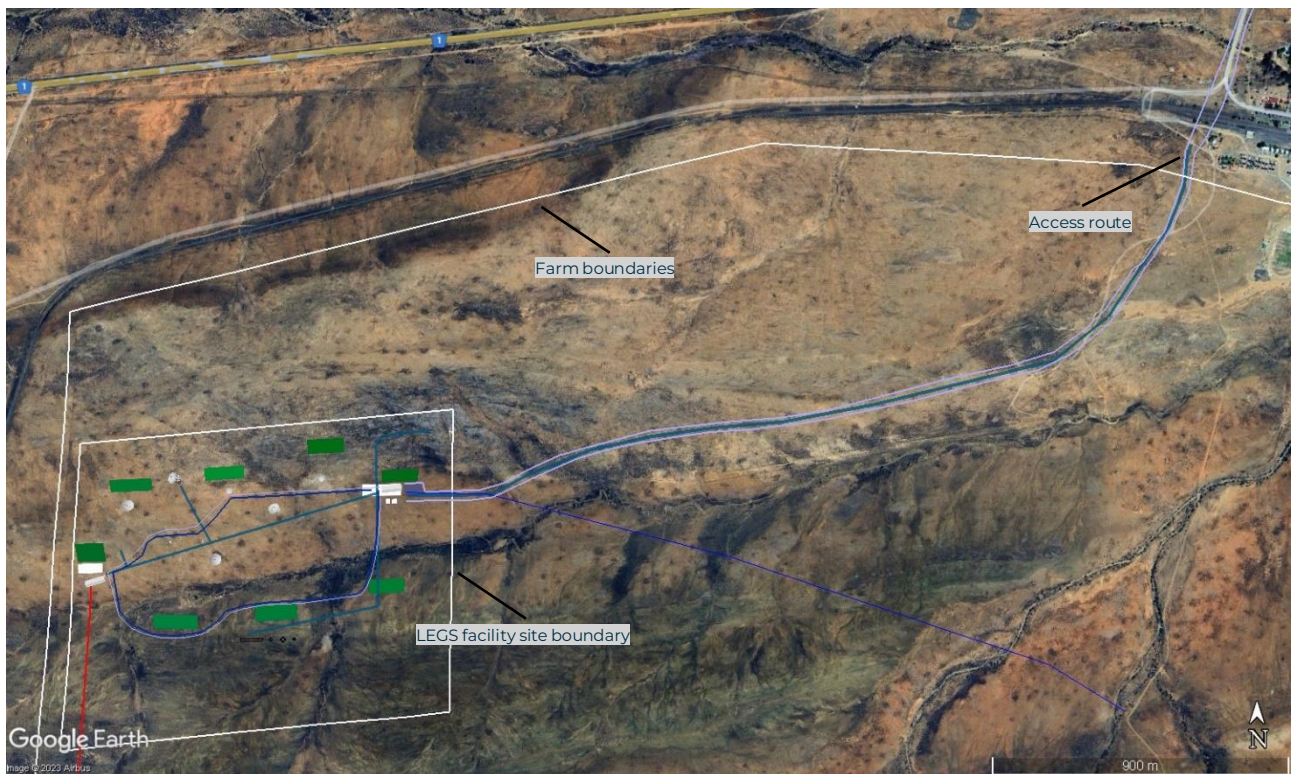


Figure 1-1 Proposed development

1.4 Classification into Geotechnical Category (SANS10160-5)

The major proportion of the development is considered to classify as Geotechnical category 2 in terms of SANS 10160-5:2009 (*Basis of structural design and actions for building and industrial structures - Part 5: Basis of geotechnical design and actions*). The works comprise of conventional structures and foundations, with no exceptional risks or loading conditions or difficult ground conditions and for which design methods are well-established. The large communication antennae are considered to classify as Geotechnical category 3, for which the nature of the ground or design complexity requires specialist geotechnical input.

1.5 Scope and Limitations of Assessment

The nature of geotechnical engineering is such that variations in what is reported here may occur elsewhere over the site. Our opinions can only be based on what was visible from the limited number of data points at the time the investigation was conducted.

This report has been prepared for the exclusive use of the client, with specific application to the proposed project.

1.6 Codes of Practice

The services performed PeraGage (Pty) Ltd are conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the geotechnical profession practicing under similar conditions in the locality of the project.

The investigation was carried out per standard practice codes and guidelines including:

- I. South African Institute of Civil Engineering (SAICE) Geotechnical Division (2010) *Code of Practice for Site Investigations*;
- II. Inspecting the test pits and recording the soil profiles using the standard procedures as recommended in the AEG/SAICE/SAIEG (2002) *Guidelines for Soil and Rock Logging in South Africa*;
- III. South African National Standard (2010) SANS 10160 Part 5 Basis of geotechnical design and actions;
- IV. South African National Standards (2011) SANS 10400-H: National Building Regulations – Foundations;
- V. South African National Standards (2011) SANS 10400-P: National Building Regulations – Drainage; and
- VI. South African National Standards (1990) SANS 1200 D: Earthworks

1.7 Information Sources

The following principal sources were consulted and/or made available:

- I. 1:250 000 scale Geological Map 3320 Ladysmith published in 1990;
- II. Google Earth satellite imagery (current and historical); and
- III. Various literature relating to the site geology and soils.



2. Site Characterisation

2.1 Site Location and Description

The project site is situated near Matjiesfontein, which is roughly 237 km north-east of Cape Town's city centre. The LEGS communication facility is to be constructed on an approximately 200 hectare site area.

The location of the site relative to Matjiesfontein is illustrated in Figure 2-1.



Figure 2-1 Locality plan of the LEGS communication facility

2.2 Topography, Drainage, Existing Infrastructure and Site History

The topography of Matjiesfontein and its surrounding areas is characterised by a mix of open plains, gentle slopes, and rocky outcrops. The undulating, semi-arid plains of the area are characterised by expanses of flat terrain with sparse vegetation and occasional dry riverbeds known as "dorps" between steeper hills.

The Witteberg Mountain Range lies directly south of the project site.

There are several distinct natural drainage features on site, with rills, gullies and occasional dongas sporadically located, all leading towards a generally dry riverbed which runs in a west-to-east direction through the middle of the project site. These are typical surface erosion features caused by sudden heavy rains which are associated with the climate of the Karoo region.

In general, the topography in the northern section slopes gently towards the south while the topography to the south of the riverbed slopes to the north. Rocky outcrops occur over the north-eastern portion of the site and the topography is steep and undulating locally in this area.

The only noteworthy nearby infrastructure is the railway line, which is approximately 250 m from the north-east portion of the site boundary.

2.3 Climate

Matjiesfontein is situated in the drier regions of the Western Cape province, and experiences a semi-arid climate with hot summers and cool winters. Summers months (December to February) are hot and dry, with average daytime temperatures ranging from 30 to 35 degrees Celsius. Winter months (June to August) are mild and cool, with daytime temperatures ranging from 15 to 20 degrees Celsius. Frost is rare but can occur during cold spells.

Rainfall in Matjiesfontein is relatively low throughout the year. The town receives an average of about 200 to 250 mm of rainfall annually, with the majority of precipitation occurring during the winter months.

Climate determines the mode of weathering as well as the rate of weathering, with the effect of climate on the weathering process (i.e., soil formation) determined by the climatic N-value defined by Weinert (1964).

The climatic N-value has been determined to be approximately 9.0 in the Matjiesfontein area. This implies an arid climate with a slight deficit of water. Soil profiles are likely to be thinly developed, and the dominant mode of weathering being mechanical disintegration.

2.4 Geology and Engineering Geology

Matjiesfontein is located within the Karoo Basin, a geological region that spans across various parts of South Africa and is known for its rich sedimentary rock formations. According to the 1:250 000 geological map of Ladysmith (Sheet 3320), the site is underlain by rock units of the Dwyka Formation (designated C-Pd) and Prince Albert Formation (designated Pp) of the Ecca Group, comprising predominantly of tillite, diamictite and subsidiary shales, as well as occasional dark-grey shales with reddish-brown weathering siltstone. The site lies near the northern edge of the Cape Fold Belt and has been subjected to folding and is characterised by east-west trending folds with cleavage planes occurring where buckling of the rock has been accompanied by fracturing.

The bedrock within the site was variably overlain by hillwash (sediments transported largely by sheet flow) and alluvium within the valley. The site location is illustrated on an extract of the 1:250 000 geological sheet 3320 Ladysmith in Figure 2-2.



Figure 2-2 Extract from the 1:250 000 scale Geological Map 3320 Ladysmith

2.5 Seismicity

Seismically active areas in South Africa are divided into two groups in SABS 10160 “Basis of structural design and actions for buildings and industrial structures — part 4: seismic actions and general requirements for building”, namely those where seismic activity is due to natural seismic events (Zone 1 areas), and those where it is predominantly due to mining activity (Zone 2 areas). As indicated in Figure 2-3, which is extracted from SANS 10160, the site falls on the boundary of Zone 1 of the seismically active south-western part of the Western Cape Province. In absence of a detailed Probabilistic Seismic Hazard Assessment (PSHA) study, provision should be made for seismic loading in the design of the foundations as per a site within Zone 1.

According to the Seismic Hazard Map of South Africa contained in SANS 10160 the peak ground acceleration (g) with a 10% probability of being exceeded in a 50-year period in the Matjiesfontein area is in the order of 0.1 g, which would be considered a moderate hazard. The ground type is Type 1 which is characterised by shallow rock and other rock like geological formations, including at most 5 m of weaker material at the surface.

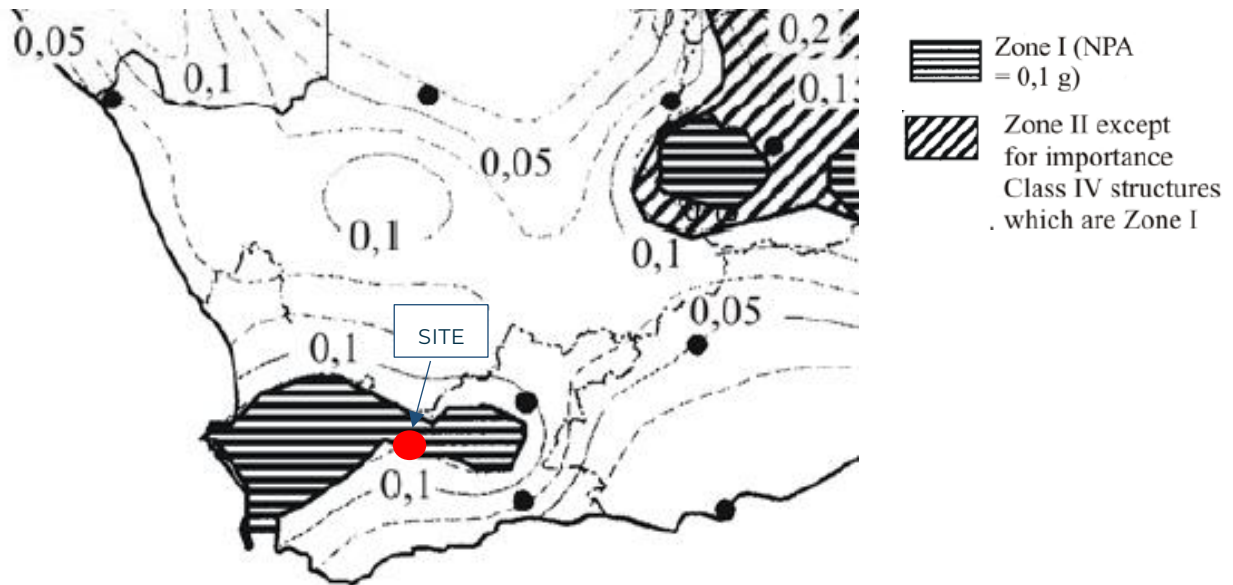


Figure 2-3 Extract from SANS 10160, Seismic Hazard Map of South Africa

3. Investigation Methodology

3.1 Overview

The field investigations were undertaken by a PeraGage Geotechnical Engineer from the 7th to the 9th of June, 2023 and involved the following activities:

- General site walk-over
- Excavation of Test Pits
 - Mechanical excavation of thirty (30 No.) test pits designated SMTP01 to SMTP30a
 - Excavated using a CASE 570T Tractor-Loader-Backhoe (TLB)
 - Excavated to depths of between 0.20 m to 2.00 m below existing ground level
 - Materials were photographed, sampled and profiled according to the relevant profiling standards and guidelines (AEG/SAICE/SAEIG, 2002) by a Geotechnical Engineer
 - Excavations were loosely backfilled on completion
- Dynamic Cone Penetrometer (DCP) Tests
 - DCP tests undertaken from surface adjacent to the test pits using a 1 m length probe
 - Data recorded as mm of penetration per 5 blows

The test pit profiling parameters are attached in Appendix A. The test pit logs are included as Appendix B. Test pit photographs are provided in Appendix C. The DCP test results are included in Appendix E.

The locations of the test pits along the proposed access road (i.e., SMTP01 to SMTP07) are illustrated in Figure 3-1.

The remaining test pits (i.e., SMTP08 to SMTP30a) are illustrated in Figure 3-2, and the specific locations according to the preliminary development plan are as follows:

- SMTP08 – water storage and sewage infrastructure;
- SMTP09 – parking area;
- SMTP10 and SMTP11 – main building;
- SMTP12 – signal processing operations;
- SMTP13, SMTP14 and SMTP15 – 18 m to 24 m diameter satellite;
- SMTP16, SMTP17 and SMTP18 – 10 m diameter satellite;
- SMTP19, SMTP20, SMTP21 and SMTP22 – 34 m diameter satellite;
- SMTP23 and SMTP24 – power infrastructure;
- SMTP25 and SMTP26 – power generation building; and
- SMTP27, SMTP28, SMTP29 and SMTP30a – along road within LEGS communication facility.



Figure 3-1 Location of test pits along the proposed access road (SMTP01 to SMTP07)



Figure 3-2 Location of test pits within the LEGS communication facility area (SMTP08 to SMTP30a)

3.2 Soil Profiles

A summary of the soil profiles observed in the test pits are summarised below. The logging parameters and descriptive terms used for the soils and rock are provided in Appendix A. The test pit logs provided in Appendix B should be consulted for more-detailed descriptions.

Transported hillwash **topsoil** was observed in twenty-six (26 No.) test pits from surface to between 0.08 m and 0.30 m below ground level (BGL), with an average thickness of 0.22 m. The topsoil was typically described as *moist, brown to reddish brown, intact to matrix supported, silty, fine to medium grained sand, with sub-angular to sub-rounded, tillite fine to medium and occasional coarse gravel, and fine plant roots*. The consistency of the soil horizon was predominately “loose”, and occasionally “medium dense”. No excavatability issues were experienced.

The topsoil layer was occasionally logged as a predominately sandy material, with slightly less gravel. The description was typically *moist, brown to orange brown, intact, gravelly, silty, fine to medium grained sand, with fine plant roots*. The consistency remained “loose” and no excavation issues were experienced.

Three (3 No.) test pits were situated near the relatively dry river bed running through the length of the site, namely SMTP27, SMTP29 and SMTP30a. Due to the close proximity to the river, thicker hillwash and alluvium deposits were observed. These soil horizons are summarised below.

Beneath the topsoil, an alluvium deposited **Sand and Gravel** horizon was observed from between 0.15 m and 1.90 m BGL. The description was typically *slightly moist, light brown to orange brown, intact to matrix supported, slightly silty, fine to medium grained sand, with sub-angular to sub-rounded, fine to medium gravel of mixed origin*. The consistency generally increased with depth, ranging from “loose” to “medium dense”. No excavatability issues were experienced.

A distinct pebble marker layer of alluvium transported **Gravel** was encountered in SMTP27, SMTP29 and SMTP30a from between 0.75 m and 1.90 m BGL, with an average thickness of 0.40 m. The pebble marker layer was generally described as *slightly moist to dry, grey, stained orange brown, clast supported, sub-angular to angular, elongated, medium to coarse gravel and occasional cobbles of mixed origin, with slightly silty sand*. The consistency ranged from “medium dense” to “dense”. Excavation rates slowed in this horizon, but did not incur refusal.

Generally, a thin soil profile was anticipated prior to executing the fieldwork, which proved to be correct. Across the majority of the site shallow bedrock was encountered beneath the topsoil horizon, with the degree of weathering differing slightly.

Completely weathered, **very soft rock, Tillite** was observed in two test pits (2 No.), namely SMTP06 and SMTP24, between 0.20 m and 0.80 m BGL. The in-situ material was logged as *reddish brown, stained orange brown, completely weathered, fine grained, weakly laminated, highly jointed, very soft rock, Tillite*. The joints were noted as wide and were stained and filled with the above-described hillwash transported gravelly sand. The very soft rock, tillite was excavated as fine to coarse gravel. No excavatability issues were experienced.

The hillwash transported topsoil predominately transitioned to highly weathered, **soft rock, Tillite**. The soft rock, tillite was observed in twelve (12 No.) test pits between 0.15 m and 0.80 m BGL, with an average thickness of 0.23 m. The rock layer was logged as *brown olive grey to grey, speckled white, stained reddish brown and orange brown, highly weathered, fine grained, massive to weakly laminated, very highly jointed,*



soft rock, Tillite. The joints were noted as very wide to wide, and were stained and filled with gravelly sand. The soft rock, tillite was generally excavated as fine to coarse gravel. No excavability issues were encountered.

The TLB approached and encountered refusal in twenty-nine (29 No.) test pits in a moderately weathered, **medium hard rock, Tillite**. This rock layer was observed between 0.08 m and 2.00 m BGL, with an average thickness of 0.32 m. The rock layer was logged as *grey, speckled white, stained red and orange brown, moderately weathered, fine grained, massive, highly jointed, medium hard rock, Tillite*. The joints were generally noted as wide to narrow, and were stained and filled with minor gravelly sand. The medium hard rock, tillite was typically excavated as cobble to boulder sized fragments. The narrow joints, particle size and rock hardness lead to hard excavation conditions and as a result the rippability of the TLB in this material became challenging.

It must be noted that a change in geology was observed in SMTP28. The profile exhibited a upper hillwash transported clayey **Sand** layer with occasional angular, elongated, mudrock fine to coarse gravel, which had a “loose” to “medium dense” consistency. This was underlain by a **Gravel** layer described as *slightly moist, dark brown to grey, clast supported, angular to sub-angular, elongated, mudrock fine to coarse gravel, with clayey sand as above*. The consistency was described as “medium dense”. The TLB reached refusal in a layer of *grey, streaked white, stained red and brown, moderately weathered, very fine grained, laminated, highly jointed, medium hard rock, Mudrock*. The joints were noted as narrow, and were stained and filled with clayey sand. The cobble to boulder sized excavations slowed the TLB progress and eventually incurred refusal.

No groundwater seepage was observed in any of the test pits on site.

No major sidewall collapse occurred in any of the test pits during excavations.

3.3 Dynamic Cone Penetrometer (DCP) Test Results

In-situ Dynamic Cone Penetrometer (DCP) tests were conducted from surface level adjacent to the test pits to assess the consistency of the soils and to provide data for estimation of the in-situ CBR values for pavement design. The tests were undertaken using a DCP apparatus with an 8 kg hammer falling from a height of fall of 575 mm onto a 20 mm diameter cone.

The results were recorded as millimetres of penetration per 5 blows. The results were converted to equivalent N_{10L} values (number of blows per 100 mm) for assessment of soil consistency and converted to “DN” values (mm/blow) for calculation of in-situ CBR values.

The N_{10L} values are plotted against depth of penetration in Figure 3-3 to Figure 3-4. The consistency of sands and gravels may be estimated using the correlation provided in Table 15-4 of the City of Cape Town Standards and Guidelines for Roads and Stormwater as calculated from Annex G in EN1997-2 (provided in Table 3-1).

Table 3-1 DCP N_{10L} consistency correlations for sands and gravels

Consistency	N_{10L}
Very Loose (Above groundwater)	<1
Loose (Above groundwater)	1-6
Medium Dense (Above groundwater)	>6
Dense (Above groundwater)	>50
Very loose (Below Groundwater)	<1
Loose (Below Groundwater)	1-4
Medium Dense (Below groundwater)	>4
Dense (Below groundwater)	>50

It must be noted that the soil strength is influenced by the in-situ moisture content. The soils below the topsoil were typically described as “slightly moist” and are anticipated to lose strength with increasing soil moisture content. The soil consistency and in-situ CBR values must therefore be interpreted conservatively.

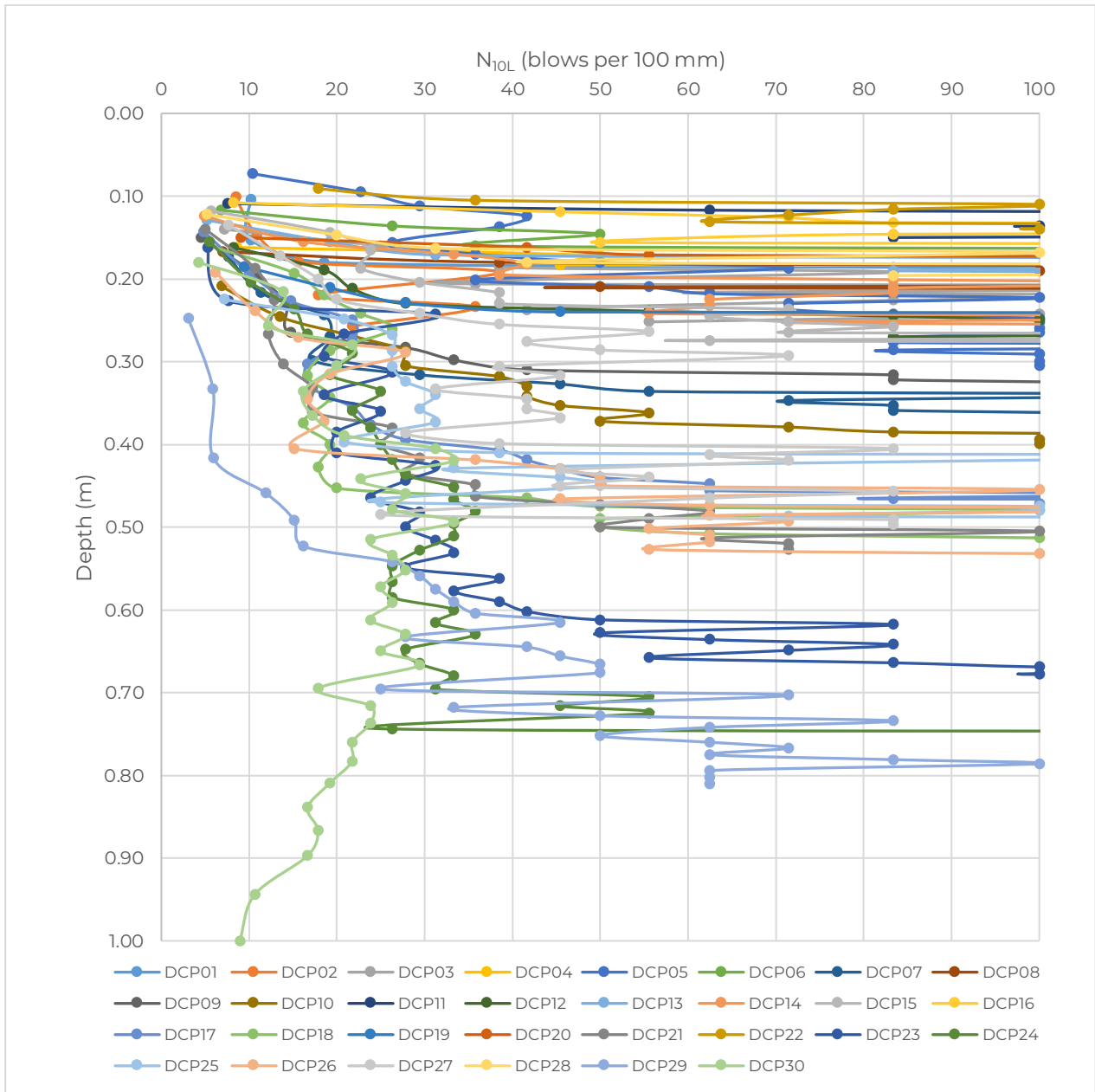


Figure 3-3 Scatter plot of N_{10L} versus depth for entire LEGS communication facility

The DCP profiles corresponds with the initial assumption made prior to executing the fieldwork that a thin soil profile was anticipated. For the majority of the DCP probes, the soil consistency was "loose" near surface, becoming "medium dense". This rapidly increased to a "dense" consistency at bedrock level at depths between 0.10 m and 0.75 m below ground level. Shallow bedrock was encountered beneath the topsoil, which lead to the termination of twenty-nine (29 No.) DCP tests without managing to probe to 1.00 m below the surface.

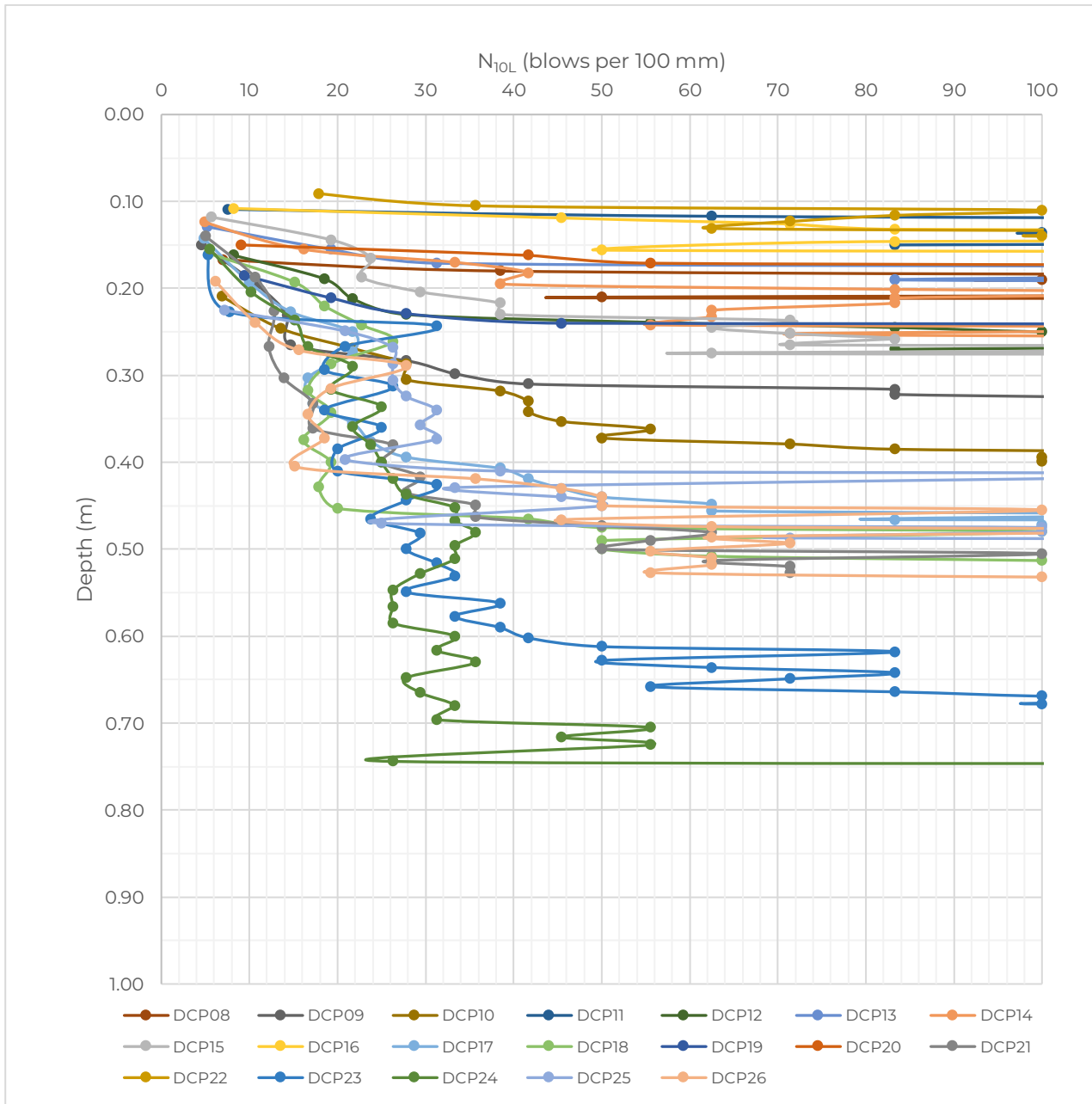


Figure 3-4 Scatter plot of N_{10L} versus depth for DCPs executed for proposed structures

The upper sand and gravel, hillwash transported, topsoil layer has a consistency ranging from “loose” to “medium dense”. The scatter plot follows a general trend exhibiting a steep increase in consistency from the topsoil to the shallow bedrock. DCP24 (executed adjacent to SMTP24) probed to a depth of 0.75 m before reaching refusal. This coincided with the soil layers observed during the excavations of SMTP24, where bands of completely weathered, very soft rock- and highly weathered, soft rock, tillite were first noted before moderately weathered, medium hard rock, tillite was observed from 0.80 m below ground level.

