

JOE GQABI DISTRICT MUNICIPALITY



CONTRACT NO.: JGDM2026/27-002

NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

TENDER DOCUMENT

VOLUME 1

NAME OF TENDERER:	
TENDERER CSD NUMBER:	
TENDERER CIDB CRS NUMBER:	
TENDERER TCS PIN:	
TENDERER TAX REFERENCE NUMBER:	
TENDER AMOUNT: Including VAT, Escalation and Contingencies)	
CLOSING DATE:	14 September 2026
CLOSING TIME:	12:00 (Noon)

PREPARED BY:

JOE GQABI DISTRICT MUNICIPALITY
CNR COLE AND GRAHAM STREETS
EKHEPHINI, 9786
Tel: 045 979 3000

NOTICE TO TENDERERS

VERY IMPORTANT NOTICE ON RESPONSIVENESS AND DISQUALIFICATIONS

A tender that does not comply with the peremptory requirements set out below will not be regarded as an Acceptable Tender and will be rejected.

“Acceptable Tender” means any tender that, in all respects, complies with the conditions of tender and specifications set out in the tender documents, including the requirements of the Preferential Procurement Policy Framework Act, 2000 (Act 5 of 2000), as amended, the Preferential Procurement Regulations, 2022, and all other applicable procurement legislation and regulations.

1. If the Tenderer or any member of a Joint Venture does not have a valid and compliant SARS Tax Compliance Status (TCS) at the closing date and time of the tender, the Tenderer will be disqualified.
2. If any pages have been removed from the original tender document and not submitted as part of the tender, or where a copy or altered version of the tender document has been submitted, the tender will not be considered.
3. Failure to complete the Bill of Quantities in full as required, i.e. the submission of lump sum amounts only, where detailed pricing is required, will result in disqualification.
4. Scratching out, writing over or painting out rates, without initialling next to the amended rates or information, affecting the evaluation of the tender, will result in disqualification.
5. The use of correction fluid (i.e. tippex/correctional fluid) or any erasable ink, e.g. pencil, will result in disqualification.
6. Non-attendance of the Compulsory Clarification Meeting will result in disqualification.
7. If the tender has not been properly signed by a person having the authority to do so, the Tenderer will be disqualified. (Refer to Declaration)
8. Tenderers who fail to complete the Data Sheets contained in Section C3.6 in full will be disqualified.
9. Where particulars required in respect of the tender have not been completed, the tender will be regarded as non-responsive. Failure to complete information required for the allocation of preference points or specific goals will not result in disqualification unless such information or supporting documentation is specifically identified in the Tender Data as a mandatory returnable document. In the absence of such information, no preference points will be awarded.
10. Tenderers shall note that only information provided in the spaces designated for that purpose within the tender document will be considered during evaluation. Where insufficient space is available, additional information may be attached, provided that clear cross-references are included indicating the relevant section and page number. Information submitted elsewhere will not be considered. The inclusion of unsolicited information is discouraged and may delay the evaluation process.
11. Any attempt by the Tenderer to influence the evaluation process or the award of the contract will result in immediate disqualification.
12. A tender submitted in the incorrect tender box or received after the stipulated closing date and time will not be considered.
13. Failure to submit the documentation required in respect of employment equity or any other statutory returnable documents specifically identified as mandatory in the Tender Data will result in disqualification.
14. If any municipal rates and taxes or municipal service charges owed by the Tenderer or any of its directors / members to the municipality or municipal entity, or to any other municipality or municipal entity, are in arrears for more than three months, the Tenderer will be disqualified. Copies of all latest relevant municipal accounts of the tendering entity, or in the case of Joint Ventures each entity constituting the Joint Venture, must be attached to this tender.
15. The Tenderer will be disqualified if, during the preceding five years, it has failed to perform satisfactorily on a contract with the municipality, municipal entity or any other organ of state, and written notice of such unsatisfactory performance was given to the Tenderer.
16. Irrespective of the procurement process followed, the Tenderer will be disqualified and no award may be made to a person:
 - a) who is in the service of the state;
 - b) if that person is not a natural person, of which any director, manager, principal shareholder or stakeholder is a person in the service of the state; or
 - c) who is an advisor, consultant or agent contracted with the municipality in respect of a contract that would give rise to a conflict of interest.

17. If the Tenderer is not registered with the CIDB in the contractor grading designation specified in the tender data, or higher, at the closing date of the tender, the Tenderer will be disqualified.
18. Tender offers will be rejected if the Tenderer or any of its directors is listed on the Register of Tender Defaulters, in terms of the Prevention and Combating of Corrupt Activities Act, 2004 (Act No. 12 of 2004), as a person prohibited from doing business with the public sector.
19. Tender offers will be rejected if the Tenderer has abused the Joe Gqabi District Municipality (JGDM) Supply Chain Management System or has committed any improper conduct in relation thereto.
20. Failure to submit financial statements where required in terms of the Tender Data or Pricing Schedule will result in disqualification.
21. Failure to fully complete and sign all returnable schedules applicable to this tender will result in disqualification.

SUMMARY FOR TENDER OPENING PURPOSES

NAME OF TENDERING ENTITY:
.....

PHYSICAL ADDRESS:	POSTAL ADDRESS:

TELEPHONE NUMBER:

FAX NUMBER:

E-MAIL ADDRESS:

TENDER SUM: R.....
(Amount brought forward from the Form of Offer and Acceptance)*

TENDER CLOSING DATE:

TENDER CLOSING TIME:

Signed by the authorised representative of the Tendering Entity:

Date:.....

Note: Should any discrepancy arise between the amount stated above and that stated in the Form of Offer and Acceptance, the amount stated in the Form of Offer and Acceptance shall take precedence.

GENERAL TENDER INFORMATION

TENDER ADVERTISED	:	14 August 2026
CIDB CONTRACTOR GRADING	:	8 CE or higher
COMPULSORY CLARIFICATION MEETING	:	11:00, 24 August 2026
VENUE FOR CLARIFICATION MEETING	:	Nqanqarhu Town Hall. No individual will be permitted to represent more than one prospective Tenderer, and a roll-call register will be maintained.
CLOSING DATE	:	14 September 2026
CLOSING TIME	:	12:00 (Noon)
CLOSING VENUE	:	Tender Boxes provided at the Joe Gqabi District Municipality Offices, Corner of Cole and Graham Streets, Ekhephini (Barkly East).
INSTRUCTIONS	:	Tender documents will be available at the Compulsory Clarification Meeting upon payment of a non-refundable tender fee of R1,500.00 (One Thousand Five Hundred Rand Only) per document. Payment may be made by cash, EFT, or direct deposit into the Municipality's bank account (ABSA Account No. 2380000019). The Tenderer's company name and tender number shall be used as the payment reference. Alternatively, payment may be made at the Cashier's Office situated on the Ground Floor of the Municipal Offices, Corner of Cole and Graham Streets, Ekhephini, between 08:00 and 15:00, prior to collection of the tender documents. Completed tenders, including the Form of Offer, all required returnable schedules and supporting documentation, shall be submitted in hard copy in a sealed envelope clearly marked with the Tenderer's name, tender number and tender description, and deposited in the designated tender box. In addition, the Tenderer shall submit one electronic copy of the complete tender submission on a USB flash drive enclosed within the sealed tender envelope. The electronic copy is required for record and administrative purposes only. In the event of any discrepancy between the hard copy and electronic copy, the signed hard copy tender submission shall take precedence. The electronic copy shall be provided in PDF format and shall contain a complete scanned copy of the signed hard copy tender submission. The tender offer shall remain valid for acceptance by the Employer for a period of 120 days from the closing date for the submission of tenders. Late tenders will not be accepted.

DATE OF THE OPENING OF TENDERS : 14 September 2026

TIME OF THE OPENING OF TENDERS : 12:00

VENUE FOR THE OPENING OF TENDERS : Supply Chain Management Unit,
Corner of Cole and Graham Streets,
Ekhephini (Barkly East).

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Part T1: Tendering Procedures

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T1.1 TENDER NOTICE AND INVITATION TO TENDER

PROJECT NAME: Nqanqarhu Water Treatment and Distribution Upgrade: Water Treatment Works

TENDER NO.: JGDM2026/27-002

Tenders are invited by the Joe Gqabi District Municipality for the construction of a new Water Treatment Works forming part of the Nqanqarhu Water Treatment and Distribution Upgrade in Nqanqarhu (Maclear), Elundini Local Municipality, Eastern Cape.