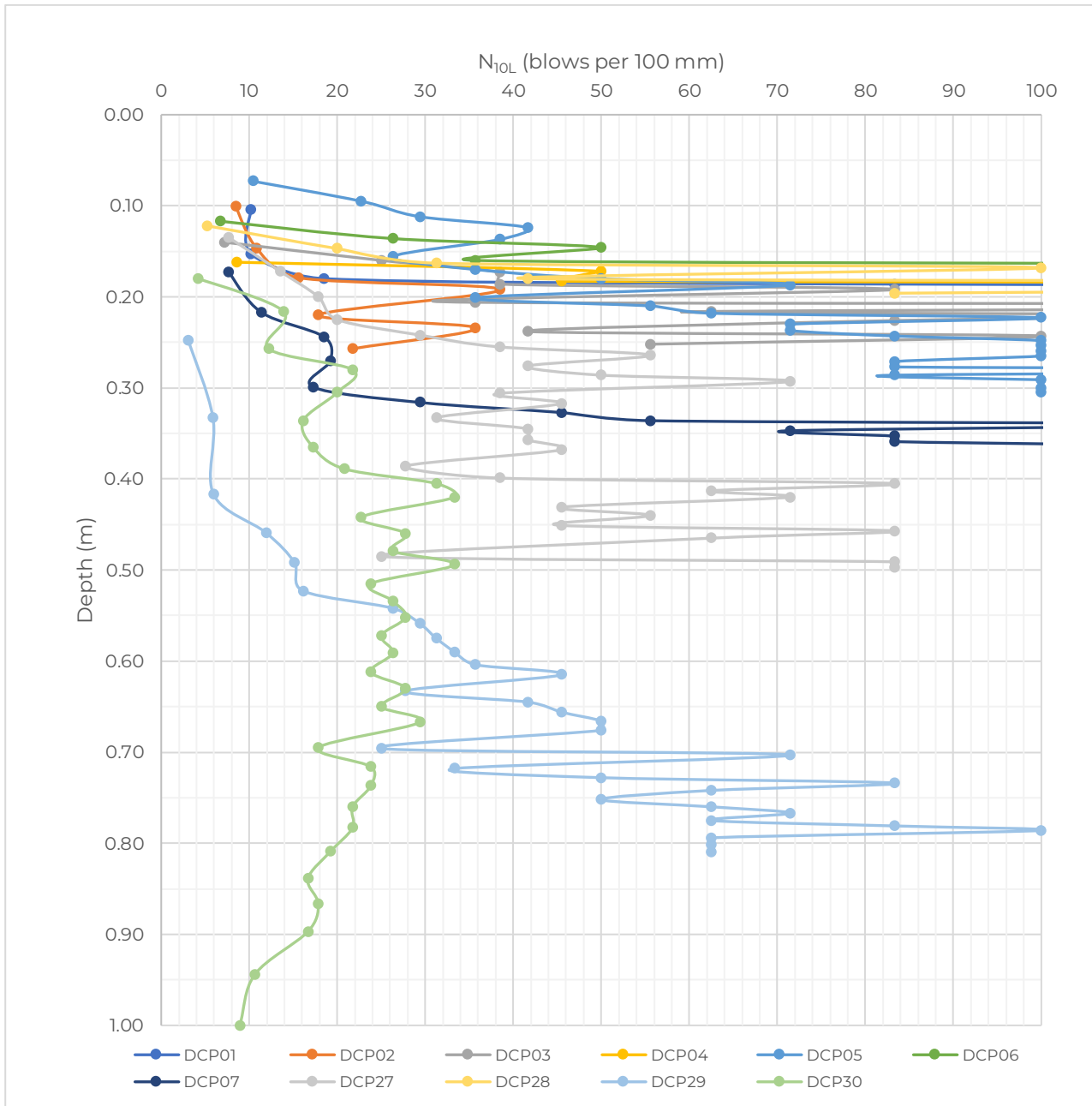


Figure 3-5 Scatter plot of N_{10L} versus depth for DCPs executed along the roads

For the majority of the DCP probes executed along the roads, a similar profile was observed as the DCPs for the proposed structures. However, at DCP27, DCP29 and DCP30 (the probes executed nearest to the relatively dry river bed running through the length of the site, where thicker hillwash and alluvium deposits were observed) the sand and gravel soils classified as “loose” to “medium dense” and “dense” with depth.

A number of methods to correlate DCP penetration values and in-situ CBR have been derived by various authors. Paige-Green (2009), suggests that the following can be used to estimate the CBR of in-situ materials from the DCP:

if $DN > 2$ mm/blow:

$$CBR = 410 \times DN^{-1.27}$$

if $DN \leq 2$ mm/blow:

$$CBR = (66.66 \times DN^2) - (330 \times DN) + 563.33$$

The above method has been used to calculate the in-situ CBR values plotted in Figure 3-6 and Figure 3-7.

It must be noted that the results of DCP testing are influenced by the soil moisture content as well as the presence of gravel, cobbles and boulders within the soil profile. The DCP test results may also be influenced by shaft friction, particularly with depth. Based on these factors, the soaked CBR values obtained from the laboratory testing are considered to provide more reliable CBR values for the soils than the DCP test results.

The DCP raw data is included as Appendix E in this report.

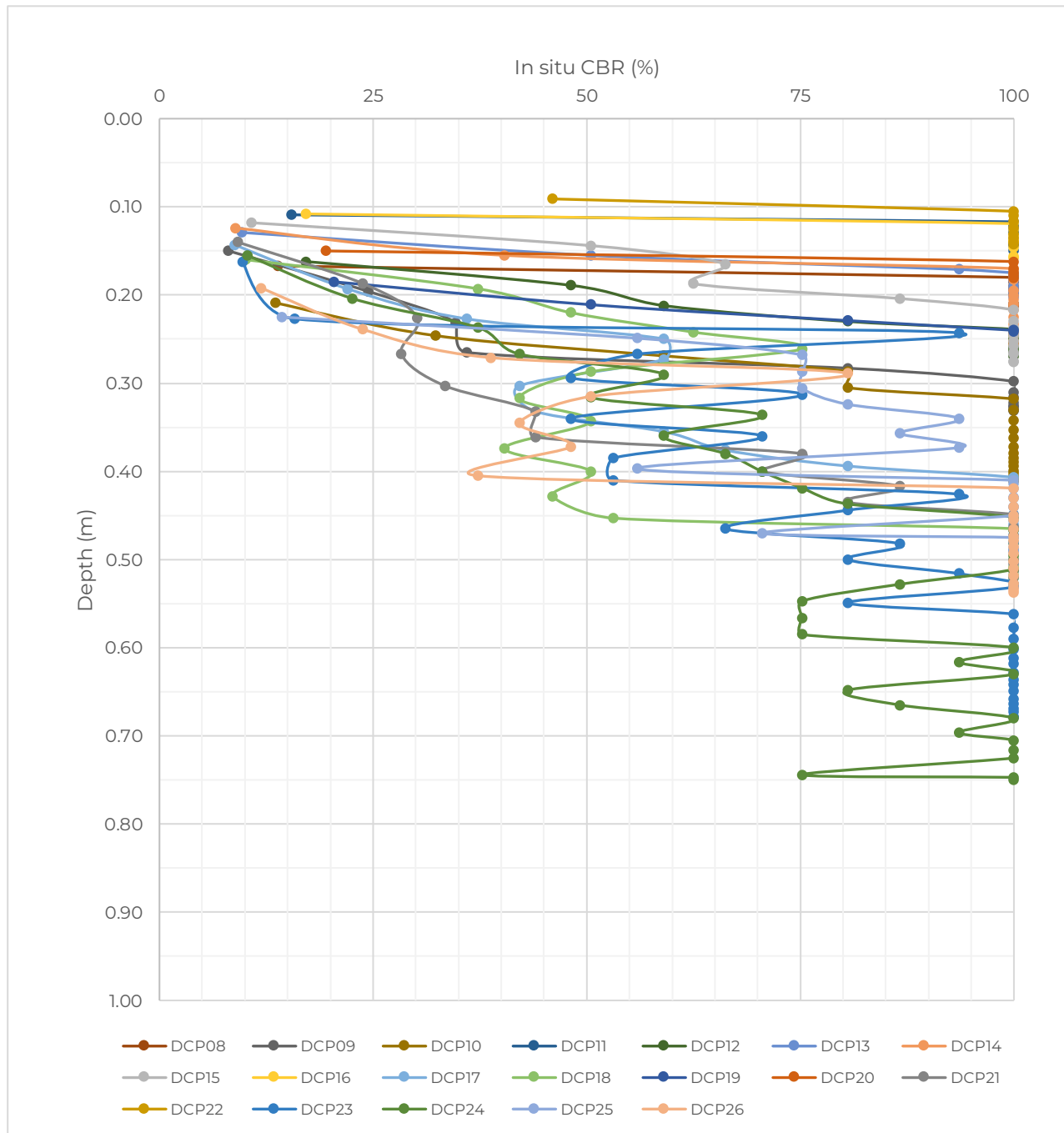


Figure 3-6 In-situ CBR versus depth for DCPs executed for proposed structures

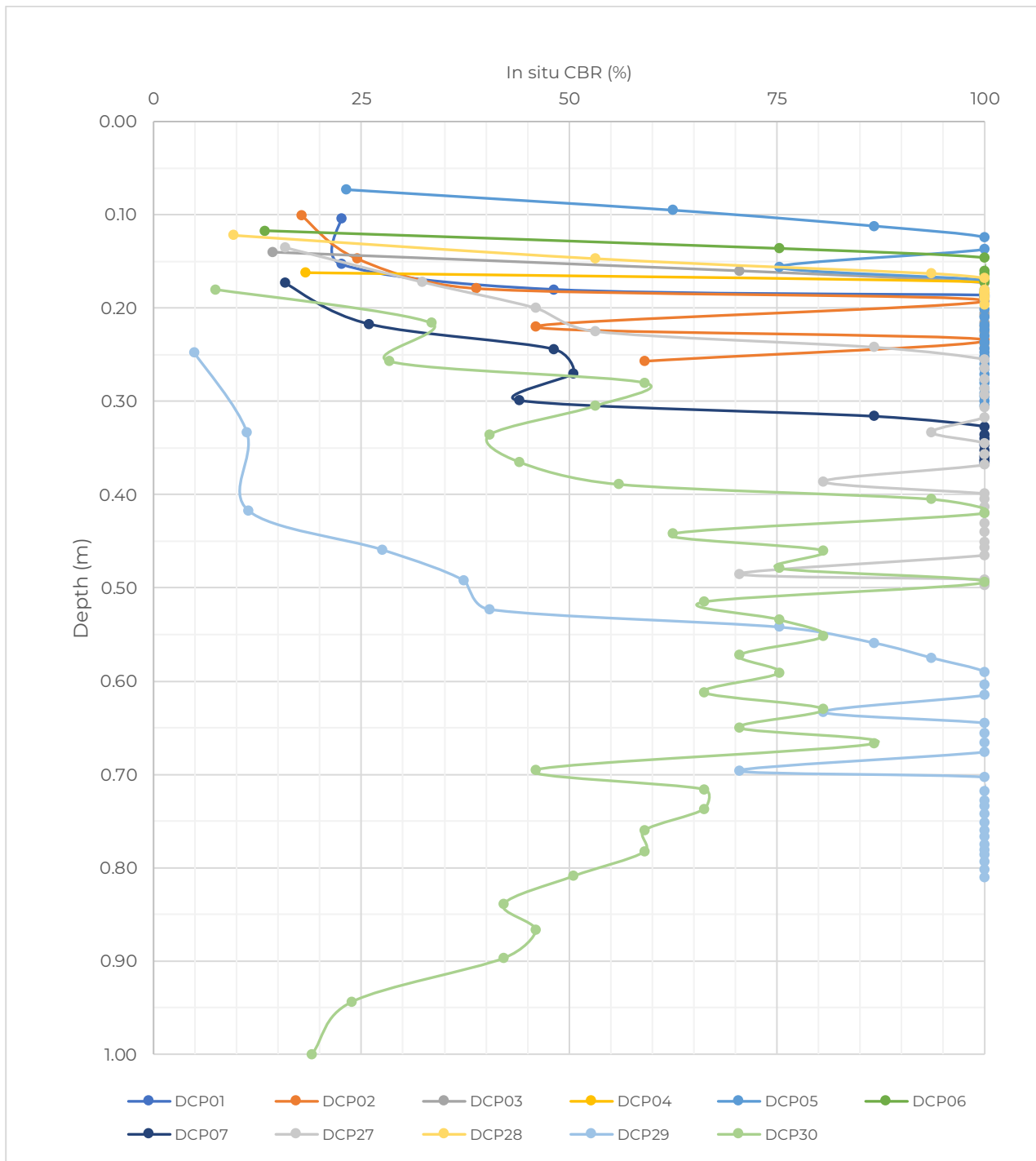


Figure 3-7 In-situ CBR versus depth for DCPs executed along the roads

3.4 Laboratory Testing

The representative soil samples were tested by Steyn-Wilson Laboratories, with the tests undertaken summarised in Table 3-2.

Table 3-2 Sample list

Laboratory Test	Number
Foundation Indicator (gradings, inc. hydrometer, Atterberg Limits)	10
Road Indicator, Moisture Density Relationship and CBR	4

The test results are summarised in Table 3-3 and Table 3-4. The detailed test results received from Steyn-Wilson Laboratories are included as Appendix D.

Table 3-3 Summary of Road- and Foundation Indicator test results

ID	Depth (m BGL)	Particle Size (%)				MC (%)	Atterberg Limits			PE
		Clay	Silt	Sand	Gravel		LL (%)	PI	LS (%)	
SMTP03*	0.20 – 0.40	15		25	60	N/A	22.00	6.90	3.70	Low
SMTP06*	0.20 – 0.55	10		21	69	N/A	24.00	6.60	3.30	Low
SMTP09*	0.00 – 0.40	19		38	43	N/A	28.10	11.40	6.50	Low
SMTP10	0.00 – 0.25	14	17	64	5	9.60	19.40	5.00	2.50	Low
SMTP12	0.00 – 0.80	6	7	52	35	4.70	21.60	8.30	4.20	Low
SMTP15	0.00 – 0.15	30	10	40	20	8.50	23.60	7.90	3.60	Low
SMTP16	0.00 – 0.70	24	9	44	23	6.90	24.30	7.60	4.00	Low
SMTP17	0.00 – 1.10	19	16	52	13	5.10	23.20	9.70	4.40	Low
SMTP20	0.00 – 0.65	22	10	41	27	6.30	21.10	8.70	4.30	Low
SMTP21	0.00 – 1.10	19	12	54	15	6.30	29.70	15.40	7.30	Low
SMTP23	0.00 – 1.15	13	12	59	17	6.40	24.50	8.20	4.30	Low
SMTP25	0.00 – 0.45	19	14	55	12	8.20	22.20	7.90	3.80	Low
SMTP26	0.00 – 0.75	15	12	50	23	6.70	24.80	9.40	5.30	Low
SMTP27*	0.00 – 1.60	29		36	35	N/A	26.50	13.40	7.10	Low
Notes: * – Road Indicator; MC – Moisture Content; LL – Liquid Limit; PI – Plasticity Index; LS – Linear Shrinkage; PE – Potential Expansiveness										

The results from the samples recovered for laboratory testing indicate that the soils on site are primarily comprised of sand and gravels. However, a moderate distribution of silt and clay sized particles were found in certain samples, which exceeded the amount of fines described in the test pit logs. This resulted in

reasonable liquid limits and plasticity indices. Linear shrinkage values of >8 are considered problematic for heave and shrinkage related movements. Most samples did not obtain values of concern, however the samples retrieved at SMTP21 and SMTP27 had linear shrinkage values of 7.30 and 7.10, respectively. According to the Van der Merwe (1964) chart, the samples classified as “low” for potential expansiveness. Based on the test results, the soils are not expected to be expansive, however a conservative approach should be considered for foundation design purposes.

Table 3-4 Summary of moisture/density relationship and California Bearing Ratio (CBR) results

ID	Depth (m BGL)	GM	SANS GR40		CBR				COTO Classification
			OMC (%)	MDD (kg/m ³)	93%	95%	98%	Swell %	
SMTP03	0.20 – 0.40	2.10	7.5	2000	6	8	10	0.00	<G9
SMTP06	0.20 – 0.55	2.35	8.5	2111	10	14	22	0.00	G8
SMTP09	0.00 – 0.40	1.80	6.4	2165	2	3	3	1.99	<G9
SMTP27	0.00 – 1.60	1.56	9.4	2041	2	2	3	1.21	<G9
Notes: GM – Grading Modulus; OMC – Optimum Moisture Content; MDD – Maximum Dry Density									

The CBR test results indicate that the materials at subgrade levels along the roads will predominately classify as poorer than G9 quality in terms of the COTO classification system.

4. Geotechnical Interpretation

4.1 Overview

The evaluation of the ground conditions is based on the site walk-over, profiles observed in the excavated test pits, DCP results and laboratory tests from the representative samples that were retrieved.

The Lunar Exploration Ground Sites (LEGS) Communication Facility will be developed on a site area of approximately 200 ha, with an access road of 2.5 km in length. The development will comprise of an operations building, power room building, telecommunication dishes of varying sizes, solar photovoltaic (PV) systems, internal roads and parking areas, underground and overhead transmission and communication lines and water infrastructure. Crane pads and laydown areas will also be required.

The founding materials will range from surface:

- Thin layer of hillwash transported, gravelly sand topsoil
- Completely weathered, very soft rock, tillite to moderately weathered, medium hard rock, tillite from depths of 0.25 m to 1.10 m below ground level (BGL)

The investigation indicates that the site conditions are suitable for the proposed development. Reasonable bearing capacities are expected on the tillite rock which will act as suitable founding medium for the proposed infrastructure.

The following geotechnical constraints were identified during the investigation:

- i. Thin layers of clayey surficial soils (potentially expansive and poor quality subgrade materials);
- ii. Thicker horizons of loose, compressible sandy soils near the river bed;
- iii. Intermediate to hard excavation conditions at relatively shallow depths; and
- iv. Poor ground permeability for on-site effluent disposal.

More detailed assessment of the founding conditions and foundation recommendations for the components of the development are provided in Sections 4.2 to 4.7.

4.2 Founding Conditions – Building and Ancillary Structures

The investigations indicate that moderately weathered, highly fractured, “medium hard rock” (estimated intact rock strength of 10 to 25 MPa), tillite occurs beneath all building and ancillary structures. The depth to bedrock and recommended founding levels are summarised in Table 4-1.

Table 4-1 Bedrock depths and recommended founding levels for buildings and ancillary structures

Structure	Test Pit	Depth of Bedrock	Refusal depth of TLB	Recommended founding level
Water storage and sewage	SMTP08	0.40 m	0.75 m	0.50 m
Main building	SMTP10	0.50 m	0.90 m	0.50 m
	SMTP11	0.40 m	0.85 m	
Signal processing operations	SMTP12	0.35 m	0.80 m	0.40 m
Power infrastructure	SMTP23	0.70 m	1.15 m	0.60 m
	SMTP24	0.80 m	1.00 m	



Structure	Test Pit	Depth of Bedrock	Refusal depth of TLB	Recommended founding level
Power generation building	SMTP25	0.25 m	0.45 m	0.40 m
	SMTP26	0.30 m	0.75 m	

The upper weathered tillite rock is expected to provide an acceptable founding medium for the buildings and ancillary structures, as the rock will have a suitable bearing capacity for the expected imposed loads of each specific structure. As such, the recommended founding levels have been provided to ensure that the structures are founded at a suitable depth, where minimal settlements are anticipated.

4.3 Founding Conditions – Antennae Structures

The investigations indicate that moderately weathered, highly fractured, “medium hard rock” (estimated intact rock strength of 10 to 25 MPa), tillite occurs beneath all major antennae. The intact rock strengths are anticipated to increase with depth to within the range of “hard rock” (estimated intact rock strength of 25 to 70 MPa).

It is understood that the antennae structures will be founded on large reinforced concrete bases or reinforced concrete structures below ground level. The foundation loads and further information on the founding requirements were not available at the time this report was produced.

The depth to bedrock, refusal depth of the TLB and the minimum recommended founding depths are listed in Table 4-2.

Table 4-2 Bedrock depths for all major antennae

Structure	Test Pit	Depth of Bedrock ¹	Refusal depth of TLB	Recommended minimum founding depth ²
18 m to 24 m diameter antennae	SMTP13	0.30 m	0.75	0.30 m
	SMTP14	0.15 m	0.25	
	SMTP15	0.15 m	0.55	
10 m diameter antennae	SMTP16	0.70 m	0.90	0.70 m
	SMTP17	0.80 m	1.10	
	SMTP18	0.30 m	0.80	
34 m diameter antennae	SMTP19	0.18 m	0.55	0.60 m
	SMTP20	0.30 m	0.65	
	SMTP21	0.55 m	1.10	
	SMTP22	0.25 m	0.50	

¹ - medium hard rock
² – below ground level at test position

The tillite rock is anticipated to provide an adequate founding medium for the antennae structure foundations. Given the sensitive nature of the antennae and the loads that will be imposed (wind and dynamic loads) is recommended that detailed analysis of the behaviour of the rock mass beneath the foundations is undertaken during the foundation design process. The interpretation of the rock mass properties is therefore provided below.

The method proposed by Hoek and Brown (1980) has been utilised to determine the rock mass parameters for the moderately weathered, highly fractured, medium hard rock, tillite described in the test pit logs. Three rock mass “properties” need to be estimated as inputs into the Hoek-Brown criterion for determining the strength and deformability of jointed rock masses, namely:

- Uniaxial Compressive Strength (UCS) of the intact rock pieces
- Value of the Hoek-Brown constant m_i for these intact rock pieces
- Value of the Geological Strength Index (GSI) for the rock mass

UCS values were assumed for the intact rock strength based on the rock hardness descriptions stated in the test pit logs.

The Hoek-Brown Rock Mass constant m_i of 15 was estimated for the moderately weathered, medium hard rock, tillite.

The GSI was determined by estimating the Rock Mass Rating (RMR) with the following relationship:

$$\text{GSI} = \text{RMR} - 5$$

The rock mass ratings and subsequent GSI is presented in Table 4-3.

Table 4-3 Estimated founding bedrock parameters

Rock Characteristic	Unit / description	Score
Uniaxial Compressive Strength (UCS)	25 MPa	4
Rock Quality Designation (RQD)	<25%	3
Joint spacing	Close (0.06-0.20 m)	8
Joint conditions	Slightly rough and moderately to highly weathered, wall rock separation <1mm	20
Groundwater condition	Damp	15
Joint orientation	Very favourable	0
Rock Mass Rating (RMR)		40
Geological Strength Index (GSI)		40

The method of Hoek and Diederichs (2005) was used to estimate the rock mass deformation modulus E_{rm} . For the moderately weathered, medium hard rock, tillite the rock mass deformation modulus E_{rm} was determined as 483 MPa.

The findings presented above show that the bedrock should provide a suitable founding medium for the proposed antennae bases, provided that these are founded at adequate depths and sized for the founding conditions.

4.4 Founding Conditions – Solar PV Facilities

While the location of the proposed solar PV facility had not been determined at the time of investigation, the ground conditions across the site were found to be broadly similar and the following generalised recommendation can therefore be provided.

The shallow depth to bedrock rules out the use of driven piles for founding the solar PV support structures.

The recommended foundation solutions for the solar PV facilities are as follows:

- Pre-drill holes to required depths, install posts into concreted holes.
- Reinforced concrete spread footing foundations with the supporting pole welded to a base plate anchored on a concrete pier.
- Pre-drill holes to required depths, backfill with spoil or imported soil and, subsequently, drive posts into hole.

It is expected that installing posts into concreted pre-drilled holes will be the most economical foundation solution when compared to the options provided above. The pre-drilled holes can be drilled using conventional rotary percussion drill rigs. Only manual labour is required to cast the piles into concrete filled holes.

Reinforced concrete spread footing foundations are considered to be technically feasible. However, these structures will need to be founded below the clayey surficial soils. Difficult excavations conditions are anticipated should the footings be founded below approximately 0.50 m.

Posts may be driven into the pre-drilled holes which would be backfilled with a combination of spoil material and/or imported soil prior to driving in the posts. This method requires the establishment of additional plant to ram the piles into the backfilled holes, which would increase costs.

A hybrid solution consisting of driven posts placed with a concrete collar may also be considered.

4.5 Subgrade Conditions

Materials of variable quality were encountered during the investigation.

The moisture/density relationship and California Bearing Ratio (CBR) results provided in Section 3.4 showed that the samples retrieved from SMTP09 and SMTP27 had CBRs of ≥ 3 . These results suggests that box cutting of the poor-quality clayey soils to the depth of bedrock or a maximum of 300 mm below roadbed level is required, and needs to be replaced with imported fill material.

The upper gravelly sands were found to generally classify as poorer than G9 quality in terms of the COTO materials classification system and are considered suitable for general fill only.

The sample retrieved from SMTP06 for laboratory testing was predominately completely to highly weathered, soft rock tillite which was found to classify as G8 quality. Weathered tillite rock recovered from cuttings and other excavations is considered suitable for use as fill material for the box cut solution proposed above. However, obtaining this material during construction will require careful selective excavation and separate stockpiling to prevent contamination with the clayey surficial soils.

4.6 Excavatability

In Table 4-4 the Classes of Excavation according to SANS 1200D are presented.



Table 4-4 SANS 1200D Classes of Excavation

Excavation Class	Description (for restricted excavation methods)
Soft Excavation	Excavation in material that can be efficiently removed by a back-acting excavator of flywheel power approximately 0.10 kW per millimetre of tined-bucket width, without the use of pneumatic tools such as paving breakers
Intermediate Excavation	Excavation in material that requires a back-acting excavator of flywheel power exceeding 0.10 kW per millimetre of tined-bucket width or the use of pneumatic tools before removal by equipment equivalent to that specified for soft excavation.
Hard Excavation	Hard rock excavation shall be excavation in material (excluding boulder excavation) that cannot be efficiently removed without blasting or wedging and splitting.

Excavations within the upper soil profile will classify as “Soft excavation” according to the SANS 1200 D Classes of Excavation. Excavations within the bedrock will grade rapidly from “Intermediate excavation” to “Hard rock excavation” according to SANS 1200 D Earthwork Classification.

4.7 On-site Effluent Disposal

The suitability for on-site effluent disposal via a septic tank and soak-away system is dependent on the permeability of the soils and environmental factors (chiefly the distance to drainage lines and water sources). Soak-aways do not function adequately if the soil permeability is low. While percolation testing was not undertaken as part of this investigation to assess the ground permeability, the shallow to bedrock and the clayey overlying soils will have low permeabilities. The permeability of the soils will likely result in the percolation rate, as defined in SANS 10400-P: National Building Regulations – Drainage, exceeding the 30-minute limit. Construction of soak-aways is not permitted in these conditions.

It is recommended that a conservancy system is implemented on this site. Alternatively, an on-site treatment system (package plant) may be considered.

Should the above options prove unfeasible, it is recommended that further intrusive investigations are undertaken in an attempt to find more suitable ground conditions. Effluent could then be piped to a soak away constructed in this area. Ground improvement in the form of ripping and /or placement of fill may be required to create suitable conditions for a soak away to function correctly.

4.8 Further Works, Construction Quality Assurance and Validation

The nature of geotechnical engineering is that variations in what is reported here may become evident during construction, once the site is opened up. It is thus imperative that a Competent Person inspect the ground conditions during construction, once the founding and subgrade materials have been exposed to ensure that conditions at variance with those predicted do not occur, and to undertake an interpretation of the facts applied in this report so as to validate the recommendations made. These requirements are also mandated under the SAICE Code of Practice.



While deep investigations (such as rotary core drilling) were not undertaken during this investigation, the ground conditions at depth may be estimated with a high degree of certainty based on the information obtained from the test pits. We submit that further investigations to assess the founding conditions beneath structures are not required (provided that the locations remain as investigated).



References

AEG/SAICE/SAIEG Association of Engineering Geologists – South African Section, South African Institution of Civil Engineering - Geotechnical Division, and South African Institute for Engineering and Environmental Geologists (2002) Guidelines for Soil and Rock Logging in South Africa, 2nd Impression, Brink, A.B.A. and Bruin, R.M.H. (eds.), Proceedings of the Geoterminology Workshop, 1990.

Hoek, E. and Brown, E.T. (1980) Empirical strength criterion for rock masses. J. Geotech. Engng Div., ASCE 106(GT9), 12013-1035.

Hoek, E. and Diederichs, M. (2006) Empirical estimates of rock mass modulus. Int. J Rock Mech. Min. Sci., 43, 203-215.

Van der Merwe, D.M. (1964) The prediction of heave from the plasticity index and percentage clay fraction of soils. The Civil Engineer in South Africa, 6(6): 103-107.

Weinert, H.H. (1964) Basic igneous rocks in road construction. CSIR Research Report No. 218 (Natn. Inst. Res. Bull. No. 5), Pretoria, CSIR, 47 p.



Appendix A.

Test pit logging parameters



SOIL DESCRIPTIVE TERMS

Reference: Brink, ABA and Bruin, RMH (2002) Guidelines for Soil and Rock Logging in South Africa, AEG/SAICE/SAIEG

DESCRIPTIVE ORDER: 1. Consistency; 2. Soil type; 3. Moisture condition; 4. Colour; 5. Soil structure; and 6. Origin

1a Consistency: Granular Soils			
*SPT "N"	GRAVELS & SANDS Generally free draining soils		Dry density (kg/m ³)
< 4	VERY LOOSE	Crumbles very easily when scraped with geological pick	< 1450
4-10	LOOSE	Small resistance to penetration by sharp pick point	1450-1600
10-30	MEDIUM DENSE	Considerable resistance to penetration by sharp pick point	1600-1750
30-50	DENSE	Very high resistance to penetration by sharp pick point. Requires many blows of pick for excavation	1750-1925
> 50	VERY DENSE	High resistance to repeated blows of geological pick. Requires power tools for excavation	> 1925

*Saturated SPT

2 Soil Type	
SOIL TYPE"	PARTICLE SIZE (mm)
CLAY	< 0,002
SILT	0,002 – 0,06
SAND	0,06 – 2
GRAVEL	2 – 60*
COBBLES	60 – 200*
* Specify average and maximum sizes, hardness, shape as well as proportion	

4 Colour	
Described at natural moisture content, as seen in profile (unless otherwise specified) and using bedding thickness criteria. (e.g. thickly banded, thinly streaked, etc.)	
SPECKLED	Very small patches of colour < 2 mm
MOTTLED	Irregular patches of colour 2 – 6 mm
BLOTCHED	Large irregular patches 6 – 20 mm
BANDED	Approximately parallel bands of varying colour
STREAKED	Randomly orientated streaks of colour
STAINED	Local colour variations: associated with discontinuity surfaces

1b Consistency: Cohesive Soils			
*SPT "N"	Insensitive SILTS & CLAYS and combination with SANDS Generally slow draining soils.		UCS (kPa)
< 5	VERY SOFT	Pick point easily pushed in 100mm. Easily moulded by fingers	< 50
5-10	SOFT	Pick point easily pushed in 30-40mm. Moulded by fingers with some pressure. Easily penetrated by thumb.	50-125
11-25	FIRM	Pick point penetrates up to 10mm. Very difficult to mould with fingers. Indented by thumb with effort. Spade just penetrates.	125-500
26-50	STIFF	Slight indentation by pushing in pick point. Cannot be moulded by fingers. Penetrated by thumbnail. Pick necessary to excavate.	250-500
51-80	VERY STIFF	Slight indentation by blow of pick point. Requires power tools for excavation.	500-1000

*Saturated SPT

3 Moisture Condition	
DRY	No water detectable
SLIGHTLY MOIST	Water just discernable
MOIST	Water easily discernable
VERY MOIST	Water can be squeezed out
WET	Generally below the water table

5 Soil Structure	
INTACT	No structure present
FISSURED	Presence of discontinuities, possibly cemented
SLICKENSIDED	Very smooth, glossy, often striated discontinuity planes
SHATTERED	Presence of open fissures. Soil breaks into gravel size blocks
MICRO-SHATTERED	Small scale shattering, very closely spaced open fissures. Soil breaks into sand size crumbs
RESIDUAL STRUCTURES	Relict bedding, lamination, foliation, etc.