The project Scope of Works includes the following:

1. Construction of a new Water Treatment Works (WTW) comprising the following:
 - a. Inlet/Dosing building
 - b. Flocculation channel
 - c. Sedimentation tank
 - d. Filter building
 - e. 1Ml Clear water reservoir
 - f. Pump station building incorporating a standby generator room and chlorination rooms
 - g. Sludge lagoons with offtake chamber and supernatant return pump station
 - h. Office/Laboratory
 - i. Gate house
 - j. Operator and Supervisor living quarters
 - k. Internal potable water reticulation and pipework
 - l. Bulk earthworks
 - m. Internal roadworks – concrete surfacing
 - n. Storm water drainage
 - o. Gabions and retaining walls
 - p. Fencing.
2. Construction of a dam outlet chamber in the Aucamp Dam with a 370 m x 355 mm Ø oPVC gravity main connecting to the WTW.
3. Construction of a new 1700 m x 315 mm Ø oPVC rising main from the new WTW.
4. Construction of one 3 Ml and one 500 kl in-situ cast concrete reservoirs.
5. Remedial works on an existing 315 mm Ø uPVC gravity main from the Maclear Dam and the connection thereof to the new WTW.
6. Construction of a 150 m long concrete access road.

Only Tenderers who are registered with the CIDB in a contractor grading designation of 8 CE or higher are eligible to submit tenders.

Requests for contract documents in electronic format

- a) Tender documents will be made available electronically via the eTender Portal and the Municipality's website (<https://www.jdgm.gov.za>).
- b) Tenderers shall be responsible for printing the tender documents and submitting a complete hard copy tender in accordance with the requirements of this tender.
- c) Tenderers shall also submit one electronic copy of the completed tender submission on a USB flash drive with the hard copy submission. The electronic copy shall be provided in PDF format and shall contain a complete scanned copy of the signed hard copy tender submission. The electronic copy is required for record and administrative purposes only.
- d) The Employer shall not accept tenders submitted electronically by e-mail, file transfer service or any other electronic platform. The signed hard copy tender submission deposited in the designated tender box shall constitute the official tender submission.
- e) In the event of any discrepancy between the hard copy and electronic copy of the tender submission, the signed hard copy shall prevail.
- f) The Employer accepts no responsibility or liability arising from reliance on electronic versions of the tender documents obtained from sources other than the official eTender Portal or the Municipality's website.

- g) Any unauthorised alteration to the tender document, as contemplated in T1.2 Tender Data, item C.2.11, shall render the tender non-responsive.
- h) Pages must be printed on coloured paper according to the following:

Colour coding component documents

The Standard for Uniformity in Construction Procurement has no requirement for colour coding component documents. Any colour identification of component documents must be undertaken in accordance with the provisions of SANS 10403.

SANS 10403 suggests that for ease of identification of the various section, each section may be printed on different coloured paper or separated by coloured divider sheets. Where this is done, the colours for each subcomponent should be as indicated below.

Recommended Colour Coding of Tender Documents		
Colour	Number	Heading
White	T1.1	Tender Notice and Invitation to Tender
Pink	T1.2	Tender Data
Yellow	T2.1	List of Returnable Documents
Yellow	T2.2	Returnable Schedules
Yellow	C1.1	Form of Offer and Acceptance
Yellow	C1.2	Contract Data
White	C1.3	Forms of Securities
White	C1.4	Forms for Adjudicators Appointment
Yellow	C2.1	Pricing Instructions
Yellow	C2.2	Activity Schedule / Bill of Quantities
Blue	C3	Scope of Work
Green	C4	Site Information

The Tenderer is deemed to have read, understood and accepted all of the above conditions.

A Compulsory Clarification Meeting will be held on Monday 24 August at 11:00 where the Employer's representatives shall take the prospective Tenderers to the site of the works. No individual will be permitted to represent more than one prospective Tenderer, and a roll-call register will be maintained.

Tenders in sealed envelopes endorsed "**TENDER NO: JGDM2026/27-002: Nqanqarhu Water Treatment and Distribution Upgrade: Water Treatment Works**" must be placed in the formal Tender Box situated outside the Main Building – Joe Gqabi District Municipality, Corner of Cole and Graham Streets, Ekhephini before closing time of **12:00 (noon) on Monday 14 September 2026**, thereafter the tenders received will be opened in public. The tender offer shall remain valid for acceptance by the Employer for a period of 120 days from the closing date for submission of tenders.

It must be expressly understood that the Municipality disclaims any responsibility for seeing that Tenders sent by post or delivered in any other way are lodged in the Tender Box. It is accordingly preferable for the Tenderer to personally ensure that the Tender is placed in the Tender Box by the Tenderer's own staff, or where appropriate, a courier appointed by the Tenderer.

EVALUATION CRITERIA

1. Tenders will first be evaluated on functionality. Tenderers scoring less than 65 points out of a possible 100 points will be regarded as non-responsive and will not be evaluated further for price and specific goals. The functionality criteria and associated weightings used to determine whether a Tenderer qualifies for further evaluation in respect of price and specific goals are set out in the Functionality Assessment under section T1.2 Tender Data.

2. The tenders will be evaluated in accordance with the Preferential Procurement Policy Framework Act, 2000 (Act 5 of 2000), the Preferential Procurement Regulations, 2022, and the Joe Gqabi District Municipality Supply Chain Management Policy (2024/25). The 90/10 preference point system shall apply.

Price and Specific Goals

PRICE 90
SPECIFIC GOALS 10

TENDERERS SHALL TAKE NOTE OF THE FOLLOWING TENDER CONDITIONS:

1. The Joe Gqabi District Municipality Supply Chain Management Policy (2024/25) will apply. Copies available on request. The contractor will need to sub-contract, where possible, work to achieve JGDM's Contractor Development Program.
2. Tenderers shall comply with all responsiveness and eligibility requirements contained in the Notice to Tenderers and Tender Data.
3. Tenderers must attend the Compulsory Clarification Meeting.
4. Tenderers must be registered with the CIDB in the required class of construction works and grading designation.
5. Tenderers must be registered on the National Treasury Central Supplier Database (CSD).
6. Tenderers and their directors may not be in the service of the state.
7. Municipal rates, taxes and service charges may not be in arrears for more than three months.
8. Joint Ventures shall submit signed Joint Venture agreements and all required returnable documents for each constituent member.
9. The 90/10 preference point system shall apply.
10. Tenders submitted late, unsigned, incomplete, altered, or failing to comply with the responsiveness criteria contained in the tender documents may be rejected.
11. The Joe Gqabi District Municipality reserves the right not to accept the lowest or any tender.

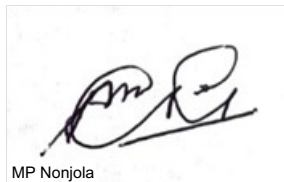
The Municipality reserves the right to extend the Tender Period and/or amend the Conditions of Tender during the Tender Period at its discretion.

Technical enquiries should be directed to Mr Lumanyano Wana (PMU Manager) by e-mail to: lumanyano@jgdm.gov.za during normal office hours (08:00 to 16:00, Monday to Friday).

SCM-related enquiries should be directed to Mr Thomas Maseko (SCM) at Joe Gqabi District Municipality by email to masekot@jgdm.gov.za during normal office hours (08:00 to 16:00, Monday to Friday).

Issued by

Mr. MP Nonjola
Municipal Manager
Joe Gqabi District Municipality



MP Nonjola

Municipal Manager: Joe Gqabi District Municipality

Digitally Signed: 13.08.2026 Reference: 33770 File plan: 8/1
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PART A INVITATION TO BID

YOU ARE HEREBY INVITED TO BID FOR REQUIREMENTS OF THE (NAME OF MUNICIPALITY/ MUNICIPAL ENTITY)					
BID NUMBER:	JGDM2026/27-002	CLOSING DATE:	14 September 2026	CLOSING TIME:	12:00
DESCRIPTION	NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS				
THE SUCCESSFUL BIDDER WILL BE REQUIRED TO FILL IN AND SIGN A WRITTEN CONTRACT FORM (MBD7).					
BID RESPONSE DOCUMENTS MAY BE DEPOSITED IN THE BID BOX SITUATED AT (STREET ADDRESS)					
JOE GQABI DISTRICT MUNICIPALITY OFFICES					
CORNER OF COLE AND GRAHAM STREETS					
EKHEPHINI					
9786					
SUPPLIER INFORMATION					
NAME OF BIDDER					
POSTAL ADDRESS					
STREET ADDRESS					
TELEPHONE NUMBER	CODE		NUMBER		
CELLPHONE NUMBER					
FACSIMILE NUMBER	CODE		NUMBER		
E-MAIL ADDRESS					
VAT REGISTRATION NUMBER					
TAX COMPLIANCE STATUS	TCS PIN:		OR	CSD No:	
ARE YOU THE ACCREDITED REPRESENTATIVE IN SOUTH AFRICA FOR THE GOODS /SERVICES OFFERED?	☐ Yes ☐ No [IF YES ENCLOSE PROOF]		ARE YOU A FOREIGN BASED SUPPLIER FOR THE GOODS /SERVICES OFFERED?		☐ Yes ☐ No [IF YES, ANSWER PART B:3]
TOTAL NUMBER OF ITEMS OFFERED					
TOTAL BID PRICE	R				
SIGNATURE OF BIDDER			DATE		
CAPACITY UNDER WHICH THIS BID IS SIGNED					
BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO:			TECHNICAL INFORMATION MAY BE DIRECTED TO:		
CONTACT PERSON	Thomas Maseko		CONTACT PERSON	Lumanyano Wana	
TELEPHONE NUMBER	045 979 3160		TELEPHONE NUMBER	045 979 3061	
E-MAIL ADDRESS	masekot@jgdm.gov.za		E-MAIL ADDRESS	lumanyano@jgdm.gov.za	

PART B TERMS AND CONDITIONS FOR BIDDING

1. BID SUBMISSION:										
1.1. BIDS MUST BE DELIVERED BY THE STIPULATED TIME TO THE CORRECT ADDRESS. LATE BIDS WILL NOT BE ACCEPTED FOR CONSIDERATION. 1.2. ALL BIDS MUST BE SUBMITTED ON THE OFFICIAL FORMS PROVIDED (NOT TO BE RE-TYPED) OR ONLINE 1.3. THIS BID IS SUBJECT TO THE PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT AND THE PREFERENTIAL PROCUREMENT REGULATIONS THE GENERAL CONDITIONS OF CONTRACT (GCC) AND, IF APPLICABLE, ANY OTHER SPECIAL CONDITIONS OF CONTRACT.										
2. TAX COMPLIANCE REQUIREMENTS										
2.1 BIDDERS MUST ENSURE COMPLIANCE WITH THEIR TAX OBLIGATIONS. 2.2 BIDDERS ARE REQUIRED TO SUBMIT THEIR UNIQUE PERSONAL IDENTIFICATION NUMBER (PIN) ISSUED BY SARS TO ENABLE THE ORGAN OF STATE TO VIEW THE TAXPAYER'S PROFILE AND TAX STATUS. 2.3 APPLICATION FOR THE TAX COMPLIANCE STATUS (TCS) CERTIFICATE OR PIN MAY ALSO BE MADE VIA E-FILING. IN ORDER TO USE THIS PROVISION, TAXPAYERS WILL NEED TO REGISTER WITH SARS AS E-FILERS THROUGH THE WEBSITE WWW.SARS.GOV.ZA. 2.4 FOREIGN SUPPLIERS MUST COMPLETE THE PRE-AWARD QUESTIONNAIRE IN PART B:3. 2.5 BIDDERS MAY ALSO SUBMIT A PRINTED TCS CERTIFICATE TOGETHER WITH THE BID. 2.6 IN BIDS WHERE CONSORTIA / JOINT VENTURES / SUB-CONTRACTORS ARE INVOLVED, EACH PARTY MUST SUBMIT A SEPARATE TCS CERTIFICATE / PIN / CSD NUMBER. 2.7 WHERE NO TCS IS AVAILABLE BUT THE BIDDER IS REGISTERED ON THE CENTRAL SUPPLIER DATABASE (CSD), A CSD NUMBER MUST BE PROVIDED.										
3. QUESTIONNAIRE TO BIDDING FOREIGN SUPPLIERS										
<table style="width: 100%; border: none;"> <tr> <td style="width: 70%;">3.1. IS THE ENTITY A RESIDENT OF THE REPUBLIC OF SOUTH AFRICA (RSA)?</td> <td style="width: 30%; text-align: right;">☐ YES ☐ NO</td> </tr> <tr> <td>3.2. DOES THE ENTITY HAVE A BRANCH IN THE RSA?</td> <td style="text-align: right;">☐ YES ☐ NO</td> </tr> <tr> <td>3.3. DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA?</td> <td style="text-align: right;">☐ YES ☐ NO</td> </tr> <tr> <td>3.4. DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA?</td> <td style="text-align: right;">☐ YES ☐ NO</td> </tr> <tr> <td>3.5. IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION?</td> <td style="text-align: right;">☐ YES ☐ NO</td> </tr> </table> IF THE ANSWER IS "NO" TO ALL OF THE ABOVE, THEN IT IS NOT A REQUIREMENT TO REGISTER FOR A TAX COMPLIANCE STATUS SYSTEM PIN CODE FROM THE SOUTH AFRICAN REVENUE SERVICE (SARS) AND IF NOT REGISTER AS PER 2.3 ABOVE.	3.1. IS THE ENTITY A RESIDENT OF THE REPUBLIC OF SOUTH AFRICA (RSA)?	☐ YES ☐ NO	3.2. DOES THE ENTITY HAVE A BRANCH IN THE RSA?	☐ YES ☐ NO	3.3. DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA?	☐ YES ☐ NO	3.4. DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA?	☐ YES ☐ NO	3.5. IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION?	☐ YES ☐ NO
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3.4. DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA?	☐ YES ☐ NO									
3.5. IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION?	☐ YES ☐ NO									

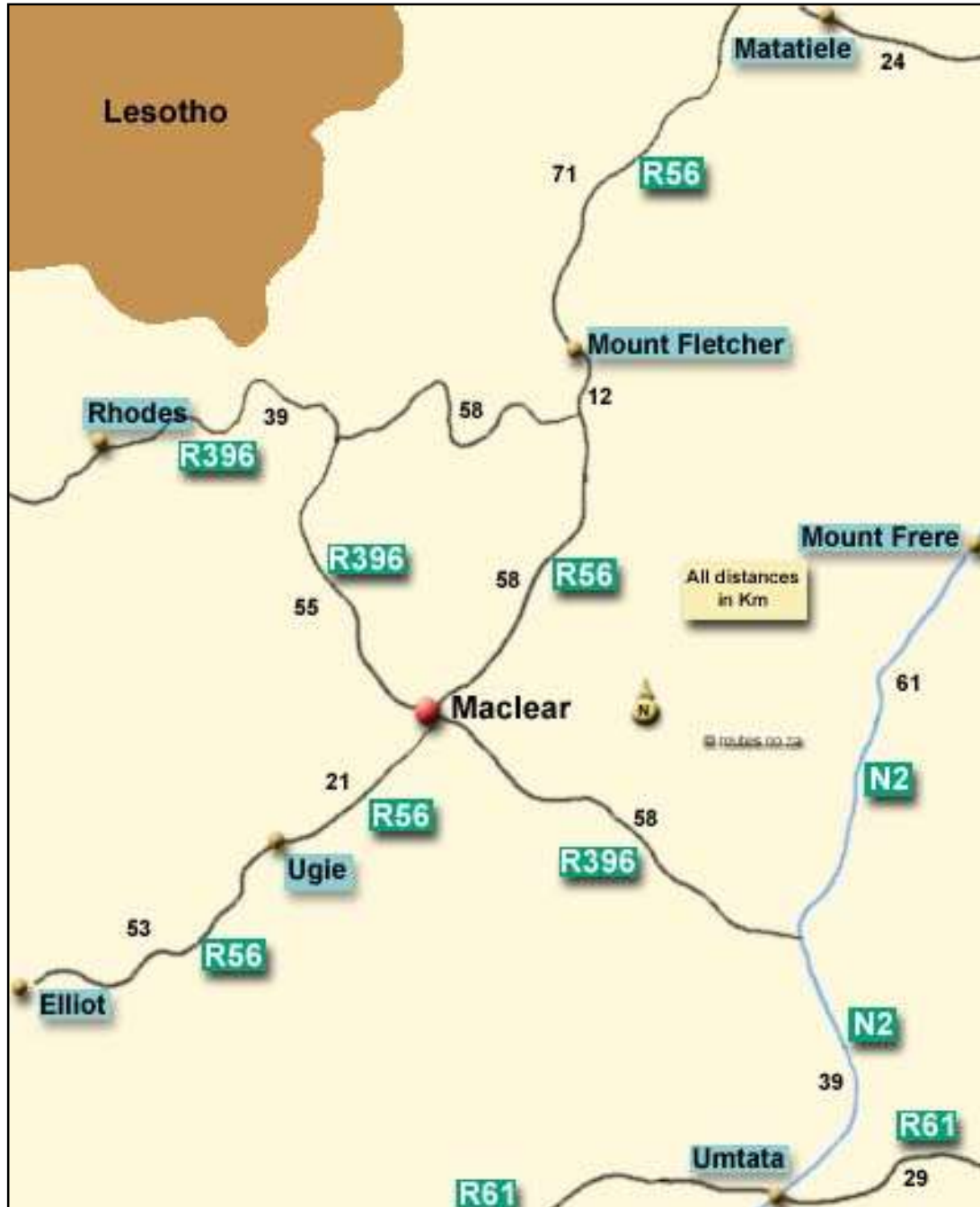
**NB: FAILURE TO PROVIDE ANY OF THE ABOVE PARTICULARS MAY RENDER THE BID INVALID.
NO BIDS WILL BE CONSIDERED FROM PERSONS IN THE SERVICE OF THE STATE.**