5 Origin	
TRANSPORTED	Alluvium, hillwash, talus, etc.
RESIDUAL	Weathered from parent rock e.g. residual granite
PEDOCRETES	Ferricrete, laterite, silcrete, calcrete, etc.

Pedocretes		
DEGREE OF CEMENTATION		UCS (MPa)
VERY WEAKLY CEMENTED	Some material can be crumbled between finger and thumb. Disintegrates under knife blade to a friable state.	0,1 – 0,5
WEAKLY CEMENTED	Cannot be crumbled between strong fingers. Some material can be crumbled by strong pressure between thumb and hard surface. Under light hammer blows disintegrates to friable state.	0,5 – 2
CEMENTED	Material crumbles under firm blows of sharp pick point. Grains can be dislodged with some difficulty by a knife blade.	2 – 5
STRONGLY CEMENTED	Firm blows of sharp pick point on hand-held specimen show 1-3mm indentations. Grains cannot be dislodged by knife blade.	5 – 10
VERY STRONGLY CEMENTED	Hand-held specimen can be broken by single firm blow of hammerhead. Similar appearance to concrete.	10 - 25

Appendix B.

Test pit logs



<div>CLIENT: SANSA</div> <div>PROJECT: SANSA Matjiesfontein</div> <div>PROJECT NO.: 23123G</div> <div>SITE : Matjiesfontein</div>	<div>HOLE NO. : SMTP01</div> <div>X COORD: 20°34'37.43"E</div> <div>Y COORD: 33°14'2.56"S</div> <div>ELEVATION:</div>	<div>SHEET 1 of 1</div>
---	---	-------------------------

DEPTH (m)		DESCRIPTION	Dynamic Probe Light										
			DCP N10										
			5	10	15	20	25	30	35	40	45	50	55
0.20		Loose, gravelly SAND Moist, brown to orange brown, loose, intact, slightly clayey, silty, fine to medium grained sand, with occasional sub-angular to sub-rounded, fine to medium gravel and fine to coarse plant roots, Topsoil/Hillwash.											
0.45		Moderately weathered medium hard rock, TILLITE Olive grey to grey, speckled white, mottled cream, stained orange brown and reddish brown, moderately weathered, fine grained, massive, medium hard rock, Tillite. Dwyka Formation. Note: 1) Upper 0.00 - 0.40 m: Joints very wide and filled with gravelly sand as above. 2) Excavated as cobble to boulder sized fragments with minor sand. 3) Joints at base of test pit: Highly jointed, narrow, stained.											
1													
2													
3													
4													
5													

NOTES:		1. No sample taken	5. Test pit terminated due to TLB approaching refusal
		2. No groundwater seepage	6. DCP undertaken at ground level
		3. No major sidewall collapse	7.
		4. Double width test pit	8.
MACHINE:	DATE PROFILED: 09/06/2023		
DIAM:	PROFILED BY: TJS	PROF REG.:	
FILE REF:	CHECKED BY: SB	PROF. REG:	

TRIAL PIT LOG

HOLE NO. : SMTP02

X COORD: 20°34'32.35"E

Y COORD: 33°14'8.91"S

ELEVATION:

SHEET 1 of 1

CLIENT: SANSA

PROJECT: SANSA Matjiesfontein

PROJECT NO.: 23123G

SITE : Matjiesfontein


[illegible]

<div>CLIENT: SANSA PROJECT: SANSA Matjiesfontein PROJECT NO.: 23123G SITE : Matjiesfontein</div>			<div>TRIAL PIT LOG</div>		<div>HOLE NO. : SMTP03 X COORD: 20°34'27.17"E Y COORD: 33°14'13.74"S ELEVATION: SHEET 1 of 1</div>	
DEPTH (m)			DESCRIPTION	Dynamic Probe Light		
				DCP N10 5 10 15 20 25 30 35 40 45 50 55		
	0.20		<div>Loose, gravelly SAND Moist, brown to orange brown, loose, intact, slightly clayey, silty, fine to medium grained sand, with occasional sub-angular to sub-rounded, fine to medium gravel and fine to coarse plant roots, Topsoil/Hillwash.</div>			
	0.40		<div>Moderately weathered, medium hard rock, TILLITE Olive grey to grey, speckled white, mottled cream, stained orange brown and reddish brown, moderately weathered, fine grained, massive, medium hard rock, Tillite Dwyka Formation. Note: 1) Upper 0.00 - 0.30 m: Joints very wide and filled with sand as above. 2) Excavated as cobble to boulder sized fragments. 3) Band of highly weathered, weakly laminated, very highly jointed, Tillite at 0.20 - 0.35 m. 4) Joints at base of test pit: Highly jointed, narrow, stained.</div>			
	1					
	2					
	3					
	4					
	5					
<div>NOTES: 1. Sample taken: 0.20 – 0.40 m 2. No groundwater seepage 3. No major sidewall collapse 4. Double width test pit 5. Test pit terminated due to TLB refusal 6. DCP undertaken at ground level 7. 8.</div>						
<div>MACHINE: DIAM: FILE REF:</div>			<div>DATE PROFILED: 09/06/2023 PROFILED BY: TJS CHECKED BY: SB PROF. REG.: 4002279/07</div>			

<div>CLIENT: SANSA PROJECT: SANSA Matjiesfontein PROJECT NO.: 23123G SITE : Matjiesfontein</div>			<div>TRIAL PIT LOG</div>		<div>HOLE NO. : SMTP04 X COORD: 20°34'15.00"E Y COORD: 33°14'17.86"S ELEVATION: SHEET 1 of 1</div>	
DEPTH (m)			DESCRIPTION	Dynamic Probe Light		
				DCP N10 5 10 15 20 25 30 35 40 45 50 55		
0.15			Loose, gravelly SAND Moist, brown to orange brown, loose, intact, slightly clayey, silty, fine to medium grained sand, with occasional sub-angular to sub-rounded, fine to medium gravel and fine to coarse plant roots, Topsoil/Hillwash.			
			Moderately weathered, medium hard rock, TILLITE Olive grey to grey, speckled white, mottled cream, stained orange brown and reddish brown, moderately weathered, fine grained, massive, medium hard rock, Tillite Dwyka Formation. Note: 1) Upper 0.00 - 0.40 m: Joints very wide to wide with depth and filled with sand as above. 2) Excavated as cobble to boulder sized fragments with minor sand. 3) Joints at base of test pit: Highly jointed, narrow, stained.			
0.65						
1						
2						
3						
4						
5						
<div>NOTES: 1. No sample taken 5. Test pit terminated due to TLB refusal 2. No groundwater seepage 6. DCP undertaken at ground level 3. No major sidewall collapse 7. 4. Double width test pit 8.</div>						
<div>MACHINE: DATE PROFILED: 09/06/2023 DIAM: PROFILED BY: TJS PROF REG.: FILE REF: CHECKED BY: SB PROF. REG: 4002279/07</div>						

<div>CLIENT: SANSA PROJECT: SANSA Matjiesfontein PROJECT NO.: 23123G SITE : Matjiesfontein</div>			<div>TRIAL PIT LOG</div>		<div>HOLE NO. : SMTP05 X COORD: 20°33'56.70"E Y COORD: 33°14'21.33"S ELEVATION:</div>	
					SHEET 1 of 1	
DEPTH (m)			DESCRIPTION	Dynamic Probe Light		
				DCP N10 5 10 15 20 25 30 35 40 45 50 55		
	0.10		Loose, gravelly SAND Moist, brown to orange brown, loose, intact, slightly clayey, silty, fine to medium grained sand, with occasional sub-angular to sub-rounded, fine to medium gravel and fine to coarse plant roots, Topsoil/Hillwash.			
	0.40		Moderately weathered, medium hard rock, TILLITE Olive grey to grey, speckled white, mottled cream, stained orange brown and reddish brown, moderately weathered, fine grained, massive, medium hard rock, Tillite. Dwyka Formation. Note: 1) Upper 0.00 - 0.20 m: Joints very wide to wide with depth and filled with sand as above 2) Excavated as cobble to boulder sized fragments with minor sand. 3) Joints at base of test pit: Highly jointed, narrow, stained.			
	1					
	2					
	3					
	4					
	5					
<div>NOTES: 1. No sample taken 5. Test pit terminated due to TLB refusal 2. No groundwater seepage 6. DCP undertaken at ground level 3. No major sidewall collapse 7. 4. Triple width test pit 8.</div>						
<div>MACHINE: DATE PROFILED: 09/06/2023 DIAM: PROFILED BY: TJS PROF REG.: FILE REF: CHECKED BY: SB PROF. REG: 4002279/07</div>						

<div>CLIENT: SANSA PROJECT: SANSA Matjiesfontein PROJECT NO.: 23123G SITE : Matjiesfontein</div>			<div>TRIAL PIT LOG</div>			<div>HOLE NO. : SMTP06 X COORD: 20°33'35.10"E Y COORD: 33°14'23.78"S ELEVATION: SHEET 1 of 1</div>									
DEPTH (m)			DESCRIPTION	Dynamic Probe Light											
				DCP N10 5 10 15 20 25 30 35 40 45 50 55											
0.20	0.45	0.55	Loose, gravelly SAND Moist, brown to orange brown, loose, intact, slightly clayey, silty, fine to medium grained sand, with occasional sub-angular to sub-rounded, fine to medium gravel and fine to coarse plant roots, Topsoil/Hillwash.												
			Highly to completely weathered, very soft rock, TILLITE Light brown grey to olive grey, speckled grey, stained red and orange brown, highly to completely weathered, fine grained, weakly laminated, very soft rock, Tillite Dwyka Formation. Note: 1) Excavated as a fine to coarse gravel. 2) Very highly jointed, wide, stained and filled with gravelly sand.												
1			Moderately weathered, medium hard rock, TILLITE Olive grey to grey, speckled white, mottled cream, stained orange brown and reddish brown, moderately weathered, fine grained, massive, medium hard rock, Tillite Dwyka Formation. Note: 1) Excavated as medium to coarse gravel to cobble to boulder sized fragments with depth. 2) Highly jointed, wide to narrow, stained and filled with minor sand.												
2															
3															
4															
5															
NOTES: 1. Sample taken: 0.20 – 0.55 m 5. Test pit terminated due to TLB approaching refusal 2. No groundwater seepage 6. DCP undertaken at ground level 3. No major sidewall collapse 7. 4. Double width test pit 8.															
MACHINE:			DATE PROFILED: 09/06/2023												
DIAM:			PROFILED BY: TJS			PROF REG.:									
FILE REF:			CHECKED BY: SB			PROF. REG: 4002279/07									

<div>CLIENT: SANSA PROJECT: SANSA Matjiesfontein PROJECT NO.: 23123G SITE : Matjiesfontein</div>			<div>TRIAL PIT LOG</div>		<div>HOLE NO. : SMTP07 X COORD: 20°33'15.29"E Y COORD: 33°14'29.21"S ELEVATION: SHEET 1 of 1</div>										
DEPTH (m)			DESCRIPTION			Dynamic Probe Light									
						DCP N10 5 10 15 20 25 30 35 40 45 50 55									
0.30			Loose, gravelly SAND Moist, brown to orange brown, loose, intact, slightly clayey, silty, fine to medium grained sand, with occasional sub-angular to sub-rounded, fine to medium gravel and fine to coarse plant roots, Topsoil/Hillwash.												
		0.65	Moderately weathered, medium hard rock, TILLITE Olive grey to grey, speckled white, mottled cream, stained orange brown and reddish brown, moderately weathered, fine grained, massive, medium hard rock, Tillite. Dwyka Formation. Note: 1) Upper 0.00 - 0.40 m: Joints wide and filled with gravelly sand as above 2) Excavated as cobble to boulder sized fragments with minor sand. 3) Joints at base of test pit: Highly jointed, narrow to very narrow, stained.												
1															
2															
3															
4															
5															
NOTES: 1. No sample taken 5. Test pit terminated due to TLB approaching refusal 2. No groundwater seepage 6. DCP undertaken at ground level 3. No major sidewall collapse 7. 4. Double width test pit 8.															
MACHINE: DATE PROFILED: 09/06/2023															
DIAM: PROFILED BY: TJS PROF. REG.:															
FILE REF: CHECKED BY: SB PROF. REG: 4002279/07															

TRIAL PIT LOG

HOLE NO. : SMTP08

X COORD: 20°33'6.12"E

Y COORD: 33°14'30.04"S

ELEVATION:

SHEET 1 of 1

CLIENT: SANSA

PROJECT: SANSA Matjiesfontein

PROJECT NO.: 23123G

SITE : Matjiesfontein

DEPTH (m)		DESCRIPTION	Dynamic Probe Light										
			DCP N10										
			5	10	15	20	25	30	35	40	45	50	55
0.25		Loose, GRAVEL and SAND											
0.40		Slightly moist to moist, brown, blotched light brown and reddish brown, loose, intact to matrix supported, slightly clayey, silty, fine to medium grained sand, with sub-angular to angular, tillite fine to medium gravel and cobble sized fragments, and fine plant roots, Topsoil/Hillwash.											
0.75		Highly to moderately weathered, soft rock, TILLITE											
1		Grey brown to grey, speckled black, stained red and orange brown, highly to moderately weathered, fine grained, massive, soft rock, Tillite. Dwyka Formation.											
		Note: 1) Very highly jointed, wide, stained and filled with gravelly sand.											
		2) Excavated as gravel to cobble to boulder sized fragments.											
		Moderately weathered, medium hard rock, TILLITE											
2		Grey brown to grey, speckled black and orange brown, stained red and orange, moderately weathered, fine grained, massive, medium hard rock, Tillite. Dwyka Formation.											
		Note: 1) Highly jointed, wide to narrow, stained and filled with minor gravelly sand.											
		2) Excavated as cobble to boulder sized fragments.											
3													
4													
5													

- NOTES:
- No sample taken
 - No groundwater seepage
 - No major sidewall collapse
 - Double width test pit
 - Test pit terminated due to TLB approaching refusal
 - DCP undertaken at ground level
 -
 -

MACHINE:

DATE PROFILED: 07/06/2023

DIAM:

PROFILED BY: TJS

PROF REG.:

FILE REF:

CHECKED BY: SB

PROF. REG: 4002279/07

TRIAL PIT LOG

HOLE NO. : SMTP09

X COORD: 20°33'9.57"E

Y COORD: 33°14'28.67"S

ELEVATION:

SHEET 1 of 1

CLIENT: SANSA

PROJECT: SANSA Matjiesfontein

PROJECT NO.: 23123G

SITE : Matjiesfontein

[illegible]

NOTES: 1. Sample taken: 0.00 – 0.40 m
2. No groundwater seepage
3. No major sidewall collapse
4. Double width test pit

5. Test pit terminated due to TLB approaching refusal
6. DCP undertaken at ground level
- 7.
- 8.

MACHINE:

DATE PROFILED: 07/06/2023

DIAM:

PROFILED BY: TJS

PROF REG.:

FILE REF:

CHECKED BY: SB

PROF. REG: 4002279/07

TRIAL PIT LOG

HOLE NO. : SMTP10

X COORD: 20°33'6.98"E

Y COORD: 33°14'28.56"S

ELEVATION:



SHEET 1 of 1

CLIENT: SANSA

PROJECT: SANSA Matjiesfontein

PROJECT NO.: 23123G

SITE : Matjiesfontein

DEPTH (m)		DESCRIPTION	Dynamic Probe Light										
			DCP N10										
			5	10	15	20	25	30	35	40	45	50	55
0.25		Loose, SAND Slightly moist to moist, brown to light brown, loose, intact, gravelly, silty, fine to medium grained sand, with fine to coarse plant roots, Topsoil/Hillwash.											
0.40													
0.80		Highly weathered, very soft rock, TILLITE Dark grey, speckled orange brown, stained red, highly weathered, fine grained, massive to weakly laminated, very soft rock, Tillite. Dwyka Formation. Note: 1) Very highly jointed, wide, stained and filled with gravelly sand. 2) Excavated as a fine to coarse gravel.											
1		Moderately weathered, medium hard rock, TILLITE Olive grey to grey, speckled white, moderately weathered, fine grained, massive, medium hard rock, Tillite. Dwyka Formation. Note: 1) Highly jointed, wide to narrow with depth, stained and filled with minor gravelly sand. 2) Excavated as cobble to boulder sized fragments.											
2													
3													
4													
5													

NOTES: 1. Sample taken: 0.00 – 0.25 m 5. Test pit terminated due to TLB approaching refusal
2. No groundwater seepage 6. DCP undertaken at ground level
3. No major sidewall collapse 7.
4. Triple width test pit 8.

MACHINE: DATE PROFILED: 07/06/2023
DIAM: PROFILED BY: TJS PROF REG.:
FILE REF: CHECKED BY: SB PROF. REG: 4002279/07

<div>CLIENT: SANSA PROJECT: SANSA Matjiesfontein PROJECT NO.: 23123G SITE : Matjiesfontein</div>			<div>TRIAL PIT LOG</div>			<div>HOLE NO. : SMTP11 X COORD: 20°33'6.98"E Y COORD: 33°14'28.56"S ELEVATION:</div>			<div>SHEET 1 of 1</div>				
DEPTH (m)			DESCRIPTION	Dynamic Probe Light									
				DCP N10 5 10 15 20 25 30 35 40 45 50 55									
0.20	0.40	0.85	<div><div><div>Loose, SAND and GRAVEL</div><div>Slightly moist to moist, brown, blotched light brown and reddish brown, loose, intact to matrix supported, slightly clayey, silty, fine to medium grained sand, with sub-angular to angular, tillite fine to medium gravel and cobble sized fragments, and fine plant roots, Topsoil/Hillwash.</div><div>Highly to moderately weathered, soft rock, TILLITE</div><div>Grey brown to grey, speckled black, stained red and orange brown, highly to moderately weathered, fine grained, massive, soft rock, Tillite. Dwyka Formation.</div><div>Note: 1) Very highly jointed, wide to narrow, stained and filled with gravelly sand.</div><div>2) Excavated as gravel to cobble to boulder sized fragments.</div><div>Moderately weathered, medium hard rock, TILLITE</div><div>Grey brown to grey, speckled black and orange brown, stained red and orange, moderately weathered, fine grained, massive, medium hard rock, Tillite. Dwyka Formation.</div><div>Note: 1) Highly jointed, narrow, stained and filled with minor gravelly sand.</div><div>2) Excavated as cobble to boulder sized fragments.</div></div></div>										
1													
2													
3													
4													
5													

NOTES:

1. Sample taken: 0.00 – 0.25 m

2. No groundwater seepage

3. No major sidewall collapse

4. Triple width test pit

5. Test pit terminated due to TLB approaching refusal

6. DCP undertaken at ground level

7.

8.

MACHINE:	DATE PROFILED: 07/06/2023	
DIAM:	PROFILED BY: TJS	PROF REG.:
FILE REF:	CHECKED BY: SB	PROF. REG: 4002279/07

TRIAL PIT LOG

HOLE NO. : SMTP12

X COORD: 20°33'2.90"E

Y COORD: 33°14'28.31"S

ELEVATION:

SHEET 1 of 1

CLIENT: SANSA

PROJECT: SANSA Matjiesfontein

PROJECT NO.: 23123G

SITE : Matjiesfontein

DEPTH (m)		DESCRIPTION	Dynamic Probe Light										
			DCP N10										
			5 10 15 20 25 30 35 40 45 50 55										
0.20		Loose, SAND and GRAVEL											
0.35		Moist, brown to reddish brown, loose, intact to matrix supported, silty, fine to medium grained sand, with sub-angular to sub-rounded, tillite fine to medium and occasional coarse gravel, and fine plant roots, Topsoil/Hillwash.											
0.80		Highly weathered, very soft rock, TILLITE											
1		Dark grey, blotched red, stained reddish brown, highly weathered, fine grained, massive to weakly laminated, very soft rock, Tillite. Dwyka Formation.											
		Note: 1) Very highly jointed, wide, stained and filled with gravelly sand.											
		2) Excavated as fine to coarse gravel.											
		Moderately weathered, medium hard rock, TILLITE											
2		Grey, speckled white, stained red and orange brown, moderately weathered, fine grained, massive, medium hard rock, Tillite. Dwyka Formation.											
		Note: 1) Highly jointed, narrow, stained and filled with minor gravelly sand.											
		2) Excavated as cobble to boulder sized fragments.											
3													
4													
5													

- NOTES: 1. Sample taken: 0.00 – 0.80 m 5. Test pit terminated due to TLB refusal
2. No groundwater seepage 6. DCP undertaken at ground level
3. No major sidewall collapse 7.
4. Double width test pit 8.

MACHINE:

DATE PROFILED: 08/06/2023

DIAM:

PROFILED BY: TJS

PROF REG.:

FILE REF:

CHECKED BY: SB

PROF. REG: 4002279/07

TRIAL PIT LOG

HOLE NO. : SMTP13

X COORD: 20°32'58.17"E

Y COORD: 33°14'27.48"S

ELEVATION:

SHEET 1 of 1

CLIENT: SANSA

PROJECT: SANSA Matjiesfontein

PROJECT NO.: 23123G

SITE : Matjiesfontein

DEPTH (m)			DESCRIPTION	Dynamic Probe Light															
				DCP N10 5 10 15 20 25 30 35 40 45 50 55															
0.15			Loose, SAND and GRAVEL																
0.30			Slightly moist to moist, brown, blotched light brown and reddish brown, loose, intact to matrix supported, slightly clayey, silty, fine to medium grained sand, with sub-angular to angular, tillite fine to medium gravel and cobble sized fragments, and fine plant roots, Topsoil/Hillwash.																
0.75			Highly weathered, very soft rock, TILLITE																
1			Dark grey, speckled orange brown, stained red, highly weathered, fine grained, massive to weakly laminated, very soft rock, Tillite. Dwyka Formation. Note: 1) Very highly jointed, wide, stained and filled with gravelly sand. 2) Excavated as fine to coarse gravel.																
			Moderately weathered, medium hard rock, TILLITE																
2			Olive grey to grey, speckled white, moderately weathered, fine grained, massive, medium hard rock, Tillite. Dwyka Formation. Note: 1) Highly jointed, narrow, stained and filled with minor gravelly sand. 2) Excavated as cobble to boulder sized fragments.																
3																			
4																			

NOTES:	1. No sample taken	5. Test pit terminated due to TLB refusal
	2. No groundwater seepage	6. DCP undertaken at ground level
	3. No major sidewall collapse	7.
	4. Double width test pit	8.

MACHINE:	DATE PROFILED: 07/06/2023	
DIAM:	PROFILED BY: TJS	PROF REG.:
FILE REF:	CHECKED BY: SB	PROF. REG: 4002279/07

<div>CLIENT: SANSA</div> <div>PROJECT: SANSA Matjiesfontein</div> <div>PROJECT NO.: 23123G</div> <div>SITE : Matjiesfontein</div>	<div>TRIAL PIT LOG</div> <div>HOLE NO. : SMTP14</div> <div>X COORD: 20°32'57.60"E</div> <div>Y COORD: 33°14'27.36"S</div> <div>ELEVATION:</div> <div>SHEET 1 of 1</div>
---	---

DEPTH (m)		DESCRIPTION	Dynamic Probe Light											
			DCP N10											
			5	10	15	20	25	30	35	40	45	50	55	
0.15	0.25	<div><div>Loose, gravelly SAND</div><div>Slightly moist, brown to light brown, loose, intact, slightly silty, fine to medium grained sand, with occasional sub-angular to sub-rounded, tillite fine to coarse gravel, and fine to coarse plant roots, Topsoil/Hillwash.</div><div>Moderately weathered, medium hard rock, TILLITE</div><div>Moderately weathered, medium hard rock, TILLITE</div><div>Grey, speckled white, blotched cream, stained orange brown, moderately weathered, fine grained, massive, medium hard rock, Tillite. Dwyka Formation.</div><div>Note: 1) Upper 0.00 - 0.15 m: Joints very wide and filled with gravelly sand as above.</div><div>2) Excavated as cobble to boulder sized fragments with minor gravelly sand.</div><div>3) Joints at base of test pit: Highly jointed, narrow, stained.</div></div>												
1														
2														
3														
4														
5														

NOTES:	1. No sample taken	5. Test pit terminated due to TLB refusal
	2. No groundwater seepage	6. DCP undertaken at ground level
	3. No major sidewall collapse	7. Slow progress/excavation rate by TLB on tillite
	4. Double width test pit	8.
MACHINE:	DATE PROFILED: 07/06/2023	
DIAM:	PROFILED BY: TJS	PROF REG.:
FILE REF:	CHECKED BY: SB	PROF. REG: 4002279/07

<div>CLIENT: SANSA PROJECT: SANSA Matjiesfontein PROJECT NO.: 23123G SITE : Matjiesfontein</div>			<div>TRIAL PIT LOG</div>		<div>HOLE NO. : SMTP15 X COORD: 20°32'57.94"E Y COORD: 33°14'27.96"S ELEVATION: SHEET 1 of 1</div>	
DEPTH (m)			DESCRIPTION	Dynamic Probe Light		
				DCP N10 5 10 15 20 25 30 35 40 45 50 55		
0.15		0.55	Loose, gravelly SAND Slightly moist, brown to light brown, loose, intact, slightly silty, fine to medium grained sand, with occasional sub-angular to sub-rounded, tillite fine to coarse gravel, and fine to coarse plant roots, Topsoil/Hillwash.			
			Moderately weathered, medium hard rock, TILLITE Grey, speckled white, blotched cream, stained orange brown, moderately weathered, fine grained, massive, medium hard rock, Tillite. Dwyka Formation. Note: 1) Upper 0.00 - 0.40 m: Joints very wide and filled with gravelly sand as above. 2) Excavated as cobble to boulder sized fragments with minor sand. 3) Joints at base of test pit: Highly jointed, narrow, stained.			
1						
2						
3						
4						
5						
<div>NOTES: 1. Sample taken: 0.00 – 0.15 m 2. No groundwater seepage 3. No major sidewall collapse 4. Double width test pit 5. Test pit terminated due to TLB refusal 6. DCP undertaken at ground level 7. Slow progress/excavation rate by TLB on tillite 8.</div>						
MACHINE:		DATE PROFILED: 07/06/2023				
DIAM:		PROFILED BY: TJS		PROF REG.:		
FILE REF:		CHECKED BY: SB		PROF. REG: 4002279/07		

TRIAL PIT LOG

HOLE NO. : SMTP16

X COORD: 20°32'44.46"E

Y COORD: 33°14'33.60"S

ELEVATION:

SHEET 1 of 1

CLIENT: SANSA

PROJECT: SANSA Matjiesfontein

PROJECT NO.: 23123G

SITE : Matjiesfontein

[illegible]

NOTES: 1. Sample taken: 0.00 – 0.70 m
2. No groundwater seepage
3. No major sidewall collapse
4. Double width test pit

5. Test pit terminated due to TLB refusal
6. DCP undertaken at ground level
- 7.
- 8.

MACHINE:

DATE PROFILED: 07/06/2023

DIAM:

PROFILED BY: TJS

PROF REG.:

FILE REF:

CHECKED BY: SB

PROF. REG: 4002279/07

TRIAL PIT LOG

HOLE NO. : SMTP17

X COORD: 20°32'44.14"E

Y COORD: 33°14'34.06"S

ELEVATION:

SHEET 1 of 1

CLIENT: SANSA

PROJECT: SANSA Matjiesfontein

PROJECT NO.: 23123G

SITE : Matjiesfontein

[illegible]

NOTES: 1. Sample taken: 0.00 – 1.10 m
2. No groundwater seepage
3. No major sidewall collapse
4. Double width test pit

5. Test pit terminated due to TLB refusal
6. DCP undertaken at ground level
- 7.
- 8.

MACHINE:

DATE PROFILED: 07/06/2023

DIAM:

PROFILED BY: TJS

PROF REG.:

FILE REF:

CHECKED BY: SB

PROF. REG: 4002279/07

TRIAL PIT LOG		HOLE NO. : SMTP18	
CLIENT: SANSA		X COORD: 20°32'44.09"E	
PROJECT: SANSA Matjiesfontein		Y COORD: 33°14'33.18"S	
PROJECT NO.: 23123G		ELEVATION:	
SITE : Matjiesfontein		SHEET 1 of 1	

DEPTH (m)		DESCRIPTION	Dynamic Probe Light										
			DCP N10										
			5	10	15	20	25	30	35	40	45	50	55
		Loose, gravelly SAND											
	0.30	Slightly moist, orange brown, loose, intact, silty, fine to medium grained sand, with occasional sub-angular to sub-rounded, tillite fine gravel, and fine to coarse plant roots, Topsoil/Hillwash.											
		Moderately weathered, medium hard rock, TILLITE											
	0.80	Olive grey to grey, speckled white, blotched cream, stained orange brown, moderately weathered, fine grained, massive, medium hard rock, Tillite. Dwyka Formation.											
1		Note: 1) Upper 0.00 - 0.50 m: Joints very wide and filled with gravelly sand as above.											
		2) Excavated as cobble to boulder sized fragments with minor gravelly sand.											
		3) Joints at base of test pit: Highly jointed, narrow, stained.											
2													
3													
4													
5													

NOTES:	1. No sample taken	5. Test pit terminated due to TLB refusal
	2. No groundwater seepage	6. DCP undertaken at ground level
	3. No major sidewall collapse	7.
	4. Double width test pit	8.