SIGNATURE OF BIDDER:

CAPACITY UNDER WHICH THIS BID IS SIGNED:

DATE:

T1.1.1 LOCALITY PLAN



T1.2 Tender Data

Tender data is covered in three sections. T1.2.1 refers to the Standard Conditions of Tender, whilst T1.2.2 lists the Variations to the Standard Conditions of Tender and T1.2.3 covers the Additional Conditions of Tender.

T1.2.1 Standard Conditions of Tender as Amended

The conditions of tender are the Standard Conditions of Tender as contained in Annexure C of the CIDB Standard for Uniformity in Engineering and Construction Works Contracts (August 2019) as published in Government Gazette No 42622, Board Notice 423 of 2019 of 8 August 2019 (available at www.cidb.org.za). The Standard Conditions of Tender make several references to the Tender Data for details that apply specifically to this tender. The Tender Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and the Standard Conditions of Tender.

C.1 General

C.1.1 Actions

C.1.1.1 *The Employer and each Tenderer submitting a tender offer shall comply with these conditions of tender. In their dealings with each other, they shall discharge their duties and obligations as set out in C.2 and C.3, timeously and with integrity, and behave equitably, honestly and transparently, comply with all legal obligations and not engage in anticompetitive practices.*

C.1.1.2 *The Employer and the Tenderer and all their agents and employees involved in the tender process shall avoid conflicts of interest and where a conflict of interest is perceived or known, declare any such conflict of interest, indicating the nature of such conflict. Tenderers shall declare any potential conflict of interest in their tender submissions. Employees, agents and advisors of the Employer shall declare any conflict of interest to whoever is responsible for overseeing the procurement process at the start of any deliberations relating to the procurement process or as soon as they become aware of such conflict, and abstain from any decisions where such conflict exists or recuse themselves from the procurement process, as appropriate.*

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

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

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

C.1.2 Tender Documents

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

C.1.3 Interpretation

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

C.1.3.2 *These conditions of tender, the tender data and tender schedules which are only required for tender evaluation purposes, shall not form part of any contract arising from the invitation to tender.*

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

- a) **conflict of interest** means any situation in which:
 - i) someone in a position of trust has competing professional or personal interests which make it difficult to fulfill his or her duties impartially;
 - ii) an individual or organisation is in a position to exploit a professional or official capacity in some way for their personal or corporate benefit; or
 - iii) incompatibility or contradictory interests exist between an employee and the organisation which employs that employee.
- b) **comparative offer** means the price after the factors of a non-firm price and all unconditional discounts it can be utilised to have been taken into consideration;
- c) **corrupt practice** means the offering, giving, receiving or soliciting of anything of value to influence the action of the Employer or his staff or agents in the tender process;
- d) **fraudulent practice** means the misrepresentation of the facts in order to influence the tender process or the award of a contract arising from a tender offer to the detriment of the Employer, including collusive practices intended to establish prices at artificial levels;

C.1.4 Communication and Employer's Agent

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

C.1.5 Cancellation and Re-Invitation of Tenders

C.1.5.1 An employer may, prior to the award of the tender, cancel a tender if-

- a) due to changed circumstances, there is no longer a need for the engineering and construction works specified in the invitation;
- b) funds are no longer available to cover the total envisaged expenditure;
- c) no acceptable tenders are received; or
- d) there is a material irregularity in the tender process.

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

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

C.1.6 Procurement Procedures

C.1.6.1 General

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

C.1.6.2 Competitive negotiation procedure

C.1.6.2.1 Where the tender data require that the competitive negotiation procedure is to be followed, Tenderers shall submit tender offers in response to the proposed contract in the first round of submissions. Notwithstanding the requirements of C.3.4, the Employer shall announce only the names of the Tenderers who make a submission. The requirements of C.8 relating to the material deviations or qualifications which affect the competitive position of Tenderers shall not apply.

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

Notwithstanding the provisions of C.2.17, the Employer may request that tenders be clarified, specified and fine-tuned in order to improve a Tenderer's competitive position provided that such clarification,

specification, fine-tuning or additional information does not alter any fundamental aspects of the offers or impose substantial new requirements which restrict or distort competition or have a discriminatory effect.

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

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

C.1.6.3 ***Proposal procedure using the two stage-system***

C.1.6.3.1 ***Option 1***

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

C.1.6.3.2 ***Option 2***

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

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

C.2 ***Tenderer's obligations***

C.2.1 ***Eligibility***

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

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

C.2.2 ***Cost of tendering***

C.2.2.1 *Accept that, unless otherwise stated in the tender data, the Employer will not compensate the Tenderer for any costs incurred in the preparation and submission of a tender offer, including the costs of any testing necessary to demonstrate that aspects of the offer complies with requirements.*

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

C.2.3 ***Check documents***

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

C.2.4 ***Confidentiality and copyright of documents***

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

C.2.5 Reference documents

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

C.2.6 Acknowledge addenda

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

C.2.7 Clarification meeting

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

C.2.8 Seek clarification

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

C.2.9 Insurance

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

C.2.10 Pricing the tender offer

C.2.10.1 *Include in the rates, prices, and the tendered total of the prices (if any) all duties, taxes (except Value Added Tax (VAT), and other levies payable by the successful Tenderer, such duties, taxes and levies being those applicable fourteen (14) days before the closing time stated in the tender data.*

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

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

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

C.2.11 Alterations to documents

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

C.2.12 Alternative tender offers

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

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

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

C.2.13 Submitting a tender offer

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

- C.2.13.2** *Return all returnable documents to the Employer after completing them in their entirety, either electronically (if they were issued in electronic format) or by writing legibly in non-erasable ink.*
- C.2.13.3** *Submit the parts of the tender offer communicated on paper as an original plus the number of copies stated in the tender data, with an English translation of any documentation in a language other than English, and the parts communicated electronically in the same format as they were issued by the Employer.*
- C.2.13.4** *Sign the original and all copies of the tender offer where required in terms of the tender data. The Employer will hold all authorized signatories liable on behalf of the Tenderer. Signatories for Tenderers proposing to contract as Joint Ventures shall state which of the signatories is the lead partner whom the Employer shall hold liable for the purpose of the tender offer.*
- C.2.13.5** *Seal the original and each copy of the tender offer as separate packages marking the packages as "ORIGINAL" and "COPY". Each package shall state on the outside the Employer's address and identification details stated in the tender data, as well as the Tenderer's name and contact address.*
- C.2.13.6** *Where a two-envelope system is required in terms of the tender data, place and seal the returnable documents listed in the tender data in an envelope marked "financial proposal" and place the remaining returnable documents in an envelope marked "technical proposal". Each envelope shall state on the outside the Employer's address and identification details stated in the tender data, as well as the Tenderer's name and contact address.*
- C.2.13.7** *Seal the original tender offer and copy packages together in an outer package that states on the outside only the Employer's address and identification details as stated in the tender data.*
- C.2.13.8** *Accept that the Employer will not assume any responsibility for the misplacement or premature opening of the tender offer if the outer package is not sealed and marked as stated.*
- C.2.13.9** *Accept that tender offers submitted by facsimile or e-mail will be rejected by the Employer, unless stated otherwise in the tender data.*
- C.2.14** **Information and data to be completed in all respects**
Accept that tender offers, which do not provide all the data or information requested completely and in the form required, may be regarded by the Employer as non-responsive.
- C.2.15** **Closing time**
- C.2.15.1** *Ensure that the Employer receives the tender offer at the address specified in the tender data not later than the closing time stated in the tender data. Accept that proof of posting shall not be accepted as proof of delivery.*
- C.2.15.2** *Accept that, if the Employer extends the closing time stated in the tender data for any reason, the requirements of these conditions of tender apply equally to the extended deadline.*
- C.2.16** **Tender offer validity**
- C.2.16.1** *Hold the tender offer(s) valid for acceptance by the Employer at any time during the validity period stated in the tender data after the closing time stated in the tender data.*
- C.2.16.2** *If requested by the Employer, consider extending the validity period stated in the tender data for an agreed additional period with or without any conditions attached to such extension.*
- C.2.16.3** *Accept that a tender submission that has been submitted to the Employer may only be withdrawn or substituted by giving the Employer's Agent written notice before the closing time for tenders that a tender is to be withdrawn or substituted. If the validity period stated in C.2.16 lapses before the Employer evaluating the tender, the contractor reserves the right to review the price based on Consumer Price Index (CPI).*

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

C.2.17 Clarification of tender offer after submission

Provide clarification of a tender offer in response to a request to do so from the Employer during the evaluation of tender offers. This may include providing a breakdown of rates or prices and correction of arithmetical errors by the adjustment of certain rates or item prices (or both). No change in the competitive position of Tenderers or substance of the tender offer is sought, offered, or permitted.

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

C.2.18 Provide other material

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

Should the Tenderer not provide the material, or a satisfactory reason as to why it cannot be provided, by the time for submission stated in the Employer's request, the Employer may regard the tender offer as non-responsive.

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

C.2.19 Inspections, tests and analysis

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

C.2.20 Submit securities, bonds and policies

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

C.2.21 Check final draft

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

C.2.22 Return of other tender documents

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

C.2.23 Certificates

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

C.3 The Employer's undertakings

C.3.1 Respond to requests from the Tenderer

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

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

a) an individual firm, or a Joint Venture as a whole, or any individual member of the Joint Venture fails to

- meet any of the collective or individual qualifying requirements;*
- b) *the new partners to a Joint Venture were not prequalified in the first instance, either as individual firms or as another Joint Venture; or*
- c) *in the opinion of the Employer, acceptance of the material change would compromise the outcome of the prequalification process.*

C.3.2 Issue Addenda

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

C.3.3 Return late tender offers

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

C.3.4 Opening of tender submissions

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

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

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

C.3.5 Two-envelope system

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

C.3.5.2 *Evaluate functionality of the technical proposals offered by Tenderers, then advise Tenderers who remain in contention for the award of the contract of the time and place when the financial proposals will be opened. Open only the financial proposals of Tenderers, who score in the functionality evaluation more than the minimum number of points for functionality stated in the tender data, and announce the score obtained for the technical proposals and the total price and any points claimed on BBBEE status level. Return unopened financial proposals to Tenderers whose technical proposals failed to achieve the minimum number of points for functionality.*

C.3.6 Non-disclosure

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

C.3.7 Grounds for rejection and disqualification

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

C.3.8 Test for responsiveness

C.3.8.1 *Determine, after opening and before detailed evaluation, whether each tender offer properly received:*

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

C.3.8.2 *A responsive tender is one that conforms to all the terms, conditions, and specifications of the tender documents without material deviation or qualification. A material deviation or qualification is one which, in the Employer's opinion, would:*

- a) *detrimentally affect the scope, quality, or performance of the works, services or supply identified in the Scope of Work,*
- b) *significantly change the Employer's or the Tenderer's risks and responsibilities under the contract, or*
- c) *affect the competitive position of other Tenderers presenting responsive tenders, if it were to be rectified.*

Reject a non-responsive tender offer, and not allow it to be subsequently made responsive by correction or withdrawal of the non-conforming deviation or reservation.

C.3.9 *Arithmetical errors, omissions and discrepancies*

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

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

- a) *the gross misplacement of the decimal point in any unit rate;*
- b) *omissions made in completing the pricing schedule or bills of quantities; or*
- c) *arithmetic errors in:*
 - i) *line item totals resulting from the product of a unit rate and a quantity in bills of quantities or schedules of prices; or*
 - ii) *the summation of the prices.*

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

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

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

C.3.10 *Clarification of a tender offer*

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

C.3.11 *Evaluation of tender offers*

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

Conditions of tender are by definition the document that establishes a tenderer's obligations in submitting a tender and the employer's undertaking in soliciting and evaluating tender offers. Such conditions establish the rules from the time a tender is advertised to the time that a contract is awarded and require employers to conduct the process of offer and acceptance in terms of a set of standard procedures.

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

The activities associated with evaluating tender offers are as follows:

- a) Open and record tender offers received
- b) Determine whether or not tender offers are complete
- c) Determine whether or not tender offers are responsive
- d) Evaluate tender offers
- e) Determine if there are any grounds for disqualification
- f) Determine acceptability of preferred tenderer
- g) Prepare a tender evaluation report
- h) Confirm the recommendation contained in the tender evaluation report

C.3.11.1 General

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

C.3.12 Insurance provided by the Employer

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

C.3.13 Acceptance of tender offer

Accept the tender offer, if in the opinion of the Employer, it does not present any risk and only if the Tenderer:

- a) is not under restrictions, or has principals who are under restrictions, preventing participating in the Employer's procurement;
- b) can, as necessary and in relation to the proposed contract, demonstrate that he or she possesses the professional and technical qualifications, professional and technical competence, financial resources, equipment and other physical facilities, managerial capability, reliability, experience and reputation, expertise and the personnel, to perform the contract;
- c) has the legal capacity to enter into the contract;
- d) is not insolvent, in receivership, under Business Rescue as provided for in chapter 6 of the Companies Act No. 2008, bankrupt or being wound up, has his/her affairs administered by a court or a judicial officer, has suspended his/her business activities, or is subject to legal proceedings in respect of any of the foregoing;

- e) *complies with the legal requirements, if any, stated in the tender data; and*
- f) *is able, in the opinion of the Employer, to perform the contract free of conflicts of interest.*

C.3.14 Prepare contract documents

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

- a) *addenda issued during the tender period,*
- b) *inclusion of some of the returnable documents, and*
- c) *other revisions agreed between the Employer and the successful Tenderer.*

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

C.3.15 Complete adjudicator's contract

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

C.3.16 Registration of the award

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

C.3.17 Provide copies of the contracts

Provide to the successful Tenderer the number of copies stated in the tender data of the signed copy of the contract as soon as possible after completion and signing of the form of offer and acceptance.

C.3.18 Provide written reasons for actions taken

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

Alpha-numerics associated with the Contractor Grading Designations

TABLE C(i): CONTRACTOR GRADING DESIGNATIONS AND ASSOCIATED PARAMETERS (2021)

<i>Contractor Grading Designation</i>	<i>Tender Value Range designation</i>	<i>Maximum Value of Contract that a Contractor is considered capable of performing (R)</i>
<i>2 (class of construction works)</i>	<i>2</i>	<i>1,000,000.00</i>
<i>3 (class of construction works)</i>	<i>3</i>	<i>3,000,000.00</i>
<i>4 (class of construction works)</i>	<i>4</i>	<i>6,000,000.00</i>
<i>5 (class of construction works)</i>	<i>5</i>	<i>10,000,000.00</i>
<i>6 (class of construction works)</i>	<i>6</i>	<i>20,000,000.00</i>
<i>7 (class of construction works)</i>	<i>7</i>	<i>60,000,000.00</i>
<i>8 (class of construction works)</i>	<i>8</i>	<i>200,000,000.00</i>
<i>9 (class of construction works)</i>	<i>9</i>	<i>No limit</i>

T1.2.2 Variations to the Standard Conditions of Tender

The Standard Conditions of Tender make several references to the tender data for details that apply specifically to this tender. The tender data shall take precedence in the interpretation of any ambiguity or inconsistency between it and the Standard Conditions of Tender. Each item of data given below is cross-referenced to the clause in the Standard Conditions of Tender to which it mainly applies.