MACHINE:	DATE PROFILED: 07/06/2023	
DIAM:	PROFILED BY: TJS	PROF REG.:
FILE REF:	CHECKED BY: SB	PROF. REG: 4002279/07

<div>CLIENT: SANSA</div> <div>PROJECT: SANSA Matjiesfontein</div> <div>PROJECT NO.: 23123G</div> <div>SITE : Matjiesfontein</div>	<div>TRIAL PIT LOG</div> <div>HOLE NO. : SMTP19</div> <div>X COORD: 20°32'35.91"E</div> <div>Y COORD: 33°14'30.12"S</div> <div>ELEVATION:</div>	<div>SHEET 1 of 1</div>
---	---	-------------------------

DEPTH (m)		DESCRIPTION	Dynamic Probe Light										
			DCP N10										
			5	10	15	20	25	30	35	40	45	50	55
0.18		Loose, SAND and GRAVEL Moist, brown to reddish brown, loose, intact to matrix supported, silty, fine to medium grained sand, with sub-angular to sub-rounded, tillite fine to medium and occasional coarse gravel, and fine plant roots, Topsoil/Hillwash.											
0.55		Moderately weathered, medium hard rock, TILLITE Grey, speckled white, stained red and orange brown, moderately weathered, fine grained, massive, medium hard rock, Tillite. Dwyka Formation. Note: 1) Upper 0.00 - 0.30 m: Joints very wide and filled with gravelly sand as above. 2) Excavated as cobble to boulder sized fragments with minor gravelly sand. 3) Joints at base of test pit: Highly jointed, narrow, stained.											
1													
2													
3													
4													
5													

NOTES:	1. No sample taken	5. Test pit terminated due to TLB refusal
	2. No groundwater seepage	6. DCP undertaken at ground level
	3. No major sidewall collapse	7.
	4. Double width test pit	8.

MACHINE:	DATE PROFILED: 08/06/2023	
DIAM:	PROFILED BY: TJS	PROF REG.:
FILE REF:	CHECKED BY: SB	PROF. REG: 4002279/07

<div>CLIENT: SANSA PROJECT: SANSA Matjiesfontein PROJECT NO.: 23123G SITE : Matjiesfontein</div>			<div>TRIAL PIT LOG</div>		<div>HOLE NO. : SMTP20 X COORD: 20°32'36.23"E Y COORD: 33°14'29.62"S ELEVATION: SHEET 1 of 1</div>	
DEPTH (m)			DESCRIPTION	Dynamic Probe Light		
				DCP N10 5 10 15 20 25 30 35 40 45 50 55		
	0.30		<div>Loose, SAND and GRAVEL</div> <p>Moist, brown to reddish brown, loose, intact to matrix supported, silty, fine to medium grained sand, with sub-angular to sub-rounded, tillite fine to medium and occasional coarse gravel, and fine plant roots, Topsoil/Hillwash.</p>			
	0.65		<div>Moderately weathered, medium hard rock, TILLITE</div> <p>Grey, speckled white, stained red and orange brown, moderately weathered, fine grained, massive, medium hard rock, Tillite. Dwyka Formation.</p> <p>Note: 1) Upper 0.00 - 0.40 m: Joints very wide and filled with gravelly sand as above.</p> <p>2) Excavated as cobble to boulder sized fragments with minor gravelly sand.</p> <p>3) Joints at base of test pit: Highly jointed, narrow, stained.</p>			
1						
2						
3						
4						
5						
<div>NOTES: 1. Sample taken: 0.00 – 0.65 m 2. No groundwater seepage 3. No major sidewall collapse 4. Double width test pit 5. Test pit terminated due to TLB refusal 6. DCP undertaken at ground level 7. 8.</div>						
<div>MACHINE: DIAM: FILE REF:</div>			<div>DATE PROFILED: 08/06/2023 PROFILED BY: TJS CHECKED BY: SB PROF. REG.: PROF. REG: 4002279/07</div>			

TRIAL PIT LOG

HOLE NO. : SMTP21

X COORD: 20°32'36.37"E

Y COORD: 33°14'30.54"S

ELEVATION:

SHEET 1 of 1

CLIENT: SANSA

PROJECT: SANSA Matjiesfontein

PROJECT NO.: 23123G

SITE : Matjiesfontein

DEPTH (m)			DESCRIPTION	Dynamic Probe Light															
				DCP N10 5 10 15 20 25 30 35 40 45 50 55															
0.25			Loose, SAND and GRAVEL Moist, brown to reddish brown, loose, intact to matrix supported, silty, fine to medium grained sand, with sub-angular to sub-rounded, tillite fine to medium and occasional coarse gravel, and fine plant roots, Topsoil/Hillwash.																
0.55			Highly weathered, soft rock, TILLITE Dark grey to grey, speckled white, stained reddish brown and orange brown, highly weathered, fine grained, massive to weakly laminated, soft rock, Tillite. Dwyka Formation. Note: 1) Very highly jointed, very wide to wide, stained and filled with gravelly sand. 2) Excavated as fine to coarse gravel.																
1.10			Moderately weathered, medium hard rock, TILLITE Grey, speckled white, stained red and orange brown, moderately weathered, fine grained, massive, medium hard rock, Tillite. Dwyka Formation. Note: 1) Highly jointed, wide to narrow with depth, stained and filled with minor gravelly sand. 2) Excavated as cobble to boulder sized fragments.																
2																			
3																			
4																			

NOTES: 1. Sample taken: 0.00 – 1.10 m
2. No groundwater seepage
3. No major sidewall collapse
4. Double width test pit

5. Test pit terminated due to TLB refusal
6. Confined space for the TLB
7. DCP undertaken at ground level
- 8.

MACHINE:

DATE PROFILED: 08/06/2023

DIAM:


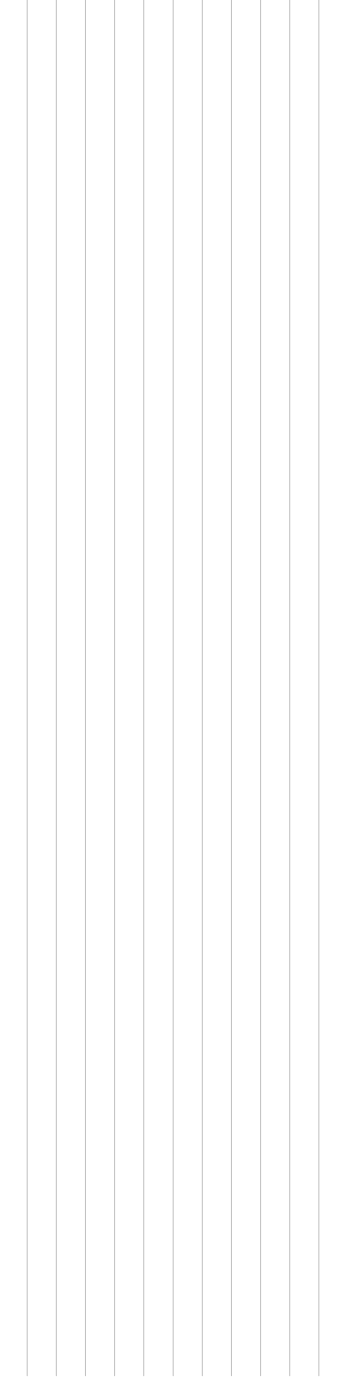

PROFILED BY: TJS

PROF REG.:

FILE REF:

CHECKED BY: SB

PROF. REG: 4002279/07

<div>CLIENT: SANSA PROJECT: SANSA Matjiesfontein PROJECT NO.: 23123G SITE : Matjiesfontein</div>			<div>TRIAL PIT LOG</div>			<div>HOLE NO. : SMTP22 X COORD: 20°32'35.30"E Y COORD: 33°14'30.08"S ELEVATION: SHEET 1 of 1</div>										
DEPTH (m)			DESCRIPTION				Dynamic Probe Light									
							DCP N10 5 10 15 20 25 30 35 40 45 50 55									
	0.25		<div>Loose, SAND and GRAVEL</div> <p>Moist, brown to reddish brown, loose, intact to matrix supported, silty, fine to medium grained sand, with sub-angular to sub-rounded, tillite fine to medium and occasional coarse gravel, and fine plant roots, Topsoil/Hillwash.</p>													
	0.50		<div>Moderately weathered, medium hard rock, TILLITE</div> <p>Grey, speckled white, stained red and orange brown, moderately weathered, fine grained, massive, medium hard rock, Tillite. Dwyka Formation.</p> <p>Note: 1) Upper 0.00 - 0.35 m: Joints very wide and filled with gravelly sand as above.</p> <p>2) Excavated as cobble to boulder sized fragments with minor gravelly sand.</p> <p>3) Joints at base of test pit: Highly jointed, narrow, stained.</p>													
	1															
	2															
	3															
	4															
	5															
NOTES: 1. No sample taken 5. Test pit terminated due to TLB refusal																
2. No groundwater seepage 6. DCP undertaken at ground level																
3. No major sidewall collapse 7.																
4. Double width test pit 8.																
MACHINE: DATE PROFILED: 08/06/2023																
DIAM: PROFILED BY: TJS PROF REG.:																
FILE REF: CHECKED BY: SB PROF. REG: 4002279/07																

TRIAL PIT LOG

HOLE NO. : SMTP23

X COORD: 20°32'30.45"E

Y COORD: 33°14'36.32"S

ELEVATION:

SHEET 1 of 1

CLIENT: SANSA

PROJECT: SANSA Matjiesfontein

PROJECT NO.: 23123G

SITE : Matjiesfontein

[illegible]

NOTES: 1. Sample taken: 0.00 – 1.15 m
2. No groundwater seepage
3. No major sidewall collapse
4. Double width test pit

5. Test pit terminated due to TLB refusal
6. Confined space for the TLB
7. DCP undertaken at ground level
- 8.

MACHINE:

DATE PROFILED: 08/06/2023

DIAM:


PROFILED BY: TJS

PROF REG.:

FILE REF:

CHECKED BY: SB

PROF. REG: 4002279/07

<div>CLIENT: SANSA PROJECT: SANSA Matjiesfontein PROJECT NO.: 23123G SITE : Matjiesfontein</div>			<div>TRIAL PIT LOG</div>			<div>HOLE NO. : SMTP24 X COORD: 20°32'32.49"E Y COORD: 33°14'36.24"S ELEVATION: SHEET 1 of 1</div>											
DEPTH (m)			DESCRIPTION	Dynamic Probe Light													
				DCP N10 5 10 15 20 25 30 35 40 45 50 55													
0.30 0.70 0.80 1.00 1 2 3 4 5		Loose, gravelly SAND Moist, brown to orange brown, loose, intact, silty, fine to medium grained sand, with occasional sub-angular, tillite fine to coarse gravel, and fine to coarse plant roots, Topsoil/Hillwash.															
		Completely weathered, very soft rock, TILLITE Reddish brown, stained orange brown, completely weathered, fine grained, weakly laminated, very soft rock, Tillite. Dwyka Formation Note: 1) Very highly jointed, wide, stained and filled with sand. 2) Excavated as fine to coarse gravel.															
		Highly weathered, soft rock, TILLITE Brown to olive grey, speckled white, stained red, highly weathered, fine grained, massive to weakly laminated, soft rock, Tillite. Dwyka Formation. Note: 1) Very highly to highly jointed, wide to narrow with depth, stained and filled with sand. 2) Excavated as gravel to cobble to boulder sized fragments.															
		Moderately weathered, medium hard rock, TILLITE Grey, speckled white, stained red and orange brown, moderately weathered, fine grained, massive, medium hard rock, Tillite, with sand as above. Overall consistency dense to very dense with depth. Note: 1) Highly jointed, narrow, stained and filled with sand. 2) Excavated as cobble to boulder sized fragments.															
<div>NOTES: 1. No sample taken 5. Test pit terminated due to TLB refusal 2. No groundwater seepage 6. Confined space for the TLB 3. No major sidewall collapse 7. DCP undertaken at ground level 4. Double width test pit 8.</div>																	
MACHINE:			DATE PROFILED: 08/06/2023														
DIAM:			PROFILED BY: TJS						PROF REG.:								
FILE REF:			CHECKED BY: SB						PROF. REG: 4002279/07								

TRIAL PIT LOG

HOLE NO. : SMTP25

X COORD: 20°32'31.13"E

Y COORD: 33°14'37.78"S

ELEVATION:

SHEET 1 of 1

CLIENT: SANSA

PROJECT: SANSA Matjiesfontein

PROJECT NO.: 23123G

SITE : Matjiesfontein

DEPTH (m)		DESCRIPTION	Dynamic Probe Light										
			DCP N10										
			5	10	15	20	25	30	35	40	45	50	55
0.25		Loose, gravelly SAND Moist, brown to orange brown, loose, intact, silty, fine to medium grained sand, with occasional sub-angular, tillite fine to coarse gravel, and fine to coarse plant roots, Topsoil/Hillwash.											
0.45		Moderately weathered, medium hard rock, TILLITE Olive grey to grey, speckled white, stained red and orange brown, moderately weathered, fine grained, massive, medium hard rock, Tillite. Dwyka Formation. Note: 1) Upper 0.00 - 0.35 m: Joints very wide and filled with gravelly sand as above. 2) Excavated as cobble to boulder sized fragments with minor gravelly sand. 3) Joints at base of test pit: Highly jointed, narrow, stained.											
1													
2													
3													
4													
5													

NOTES:	1. Sample taken: 0.00 – 0.45 m	5. Test pit terminated due to TLB refusal
	2. No groundwater seepage	6. DCP undertaken at ground level
	3. No major sidewall collapse	7.
	4. Double width test pit	8.

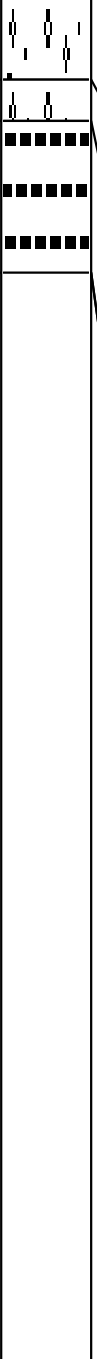
MACHINE:	DATE PROFILED: 08/06/2023	
DIAM:	PROFILED BY: TJS	PROF REG.:
FILE REF:	CHECKED BY: SB	PROF. REG: 4002279/07

TRIAL PIT LOG CLIENT: SANSA PROJECT: SANSA Matjiesfontein PROJECT NO.: 23123G SITE : Matjiesfontein		HOLE NO. : SMTP27 X COORD: 20°32'34.31"E Y COORD: 33°14'39.74"S ELEVATION:
		SHEET 1 of 1

DEPTH (m)		DESCRIPTION	Dynamic Probe Light										
			DCP N10										
			5	10	15	20	25	30	35	40	45	50	55
0.15		Loose, SAND Moist, brown to orange brown, loose, intact, gravelly, silty, fine to medium grained sand, with fine plant roots, Topsoil/Hillwash.											
0.75		Medium dense, SAND Slightly moist, light orange brown, predominately medium dense, intact, slightly silty, fine to medium grained sand, Alluvium											
1.10		Medium dense, SAND and GRAVEL As above, interlayered with mudrock coarse gravel to cobble sized fragments, Pebble marker.											
1.60		Moderately weathered, medium hard rock, TILLITE Grey, speckled white, stained orange brown, moderately weathered, fine grained, massive, medium hard rock, Tillite. Dwyka Formation. Note: 1) Highly jointed, narrow, stained and filled with sand. 2) Excavated as cobble sized fragments.											
2													
3													
4													
5													

NOTES: 1. Sample taken: 0.00 – 1.60 m 2. No groundwater seepage 3. No major sidewall collapse 4. Double width test pit		5. Test pit terminated due to TLB refusal 6. DCP undertaken at ground level 7. 8.
MACHINE: DIAM: FILE REF:	DATE PROFILED: 08/06/2023 PROFILED BY: TJS PROF REG.: CHECKED BY: SB PROF. REG: 4002279/07	

<div>CLIENT: SANSA PROJECT: SANSA Matjiesfontein PROJECT NO.: 23123G SITE : Matjiesfontein</div>			<div>TRIAL PIT LOG</div>		<div>HOLE NO. : SMTP26 X COORD: 20°32'32.95"E Y COORD: 33°14'37.36"S ELEVATION:</div>	
					SHEET 1 of 1	
DEPTH (m)			DESCRIPTION	Dynamic Probe Light		
				DCP N10 5 10 15 20 25 30 35 40 45 50 55		
0.30			Loose, gravelly SAND			
			Moist, brown to orange brown, loose, intact, silty, fine to medium grained sand, with occasional sub-angular, tillite fine to coarse gravel, and fine to coarse plant roots, Topsoil/Hillwash.			
0.75			Moderately weathered, medium hard rock, TILLITE			
			Olive grey to grey, speckled white, stained red and orange brown, moderately weathered, fine grained, massive, medium hard rock, Tillite. Dwyka Formation. Note: 1) Upper 0.00 - 0.50 m: Joints very wide and filled with sand as above. 2) Excavated as cobble to boulder sized fragments with minor sand. 3) Joints at base of test pit: Highly jointed, narrow, stained.			
1						
2						
3						
4						
5						
<div>NOTES: 1. Sample taken: 0.00 – 0.75 m 2. No groundwater seepage 3. No major sidewall collapse 4. Double width test pit 5. Test pit terminated due to TLB refusal 6. DCP undertaken at ground level 7. 8.</div>						
<div>MACHINE: DATE PROFILED: 08/06/2023 DIAM: PROFILED BY: TJS PROF REG.: FILE REF: CHECKED BY: SB PROF. REG: 4002279/07</div>						

<div>CLIENT: SANSA PROJECT: SANSA Matjiesfontein PROJECT NO.: 23123G SITE : Matjiesfontein</div>			<div>TRIAL PIT LOG</div>			<div>HOLE NO. : SMTP28 X COORD: 20°32'43.29"E Y COORD: 33°14'42.84"S ELEVATION: SHEET 1 of 1</div>										
DEPTH (m)			DESCRIPTION	Dynamic Probe Light												
				DCP N10 5 10 15 20 25 30 35 40 45 50 55												
0.30 0.45 1.00 1 2 3 4 5		<div>Loose to medium dense, gravelly SAND Moist, dark brown, mottled grey, loose to medium dense, intact, clayey, fine to medium grained sand, with occasional angular, elongated, mudrock fine to coarse gravel, Topsoil/Hillwash.</div> <div>Medium dense, GRAVEL Slightly moist, dark brow to grey, medium dense, clast supported, angular to sub-angular, elongated, mudrock fine to coarse gravel, with clayey sand as above, Hillwash.</div> <div>Moderately weathered, medium hard rock, MUDROCK Grey, streaked white, stained red and brown, moderately weathered, very fine grained, laminated, medium hard rock, seemingly Mudrock. Dwyka Formation. Note: 1) Highly jointed, narrow, stained and filled with clayey sand. 2) Excavated as cobble to boulder sized fragments.</div>														
		NOTES: 1. No sample taken 5. Test pit terminated due to TLB refusal														
		2. No groundwater seepage 6. DCP undertaken at ground level														
		3. No major sidewall collapse 7.														
		4. Double width test pit 8.														
MACHINE:			DATE PROFILED: 08/06/2023													
DIAM:			PROFILED BY: TJS			PROF. REG.:										
FILE REF:			CHECKED BY: SB			PROF. REG: 4002279/07										

<div>TRIAL PIT LOG</div> <div>CLIENT: SANSA PROJECT: SANSA Matjiesfontein PROJECT NO.: 23123G SITE : Matjiesfontein</div>			<div>HOLE NO. : SMTP29 X COORD: 20°32'58.09"E Y COORD: 33°14'39.44"S ELEVATION: SHEET 1 of 1</div>											
DEPTH (m)			DESCRIPTION	Dynamic Probe Light										
				DCP N10 5 10 15 20 25 30 35 40 45 50 55										
0.25 0.60 1 1.50 1.75 1.80		Loose, SAND and GRAVEL Slightly moist to moist, brown, loose, intact to matrix supported, slightly silty, fine to medium grained sand, with sub-angular, elongated, fine to medium gravel of mixed origin, and fine to coarse plant roots, Topsoil/Hillwash.												
		Loose to medium dense, SAND and GRAVEL Slightly moist, light brown to orange brown, loose to medium dense, matrix supported, sub-angular, elongated, fine to medium gravel of mixed origin, with slightly silty, fine to medium grained sand, Hillwash.												
		Medium dense, SAND and GRAVEL Dry, light brown to orange brown, medium dense, intact to matrix supported, slightly silty, fine to medium grained sand, with sub-angular to sub-rounded, fine to medium gravel of mixed origin, Alluvium												
		Medium dense to dense, GRAVEL Dry, grey, stained orange brown, medium dense to dense, clast supported, sub-angular to angular, elongated, tillite medium to coarse gravel, with slightly silty, sand as above, Alluvium												
		Moderately weathered, medium hard rock, TILLITE Dark grey, speckled white, stained dark red and light orange brown, moderately weathered, fine grained, predominately massive, medium hard rock, Tillite. Dwyka Formation. Note: 1) Highly jointed, narrow, stained and filled with silty sand. 2) Excavated as cobble sized fragments.												
2														
3														
4														
5														
NOTES: 1. No sample taken 5. Test pit terminated due to TLB refusal 2. No groundwater seepage 6. Confined space for the TLB 3. No major sidewall collapse 7. DCP undertaken at ground level 4. Double width test pit 8.														
MACHINE: DATE PROFILED: 08/06/2023 DIAM: PROFILED BY: TJS PROF REG.: FILE REF: CHECKED BY: SB PROF. REG: 4002279/07														

TRIAL PIT LOG

HOLE NO. : SMTP30a

X COORD: 20°33'3.06"E

Y COORD: 33°14'36.09"S

ELEVATION:

SHEET 1 of 1

CLIENT: SANSA

PROJECT: SANSA Matjiesfontein

PROJECT NO.: 23123G

SITE : Matjiesfontein

[illegible]

NOTES:	1. No sample taken	5. Test pit terminated due to TLB refusal
	2. No groundwater seepage	6. Confined space for the TLB
	3. No major sidewall collapse	7. DCP undertaken at ground level
	4. Double width test pit	8.

MACHINE: DATE PROFILED: 08/06/2023
DIAM: PROFILED BY: TJS PROF REG.:
FILE REF: CHECKED BY: SB PROF. REG: 4002279/07

Appendix C.

Test pit photographs





Figure 1 SMTP01 test pit excavations



Figure 2 SMTP01 test pit profile



Figure 3 SMTP02 test pit excavations



Figure 4 SMTP02 closeup of moderately weathered, medium hard rock, tillite



Figure 5 SMTP03 test pit excavations



Figure 6 SMTP03 closeup of moderately weathered, medium hard rock, tillite



Figure 7 SMTP04 test pit profile



Figure 8 SMTP04 test pit excavations



Figure 9 SMTP05 test pit profile



Figure 10 SMTP05 spoil



Figure 11 SMTP06 test pit profile



Figure 12 SMTP06 test pit excavations



Figure 13 SMTP07 test pit profile



Figure 14 SMTP07 test pit excavations and spoil



Figure 15 SMTP08 test pit profile



Figure 16 SMTP08 test pit excavations



Figure 17 SMTP09 test pit profile



tillite

Figure 18 SMTP09 moderately weathered,



Figure 19 SMTP10 test pit profile



Figure 20 SMTP10 spoil



Figure 21 SMTP11 test pit profile



Figure 22 SMTP11 test pit excavations



Figure 23 SMTP12 test pit profile



Figure 24 SMTP12 test pit excavations



Figure 25 SMTP13 test pit profile



Figure 26 SMTP13 spoil



Figure 27 SMTP14 test pit excavations



Figure 28 SMTP14 moderately weathered, medium hard rock, tillite



Figure 29 SMTP15 test pit profile



Figure 30 SMTP15 test pit excavations



Figure 31 SMTP16 test pit profile



Figure 32 SMTP16 test pit excavations



Figure 33 SMTP17 test pit profile



Figure 34 SMTP17 spoil



Figure 35 SMTP18 test pit profile



Figure 36 SMTP18 closeup of moderately weathered, medium hard rock, tillite



Figure 37 SMTP19 test pit profile



Figure 38 SMTP19 test pit excavations



Figure 39 SMTP20 test pit profile



Figure 40 SMTP20 test pit excavations



Figure 41 SMTP21 test pit profile



Figure 42 SMTP21 test pit excavations



Figure 43 SMTP22 test pit excavations



Figure 44 SMTP22 spoil



Figure 45 SMTP23 test pit profile



Figure 46 SMTP23 spoil



Figure 47 SMTP24 test pit profile



Figure 48 SMTP24 test pit excavations



Figure 49 SMTP25 test pit profile



tillite

Figure 50 SMTP25 moderately weathered,



Figure 51 SMTP26 test pit profile



Figure 52 SMTP26 test pit excavations



Figure 53 SMTP27 test pit profile



marker

Figure 54 SMTP27 closeup of pebble



Figure 55 SMTP28 test pit profile



Figure 56 SMTP28 closeup of moderately weathered, medium hard rock, mudrock



Figure 57 SMTP29 test pit profile



Figure 58 SMTP29 spoil



Figure 59 SMTP30a test pit profile



Figure 60 SMTP30a spoil

Appendix D.

Laboratory test results





11 Gooderson Road Blackheath

PO Box 58 Blackheath 7581

Tel: 021 905 0435

Fax: 086 499 9482

Email: info@steynwilson.co.zaWeb: www.steynwilson.co.za

Client: **PeraGage**
 Project: 23123G SANSA Matjiesfontien
 Attention: Steven Bok
 Your Ref. No: -
 Date Reported 20/06/23

TEST REPORT REFERENCE NUMBER / JOB NUMBER :**SWL28376**

Dear Sir / Madam

Herewith please find the original reports pertaining to the above mentioned project.

Test Requested

4 x FOUNDATION INDICATOR

Site Sampling and Materials Information

Sampling Method

Specimens delivered to Steyn Wilson Laboratory.

Environmental Condition

Rainy

Deviation from the prescribed test method

No deviation from standard test method.

Responsibility of information disclaimer

The sample information was received from the customer. Results apply to the sample as received from the Customer.

**FINAL REPORT**

We would like to take this opportunity to thank you for your valued support.
 Should you have any further enquiries please don't hesitate to contact me.

Yours Faithfully

STEYN-WILSON LABORATORIES (PTY) LTD

Remarks:

- Information contained herein is confidential to STEYN-WILSON PTY LTD and the addressee
- Opinions & Interpretations are not included in our schedule of Accreditation.
- The samples were subjected and analysed according to ASTM.
- The results reported relate only to the sample tested, Further use of the attached information is not the responsibility or liability of STEYN-WILSON LABORATORIES (PTY) LTD.
- This document is the correct record of all measurements made, and may not be reproduced other than with full written approval from a director of STEYN-WILSON LABORATORIES (PTY) LTD.
- Measuring equipment is traceable to national standards (Where applicable).
- Should there be any deviation from the prescribed test method comments will be made thereof, pertaining to the test on the relevant materials report.
- Uncertainty of measurement is calculated and corresponds to a coverage probability of approximately 95%. Available on request.
- The decision rule states that the measurement of uncertainty can be applied by the customer to the test results, on request. It is not the responsibility or liability of STEYN-WILSON LABORATORIES (PTY) LTD.