The following variations, amendments and additions to the Standard Conditions of Tender shall apply to this tender.

Clause No. Variation, Amendment or Addition

C.1 General

C.1.1 Actions

Add the following:

The Employer is : **Joe Gqabi District Municipality**, represented by Mr. L. Wana
Telephone No. : 045 979 3061
Email Address : lumanyano@jgdm.gov.za

C.1.2 Tender Documents

Add the following:

The following documents form part of this tender:

The General Conditions of Contract for Construction Work (Fourth Edition) 2025 as published by the South African Institution of Engineering. This publication is available and Tenderers must obtain copies at their own cost from the South African Institution of Civil Engineering (SAICE), Private Bag X200, Halfway House 1685, Tel (011) 805 5947, Fax: (011) 805 5971, email: civilinfo@saice.org.za.

Standard specifications, SANS.

The tender documents issued by the Employer comprise:

VOLUME 1

Part T1: Tendering Procedures

- T1.1 Tender Notice and Invitation to Tender
- T1.2 Tender Data

Part T2: Returnable Documents

- T2.1 List Of Returnable Documents
- T2.2 Returnable Schedules

Part C1: Agreements and Contract Data

- C1.1 Form of Offer and Acceptance
- C1.2 Contract Data (Part 1: Contract Data Provided by the Employer)
- C1.2 Contract Data (Part 2: Contract Data Provided by the Contractor)
- C1.3 Pro Forma Performance Guarantee
- C1.4 Arbitration

Part C2: Pricing Data

- C2.1 Pricing Assumptions
- C2.2 Bill Of Quantities

Part C3: Scope Of Work

- C3.1 Description Of The Works
- C3.2 Engineering
- C3.3 Procurement
- C3.4 Construction
- C3.5 Management
- C3.6 Electrical Installation
- C3.7 Annexures

- C3.7.1 Employer's Occupation Health and Safety Agreement
- C3.7.2 Employer's Health and Safety Specifications
- C3.7.3 Employer's Environmental Specification
- C3.7.4 Health and Safety Specification
- C3.7.5 Environmental Management Programme
- C3.7.6 List of Drawings

Part C4: Site Information

- C4.1 Geotechnical Investigation

VOLUME 2

Engineering Drawings (listed in Section C3.7.6)

Add the following additional clause:

Tender and/or Document Deposit

A non-refundable document deposit of R1,500.00 (One Thousand Five Hundred Rand Only) payable either in cash, EFT or direct bank deposit to ABSA, 2380000019 is required on collection of the tender documents. Please quote the company name and Tender number as reference. Payments may also be made at the Cashier's Office, which is situated at the ground floor, Cnr of Graham and Cole Streets, Ekhephini between the hours of 08:00 and 15:00 prior to the collection of the Tender documents.

C.1.4 Communication and Employer's Agent

Add the following:

Attention is drawn to the fact that verbal information, given by the Employer's Agent during site visits/clarification meetings or at any other time prior to the award of the Contract, will not be regarded as binding on the Employer. Only information issued formally by the Employer in writing to Tenderers, will be regarded as amending the tender documents.

The Employer's Agent is:

GIBB (Pty) Ltd (referred to as GIBB), represented by Mrs Lize Smit

Address : PO Box 2700, Rivonia, 2128
GIBB House, 9 Pearce Street, Berea, KuGompo City, 5241

Telephone No. : 043 706 3600

Email Address : lsmit@gibb.co.za

C.1.4.1 Add the following new sub-clause:

The Employer may reject a Tender if, in the opinion of the Employer, the Tenderer will be unable to achieve the contract participation goal tendered, in the performance of the contract.

C.1.4.2 Add the following new sub-clause:

Competitive negotiation procedure will **not** be followed.

C.2 Tenderer's obligations**C.2.1 Eligibility**

Add the following after C.2.1.2

Only those Tenderers who satisfy the following criteria are eligible to submit tenders:

A. Construction Industry Development Board (CIDB) Registration

Only those Tenderers who are registered with the CIDB, or are capable of being so prior to the evaluation of submissions, in a contractor grading designation equal to or higher than a contractor grading designation, determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25(1B) or 25(7A) of the Construction Industry Development Regulations, for a 8 CE or higher class of construction work, are eligible to have their Tenders evaluated.

B. Joint ventures are eligible to submit tenders provided that:

1. every member of the Joint Venture is registered with the CIDB;
2. the lead partner has a contractor grading designation in the 8 CE or higher class of construction work;
3. the combined contractor grading designation calculated in accordance with the Construction Industry Development Board Regulations is equal to or higher than a contractor grading designation, determined in accordance with the sum tendered for a 8 CE or higher class of construction work or a value determined in accordance with Regulation 25(1B) or 25(7A) of the Construction Industry Development Regulations.

Table C(i) on page 18, reflects the alpha-numeric associated with the contractor Grading Designations.

If called upon to do so by the Employer and/or the Employer's Agent, the Tenderer shall within 48 hours provide satisfactory evidence of compliance with this condition. Failure to provide the evidence within the time limit may result in the tender offer being rejected as non-responsive.

C.2.2 Cost of tendering

Add the following to the clause:

Accept that once a tender document is drawn the deposit paid for the said tender document will not be refunded under any circumstance.

Accept that the Employer will not compensate the Tenderer for any costs incurred, in attending interviews in the office of the Employer or the Employer's Agent (if required).

C.2.7 Clarification meeting

Add the following:

The arrangement for a **compulsory clarification meeting** is as stated in the Tender Notice and Invitation to Tender.

The Tenderer should be represented at the clarification meeting by a person who is suitably qualified and experienced to comprehend the implications of the work involved.

Ensure that, his certificate of attendance is signed by the Employer's Agent.

Tender documents will be available at the compulsory clarification meeting. Details relating to the collection of tender documents is indicated in the Tender Notice and Invitation to Tender.

C.2.9 Insurance

Amend the following:

The Employer does not provide insurance.

The successful Tenderer (i.e. Contractor) is responsible for providing full insurance cover for the contract.

C.2.10 Pricing the tender offer

Add the following to the sub-clause C.2.10.3:

This tender is subject to contract price adjustment.

To correct errors made, draw a line through the incorrect entry and write the correct entry above in **BLACK INK** and place the initial of the authorised signatories next to the correct entry.

C.2.12 Alternative Tender Offers

Add the following after C.2.12.3:

- A. If a Tenderer wishes to submit an alternative offer, he shall do so as a separate complete offer on a separate complete set of tender documents clearly marked as an "Alternative Tender", in order to distinguish it from the original tender. The only criteria permitted for such alternative tender offer is that

it demonstrably satisfies the Employer's standards and requirements, the details of which may be obtained from the Employer's Agent.

- B. Calculations, drawings and all other pertinent technical information and characteristics as well as modified or proposed Pricing Data, must be submitted with the alternative tender offer. This data will enable the Employer to evaluate the efficacy of the alternative offer and its principal elements; evaluate the degree to which the alternative complies with the Employer's standards and requirements; and to evaluate the acceptability of the pricing proposals. Calculations must be set out in a clear and logical sequence, and must clearly reflect all design assumptions. Pricing Data must reflect all assumptions in the development of the pricing proposal.
- C. Failure to properly comply with this clause, thereby preventing the Employer and/or the Employer's Agent to properly assess the full implications of the alternative tender, is likely to disqualify the alternative offered from further consideration.
- D. Acceptance of an alternative tender offer will mean acceptance in principle of the offer. It will be an obligation of the contract for the Tenderer, in the event that the alternative is accepted, to accept full responsibility and liability that the alternative offer complies in all respects with the Employer's standards and requirements.
- E. The modified Pricing Data must include an amount equal to 5% of the amount tendered for the alternative offer (after adding contingencies and VAT), to cover the Employer's costs of confirming the acceptability of the detailed design before it is constructed. Tenderers are required to indicate alternative tender offers in Schedule A12: Alterations / Amendments By Tenderer in Section T2.2 Returnable Schedules.
- F. A bank guaranteed cheque equal to 0.5% of the tendered amount for the alternative offer must be submitted with the alternative offer. The alternative offer will not be considered if not accompanied with the said guaranteed cheque.

C.2.13 Submitting a Tender Offer

C.2.13.1 Add the following to the sub-clause:

No claim will be entertained for faults in the tender price resulting from any discrepancies, omissions or indistinct figures.

C.2.13.2 Replace the contents of the sub-clause with the following:

Return all volumes of the tender document to the Employer after completion of the relevant sections of each volume in their entirety, by writing in **BLACK INK**.

All volumes are to be left intact in its original format and no pages shall be removed or re-arranged.

C.2.13.3 Add the following to the sub-clause:

Parts of each tender offer communicated on paper shall be submitted as an original, plus 0 (nought) copies. **No** copies of the tender offer are required.

C.2.13.4 Add the following to the sub-clause:

The tender shall be signed by a person duly authorised to do so. Tenders submitted by Joint Ventures of two or more firms shall be accompanied by the document of formation of the Joint Venture, authenticated by a notary public or other official deputed to witness sworn statements, in which is defined precisely the conditions under which the Joint Venture will function, its period of duration, the persons authorised to represent and obligate it, the participation of the several firms forming the Joint Venture, and any other information necessary to permit a full appraisal of its functioning.

Only authorised signatories may sign the original (and all copies of the) tender offer, where required in terms of C.2.13.4.

C.2.13.5 Add the following to the sub-clause:

The Employer's address for delivery of tender offers and identification details to be shown on each tender offer package are:

Location of tender box : Tender Boxes provided at JOE GQABI DISTRICT MUNICIPALITY OFFICE

Physical address : Corner of Cole and Graham Street, Ekhephini 9786

Identification details : TENDER NO. : JGDM2026/27-002

Nqanqarhu Water Treatment and Distribution Upgrade: Water Treatment Works

C.2.13.6 Add the following to the sub-clause:
A two-envelope procedure will **not** be followed.

C.2.13.9 Add the following to the sub-clause:
Telephonic, telegraphic, telex, facsimile or e-mailed tender offers will not be accepted.

ADD THE FOLLOWING NEW SUB-CLAUSES TO C.2.13, AFTER SUB-CLAUSE C.2.13.9.

C.2.13.10 The Tenderer is required to enter information in the following sections of the document:

Section T1.1	Invitation to Tender
Section T2.2	Returnable Documents
Section C1.1	Form of Offer and Acceptance
Section C1.2	Contract Data (Part 2: Contract Data Provided by the Contractor)
Section C2.2	Bill of Quantities
Section C3.6	Electrical Installation

The above sections shall be signed by the Tenderer (and witnesses where required). Individual pages should only be initialled by the successful Tenderer and by the witnesses, after acceptance by the Employer of the tender offer. The Tenderer shall complete and sign the Form of Offer, prior to the submission of a tender offer.

Accept that failure on the part of the Tenderer to submit any one of the Returnable Documents listed in T2.1, shall result in a tender offer being regarded as non-responsive. The Schedule of Deviations (if applicable) shall be signed by the successful Tenderer, after acceptance by the Employer of the tender offer.

Accept that the Employer shall in the evaluation of tender offers take due account of the Tenderer's past performance in the execution of similar Engineering Works of comparable magnitude, and the degree to which he possesses the necessary technical, financial and other resources to enable him to complete the Works successfully within the contract period. The Tenderer shall satisfy the Employer and the Employer's Agent as to his ability to perform and complete the Works timeously, safely and with satisfactory quality, and furnish details in Section T2.2 of Returnable Schedules of a similar nature and magnitude which they have successfully executed in the past.

Accept that the Employer is restricted in accordance with the OHS Act, 1993 (Act No. 85 of 1993) and Construction Regulations 2014, Clause 4(4) to **only** appoint a Contractor whom he is satisfied has the necessary competencies and resources to carry out the Work safely.

Accept that submitting inferior and inadequate information relating to health and safety shall be regarded as justifiable and compelling reasons **not** to accept the tender offer of the Tenderer scoring the highest number of tender evaluation points.

C.2.15 Closing Time

C.2.15.1 Add the following:
The closing time for submission of tender offers is as stated in the Tender Notice and Invitation to Tender.

C.2.16 Tender Offer Validity

C.2.16.1 Add the following:
The tender offer validity period is 120 days.

If the tender validity expires on a Saturday, Sunday or public holiday, the tender shall remain valid and open for acceptance, until the closure for business on the following working day.

C.2.17 Clarification of Tender Offer after Submission

C.2.17.1 Add the following sub-clause:

A tender may be rejected as non-responsive if the Tenderer fails to provide any clarification requested by the Employer, or confirmation of registration with CIDB within the time for submission stated in the Employer's written request for such clarification or confirmation. A tender may be rejected if the unit rates or lump sums for some of the items in the Bill of Quantities are, in the opinion of the Employer, unreasonable or out of proportion; and the Tenderer fails, within the time stated in writing by the Employer, to justify any specific rates or lump sums (i.e. to provide a financial breakdown of how such rates or sums were obtained); or to adjust the unit rates or lump sums for such items while retaining the total of the prices unchanged.

C.2.17.2 Add the following sub-clause:

Notwithstanding C.2.23, submit within seven (7) days from receipt of a written request by the Employer, a full report from his banker as to his financial standing. The Employer may, at its discretion, condone any failure to comply with the foregoing condition.

Accept that the Employer and / or the Employer's Agent, reserves the right to approach the Tenderer's banker or guarantor(s) as indicated in the tender document; or the bankers of each of the individual members of any Joint Venture that is constituted for purposes of this Contract; with a view of ascertaining whether the required guarantee will be furnished, and for purposes of ascertaining the financial strength of the Tenderer or of the individual members of such Joint Venture.

C.2.22 Return of tender documents

Replace the clause with the following:

Return all retained tender documents prior to the closing time for the submission of tenders.

C.2.23 Certificates

Add the following:

The Tenderer is required to submit the following certificates with the tender:

- **Certificate of Contractor Registration (CIDB)**
Certificate of the Contractor's Registration issued by the Construction Industry Development Board (CIDB). Where a Tenderer satisfies CIDB contractor grading designation requirements through Joint Venture formation, such Tenderers must submit the Certificates of Contractor Registration in respect of each partner. (Document B1 in Part T2.2).
- **Tax Compliance Status**
Tenderers shall be registered with the South African Revenue Service (SARS) and must have a valid and compliant Tax Compliance Status (TCS) at the closing date and time of the tender. Tenderers shall provide their SARS Tax Compliance Status (TCS) PIN and Tax Reference Number in the tender submission (Document B2 in Part T2.2) to enable the Employer to verify their tax compliance status electronically. Failure to have a valid and compliant Tax Compliance Status (TCS) at the closing date and time of the tender may result in the tender being regarded as non-responsive and rejected. In the case of a Consortium or Joint Venture, each member of the Consortium or Joint Venture shall separately comply with the requirements of this clause and provide its own TCS PIN and Tax Reference Number.
- **Bargaining Council Certificates**
Tenderers shall be registered with the Bargaining Council for the Civil Engineering Industry (BCCEI) and shall provide a valid BCCEI Certificate of Registration.

Where a Joint Venture is tendering, each Joint Venture member undertaking civil engineering work shall provide a valid BCCEI Certificate of Registration.

Where specialist subcontractors are proposed whose activities do not fall within the scope of the BCCEI, such subcontractors shall provide proof of registration with the relevant Bargaining Council applicable to their industry, where required by law.

The Employer reserves the right to require proof that any contractor or subcontractor is registered with the Bargaining Council applicable to its activities.
(Document B6 in Part T2.2).

▪ **Financial Statements**

Tenderer must submit audited annual financial statements for the latest three (3) financial years, or for the period since establishment if established during the preceding three (3) years, where audited financial statements are required by law (Document B3 in Part T2.2);

Each member of a Consortium or Joint Venture shall submit separate financial statements in respect of the above requirements.

C.3 The Employer's undertakings

C.3.1 Respond to requests from the Tenderer

C.3.1.1 Add the following:

Respond to a request for clarification received up to eight (8) working days before the tender closing time, stated in the tender data, and notify all Tenderers who collected tender documents.

C.3.4 Opening of tender submissions

C.3.4.1 Add the following:

The time and location for opening of the tender offers is:

Time : 12:00 pm on 14 September 2026
Location : Joe Gqabi District Municipality Offices,
Corner of Cole and Graham Street, Ekhephini (Barkly East).

Thereafter tenders will be opened in public.