Mr. R. Wilson
Technical Signatory

DIRECTORS: Mr. J. Steyn ND-Civil (Managing) | Mr. R. Wilson B-Tech Civil (Operations)



CIVIL ENGINEERING TESTING LABORATORIES



11 Gooderson Road Blackheath
PO Box 58 Blackheath 7581
Tel: 021 905 0435
Fax: 086 499 9482
Email: info@steynwilson.co.za
Web: www.steynwilson.co.za

Customer : **PeraGage**
Private Bag X5
Century City
7441
Attention : Steven Bok

Project : 23123G SANSA Matjiesfontien
Date Received : 09/06/23
Date Reported : 20/06/23
Req. Number : -
Date Sampled: 09/06/23

FOUNDATION INDICATOR ASTM D422

Material Description:	Dark Reddish Brown Silty Soil	Sample Number:	28376 / 4		
Position:	TP10	Liquid Limit	19,4	Linear Shrinkage	2,5
Depth:	0.00 - 0.25m	Plasticity Index	5	Insitu M/C%	9,6

PH (TMH1 A20)

(TMH1 A21T)
Conductivity
s.m⁻¹

SG (TMH1 A12T)*

2,510

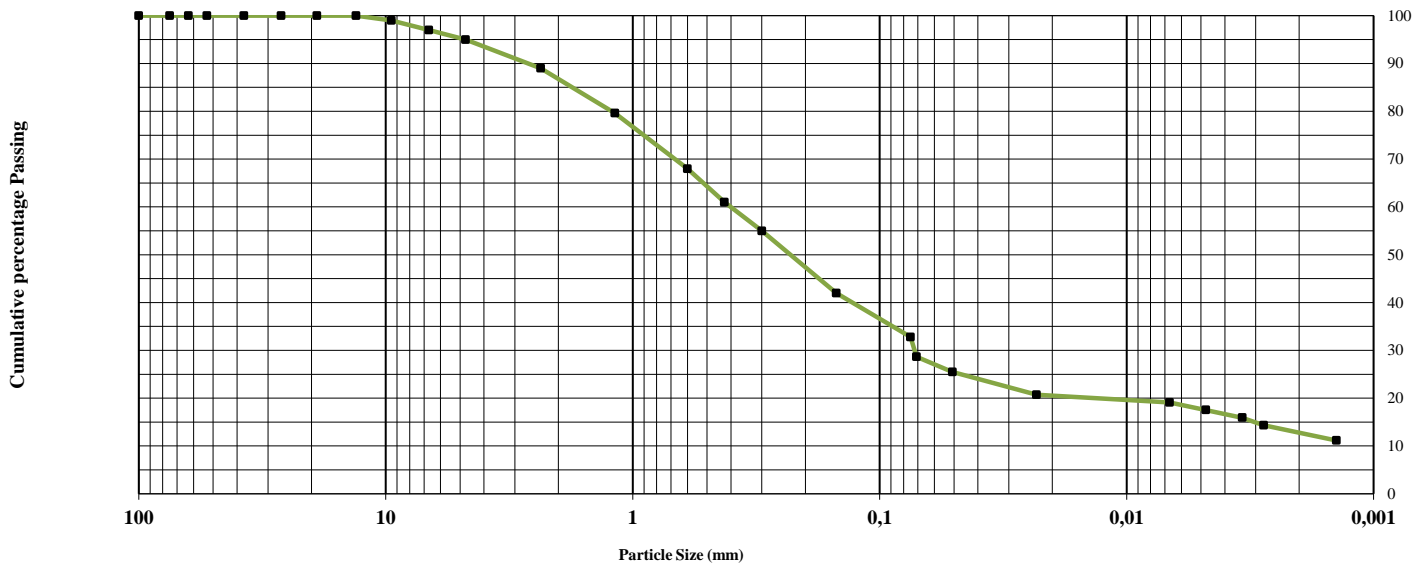
SIEVE ANALYSIS (TMH 1 A1a)*

HYDROMETER ASTM D422

100	75	63	53	37,5	26,5	19,0	13,2	9,5	6,7	4,75	2,36	1,18	0,60	0,425	0,300	0,150	0,075	0,071	0,051	0,023	0,007	0,005	0,003	0,003	0,001
100	100	100	100	100	100	100	100	99	97	95	89	79,6	68	61	55	42	32,8	28,66	25,47	20,7	19,1	17,51	15,92	14,33	11,14

% Passing

Particle Size Distribution



% Gravel

5

% Sand

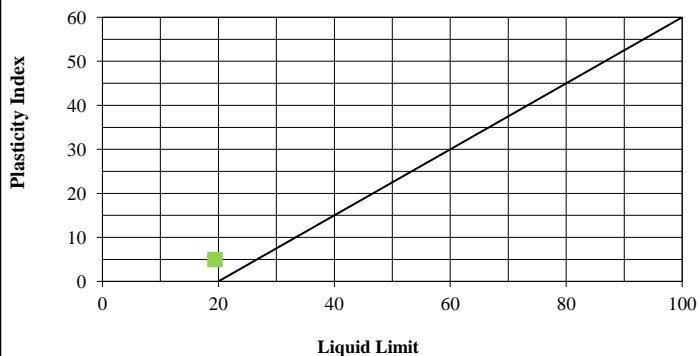
64

% Silt

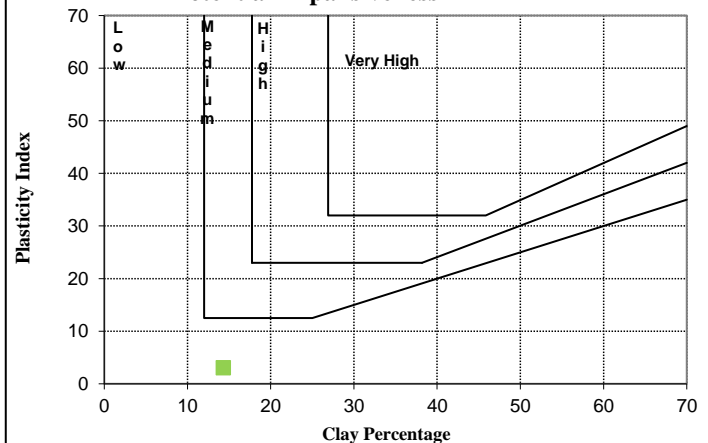
17

% Clay

14

Plasticity Chart
A Line

Potential Expansiveness



NOTE: All tests marked with (*) means that those test methods are not accredited.



CIVIL ENGINEERING TESTING LABORATORIES



11 Gooderson Road Blackheath
PO Box 58 Blackheath 7581
Tel: 021 905 0435
Fax: 086 499 9482
Email: info@steynwilson.co.za
Web: www.steynwilson.co.za

Customer : **PeraGage**

Private Bag X5

Century City

7441

Attention : Steven Bok

Project : 23123G SANSA Matjiesfontien

Date Received : 09/06/23

Date Reported : 20/06/23

Req. Number : -

FOUNDATION INDICATOR ASTM D422

Material Description:	Dark Reddish Brown Silty Soil	Sample Number:	28376 / 5		
Position:	TP12	Liquid Limit	21,6	Linear Shrinkage	4,2
Depth:	0.00 - 0.80m	Plasticity Index	8,3	Insitu M/C%	4,7

PH (TMH1 A20)*

(TMH1 A21T)*
Conductivity
s.m⁻¹

SG (TMH1 A12T)*

2,515

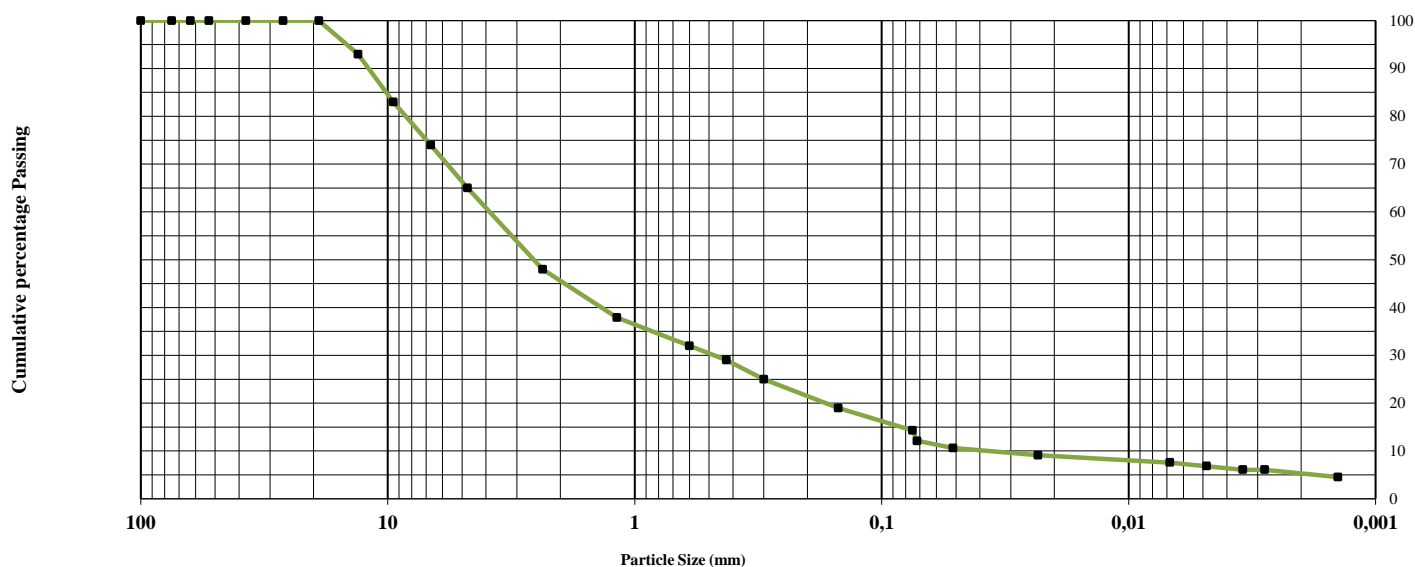
SIEVE ANALYSIS (TMH 1 A1a)*

HYDROMETER ASTM D422

100	75	63	53	37,5	26,5	19,0	13,2	9,5	6,7	4,75	2,36	1,18	0,60	0,425	0,300	0,150	0,075	0,072	0,051	0,023	0,007	0,005	0,003	0,003	0,001
100	100	100	100	100	100	100	93	83	74	65	48	37,9	32	29	25	19	14,3	12,13	10,61	9,096	7,58	6,822	6,064	6,064	4,548

% Passing

Particle Size Distribution



% Gravel

35

% Sand

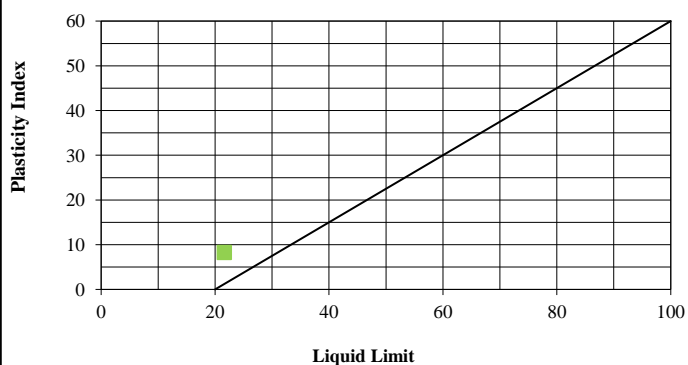
52

% Silt

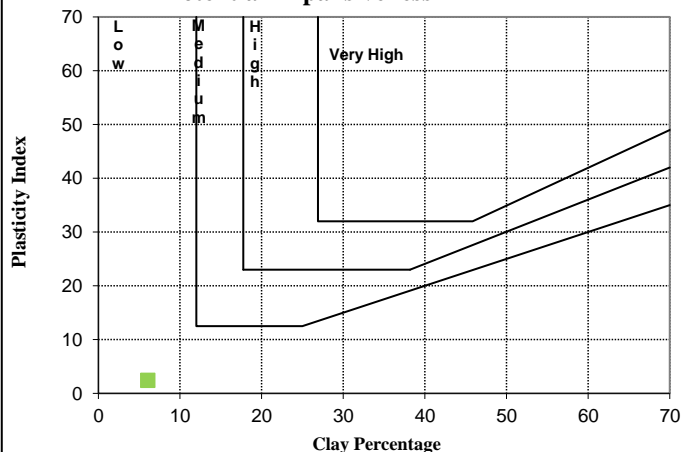
7

% Clay

6

Plasticity Chart
A Line

Potential Expansiveness



NOTE: All tests marked with (*) means that those test methods are not accredited.



STEYN-WILSON
LABORATORIES

CIVIL ENGINEERING TESTING LABORATORIES



11 Gooderson Road Blackheath
PO Box 58 Blackheath 7581
Tel: 021 905 0435
Fax: 086 499 9482
Email: info@steynwilson.co.za
Web: www.steynwilson.co.za

Customer : **PeraGage**

Private Bag X5

Century City

7441

Attention : Steven Bok

Project : 23123G SANSA Matjiesfontien

Date Received : 09/06/23

Date Reported : 20/06/23

Req. Number : -

FOUNDATION INDICATOR ASTM D422

Material Description:	Dark Reddish Brown Silty Soil	Sample Number:	28376 / 6		
Position:	TP15	Liquid Limit	23,6	Linear Shrinkage	3,6
Depth:	0.00 - 0.15m	Plasticity Index	7,9	Insitu M/C%	8,5

PH (TMH1 A20)*

(TMH1 A21T)*
Conductivity
s.m⁻¹

SG (TMH1 A12T)*

2,478

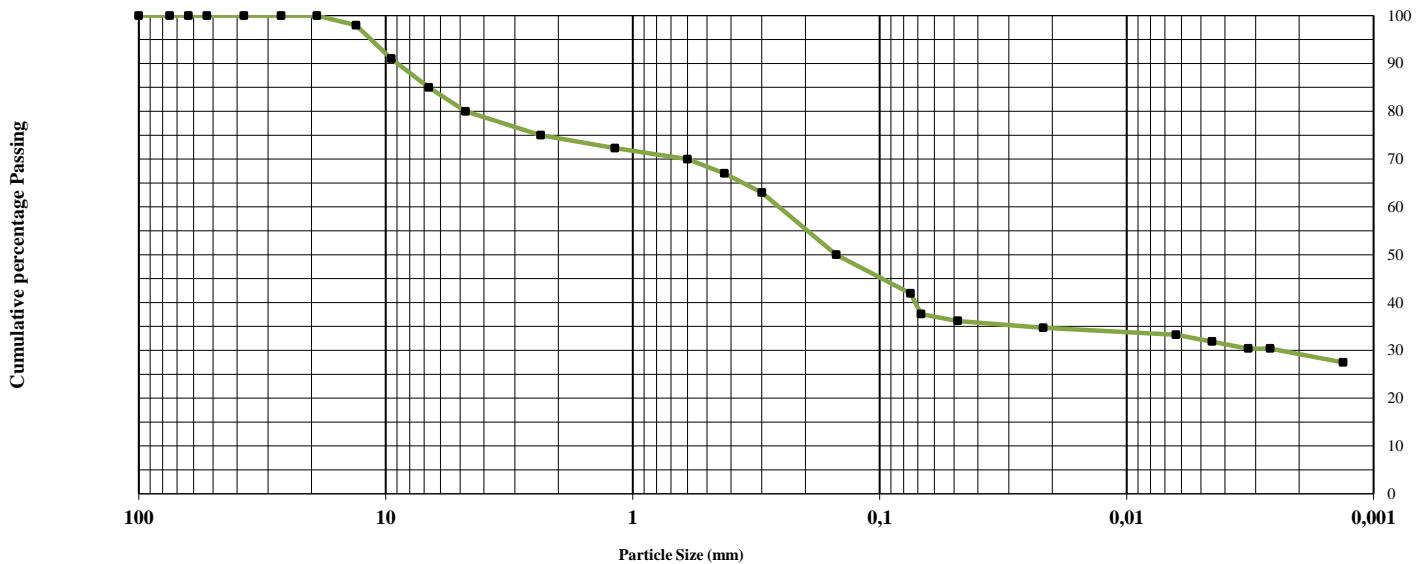
SIEVE ANALYSIS (TMH 1 A1a)*

HYDROMETER ASTM D422

100	75	63	53	37,5	26,5	19,0	13,2	9,5	6,7	4,75	2,36	1,18	0,60	0,425	0,300	0,150	0,075	0,068	0,048	0,022	0,006	0,005	0,003	0,003	0,001
100	100	100	100	100	100	100	98	91	85	80	75	72,3	70	67	63	50	41,9	37,6	36,15	34,7	33,26	31,81	30,37	30,37	27,47

% Passing

Particle Size Distribution



% Gravel

20

% Sand

40

% Silt

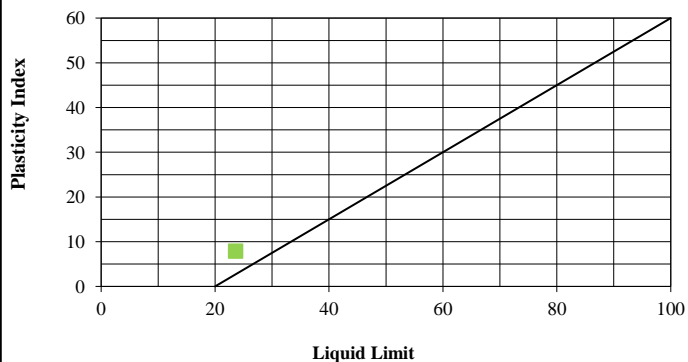
10

% Clay

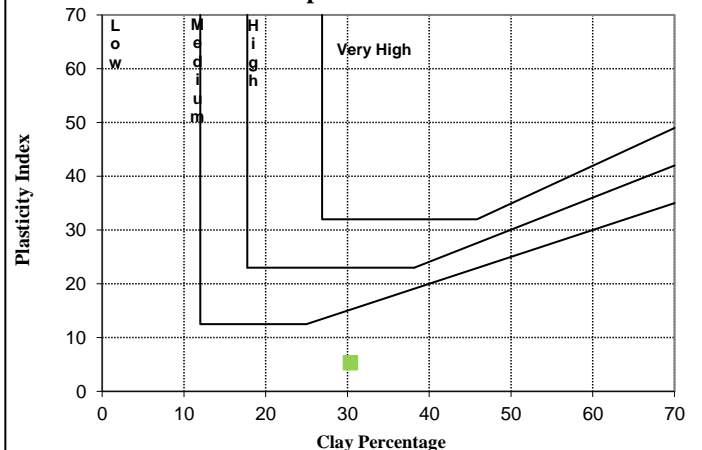
30

Plasticity Chart

A Line



Potential Expansiveness



NOTE: All tests marked with (*) means that those test methods are not accredited.



STEYN-WILSON
LABORATORIES

CIVIL ENGINEERING TESTING LABORATORIES



11 Gooderson Road Blackheath
PO Box 58 Blackheath 7581
Tel: 021 905 0435
Fax: 086 499 9482
Email: info@steynwilson.co.za
Web: www.steynwilson.co.za

Customer : **PeraGage**

Private Bag X5

Century City

7441

Attention : Steven Bok

Project : 23123G SANSA Matjiesfontien

Date Received : 09/06/23

Date Reported : 20/06/23

Req. Number : -

FOUNDATION INDICATOR ASTM D422

Material Description:	Dark Reddish Brown Silty Soil	Sample Number:	28376 / 7		
Position:	TP16	Liquid Limit	24,3	Linear Shrinkage	4
Depth:	0.00 - 0.70m	Plasticity Index	7,6	Insitu M/C%	6,9

PH (TMH1 A20)*

(TMH1 A21T)*
Conductivity
s.m⁻¹

SG (TMH1 A12T)*

2,493

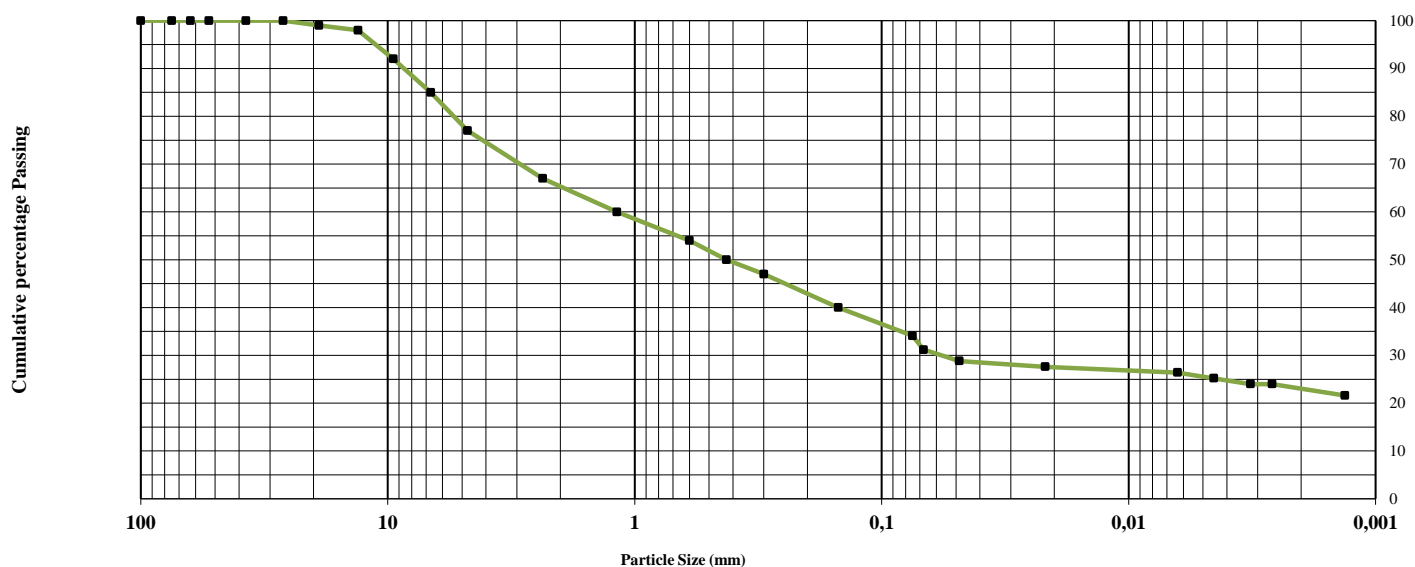
SIEVE ANALYSIS (TMH 1 A1a)*

HYDROMETER ASTM D422

100	75	63	53	37,5	26,5	19,0	13,2	9,5	6,7	4,75	2,36	1,18	0,60	0,425	0,300	0,150	0,075	0,068	0,048	0,022	0,006	0,005	0,003	0,003	0,001
100	100	100	100	100	100	99	98	92	85	77	67	60	54	50	47	40	34,1	31,2	28,8	27,6	26,4	25,2	24	24	21,6

% Passing

Particle Size Distribution



% Gravel

23

% Sand

44

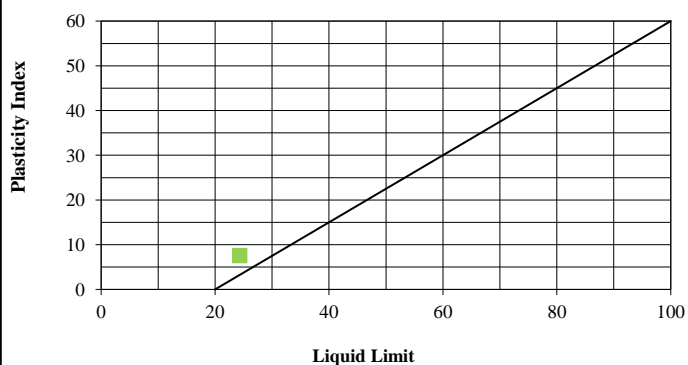
% Silt

9

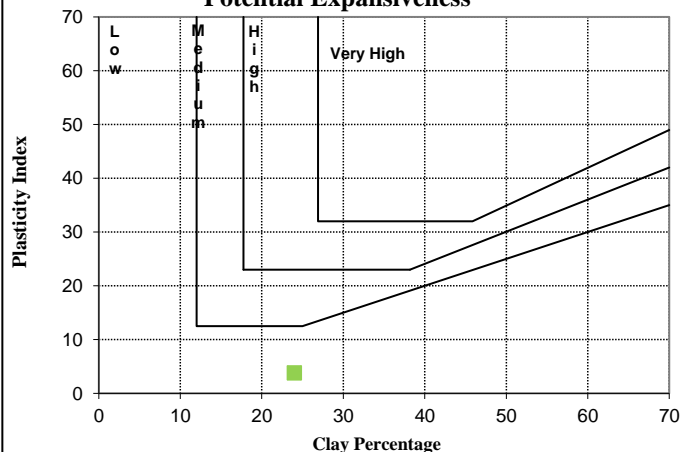
% Clay

24

Plasticity Chart A Line



Potential Expansiveness



NOTE: All tests marked with (*) means that those test methods are not accredited.



11 Gooderson Road Blackheath

PO Box 58 Blackheath 7581

Tel: 021 905 0435

Fax: 086 499 9482

Email: info@steynwilson.co.zaWeb: www.steynwilson.co.za

Client: **PeraGage**
 Project: 23123G SANSA Matjiesfontien
 Attention: Steven Bok
 Your Ref. No: -
 Date Reported 20/06/23

TEST REPORT REFERENCE NUMBER / JOB NUMBER :**SWL28376**

Dear Sir / Madam

Herewith please find the original reports pertaining to the above mentioned project.

Test Requested

4 x FOUNDATION INDICATOR

Site Sampling and Materials Information

Sampling Method

Specimens delivered to Steyn Wilson Laboratory.

Environmental Condition

Rainy

Deviation from the prescribed test method

No deviation from standard test method.

Responsibility of information disclaimer

The sample information was received from the customer. Results apply to the sample as received from the Customer.

**FINAL REPORT**

We would like to take this opportunity to thank you for your valued support.
 Should you have any further enquiries please don't hesitate to contact me.

Yours Faithfully

STEYN-WILSON LABORATORIES (PTY) LTD

Remarks:

- Information contained herein is confidential to STEYN-WILSON PTY LTD and the addressee
- Opinions & Interpretations are not included in our schedule of Accreditation.
- The samples were subjected and analysed according to ASTM.
- The results reported relate only to the sample tested, Further use of the attached information is not the responsibility or liability of STEYN-WILSON LABORATORIES (PTY) LTD.
- This document is the correct record of all measurements made, and may not be reproduced other than with full written approval from a director of STEYN-WILSON LABORATORIES (PTY) LTD.
- Measuring equipment is traceable to national standards (Where applicable).
- Should there be any deviation from the prescribed test method comments will be made thereof, pertaining to the test on the relevant materials report.
- Uncertainty of measurement is calculated and corresponds to a coverage probability of approximately 95%. Available on request.
- The decision rule states that the measurement of uncertainty can be applied by the customer to the test results, on request. It is not the responsibility or liability of STEYN-WILSON LABORATORIES (PTY) LTD.

Mr. R. Wilson
Technical Signatory

DIRECTORS: Mr. J. Steyn ND-Civil (Managing) | Mr. R. Wilson B-Tech Civil (Operations)



CIVIL ENGINEERING TESTING LABORATORIES



11 Gooderson Road Blackheath
PO Box 58 Blackheath 7581
Tel: 021 905 0435
Fax: 086 499 9482
Email: info@steynwilson.co.za
Web: www.steynwilson.co.za

Customer : **PeraGage** Project : 23123G SANSA Matjiesfontien
Private Bag X5 Date Received : 09/06/23
Century City Date Reported : 20/06/23
7441 Req. Number : -
Attention : Steven Bok Date Sampled: 09/06/23

FOUNDATION INDICATOR ASTM D422

Material Description:	Dark Reddish Brown Silty Soil	Sample Number:	28376 / 8		
Position:	TP17	Liquid Limit	23,2	Linear Shrinkage	4,4
Depth:	0.00 - 1.10m	Plasticity Index	9,7	Insitu M/C%	5,1

PH (TMH1 A20)

(TMH1 A21T)
Conductivity
s.m⁻¹

SG (TMH1 A12T)*

2,437

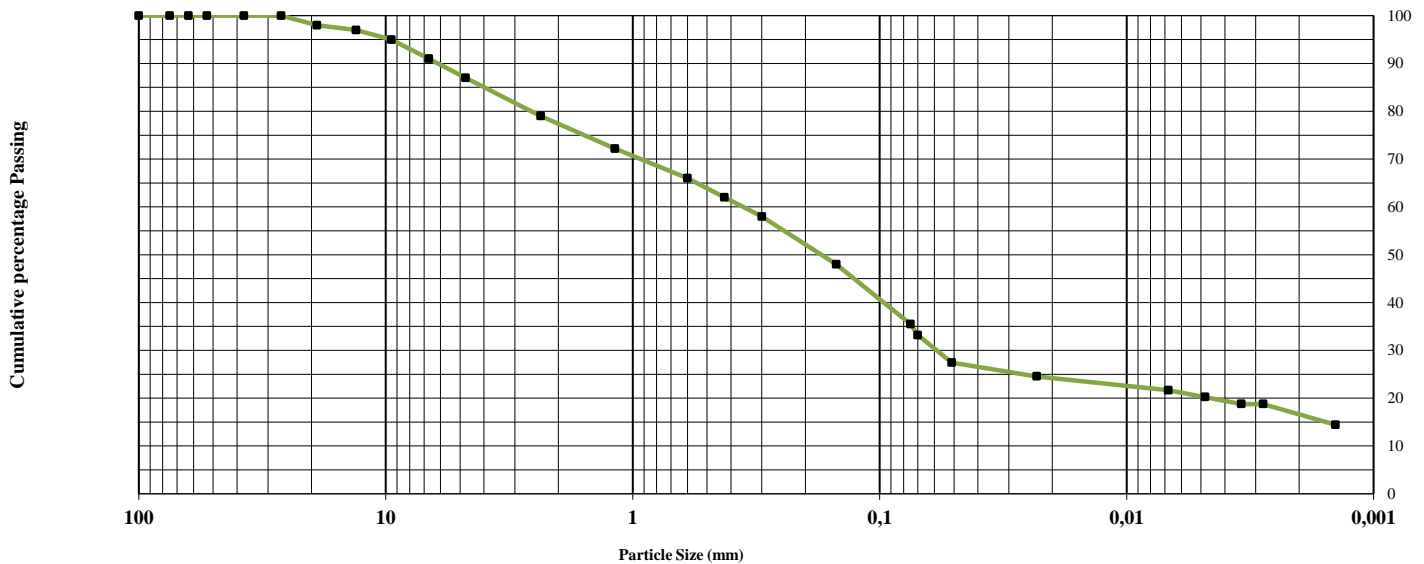
SIEVE ANALYSIS (TMH 1 A1a)*

HYDROMETER ASTM D422

100	75	63	53	37,5	26,5	19,0	13,2	9,5	6,7	4,75	2,36	1,18	0,60	0,425	0,300	0,150	0,075	0,070	0,051	0,023	0,007	0,005	0,003	0,003	0,001
100	100	100	100	100	100	98	97	95	91	87	79	72,2	66	62	58	48	35,5	33,21	27,44	24,55	21,66	20,22	18,77	18,77	14,44

% Passing

Particle Size Distribution



% Gravel

13

% Sand

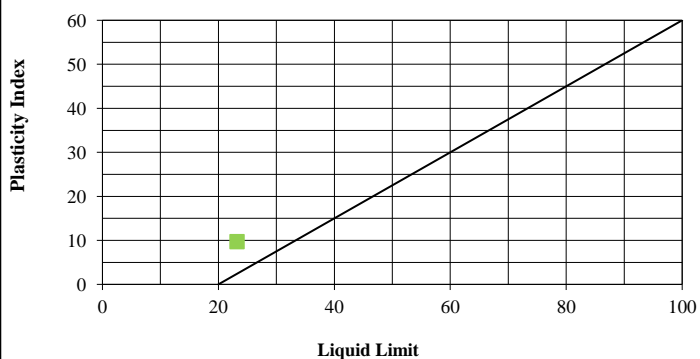
52

% Silt

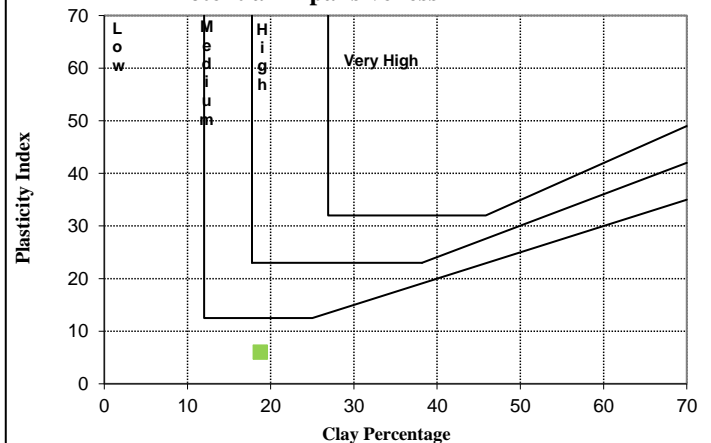
16

% Clay

19

Plasticity Chart
A Line

Potential Expansiveness



NOTE: All tests marked with (*) means that those test methods are not accredited.



STEYN-WILSON
LABORATORIES

CIVIL ENGINEERING TESTING LABORATORIES



11 Gooderson Road Blackheath
PO Box 58 Blackheath 7581
Tel: 021 905 0435
Fax: 086 499 9482
Email: info@steynwilson.co.za
Web: www.steynwilson.co.za

Customer : **PeraGage**

Private Bag X5

Century City

7441

Attention : Steven Bok

Project : 23123G SANSA Matjiesfontien

Date Received : 09/06/23

Date Reported : 20/06/23

Req. Number : -

FOUNDATION INDICATOR ASTM D422

Material Description:	Dark Reddish Brown Silty Soil	Sample Number:	28376 / 9		
Position:	TP20	Liquid Limit	21,1	Linear Shrinkage	4,3
Depth:	0.00 - 0.65m	Plasticity Index	8,7	Insitu M/C%	6,3

PH (TMH1 A20)*

(TMH1 A21T)*
Conductivity
s.m⁻¹

SG (TMH1 A12T)*

2,461

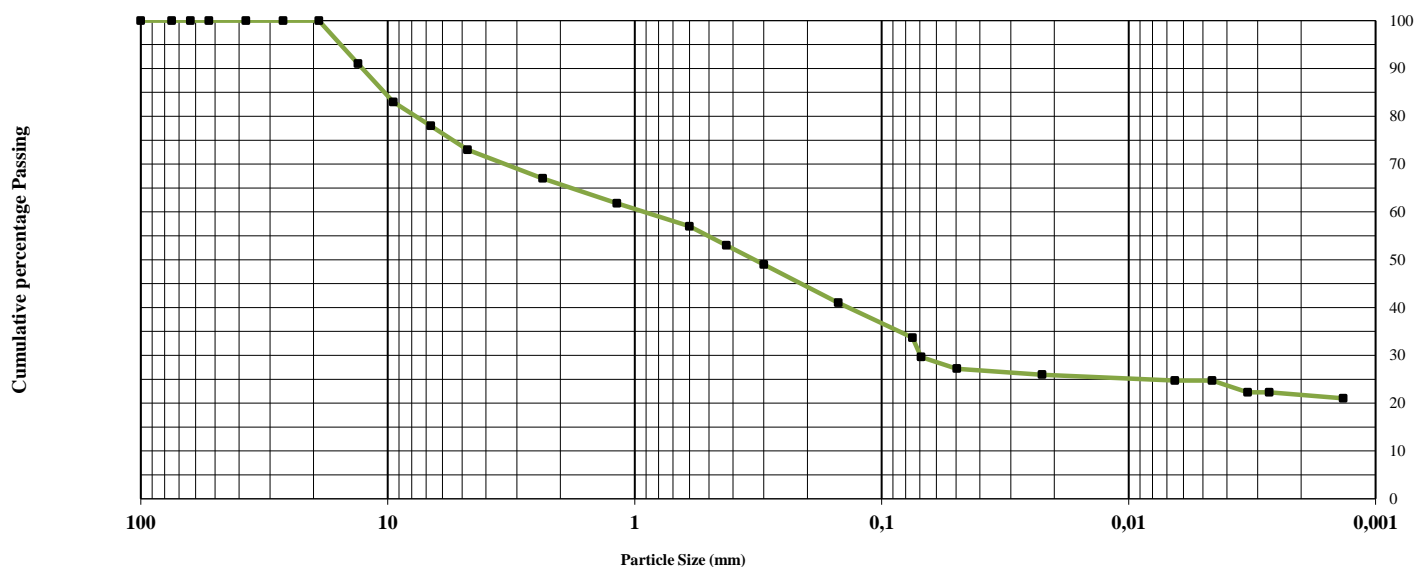
SIEVE ANALYSIS (TMH 1 A1a)*

HYDROMETER ASTM D422

100	75	63	53	37,5	26,5	19,0	13,2	9,5	6,7	4,75	2,36	1,18	0,60	0,425	0,300	0,150	0,075	0,069	0,050	0,022	0,006	0,005	0,003	0,003	0,001
100	100	100	100	100	100	100	91	83	78	73	67	61,8	57	53	49	41	33,7	29,66	27,19	25,96	24,72	24,72	22,25	22,25	21,01

% Passing

Particle Size Distribution



% Gravel

27

% Sand

41

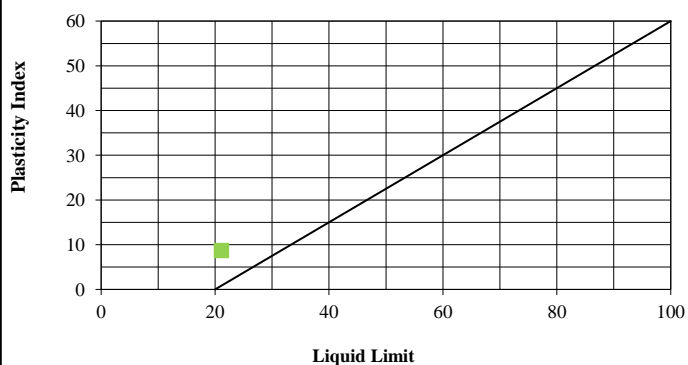
% Silt

10

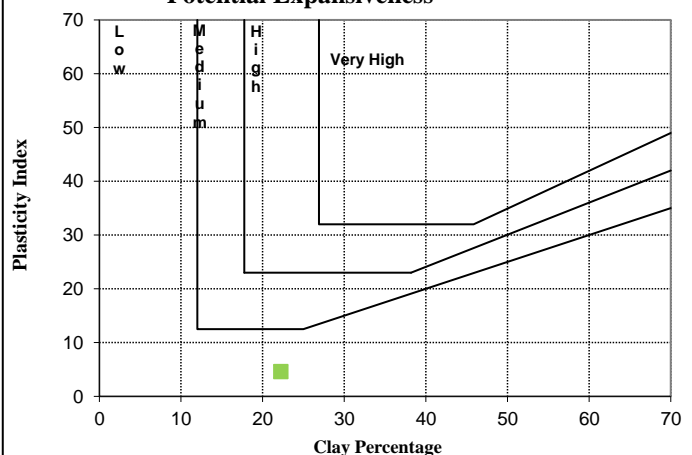
% Clay

22

Plasticity Chart A Line



Potential Expansiveness



NOTE: All tests marked with (*) means that those test methods are not accredited.



STEYN-WILSON
LABORATORIES

CIVIL ENGINEERING TESTING LABORATORIES



11 Gooderson Road Blackheath
PO Box 58 Blackheath 7581
Tel: 021 905 0435
Fax: 086 499 9482
Email: info@steynwilson.co.za
Web: www.steynwilson.co.za

Customer : **PeraGage**

Private Bag X5

Century City

7441

Attention : Steven Bok

Project : 23123G SANSA Matjiesfontien

Date Received : 09/06/23

Date Reported : 20/06/23

Req. Number : -

FOUNDATION INDICATOR ASTM D422

Material Description:	Dark Reddish Brown Silty Soil	Sample Number:	28376 / 10		
Position:	TP21	Liquid Limit	29,7	Linear Shrinkage	7,3
Depth:	0.00 - 1.10m	Plasticity Index	15,4	Insitu M/C%	6,3

PH (TMH1 A20)*

(TMH1 A21T)*
Conductivity
s.m⁻¹

SG (TMH1 A12T)*

2,456

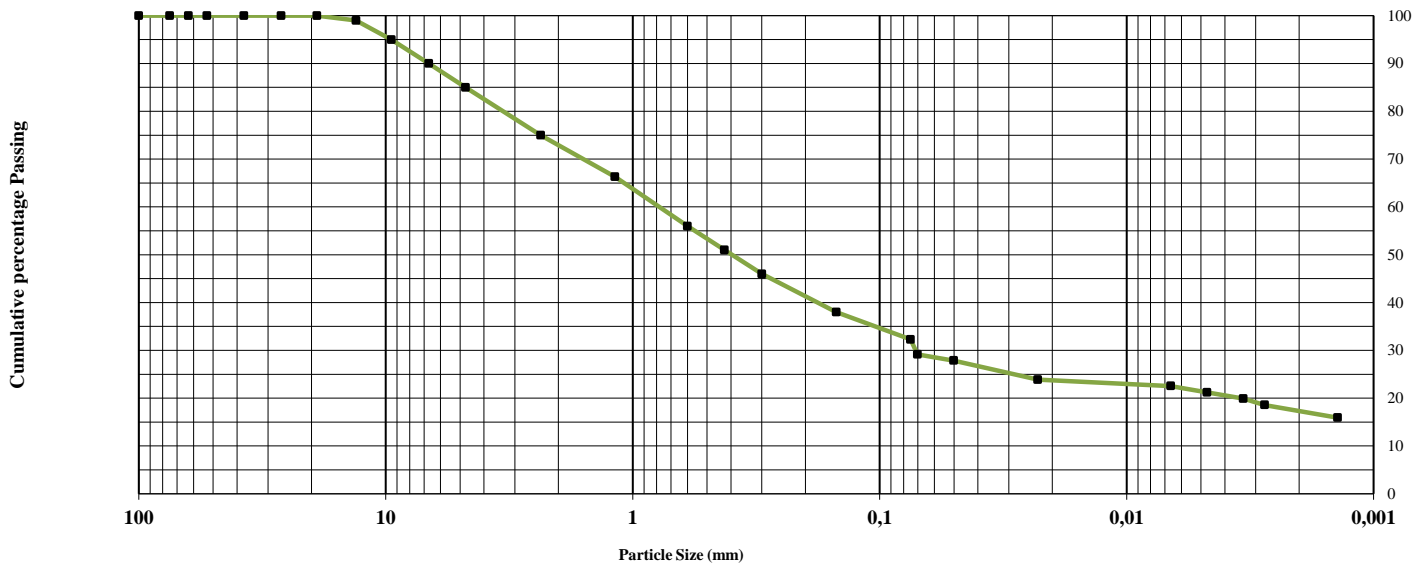
SIEVE ANALYSIS (TMH 1 A1a)*

HYDROMETER ASTM D422

100	75	63	53	37,5	26,5	19,0	13,2	9,5	6,7	4,75	2,36	1,18	0,60	0,425	0,300	0,150	0,075	0,070	0,050	0,023	0,007	0,005	0,003	0,003	0,001
100	100	100	100	100	100	100	99	95	90	85	75	66,3	56	51	46	38	32,3	29,17	27,85	23,87	22,54	21,22	19,89	18,56	15,91

% Passing

Particle Size Distribution



% Gravel

15

% Sand

54

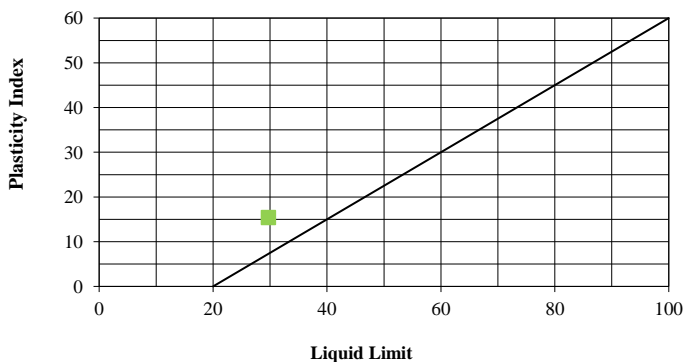
% Silt

12

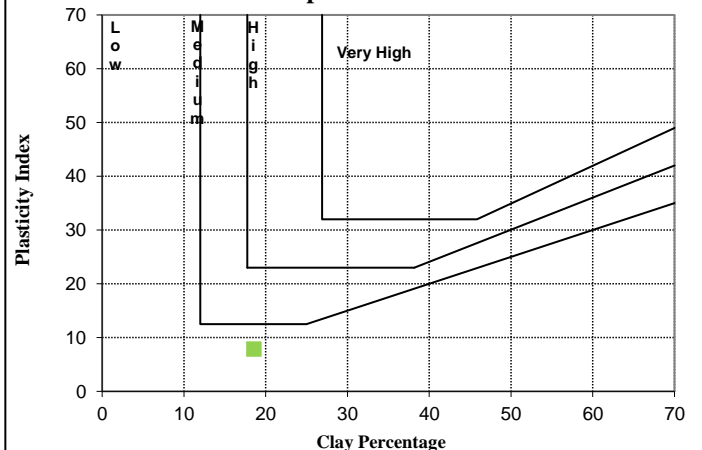
% Clay

19

Plasticity Chart A Line



Potential Expansiveness



NOTE: All tests marked with (*) means that those test methods are not accredited.



STEYN-WILSON
LABORATORIES

CIVIL ENGINEERING TESTING LABORATORIES



11 Gooderson Road Blackheath
PO Box 58 Blackheath 7581
Tel: 021 905 0435
Fax: 086 499 9482
Email: info@steynwilson.co.za
Web: www.steynwilson.co.za

Customer : **PeraGage**

Private Bag X5

Century City

7441

Attention : Steven Bok

Project : 23123G SANSA Matjiesfontien

Date Received : 09/06/23

Date Reported : 20/06/23

Req. Number : -

FOUNDATION INDICATOR ASTM D422

Material Description:	Dark Reddish Brown Silty Soil	Sample Number:	28376 / 11		
Position:	TP23	Liquid Limit	24,5	Linear Shrinkage	4,3
Depth:	0.00 - 1.15m	Plasticity Index	8,2	Insitu M/C%	6,4

PH (TMH1 A20)*

(TMH1 A21T)*
Conductivity
s.m⁻¹

SG (TMH1 A12T)*

2,432

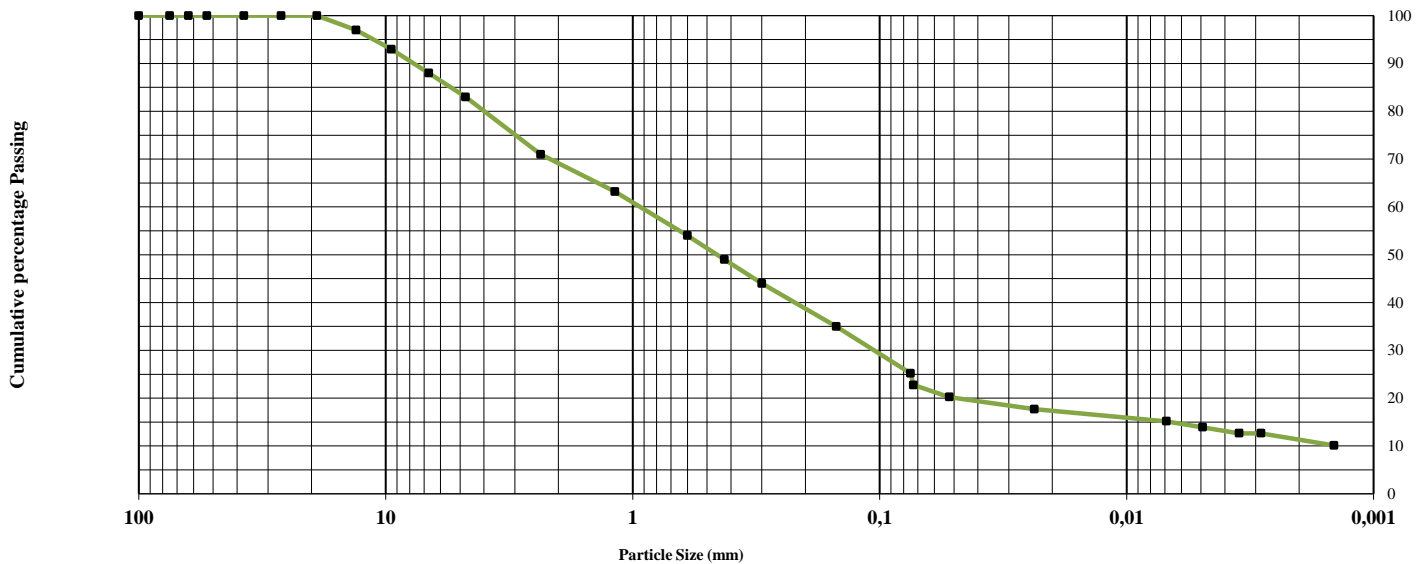
SIEVE ANALYSIS (TMH 1 A1a)*

HYDROMETER ASTM D422

100	75	63	53	37,5	26,5	19,0	13,2	9,5	6,7	4,75	2,36	1,18	0,60	0,425	0,300	0,150	0,075	0,073	0,052	0,024	0,007	0,005	0,004	0,003	0,001
100	100	100	100	100	100	100	97	93	88	83	71	63,2	54	49	44	35	25,2	22,75	20,22	17,7	15,17	13,9	12,64	12,64	10,11

% Passing

Particle Size Distribution



% Gravel

17

% Sand

59

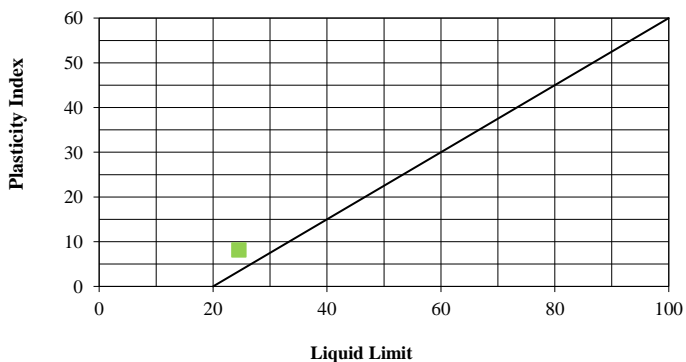
% Silt

12

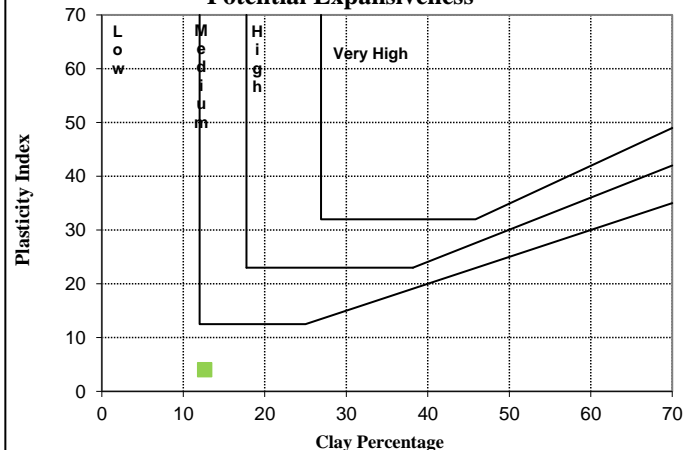
% Clay

13

Plasticity Chart A Line



Potential Expansiveness



NOTE: All tests marked with (*) means that those test methods are not accredited.



11 Gooderson Road Blackheath

PO Box 58 Blackheath 7581

Tel: 021 905 0435

Fax: 086 499 9482

Email: info@steynwilson.co.zaWeb: www.steynwilson.co.za

Client: **PeraGage**

Project: 23123G SANSA Matjiesfontien

Attention: Steven Bok

Your Ref. No: -

Date Reported 20/06/23

TEST REPORT REFERENCE NUMBER / JOB NUMBER :**SWL28376**

Dear Sir / Madam

Herewith please find the original reports pertaining to the above mentioned project.

Test Requested

2 x FOUNDATION INDICATOR

Site Sampling and Materials Information

Sampling Method

Specimens delivered to Steyn Wilson Laboratory.

Environmental Condition

Rainy

Deviation from the prescribed test method

No deviation from standard test method.

Responsibility of information disclaimer

The sample information was received from the customer. Results apply to the sample as received from the Customer.

**FINAL REPORT**

We would like to take this opportunity to thank you for your valued support.

Should you have any further enquiries please don't hesitate to contact me.

Yours Faithfully

STEYN-WILSON LABORATORIES (PTY) LTD

Remarks:

- Information contained herein is confidential to STEYN-WILSON PTY LTD and the addressee
- Opinions & Interpretations are not included in our schedule of Accreditation.
- The samples were subjected and analysed according to ASTM.
- The results reported relate only to the sample tested, Further use of the attached information is not the responsibility or liability of STEYN-WILSON LABORATORIES (PTY) LTD.
- This document is the correct record of all measurements made, and may not be reproduced other than with full written approval from a director of STEYN-WILSON LABORATORIES (PTY) LTD.
- Measuring equipment is traceable to national standards (Where applicable).
- Should there be any deviation from the prescribed test method comments will be made thereof, pertaining to the test on the relevant materials report.
- Uncertainty of measurement is calculated and corresponds to a coverage probability of approximately 95%. Available on request.
- The decision rule states that the measurement of uncertainty can be applied by the customer to the test results, on request. It is not the responsibility or liability of STEYN-WILSON LABORATORIES (PTY) LTD.

Mr. R. Wilson
Technical Signatory

DIRECTORS: Mr. J. Steyn ND-Civil (Managing) | Mr. R. Wilson B-Tech Civil (Operations)



STEYN-WILSON
LABORATORIES

CIVIL ENGINEERING TESTING LABORATORIES



11 Gooderson Road Blackheath
PO Box 58 Blackheath 7581
Tel: 021 905 0435
Fax: 086 499 9482
Email: info@steynwilson.co.za
Web: www.steynwilson.co.za

Customer : **PeraGage** Project : 23123G SANSA Matjiesfontien
Private Bag X5 Date Received : 09/06/23
Century City Date Reported : 20/06/23
7441 Req. Number : -
Attention : Steven Bok Date Sampled: 09/06/23

FOUNDATION INDICATOR ASTM D422

Material Description:	Dark Reddish Brown Silty Soil	Sample Number:	28376 / 12		
Position:	TP25	Liquid Limit	22,2	Linear Shrinkage	3,8
Depth:	0.00 - 0.45m	Plasticity Index	7,9	Insitu M/C%	8,2

PH (TMH1 A20)

(TMH1 A21T)
Conductivity
s.m⁻¹

SG (TMH1 A12T)*

2,498

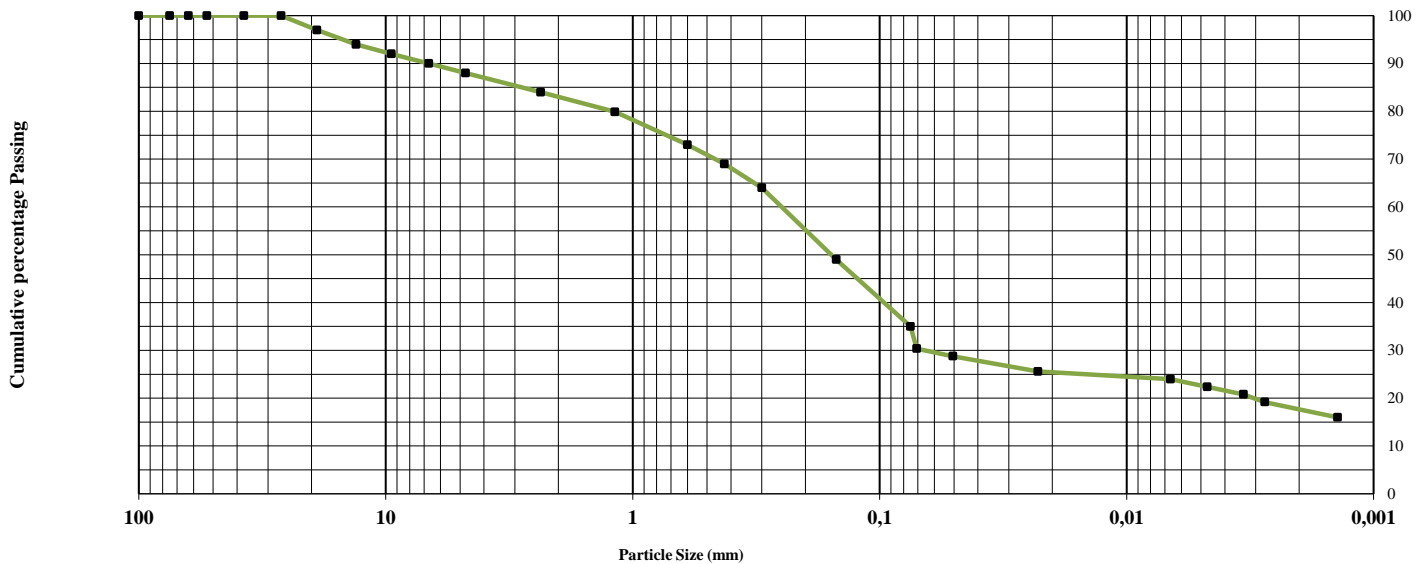
SIEVE ANALYSIS (TMH 1 A1a)*

HYDROMETER ASTM D422

100	75	63	53	37,5	26,5	19,0	13,2	9,5	6,7	4,75	2,36	1,18	0,60	0,425	0,300	0,150	0,075	0,071	0,050	0,023	0,007	0,005	0,003	0,003	0,001
100	100	100	100	100	100	97	94	92	90	88	84	79,9	73	69	64	49	35	30,36	28,76	25,57	23,97	22,37	20,77	19,18	15,98

% Passing

Particle Size Distribution



% Gravel

12

% Sand

55

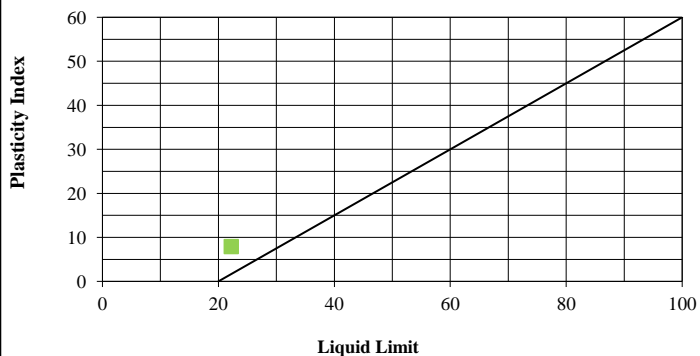
% Silt

14

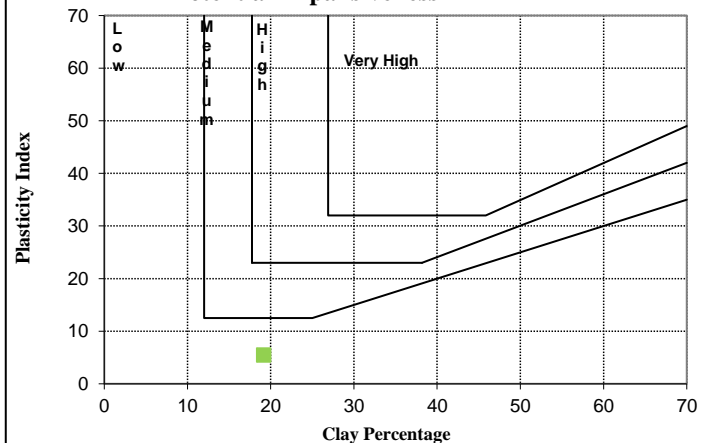
% Clay

19

Plasticity Chart A Line



Potential Expansiveness



NOTE: All tests marked with (*) means that those test methods are not accredited.



STEYN-WILSON
LABORATORIES

CIVIL ENGINEERING TESTING LABORATORIES



11 Gooderson Road Blackheath
PO Box 58 Blackheath 7581
Tel: 021 905 0435
Fax: 086 499 9482
Email: info@steynwilson.co.za
Web: www.steynwilson.co.za

Customer : **PeraGage**

Private Bag X5

Century City

7441

Attention : Steven Bok

Project : 23123G SANSA Matjiesfontien

Date Received : 09/06/23

Date Reported : 20/06/23

Req. Number : -

FOUNDATION INDICATOR ASTM D422

Material Description:	Dark Reddish Brown Silty Soil	Sample Number:	28376 / 13		
Position:	TP26	Liquid Limit	24,8	Linear Shrinkage	5,3
Depth:	0.00 - 0.75m	Plasticity Index	9,4	Insitu M/C%	6,7

PH (TMH1 A20)*

(TMH1 A21T)*
Conductivity
s.m⁻¹

SG (TMH1 A12T)*

2,388

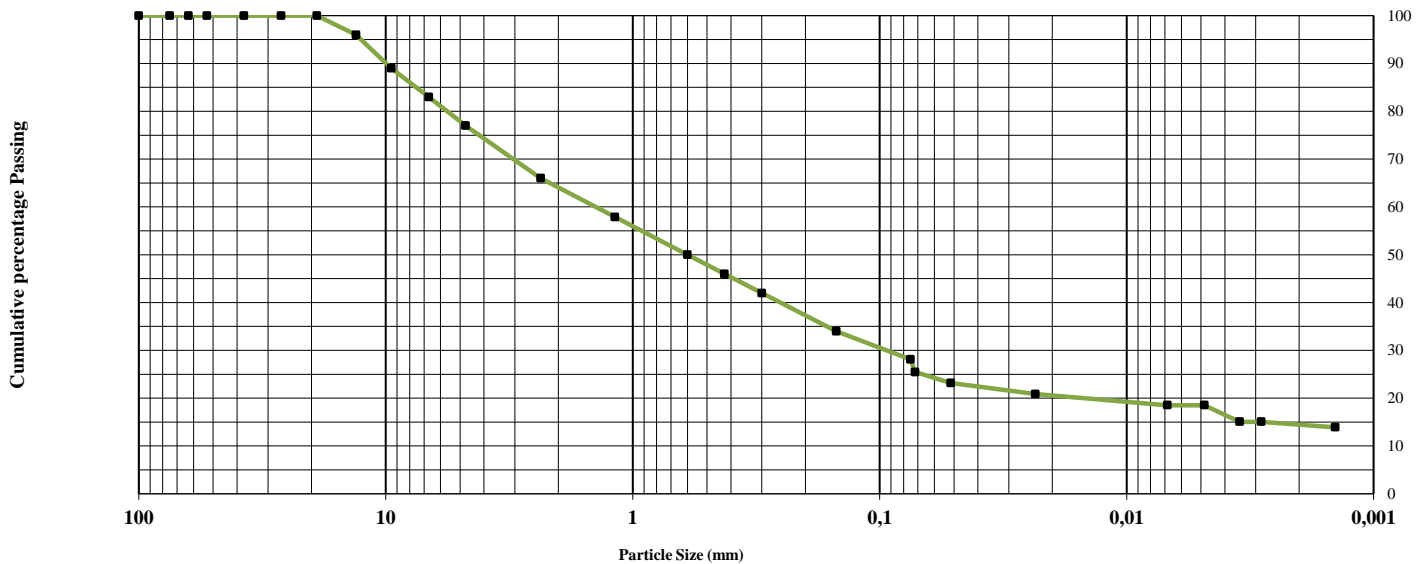
SIEVE ANALYSIS (TMH 1 A1a)*

HYDROMETER ASTM D422

100	75	63	53	37,5	26,5	19,0	13,2	9,5	6,7	4,75	2,36	1,18	0,60	0,425	0,300	0,150	0,075	0,072	0,052	0,023	0,007	0,005	0,003	0,003	0,001
100	100	100	100	100	100	100	96	89	83	77	66	57,9	50	46	42	34	28,1	25,48	23,16	20,84	18,53	18,53	15,05	15,05	13,9

% Passing

Particle Size Distribution



% Gravel

23

% Sand

50

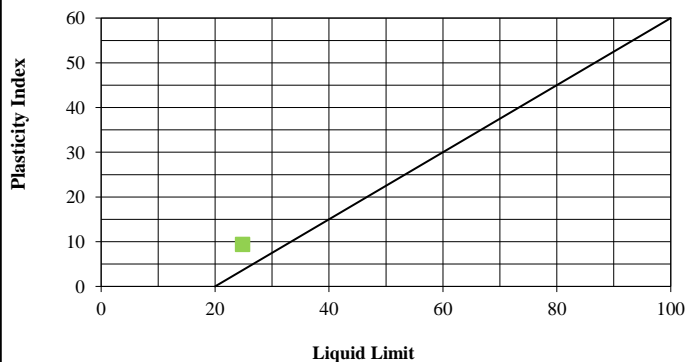
% Silt

12

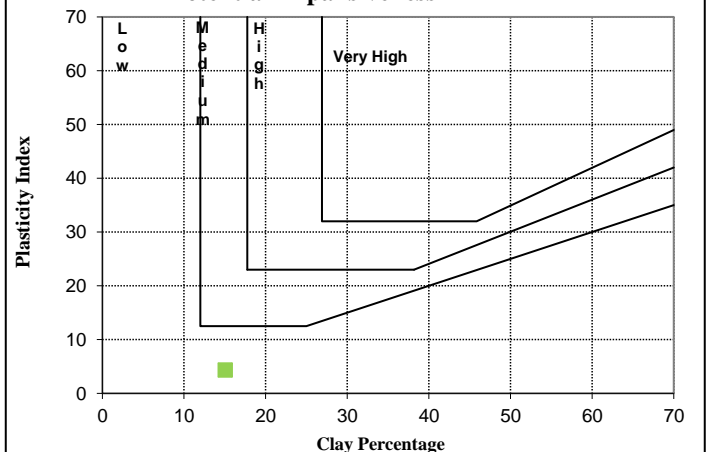
% Clay

15

Plasticity Chart A Line



Potential Expansiveness



NOTE: All tests marked with (*) means that those test methods are not accredited.



CIVIL ENGINEERING TESTING LABORATORIES



11 Gooderson Road Blackheath

PO Box 58 Blackheath 7581

Tel: 021 905 0435

Fax: 086 499 9482

Email: info@steynwilson.co.zaWeb: www.steynwilson.co.za

Client: **PeraGage**

Project: 23123G SANSA Matjiesfontein

Attention: Steven Bok

Your Ref. No: -

Date Reported 20/06/23

TEST REPORT REFERENCE NUMBER / JOB NUMBER :**SWL28376**

Dear Sir / Madam

Herewith please find the original reports pertaining to the above mentioned project.

Test Requested

3 x MDD / CBR /IND

Site Sampling and Materials Information

Sampling Method

Sampled by CLIENT

Enviromental Condition

Rainy

Deviation from the prescribed test method

No deviation from standard test method.

Responsibility of information disclaimer

The sample information was received from the customer. Results apply to the sample as received from the Customer.

● FINAL REPORT

We would like to take this opportunity to thank you for your valued support.

Should you have any further enquiries please don't hesitate to contact me.

Yours Faithfully

STEYN-WILSON LABORATORIES (PTY) LTD

Remarks:

1. Information contained herein is confidential to STEYN-WILSON PTY LTD and the addressee
2. Opinions & Interpretations are not included in our schedule of Accreditation.
3. The samples where subjected and analysed according to SANS 3001.
4. The results reported relate only to the sample tested, Further use of the attached information is not the responsibility or liability of STEYN-WILSON LABORATORIES (PTY) LTD.
5. This document is the correct record of all measurements made, and may not be reproduced other than with full written approval from a director of STEYN-WILSON LABORATORIES (PTY) LTD.
6. Measuring equipment is traceable to national standards (Where applicable).
7. Should there be any deviation from the prescribed test method comments will be made thereof, pertaining to the test on the relevant materials report.
8. Uncertainty of measurement is calculated and corresponds to a coverage probability of approximately 95%. Available on request.
9. The decision rule states that the measurement of uncertainty can be applied by the customer to the test results, on request. It is not the responsibility or liability of STEYN-WILSON LABORATORIES (PTY) LTD.

Mr. R. Wilson
Technical Signatory

DIRECTORS: Mr. J. Steyn ND-Civil (Managing) | Mr. R. Wilson B-Tech Civil (Operations)



11 Gooderson Road Blackheath
PO Box 58 Blackheath 7581
Tel: 021 905 0435
Fax: 086 499 9482
Email: info@steynwilson.co.za
Web: www.steynwilson.co.za

CIVIL ENGINEERING TESTING LABORATORIES

JOB NO:	SWL28376		Your Ref	-	Date	20/06/23	
CLIENT:	PeraGage Private Bag X5 Century City 7441			PROJECT:	23123G SANSA Matjiesfontein		
ATTENTION:	Steven Bok			BALANCE:	AC1/0001		
				OVEN:	AB1/0001		
				AUTO COMPACTOR:	AD1/0002		
				CBR PRESS:	AA1/0001		
CBR REPORT - TMH5 MD1, MD2 / SANS 3001 GR1, PR5, GR10, GR12, GR20, GR30, GR40, AG10, AG4, AG14, TMH1 A20, TMH1 A21T, *COTO, SANS 3001 AG20/21							
The unambiguous description of the sample/s as received are as follows :							
SAMPLE No.		28376 / 1		SPEC	28376 / 2		SPEC
HOLE No. / SV. / CHAINAGE		TP3		COTO - G10	TP6		COTO - G8
ROAD No. OR NAME		-			-		
LAYER TESTED / SAMPLED FROM		0.20 - 0.40m			0.20 - 0.55m		
DATE RECEIVED		09/06/23			09/06/23		
CLIENTS MARKING		-			-		
DESCRIPTION OF SAMPLE (COLOUR & TYPE)		Light Brown Sandstone			Dark Brown Shale		Dark Yellowish Reddish Shale
REDUCTION FACTOR / RF CHECK		0,0675			0,0424		0,0501
		0,04		< 1%	0,07		< 1%
SIEVE ANALYSIS (mm) SANS 3001 GR1	100,0	100	-	100	-	100	-
	75,0	95	-	100	-	100	-
	63,0	87	-	100	-	99	-
	53,0	81	-	100	-	98	-
	37,5	70	-	96	-	92	-
	28,0	60	-	88	-	83	-
	20,0	53	-	79	-	77	-
	14,0	50	-	70	-	74	-
	5,00	42	-	38	-	63	-
	2,00	40	-	31	-	57	-
	0,425	35	-	24	-	44	-
	0,075	15	-	10	-	19	-
ACV	SANS AG10	%					
10 % FACT		kN					
10 % FACT Wet / Dry ratio		%					
FLAKINESS INDEX	SANS AG4	%	-	-	-	-	
FRACTURED FACES	*COTO	%	-	-	-	-	
ATTERBERG LIMITS SANS 3001 GR10, GR12	LL% - 0,425mm		22	-	24	-	28,1
	P.I. - 0,425mm		6,9	-	6,6	≤ (3xGM) + 10	11,4
	LS% - 0,425mm		3,7	-	3,3	-	6,5
	P.I. - 0,075mm						
	GM		2,10	-	2,35	0,75 ≥ GM ≤ 2,7	1,80
SOIL-MORTAR PERCENTAGES SANS 3001 PR5	Coarse sand		12		21		23
	Fine sand		51		46		44
	Coarse fine sand		21		18		15
	Medium fine sand		18		14		14
	Fine fine sand		12		13		15
	Silt and clay		37		33		33
	Coarse sand ratio		0,1		0,2		0,2
MOD AASHTO SANS 3001 GR30	OMC	%	7,5		8,5		6,4
	MDD	(kg/m³)	2000		2111		2165
APPARENT & BULK DENSITY / WATER ABSORPTION SANS 3001 AG20/21	AD	(kg/m³)					
	BD	(kg/m³)					
	WA	%					
C.B.R. SANS 3001 GR40	COMP MC	%	7,4		8,4		6,3
	SWELL	%	0,0	-	0,0	≤ 1,5	1,99
	100%		12	-	29	-	4
	98%		10	-	22	-	3
	97%		9	-	19	-	3
	95%		8	-	14	-	3
	93%		6	-	10	≥ 10	2
	90%		5	-	7	-	2
pH	TMH1 A20	%					
Conductivity	TMH1 A21T	(S/m)					
Water Soluble Sulfates	*SANS 5850-1	%					
Acid Soluble Sulfates	*SANS 5850-2	%					
Durability Mill Index (max)	SANS AG16	-					
% passing 0,425mm sieve after Test		%					

NOTE : All tests marked with (*) means that those test methods are not accredited.



CIVIL ENGINEERING TESTING LABORATORIES



11 Gooderson Road Blackheath

PO Box 58 Blackheath 7581

Tel: 021 905 0435

Fax: 086 499 9482

Email: info@steynwilson.co.zaWeb: www.steynwilson.co.za

Client: **PeraGage**

Project: 23123G SANSA Matjiesfontein

Attention: Steven Bok

Your Ref. No: -

Date Reported 20/06/23

TEST REPORT REFERENCE NUMBER / JOB NUMBER :**SWL28376**

Dear Sir / Madam

Herewith please find the original reports pertaining to the above mentioned project.

Test Requested

1 x MDD / CBR /IND

Site Sampling and Materials Information

Sampling Method

Sampled by CLIENT

Enviromental Condition

Rainy

Deviation from the prescribed test method

No deviation from standard test method.

Responsibility of information disclaimer

The sample information was received from the customer. Results apply to the sample as received from the Customer.

● FINAL REPORT

We would like to take this opportunity to thank you for your valued support.

Should you have any further enquiries please don't hesitate to contact me.

Yours Faithfully


STEYN-WILSON LABORATORIES (PTY) LTD

Remarks:

1. Information contained herein is confidential to STEYN-WILSON PTY LTD and the addressee
2. Opinions & Interpretations are not included in our schedule of Accreditation.
3. The samples where subjected and analysed according to SANS 3001.
4. The results reported relate only to the sample tested, Further use of the attached information is not the responsibility or liability of STEYN-WILSON LABORATORIES (PTY) LTD.
5. This document is the correct record of all measurements made, and may not be reproduced other than with full written approval from a director of STEYN-WILSON LABORATORIES (PTY) LTD.
6. Measuring equipment is traceable to national standards (Where applicable).
7. Should there be any deviation from the prescribed test method comments will be made thereof, pertaining to the test on the relevant materials report.
8. Uncertainty of measurement is calculated and corresponds to a coverage probability of approximately 95%. Available on request.
9. The decision rule states that the measurement of uncertainty can be applied by the customer to the test results, on request. It is not the responsibility or liability of STEYN-WILSON LABORATORIES (PTY) LTD.

Mr. R. Wilson
Technical Signatory


DIRECTORS: Mr. J. Steyn ND-Civil (Managing) | Mr. R. Wilson B-Tech Civil (Operations)



STEYN-WILSON

LABORATORIES

CIVIL ENGINEERING TESTING LABORATORIES



sanas

Testing Laboratory

T0835

11 Gooderson Road Blackheath
PO Box 58 Blackheath 7581
Tel: 021 905 0435
Fax: 086 499 9482
Email: info@steynwilson.co.za
Web: www.steynwilson.co.za

JOB NO:SWL28376Your Ref-Date20/06/23

CLIENT:PeraGage
Private Bag X5
Century City
7441

PROJECT:23123G SANSA Matjiesfontein

BALANCE:AC1/0003

OVEN:AB1/0001

AUTO COMPACTOR:AD1/0002

CBR PRESS:AA1/0002

ATTENTION:Steven Bok

CBR REPORT - TMH5 MD1, MD2 / SANS 3001 GR1, PR5, GR10, GR12, GR20, GR30, GR40, AG10, AG4, AG14, TMH1 A20, TMH1 A21T, *COTO, SANS 3001 AG20/21

The unambiguous description of the sample/s as received are as follows :

SAMPLE No.		28376 / 14		SPEC			
HOLE No. / SV. / CHAINAGE		TP27		COTO - G10			
ROAD No. OR NAME		-					
LAYER TESTED / SAMPLED FROM		0.00 - 1.60m					
DATE RECEIVED		09/06/23					
CLIENTS MARKING		-					
DESCRIPTION OF SAMPLE (COLOUR & TYPE)		Light Olive Shale					
REDUCTION FACTOR / RF CHECK		0,0489					
		0,07		< 1%			
SIEVE ANALYSIS (mm) SANS 3001 GR1	100,0	100	-				
	75,0	100	-				
	63,0	100	-				
	53,0	100	-				
	37,5	98	-				
	28,0	95	-				
	20,0	90	-				
	14,0	88	-				
	5,00	75	-				
	2,00	65	-				
	0,425	51	-				
	0,075	29	-				
ACV	SANS AG10	%					
10 % FACT		kN					
10 % FACT Wet / Dry ratio		%					
FLAKINESS INDEX	SANS AG4	%	-				
FRACTURED FACES	*COTO	%	-				
ATTERBERG LIMITS SANS 3001 GR10, GR12	LL% - 0,425mm		26,5	-			
	P.I. - 0,425mm		13,4	-			
	LS% - 0,425mm		7,1	-			
	P.I. - 0,075mm						
	GM		1,56	-			
SOIL-MORTAR PERCENTAGES SANS 3001 PR5	Coarse sand		22				
	Fine sand		33				
	Coarse fine sand		14				
	Medium fine sand		9				
	Fine fine sand		11				
	Silt and clay		44				
	Coarse sand ratio		0,2				
MOD AASHTO SANS 3001 GR30	OMC	%	9,4				
	MDD	(kg/m³)	2041				
APPARENT & BULK DENSITY / WATER ABSORPTION SANS 3001 AG20/21	AD	(kg/m³)					
	BD	(kg/m³)					
	WA	%					
C.B.R. SANS 3001 GR40	COMP MC	%	9,3				
	SWELL	%	1,21	-			
	100%		4	-			
	98%		3	-			
	97%		3	-			
	95%		2	-			
	93%		2	-			
	90%		1	-			
pH	TMH1 A20	%					
Conductivity	TMH1 A21T	(S/m)					
Water Soluble Sulfates	*SANS 5850-1	%					
Acid Soluble Sulfates	*SANS 5850-2	%					
Durability Mill Index (max)	SANS AG16	-					
% passing 0,425mm sieve after Test		%					

NOTE : All tests marked with (*) means that those test methods are not accredited.

Compiled By: M.Steyn

Approved By: J.Steyn / R. Wilson

Page 2 of 2

Appendix E.

DCP raw data



Project: 23123G SANSA Matjiesfontein

DCP Raw Data

DCP01					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	55	-0.055	0	0	0
5	104	-0.104	10	10	23
10	153	-0.153	10	10	23
15	180	-0.180	5	19	48
20	186	-0.186	1	83	100
25	188	-0.188	0	250	100
30	189	-0.189	0	500	100
35	REF				
40					
45					
50					

DCP02					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	42	-0.042	0	0	0
5	101	-0.101	12	8	18
10	147	-0.147	9	11	24
15	179	-0.179	6	16	39
20	192	-0.192	3	38	100
25	220	-0.220	6	18	46
30	234	-0.234	3	36	100
35	257	-0.257	5	22	59
40	DCP terminated-				
45	rod @ inclination				
50	seemingly due to rock interference				

DCP03					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	70	-0.070	0	0	0
5	140	-0.140	14	7	14
10	160	-0.160	4	25	70
15	173	-0.173	3	38	100
20	186	-0.186	3	38	100
25	192	-0.192	1	83	100
30	206	-0.206	3	36	100
35	208	-0.208	0	250	100
40	216	-0.216	2	63	100
45	220	-0.220	1	125	100
50	226	-0.226	1	83	100
55	238	-0.238	2	42	100
60	243	-0.243	1	100	100
65	252	-0.252	2	56	100
70	REF				

DCP04					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	104	-0.104	0	0	0
5	162	-0.162	12	9	18
10	172	-0.172	2	50	100
15	183	-0.183	2	45	100
20	184	-0.184	0	500	100
25	185	-0.185	0	500	100
30	REF				
35					
40					
45					
50					

DCP05					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	25	-0.025	0	0	0
5	73	-0.073	10	10	23
10	95	-0.095	4	23	62
15	112	-0.112	3	29	87
20	124	-0.124	2	42	100
25	137	-0.137	3	38	100
30	156	-0.156	4	26	75
35	170	-0.170	3	36	100
40	180	-0.180	2	50	100
45	187	-0.187	1	71	100
50	201	-0.201	3	36	100
55	210	-0.210	2	56	100
60	218	-0.218	2	63	100
65	223	-0.223	1	100	100
70	230	-0.230	1	71	100
75	237	-0.237	1	71	100
80	243	-0.243	1	83	100
85	248	-0.248	1	100	100
90	253	-0.253	1	100	100
95	255	-0.255	0	250	100
100	260	-0.260	1	100	100
105	265	-0.265	1	100	100
110	271	-0.271	1	83	100
115	277	-0.277	1	83	100
120	280	-0.280	1	167	100
125	286	-0.286	1	83	100
130	291	-0.291	1	100	100
135	295	-0.295	1	125	100
140	300	-0.300	1	100	100
145	305	-0.305	1	100	100
150	REF				

DCP06					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	43	-0.043	0	0	0
5	117	-0.117	15	7	13
10	136	-0.136	4	26	75
15	146	-0.146	2	50	100
20	160	-0.160	3	36	100
25	164	-0.164	1	125	100
30	168	-0.168	1	125	100
35	170	-0.170	0	250	100
40	172	-0.172	0	250	100
45	REF				
50					

DCP07					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	108	-0.108	0	0	0
5	173	-0.173	13	8	16
10	217	-0.217	9	11	26
15	244	-0.244	5	19	48
20	270	-0.270	5	19	51
25	299	-0.299	6	17	44
30	316	-0.316	3	29	87
35	327	-0.327	2	45	100
40	336	-0.336	2	56	100
45	340	-0.340	1	125	100
50	347	-0.347	1	71	100
55	353	-0.353	1	83	100
60	359	-0.359	1	83	100
65	363	-0.363	1	125	100
70	364	-0.364	0	500	100
75	367	-0.367	1	167	100
80	REF				
85					

DCP08					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	95	-0.095	0	0	0
5	167	-0.167	14	7	14
10	180	-0.180	3	38	100
15	184	-0.184	1	125	100
20	185	-0.185	0	500	100
25	190	-0.190	1	100	100
30	193	-0.193	1	167	100
35	195	-0.195	0	250	100
40	199	-0.199	1	125	100
45	200	-0.200	0	500	100
50	210	-0.210	2	50	100
55	212	-0.212	0	250	100
60	REF				

DCP09					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	40	-0.040	0	0	0
5	150	-0.150	22	5	8
10	196	-0.196	9	11	24
15	231	-0.231	7	14	35
20	265	-0.265	7	15	36
25	283	-0.283	4	28	81
30	298	-0.298	3	33	100
35	310	-0.310	2	42	100
40	316	-0.316	1	83	100
45	322	-0.322	1	83	100
50	326	-0.326	1	125	100
55	327	-0.327	0	500	100
60	330	-0.330	1	167	100
65	331	-0.331	0	500	100
70	REF				
75					

DCP10					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	136	-0.136	0	0	0
5	209	-0.209	15	7	14
10	246	-0.246	7	14	32
15	269	-0.269	5	22	59
20	287	-0.287	4	28	81
25	305	-0.305	4	28	81
30	318	-0.318	3	38	100
35	330	-0.330	2	42	100
40	342	-0.342	2	42	100
45	353	-0.353	2	45	100
50	362	-0.362	2	56	100
55	372	-0.372	2	50	100
60	379	-0.379	1	71	100
65	385	-0.385	1	83	100
70	389	-0.389	1	125	100
75	394	-0.394	1	100	100
80	399	-0.399	1	100	100
85	402	-0.402	1	167	100
90	406	-0.406	1	125	100
95	409	-0.409	1	167	100
100	411	-0.411	0	250	100
105	REF				

DCP11					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	43	-0.043	0	0	0
5	109	-0.109	13	8	15
10	117	-0.117	2	63	100
15	120	-0.120	1	167	100
20	122	-0.122	0	250	100
25	125	-0.125	1	167	100
30	127	-0.127	0	250	100
35	130	-0.130	1	167	100
40	131	-0.131	0	500	100
45	136	-0.136	1	100	100
50	140	-0.140	1	125	100
55	142	-0.142	0	250	100
60	144	-0.144	0	250	100
65	150	-0.150	1	83	100
70	REF				

DCPI2					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	101	-0.101	0	0	0
5	162	-0.162	12	8	17
10	189	-0.189	5	19	48
15	212	-0.212	5	22	59
20	230	-0.230	4	28	81
25	239	-0.239	2	56	100
30	245	-0.245	1	83	100
35	250	-0.250	1	100	100
40	254	-0.254	1	125	100
45	256	-0.256	0	250	100
50	259	-0.259	1	167	100
55	261	-0.261	0	250	100
60	264	-0.264	1	167	100
65	270	-0.270	1	83	100
70	REF				

DCPI3					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	33	-0.033	0	0	0
5	129	-0.129	19	5	10
10	155	-0.155	5	19	51
15	171	-0.171	3	31	94
20	175	-0.175	1	125	100
25	179	-0.179	1	125	100
30	181	-0.181	0	250	100
35	184	-0.184	1	167	100
40	190	-0.190	1	83	100
45	193	-0.193	1	167	100
50	197	-0.197	1	125	100
55	200	-0.200	1	167	100
60	202	-0.202	0	250	100
65	REF				

DCPI4					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	22	-0.022	0	0	0
5	124	-0.124	20	5	9
10	155	-0.155	6	16	40
15	170	-0.170	3	33	100
20	182	-0.182	2	42	100
25	195	-0.195	3	38	100
30	201	-0.201	1	83	100
35	205	-0.205	1	125	100
40	211	-0.211	1	83	100
45	217	-0.217	1	83	100
50	225	-0.225	2	63	100
55	233	-0.233	2	63	100
60	242	-0.242	2	56	100
65	245	-0.245	1	167	100
70	252	-0.252	1	71	100
75	256	-0.256	1	125	100
80	REF				

DCPI5					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	30	-0.030	0	0	0
5	118	-0.118	18	6	11
10	144	-0.144	5	19	51
15	165	-0.165	4	24	66
20	187	-0.187	4	23	62
25	204	-0.204	3	29	87
30	217	-0.217	3	38	100
35	230	-0.230	3	38	100
40	237	-0.237	1	71	100
45	245	-0.245	2	63	100
50	252	-0.252	1	71	100
55	258	-0.258	1	83	100
60	265	-0.265	1	71	100
65	267	-0.267	0	250	100
70	275	-0.275	2	63	100
75	276	-0.276	0	500	100
80	REF				

DCP16					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	47	-0.047	0	0	0
5	108	-0.108	12	8	17
10	119	-0.119	2	45	100
15	126	-0.126	1	71	100
20	132	-0.132	1	83	100
25	134	-0.134	0	250	100
30	137	-0.137	1	167	100
35	139	-0.139	0	250	100
40	140	-0.140	0	500	100
45	146	-0.146	1	83	100
50	156	-0.156	2	50	100
55	158	-0.158	0	250	100
60	REF				

DCP17					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	40	-0.040	0	0	0
5	143	-0.143	21	5	9
10	193	-0.193	10	10	22
15	227	-0.227	7	15	36
20	250	-0.250	5	22	59
25	273	-0.273	5	22	59
30	303	-0.303	6	17	42
35	332	-0.332	6	17	44
40	355	-0.355	5	22	59
45	376	-0.376	4	24	66
50	394	-0.394	4	28	81
55	407	-0.407	3	38	100
60	419	-0.419	2	42	100
65	430	-0.430	2	45	100
70	440	-0.440	2	50	100
75	448	-0.448	2	63	100
80	456	-0.456	2	63	100
85	460	-0.460	1	125	100
90	466	-0.466	1	83	100
95	467	-0.467	0	500	100
100	472	-0.472	1	100	100
105	REF				

DCP18					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	68	-0.068	0	0	0
5	160	-0.160	18	5	10
10	193	-0.193	7	15	37
15	220	-0.220	5	19	48
20	242	-0.242	4	23	62
25	261	-0.261	4	26	75
30	287	-0.287	5	19	51
35	317	-0.317	6	17	42
40	343	-0.343	5	19	51
45	374	-0.374	6	16	40
50	400	-0.400	5	19	51
55	428	-0.428	6	18	46
60	453	-0.453	5	20	53
65	465	-0.465	2	42	100
70	475	-0.475	2	50	100
75	480	-0.480	1	100	100
80	490	-0.490	2	50	100
85	500	-0.500	2	50	100
90	508	-0.508	2	63	100
95	513	-0.513	1	100	100
100	517	-0.517	1	125	100
105	521	-0.521	1	125	100
110	REF				

DCP19					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	132	-0.132	0	0	0
5	185	-0.185	11	9	20
10	211	-0.211	5	19	51
15	229	-0.229	4	28	81
20	240	-0.240	2	45	100
25	240	-0.240	0		0
30	240	-0.240	0		0
35	REF				
40					
45					
50					

DCP20					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	95	-0.095	0	0	0
5	150	-0.150	11	9	20
10	162	-0.162	2	42	100
15	171	-0.171	2	56	100
20	174	-0.174	1	167	100
25	177	-0.177	1	167	100
30	181	-0.181	1	125	100
35	REF				
40					
45					
50					

DCP21					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	40	-0.040	0	0	0
5	140	-0.140	20	5	9
10	187	-0.187	9	11	24
15	226	-0.226	8	13	30
20	267	-0.267	8	12	28
25	303	-0.303	7	14	33
30	332	-0.332	6	17	44
35	361	-0.361	6	17	44
40	380	-0.380	4	26	75
45	400	-0.400	4	25	70
50	417	-0.417	3	29	87
55	435	-0.435	4	28	81
60	449	-0.449	3	36	100
65	463	-0.463	3	36	100
70	473	-0.473	2	50	100
75	481	-0.481	2	63	100
80	490	-0.490	2	56	100
85	500	-0.500	2	50	100
90	505	-0.505	1	100	100
95	513	-0.513	2	63	100
100	520	-0.520	1	71	100
105	527	-0.527	1	71	100
110	REF				

DCP22					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	63	-0.063	0	0	0
5	91	-0.091	6	18	46
10	105	-0.105	3	36	100
15	110	-0.110	1	100	100
20	116	-0.116	1	83	100
25	123	-0.123	1	71	100
30	131	-0.131	2	63	100
35	135	-0.135	1	125	100
40	140	-0.140	1	100	100
45	142	-0.142	0	250	100
50	REF				
55					

DCP23					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	67	-0.067	0	0	0
5	162	-0.162	19	5	10
10	227	-0.227	13	8	16
15	243	-0.243	3	31	94
20	267	-0.267	5	21	56
25	294	-0.294	5	19	48
30	313	-0.313	4	26	75
35	340	-0.340	5	19	48
40	360	-0.360	4	25	70
45	385	-0.385	5	20	53
50	410	-0.410	5	20	53
55	426	-0.426	3	31	94
60	444	-0.444	4	28	81
65	465	-0.465	4	24	66
70	482	-0.482	3	29	87
75	500	-0.500	4	28	81
80	516	-0.516	3	31	94
85	531	-0.531	3	33	100
90	549	-0.549	4	28	81
95	562	-0.562	3	38	100
100	577	-0.577	3	33	100
105	590	-0.590	3	38	100
110	602	-0.602	2	42	100
115	612	-0.612	2	50	100
120	618	-0.618	1	83	100
125	628	-0.628	2	50	100
130	636	-0.636	2	63	100
135	642	-0.642	1	83	100
140	649	-0.649	1	71	100
145	658	-0.658	2	56	100
150	664	-0.664	1	83	100
155	669	-0.669	1	100	100
160	673	-0.673	1	125	100
165	678	-0.678	1	100	100
170	679	-0.679	0	500	100
175	REF				

DCP24					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	64	-0.064	0	0	0
5	155	-0.155	18	5	10
10	204	-0.204	10	10	23
15	237	-0.237	7	15	37
20	267	-0.267	6	17	42
25	290	-0.290	5	22	59
30	316	-0.316	5	19	51
35	336	-0.336	4	25	70
40	359	-0.359	5	22	59
45	380	-0.380	4	24	66
50	400	-0.400	4	25	70
55	419	-0.419	4	26	75
60	437	-0.437	4	28	81
65	452	-0.452	3	33	100
70	467	-0.467	3	33	100
75	481	-0.481	3	36	100
80	496	-0.496	3	33	100
85	511	-0.511	3	33	100
90	528	-0.528	3	29	87
95	547	-0.547	4	26	75
100	566	-0.566	4	26	75
105	585	-0.585	4	26	75
110	600	-0.600	3	33	100
115	616	-0.616	3	31	94
120	630	-0.630	3	36	100
125	648	-0.648	4	28	81
130	665	-0.665	3	29	87
135	680	-0.680	3	33	100
140	696	-0.696	3	31	94
145	705	-0.705	2	56	100
150	716	-0.716	2	45	100
155	725	-0.725	2	56	100
160	744	-0.744	4	26	75
165	747	-0.747	1	167	100
170	750	-0.750	1	167	100
175	REF				

DCP25					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	155	-0.155	0	0	0
5	225	-0.225	14	7	14
10	249	-0.249	5	21	56
15	268	-0.268	4	26	75
20	287	-0.287	4	26	75
25	306	-0.306	4	26	75
30	324	-0.324	4	28	81
35	340	-0.340	3	31	94
40	357	-0.357	3	29	87
45	373	-0.373	3	31	94
50	397	-0.397	5	21	56
55	410	-0.410	3	38	100
60	414	-0.414	1	125	100
65	429	-0.429	3	33	100
70	440	-0.440	2	45	100
75	450	-0.450	2	50	100
80	470	-0.470	4	25	70
85	475	-0.475	1	100	100
90	480	-0.480	1	100	100
95	487	-0.487	1	71	100
100	489	-0.489	0	250	100
105	491	-0.491	0	250	100
110	REF				

DCP26					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	111	-0.111	0	0	0
5	192	-0.192	16	6	12
10	239	-0.239	9	11	24
15	271	-0.271	6	16	39
20	289	-0.289	4	28	81
25	315	-0.315	5	19	51
30	345	-0.345	6	17	42
35	372	-0.372	5	19	48
40	405	-0.405	7	15	37
45	419	-0.419	3	36	100
50	430	-0.430	2	45	100
55	440	-0.440	2	50	100
60	450	-0.450	2	50	100
65	455	-0.455	1	100	100
70	466	-0.466	2	45	100
75	474	-0.474	2	63	100
80	478	-0.478	1	125	100
85	486	-0.486	2	63	100
90	493	-0.493	1	71	100
95	502	-0.502	2	56	100
100	510	-0.510	2	63	100
105	518	-0.518	2	63	100
110	527	-0.527	2	56	100
115	532	-0.532	1	100	100
120	535	-0.535	1	167	100
125	537	-0.537	0	250	100
130	REF				

DCP27					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	70	-0.070	0	0	0
5	135	-0.135	13	8	16
10	172	-0.172	7	14	32
15	200	-0.200	6	18	46
20	225	-0.225	5	20	53
25	242	-0.242	3	29	87
30	255	-0.255	3	38	100
35	264	-0.264	2	56	100
40	276	-0.276	2	42	100
45	286	-0.286	2	50	100
50	293	-0.293	1	71	100
55	306	-0.306	3	38	100
60	317	-0.317	2	45	100
65	333	-0.333	3	31	94
70	345	-0.345	2	42	100
75	357	-0.357	2	42	100
80	368	-0.368	2	45	100
85	386	-0.386	4	28	81
90	399	-0.399	3	38	100
95	405	-0.405	1	83	100
100	413	-0.413	2	63	100
105	420	-0.420	1	71	100
110	431	-0.431	2	45	100
115	440	-0.440	2	56	100
120	451	-0.451	2	45	100
125	457	-0.457	1	83	100
130	465	-0.465	2	63	100
135	485	-0.485	4	25	70
140	491	-0.491	1	83	100
145	497	-0.497	1	83	100
150	REF				

DCP28					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	26	-0.026	0	0	0
5	122	-0.122	19	5	10
10	147	-0.147	5	20	53
15	163	-0.163	3	31	94
20	168	-0.168	1	100	100
25	180	-0.180	2	42	100
30	183	-0.183	1	167	100
35	187	-0.187	1	125	100
40	190	-0.190	1	167	100
45	196	-0.196	1	83	100
50	REF				
55					

DCP29					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	85	-0.085	0	0	0
5	248	-0.248	33	3	5
10	333	-0.333	17	6	11
15	417	-0.417	17	6	11
20	459	-0.459	8	12	27
25	492	-0.492	7	15	37
30	523	-0.523	6	16	40
35	542	-0.542	4	26	75
40	559	-0.559	3	29	87
45	575	-0.575	3	31	94
50	590	-0.590	3	33	100
55	604	-0.604	3	36	100
60	615	-0.615	2	45	100
65	633	-0.633	4	28	81
70	645	-0.645	2	42	100
75	656	-0.656	2	45	100
80	666	-0.666	2	50	100
85	676	-0.676	2	50	100
90	696	-0.696	4	25	70
95	703	-0.703	1	71	100
100	718	-0.718	3	33	100
105	728	-0.728	2	50	100
110	734	-0.734	1	83	100
115	742	-0.742	2	63	100
120	752	-0.752	2	50	100
125	760	-0.760	2	63	100
130	767	-0.767	1	71	100
135	775	-0.775	2	63	100
140	781	-0.781	1	83	100
145	786	-0.786	1	100	100
150	794	-0.794	2	63	100
155	802	-0.802	2	63	100
160	810	-0.810	2	63	100
165	REF				

DCP30					
Blows	Depth (mm)	DCP Reading (m)	DPI (mm/blow)	N _{10L} (DCP Blows/100mm)	CBR (%)
0	62	-0.062	0	0	0
5	180	-0.180	24	4	7
10	216	-0.216	7	14	33
15	257	-0.257	8	12	28
20	280	-0.280	5	22	59
25	305	-0.305	5	20	53
30	336	-0.336	6	16	40
35	365	-0.365	6	17	44
40	389	-0.389	5	21	56
45	405	-0.405	3	31	94
50	420	-0.420	3	33	100
55	442	-0.442	4	23	62
60	460	-0.460	4	28	81
65	479	-0.479	4	26	75
70	494	-0.494	3	33	100
75	515	-0.515	4	24	66
80	534	-0.534	4	26	75
85	552	-0.552	4	28	81
90	572	-0.572	4	25	70
95	591	-0.591	4	26	75
100	612	-0.612	4	24	66
105	630	-0.630	4	28	81
110	650	-0.650	4	25	70
115	667	-0.667	3	29	87
120	695	-0.695	6	18	46
125	716	-0.716	4	24	66
130	737	-0.737	4	24	66
135	760	-0.760	5	22	59
140	783	-0.783	5	22	59
145	809	-0.809	5	19	51
150	839	-0.839	6	17	42
155	867	-0.867	6	18	46
160	897	-0.897	6	17	42
165	944	-0.944	9	11	24
170	1000	-1.000	11	9	19

C1.3.6 Annexure F –Proposed Site Office Facilities

SANSA Project

		Contractor Only	Shared Facilities Between Contractor Management and Consultants		Shared Ablutions between Contractor and Management		Consultants Only
	Approx.	Labour Offices, Ablutions, Kitchen, Staff Welfare and Management Offices and Administration	Common Board / Drawing Room (sqm)	Common Kitchen (sqm)	Common Bathroom Male	Common Bathroom Female	Consultants Office (sqm)
Approx. Size (m2)	-	As Required	60 sqm	12 sqm	As Required	As Required	24 sqm
Windows	1.5m (w) x 1.2m (h)	As Required	6	2	As Required	As Required	4
Windows	0.5m (w) x 0.6m (h)	As Required	-	-	As Required	As Required	
WC's	-	As Required	-	-	As Required	As Required	-
Urinals	-	As Required	-	-	As Required	As Required	-
Basins	Cold water only, with mirror above	As Required	-	-	As Required	As Required	-
Chairs	High back swivel	As Required	-	-	-	-	5
Chairs	Fixed back	As Required	0	-	-	-	5
Desk	0.8m x 1.5m, with lockable drawers	As Required	-	-	-	-	5
Counter tops	Formica, with cupboards & drawers	As Required	-	Yes	-	-	-
Cutlery & Crockery	China plates, Metal knives, forks, spoons,	As Required	Yes - As required	Yes - As required	-	-	Yes - As required
	China mugs, glasses	As Required	Yes - As required	Yes - As required	-	-	Yes - As required
Cooker	Gas, 4 plate	As Required	-	1	-	-	-
Sink	Double Bowl with hot and cold water	As Required	-	1	-	-	-
Microwave	-	As Required	-	1	-	-	-
Full size fridge	-	As Required	-	1	-	-	-
Bar fridge	-	As Required	-	-	-	-	1
Water Dispenser	-	As Required	Yes - As required	1	-	-	-
Magnetic white board	2m x 1.5m	As Required	1	-	-	-	1
Screen / Monitor	Projector / 55 inch, Smart TV, WiFi Connection	As Required	1	-	-	-	-
Printer	A3 laser jet, WiFi, ink & paper fully serviced	As Required	-	-	-	-	1
Printer	A0 laser jet, WiFi, ink and paper fully serviced	1	-	-	-	-	-
A3 Drawing files	Lever Arch or Similar	As Required	-	-	-	-	As Required
A1 & A0 Drawing hangars	Vertical stack with necessary clips	As Required	As Required	-	-	-	-
Plugs	13 amp square, double socket	As Required	1 double to TV wall, & 4 double to top of table top	Yes - As required	Yes - As required	Yes - As required	5 points
WiFi	High speed connection	As Required	Yes	-	-	-	Yes
Aircon		As Required	Yes	-	-	-	Yes
Sanitiser (foot pump)	Alcohol based, fully serviced,	As Required	As Required	As Required	As Required	As Required	As Required

SANSA Project

		Contractor Only	Shared Facilities Between Contractor Management and Consultants		Shared Ablutions between Contractor and Management		Consultants Only
	Approx.	Labour Offices, Ablutions, Kitchen, Staff Welfare and Managment Offices and Administration	Common Board / Drawing Room (sqm)	Common Kitchen (sqm)	Common Bathroom Male	Common Bathroom Female	Consultants Office (sqm)
Masks	New, disposable	As Required	As Required	As Required	As Required	As Required	As Required
Boots	Pairs, sizes vary	As Required	-	-	-	-	-
Helmets	Colour coded	As Required	-	-	-	-	-
High Vis. Vests	Sizes vary	As Required	-	-	-	-	-
Cleaning	As required (twice daily)	As Required	Yes	Yes	Yes	Yes	Yes
Backup water	Municipal connection, backup as required	As Required	Yes	Yes	Yes	Yes	Yes
Backup power		As Required	Yes	Yes	Yes	Yes	Yes
Refreshments / Snacks	For formal meetings as scheduled	As Required	As Required	As Required	As Required	As Required	As Required

C1.4 Drawing Register

Drawing Register Rev 02
SANSA Matjiesfontein Site
SANSA





Project Title	SANSA Matjiesfontein Site
Client	SANSA
Project No.	121
Executive	Herman Berry
Project Quantity Surveyor	Gerhard Liebenberg
Document Type	Drawings Register
Document Title	Drawing Register Rev 02
Issued Date	17 March 2025

Quality Management Procedures Completed:

Approved By Herman Berry

Content:

- 1.1 Architectural
- 1.2 Structural
- 1.3 Civil
- 1.4 Electrical
- 1.6 Mechanical
- 1.7 Mechanical - Wet Services
- 1.8 Fire

Confidentiality Notice

All drawings, schedules, tender information, and associated documentation included in this register are **strictly confidential**. These documents are the proprietary property of the client and are provided solely for the purposes of this project.

The recipient of these documents is expressly prohibited from sharing, copying, distributing, or disclosing any part of the documents to any third party without the prior **written approval** of the client. Unauthorized use, reproduction, or distribution of this information may result in legal or contractual consequences.

By accessing or using the documents listed in this register, the recipient acknowledges and agrees to abide by these confidentiality terms.

Last Update: 03 December 2024 Updated By: Gerhard Consultant: SVA - Architect												Refers to latest drawings only	
Drawing Number	Drawing Title	Rev	Date Received	Rev	Date Received	Rev	Date Received	Rev	Date Received	Rev	Date Received	pdf	dwg
A(02)1001	Site Plan	C	18-Nov-24			D	26-Feb-25					x	x
A(04)1000	Main Building External Finishes	B	18-Nov-24	C	11-Dec-24	D	26-Feb-25					x	x
A(04)1001	Gatehouse & Generator External Finishes	B	18-Nov-24	C	11-Dec-24	C	26-Feb-25					x	x
A(11)1001	Main Building - Ground Floor	B	05-Nov-24			C	26-Feb-25					x	x
A(11)1002	Main Building - Roof Plan	C	29-Nov-24			D	26-Feb-25					x	x
A(11)1003	Gatehouse - Ground Floor & Roof Plan	D	29-Nov-24			D	26-Feb-25					x	x
A(11)1004	Generator Building - Ground Floor & Roof Plan	B	05-Nov-24	C	11-Dec-24	C	26-Feb-25					x	x
A(12)1001	Sections - Main Building	B	05-Nov-24			B	26-Feb-25					x	x
A(12)1002	Sections - Main Building	B	05-Nov-24			C	26-Feb-25					x	x
A(12)1003	Sections - Gatehouse	C	05-Nov-24			C	26-Feb-25					x	x
A(12)1004	Sections - Generator Building	B	05-Nov-24			B	26-Feb-25					x	x
A(13)1001	Elevations - Main Building	A	05-Nov-24			B	26-Feb-25					x	x
A(13)1002	Elevations - Gatehouse	B	05-Nov-24			B	26-Feb-25					x	x
A(13)1003	Elevations - Generator Building	B	05-Nov-24			B	26-Feb-25					x	x
A(14)1001	Main Building Ceiling	C	29-Nov-24			D	26-Feb-25					x	x
A(14)1002	Gatehouse & Generator Ceiling	C	29-Nov-24			D	26-Feb-25					x	x
A(21)1000	Main Building - Strip Section Reference Plan	A	18-Nov-24			B	26-Feb-25					x	x
A(21)1001	Main Building - Strip Section	A	18-Nov-24			A	26-Feb-25					x	x
A(21)1002	Main Building - Strip Section	A	18-Nov-24			A	26-Feb-25					x	x
A(21)1003	Main Building - Strip Section	A	18-Nov-24			A	26-Feb-25					x	x
A(21)1004	Main Building - Strip Section					A	26-Feb-25					x	x
A(21)1005	Gatehouse Building Strip Sections	A	18-Nov-24			A	26-Feb-25					x	x
A(21)1006	Generator Building - Strip Sections	A	18-Nov-24			A	26-Feb-25					x	x
A(29)1000	Sundry Metal Reference	A	12-Nov-24			B	26-Feb-25					x	x
A(29)1001	Sundry Metal Reference	A	12-Nov-24			A	26-Feb-25					x	x
A(29)1002	Sundry Metal Cat Ladder & Bump Rails	A	12-Nov-24			B	26-Feb-25					x	x
A(29)1003	Sundry Metal Pergola Steel	B	25-Nov-24			B	26-Feb-25					x	x
A(30)1000	Main Building - Door Reference Plan	D	11-Dec-24			E	26-Feb-25					x	x
A(30)1000.1	Gatehouse - Door Reference Plan	D	11-Dec-24			D	26-Feb-25					x	x
A(30)1000.2	Generator Building - Door Reference Plan	D	11-Dec-24			D	26-Feb-25					x	x

Last Update: 03 December 2024 Updated By: Gerhard Consultant: SVA - Architect												Refers to latest drawings only	
Drawing Number	Drawing Title	Rev	Date Received	Rev	Date Received	Rev	Date Received	Rev	Date Received	Rev	Date Received	pdf	dwg
A(30)1001	Door Type D1	B	25-Nov-24	C	11-Dec-24	C	26-Feb-25					x	x
A(30)1002	Door Type D2	B	25-Nov-24			B	26-Feb-25					x	x
A(30)1003	Door Type D3	B	25-Nov-24			B	26-Feb-25					x	x
A(30)1004	Door Type D4	B	25-Nov-24			C	26-Feb-25					x	x
A(30)1005	Door Type D5					A	26-Feb-25					x	x
A(30)1006	Door Type D6	B	11-Dec-24			B	26-Feb-25					x	x
A(30)1007	Door Type D7	B	25-Nov-24			B	26-Feb-25					x	x
A(30)1008	Door Type D8	B	25-Nov-24			B	26-Feb-25					x	x
A(30)1009	Door Type D9	B	25-Nov-24	C	11-Dec-24	C	26-Feb-25					x	x
A(30)1010	Door Type D10	B	25-Nov-24			B	26-Feb-25					x	x
A(30)1011	Door Type D11	B	25-Nov-24			B	26-Feb-25					x	x
A(30)1012	Door Type D12	B	25-Nov-24			B	26-Feb-25					x	x
A(30)1013	Door Type D13	B	25-Nov-24			B	26-Feb-25					x	x
A(30)1014	Door Type RS1	B	25-Nov-24			B	26-Feb-25					x	x
A(30)1015	Door Type D14	B	25-Nov-24			B	26-Feb-25					x	x
A(30)1016	Door Type D15	B	25-Nov-24	C	11-Dec-24	C	26-Feb-25					x	x
A(30)1017	Door Type D16	B	25-Nov-24	D	11-Dec-24	D	26-Feb-25					x	x
A(30)1018	Door Type D17	B	25-Nov-24	C	11-Dec-24	C	26-Feb-25					x	x
A(30)1019	Door Type D18	B	25-Nov-24	C	11-Dec-24	C	26-Feb-25					x	x
A(30)1020	Door Type FD1	A	11-Dec-24			A	26-Feb-25					x	x
A(30)1021	Door Type D12	A	11-Dec-24			A	26-Feb-25					x	x
A(30)1022	Door Type D20	A	11-Dec-24			A	26-Feb-25					x	x
A(32)1000	Main Building - Shopfront Ref Plan	B	25-Nov-24			C	26-Feb-25					x	x
A(32)1001	Main Building - Shopfront Elevation	B	25-Nov-24			B	26-Feb-25					x	x
A(32)1002	Main Building - Shopfront Elevation	B	25-Nov-24			C	26-Feb-25					x	x
A(32)1003	Gate House - Shopfront Plan & Elevations	C	25-Nov-24			C	26-Feb-25					x	x
A(51)1000	Main Building Part 1 - Wall & Floor Finishes	C	25-Nov-24	D	11-Dec-24	E	26-Feb-25					x	x
A(51)1001	Main Building Part 2 - Wall & Floor Finishes	C	25-Nov-24			D	26-Feb-25					x	x
A(51)1002	Gate House - Wall & Floor Finishes	C	25-Nov-24			C	26-Feb-25					x	x
A(51)1003	Generator House - Wall & Floor Finishes	C	25-Nov-24			C	26-Feb-25					x	x
A(60)1000	Waterproofing Details Floors	A	18-Nov-24	B	11-Dec-24	B	26-Feb-25					x	x
A(60)1002	Waterproofing Details Roofs	A	18-Nov-24			A	26-Feb-25					x	x
A(70)1000	Balustrade Reference Plan	A	12-Nov-24			A	26-Feb-25					x	x
A(72)1000	Sanitaryware Reference Plan	A	18-Nov-24			A	26-Feb-25					x	x
A(72)1001	Sanitaryware Reference Plan	A	18-Nov-24			B	26-Feb-25					x	x

Last Update: 03 December 2024 Updated By: Gerhard Consultant: SVA - Architect												Refers to latest drawings only	
Drawing Number	Drawing Title	Rev	Date Received	Rev	Date Received	Rev	Date Received	Rev	Date Received	Rev	Date Received	pdf	dwg
A(72)1003	Main Building Sanware Showers	A	18-Nov-24			B	26-Feb-25					x	x
A(72)1004	Main Building Sanware Kitchen	A	18-Nov-24			B	26-Feb-25					x	x
A(72)1005	Main Building Sanware Ablutions	A	18-Nov-24			B	26-Feb-25					x	x
A(72)1006	Gatehouse Sanware Ablutions	A	18-Nov-24			B	26-Feb-25					x	x
A(72)1007	Gatehouse Sanware Kitchen	A	18-Nov-24			B	26-Feb-25					x	x
A(72)1008	Generator Sanware Kitchen	A	18-Nov-24			B	26-Feb-25					x	x
A(72)1009	Generator Sanware Ablutions	A	18-Nov-24			B	26-Feb-25					x	x
A(72)1010	Generator Sanware Shower	A	18-Nov-24			B	26-Feb-25					x	x
A(74)1000	Main Building Signage	A	11-Dec-24			A	26-Feb-25					x	x
A(74)1001	Gate House & Gen Building Signage	A	11-Dec-24			A	26-Feb-25					x	x
A76(1001)	Main Building - Joinery - Extent	B	25-Nov-24			B	26-Feb-25					x	x
A76(1002)	Main Building - Joinery - Details	B	25-Nov-24			B	26-Feb-25					x	x
A76(1003)	Main Building - Joinery - Surfaces	A	25-Nov-24			A	26-Feb-25					x	x
A76(1004)	Gatehouse - Joinery - Extent	B	25-Nov-24			B	26-Feb-25					x	x
A76(1005)	Generator - Joinery - Extent	B	25-Nov-24			B	26-Feb-25					x	x
SMFN-SVA-A-SP-01-101	Arch Specification	B	28-Nov-24			D	26-Feb-25					x	
A(70)1000	Sanware - Schedule					A	26-Feb-25					x	

Last Update: 12 June 2023 Updated By: Gerhard Liebenberg Consultant: EKCON												Refers to latest drawings only	
Drawing Number	Drawing Title	Rev	Date Received	Rev	Date Received	Rev	Date Received	Rev	Date Received	Rev	Date Received	pdf	dwg
P3589-C-ST-001	General Site Layout - Access Road							B	12-Feb-25				
P3589-C-ST-002	General Site Layout - Internal Road					A	12-Dec-24	B	12-Feb-25				
P3589-C-ST-003	Road Signage Layout							A	12-Feb-25				
P3589-C-LA-001	Road Horizontal Setting Out							A	12-Feb-25			x	x
P3589-C-LA-002	Horizontal Vehicle Swept Path Analysis Sheet 1 - 4					A	12-Dec-24	A	12-Feb-25			x	x
P3589-C-LA-003	Parking Surface Layout - Gate House	A	11-Nov-24	B	27-Nov-24	C	12-Dec-24	D	12-Feb-25			x	x
P3589-C-LA-004	Parking Surface Layout - Main Building	A	11-Nov-24	B	27-Nov-24	C	12-Dec-24	C	12-Feb-25			x	x
P3589-C-LA-003	Parking Surface Layout - Generator Building	A	11-Nov-24			B	12-Dec-24	C	12-Feb-25			x	x
												x	x
P3589-C-LL-001	Road Plan & Longitudinal Sections (Sheet 1 of 3) Access Road	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-LL-001	Road Plan & Longitudinal Sections (Sheet 2 of 3) Access Road	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-LL-001	Road Plan & Longitudinal Sections (Sheet 3 of 3) Access Road	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-LL-002	Road Plan & Longitudinal Sections (Sheet 1 of 1) Road A	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-LL-003	Road Plan & Longitudinal Sections (Sheet 1 of 1) Road B	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-LL-004	Road Plan & Longitudinal Sections (Sheet 1 of 1) Road C	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-LL-005	Road Plan & Longitudinal Sections (Sheet 1 of 1) Road D	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-LL-006	Road Plan & Longitudinal Sections (Sheet 1 of 1) Road E	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-LL-007	Retaining Wall & Plan Profiles - Main Building (Sheet 1 of 1)	A	11-Nov-24			B	12-Dec-24	C	12-Feb-25			x	x
P3589-C-BE-001	Bulk Earthworks & Profiles - Gate House	A	11-Nov-24					B	12-Feb-25			x	x
P3589-C-BE-002	Bulk Earthworks & Profiles - MB	A	11-Nov-24					B	12-Feb-25			x	x
P3589-C-BE-003	Bulk Earthworks & Profiles - Gen Building	A	11-Nov-24					B	12-Feb-25			x	x
P3589-C-BE-004	Bulk Earthworks & Profiles - Legs Antenna	A	11-Nov-24					B	12-Feb-25			x	x
P3589-C-BE-005	Bulk Earthworks & Profiles - Legs Comm Antenna	A	11-Nov-24					B	12-Feb-25			x	x
P3589-C-BE-006	Bulk Earthworks & Profiles - DSN Antenna	A	11-Nov-24					B	12-Feb-25			x	x
P3589-C-BE-007	Bulk Earthworks & Profiles - SANSA Antennas	A	11-Nov-24					B	12-Feb-25			x	x
P3589-C-BE-008	Bulk Earthworks & Profiles - Main Building Embankment	A	11-Nov-24					C	12-Feb-25				

Last Update: 12 June 2023 Updated By: Gerhard Liebenberg Consultant: EKCON												Refers to latest drawings only	
Drawing Number	Drawing Title	Rev	Date Received	Rev	Date Received	Rev	Date Received	Rev	Date Received	Rev	Date Received	pdf	dwg
P3589-C-RD-001	Road Cross Section - Access Road (Sheet 1 of 5)	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-RD-001	Road Cross Section - Access Road (Sheet 2 of 5)	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-RD-001	Road Cross Section - Access Road (Sheet 3 of 5)	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-RD-001	Road Cross Section - Access Road (Sheet 4 of 5)	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-RD-001	Road Cross Section - Access Road (Sheet 5 of 5)	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-RD-002	Road Cross Section - Road A (Sheet 1 of 2)	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-RD-002	Road Cross Section - Road A (Sheet 2 of 2)	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-RD-003	Road Cross Section - Road B (Sheet 1 of 1)	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-RD-004	Road Cross Section - Road C (Sheet 1 of 1)	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-RD-005	Road Cross Section - Road D (Sheet 1 of 1)	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-RD-006	Road Cross Section - Road E (Sheet 1 of 1)	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-TD-001	Typical Road Cross Section	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-TD-002	General Details (Road, Sewer, Water, Sleeves, Stormwater) (Sheet 1 of 4)	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-TD-003	General Details (Road, Sewer, Water, Sleeves, Stormwater) (Sheet 2 of 4)	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-TD-004	General Details (Road, Sewer, Water, Sleeves, Stormwater) (Sheet 3 of 4)	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-TD-005	General Details (Road, Sewer, Water, Sleeves, Stormwater) (Sheet 4 of 4)	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-W-001	Water Plan & Longitudial Sections					A	12-Dec-24	B	12-Feb-25			x	x
P3589-C-FS-001	Foul Sewer Plan & Longitudial Sections - Gate House (Sheet 1 of 1)	A	11-Nov-24			B	12-Dec-24	B	12-Feb-25			x	x
P3589-C-FS-002	Foul Sewer Plan & Longitudial Sections - Main Building (Sheet 1 of 1)					A	12-Dec-24	B	12-Feb-25			x	x
P3589-C-FS-003	Foul Sewer Plan & Longitudial Sections					A	12-Dec-24	B	12-Feb-25			x	x
P3589-C-SW-001	Stormwater Layout - Cross Sections							A	12-Feb-25				
P3589-C-SW-002	Stormwater Layout - Main Building	A	11-Nov-24					C	12-Feb-25			x	x
P3589-C-SL-001	General Site Layout Electrical Services Sleeves and Details (Sheet 1 of 1)					A	12-Dec-24	B	12-Feb-25			x	x

Last Update: 12 June 2023 Updated By: Gerhard Liebenberg Consultant: CAA & ESS												Refers to latest drawings only	
Drawing Number	Drawing Title	Rev	Date Received	Rev	Date Received	Rev	Date Received	Rev	Date Received	Rev	Date Received	pdf	dwg
SMFN-CAI-EE-DR-001_01	Earthing & Lightning Protection Layout	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-002_00	Site Plan Layout	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-002_01	Generator Building Equipment & Diesel Reticulation Layout	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-002_03	Main Building Power Layout	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-002_04	Main Building Cable Trays & Trunking Layout	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-002_05	Generator Buildng Cable Tray Layout	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-003_01	Main Building Lighting Layout	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-008_01	Gatehouse Electrical Layouts	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-008_02	Generator Building Electrical Layouts	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-008_03	NASA Electrical Layouts	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-008_04	Typical Trench Details	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-008_05	NASA Antenna Electrical Layout	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-008_06	Typical Access Control Details			TD1	11-Feb-25								
SMFN-CAI-EE-DR-005_00	Reticulation Single Line Diagram	TD	11-Dec-24	TD2	27-Feb-25							x	
SMFN-CAI-EE-DR-005_01	MLV Single Line Diagram	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-005_02	SMD1 Single Line Diagram	TD	11-Dec-24	TD2	27-Feb-25							x	
SMFN-CAI-EE-DR-005_03	SD1 Single Line Diagram (Operations Building Local DB)	TD	11-Dec-24	TD2	27-Feb-25	TD3	14-Mar-25					x	
SMFN-CAI-EE-DR-005_04	SD2 Single Line Diagram	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-005_05	DSANSA Single Line Diagram	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-005_07	DUPS-A Single Line Diagram	TD	11-Dec-24	TD1	11-Feb-25	TD2	14-Mar-25					x	
SMFN-CAI-EE-DR-005_08	DUPS-B Single Line Diagram	TD	11-Dec-24	TD1	11-Feb-25	TD2	14-Mar-25					x	
SMFN-CAI-EE-DR-005_09	DGH Single Line Diagram	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-005_10	Kiosk 1 Single Line Diagram	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-005_11	Kiosk 2 Single Line Diagram	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-005_12	Kiosk 3 Single Line Diagram	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-005_13	Kiosk 4 Single Line Diagram	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-005_14	DSER Single Line Diagram	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-005_15	DNER Single Line Diagram	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-005_16	NASA MDP-A Single Line Diagram	TD	11-Dec-24	TD1	11-Feb-25	TD2	14-Mar-25					x	
SMFN-CAI-EE-DR-005_17	NASA MDP-B Single Line Diagram	TD	11-Dec-24	TD1	11-Feb-25	TD2	14-Mar-25					x	
SMFN-CAI-EE-DR-005_18	ATS 1 Single Line Diagram	TD	11-Dec-24	TD1	11-Feb-25							x	
SMFN-CAI-EE-DR-005_19	ATS 2 Single Line Diagram	TD	11-Dec-24	TD1	11-Feb-25							x	

[illegible]

File Name: SANSA - Drawing Register Rev 02.xlsx
Print Date: 2025/03/17
All rights reserved.

[illegible]

[illegible]