C.3.8 Test for responsiveness

Add the following after C.3.8.2(c)

Tenders will be regarded as non-responsive if:

- the Tenderer has failed to submit a fully completed and signed Form of Offer and Acceptance (C1.1);
- the Tenderer does not comply with the minimum CIDB Contractor Grading Designation stated in the Tender Data;
- the Tenderer fails to attend the compulsory clarification meeting where attendance is stipulated as compulsory;
- the Tenderer fails to submit any mandatory returnable document identified in the Tender Data;
- the Tenderer or, in the case of a Joint Venture, any member of the Joint Venture, does not have a valid and compliant SARS Tax Compliance Status (TCS) at the closing date and time of the tender;
- the Tenderer has failed to provide clarifications or supporting documentation requested by the Employer within the period stated in the Employer's written request.

C.3.11 Evaluation of Tender Offers

C.3.11.1 General

Add the following:

JOE GQABI DISTRICT MUNICIPALITY Supply Chain Management Procurement Policy will apply (this policy will be available for viewing at JGDM upon request). JGDM will evaluate the tender based on the 90/10 principle. The Tender Committee, Tender Evaluation Committee, Tender Adjudication and Accounting Officer will work on the evaluation of the tender. The lowest tender will not necessarily be accepted; and the right to accept the whole or part of any tender; or not to consider any tender not suitably endorsed, is fully reserved by the JOE GQABI DISTRICT MUNICIPALITY.

C.3.11.2 Add the following:

The following method will be used to evaluate all responsive tender offers as amended below:

- a. Open and record tender offers received.
- b. Determine whether or not tender offers are complete.
- c. Determine whether or not tender offers are responsive, and reject non-responsive tenders.
- d. Functional assessment, rejecting all tender offers that fail to score the minimum number of points for functionality, as stated in C3.11.4.
- e. Score tender evaluation points for each financial offer.

- f. Calculate total tender evaluation points.
- g. Rank tender offers from the highest number of tender evaluation points to the lowest.
- h. Recommend the Tenderer with the highest number of tender evaluation points for the award of the contract, unless there are compelling and justifiable reasons not to do so.
- i. The 90/10 preference point system for acquisition of services, works or goods will apply to Rand value is in excess of R50 million.

C.3.11.3 Scoring Price**Add the following:**

The financial offer will be scored where the value of W_1 is **90** points.

C3.11.4 Functional Assessment**Add the following:**

The quality criteria and maximums core with respect to each of the criteria are as follows:

The Main Contractor will be evaluated on functionality, the maximum points to be scored is **100 points**, and a minimum of **65 points**. Should the Main Contractor score less, it will be considered non-responsive and will not proceed to further evaluation. The Main Contractor will be evaluated for functionality on the following criteria and weight:

NB: Tenderers will be required to score minimum points on each criterion to proceed to further evaluation.

Scoring Process

The Technical/Functional Evaluation Task Team will be established to determine the following:

- Whether or not the Tenderer understood the project specifications.
- The Tenderer's experience with similar projects.
- The suitability of the bidder's proposed Construction Equipment.
- The quality of the methodology proposed including risk identification, mitigation and management.
- The qualifications and experience of the key staff proposed.
- The Tenderer's financial ability.

The score for the Technical/Functionality Evaluation will be calculated in accordance with the table below:

1. Company Experience: Experience track record over the last ten (10) years.															
Pre-qualification Description	Deliverables	Points													
		Max	Min												
Tenderers must provide details of their previous relevant experience in the construction or upgrade of a Water Treatment Works, Wastewater Treatment Works, pump station, reinforced concrete water-retaining structure, concrete reservoir, or similar municipal water infrastructure project of comparable size and complexity. The experience of Tenderers will be evaluated as detailed under Deliverables.	Construction Experience completed in the past 10 years: <table><tr><td>3 Similar projects</td><td>(30 pts)</td><td>Excellent</td></tr><tr><td>2 Similar projects</td><td>(20 pts)</td><td>Good</td></tr><tr><td>1 Similar project</td><td>(10 pts)</td><td>Marginal</td></tr><tr><td>0 Similar project</td><td>(0 pts)</td><td>Unacceptable</td></tr></table> For each relevant project, the Tenderer shall provide proof of appointment to the project in the form of a Letter of Acceptance, Contract Agreement, Appointment Letter, Purchase Order, Work Order or similar documentary evidence, together with at least one of the following: • Completion Certificate; • Certificate of Practical Completion; • Taking-Over Certificate; • Final Completion Certificate. The submitted documentation must clearly indicate the project name, Employer, nature of the works, contract value and date of completion. Please file your proof of experience (POE) appropriately for ease of Evaluation. Refer to Schedule A6: Schedule of Work Experience of Tenderer.	3 Similar projects	(30 pts)	Excellent	2 Similar projects	(20 pts)	Good	1 Similar project	(10 pts)	Marginal	0 Similar project	(0 pts)	Unacceptable	30	20
3 Similar projects	(30 pts)	Excellent													
2 Similar projects	(20 pts)	Good													
1 Similar project	(10 pts)	Marginal													
0 Similar project	(0 pts)	Unacceptable													

2. Main Contractor or Sub-Contractor (whichever is relevant) Experience in Mechanical and Electrical Installation (Experience of nominated specialist subcontractors may be considered where such subcontractor is committed to the project. NB.: In the case of a bidder having internal M&E capacity, evidence for M&E in successfully completed projects must be attached); Experience track record over the last ten (10) years.

Pre-qualification Description	Deliverables	Points	
		Max	Min
Tenderers must provide details of their previous relevant experience in the mechanical and electrical installation of a Water Treatment Works, Wastewater Treatment Works, pump station, or similar municipal water infrastructure project of comparable size and complexity. The experience of Tenderers will be evaluated as detailed under Deliverables.	Mechanical and Electrical Construction Experience completed in the past 10 years: 4 Similar projects (20 pts) Excellent 3 Similar projects (15 pts) Good 2 Similar projects (10 pts) Marginal 1 Similar project (5 pts) Unsatisfactory 0 Similar project (0 pts) Unacceptable For each relevant project, the Tenderer shall provide proof of appointment to the project in the form of a Letter of Acceptance, Contract Agreement, Appointment Letter, Purchase Order, Work Order or similar documentary evidence, together with at least one of the following: • Completion Certificate; • Certificate of Practical Completion; • Taking-Over Certificate; • Final Completion Certificate. The submitted documentation must clearly indicate the project name, Employer, nature of the works, contract value and date of completion. Please file your POE appropriately for ease of Evaluation. Refer to Schedule A6: Schedule of Work Experience of Tenderer.	20	10

3. Expertise of Key Personnel

Pre-qualification Description	Deliverables	Points													
		Max	Min												
Tenderers must provide details of Key Personnel CVs. Please file your POE appropriately for ease of Evaluation. Refer to Schedule A17: Proposed Key Personnel. Key personal will be evaluated as detailed under Deliverables. NB: Points can only be claimed upon submission of key personnel CVs. Certified qualifications and registrations MUST be attached. The experience of the Key Personnel must be stated clearly in the CV.	1. Contracts Manager: <table><tr><th>Requirements</th><th>Pts</th><th>Scoring</th></tr><tr><td>10 years or more of relevant construction experience, Certificate: Manage Labour Intensive Construction Projects (LIC NQF Level 5 – SAQA ID: 15162) and Bachelor's Degree in Civil Engineering / Advanced Diploma in Engineering Technology (NQF Level 7) or Equivalent</td><td>20</td><td>Excellent</td></tr><tr><td>Between 5 and 9 years of relevant construction experience, Certificate: Manage Labour Intensive Construction Projects (LIC NQF Level 5 – SAQA ID: 15162) and Bachelor's Degree in Civil Engineering / Advanced Diploma in Engineering Technology (NQF Level 7) or Equivalent</td><td>15</td><td>Good</td></tr><tr><td>Between 2 and 4 years of relevant construction experience, Certificate: Manage Labour Intensive Construction Projects (LIC NQF Level 5 – SAQA ID: 15162) and Bachelor's Degree in Civil Engineering / Advanced Diploma in Engineering Technology (NQF Level 7) or Equivalent</td><td>10</td><td>Fair</td></tr></table>	Requirements	Pts	Scoring	10 years or more of relevant construction experience, Certificate: Manage Labour Intensive Construction Projects (LIC NQF Level 5 – SAQA ID: 15162) and Bachelor's Degree in Civil Engineering / Advanced Diploma in Engineering Technology (NQF Level 7) or Equivalent	20	Excellent	Between 5 and 9 years of relevant construction experience, Certificate: Manage Labour Intensive Construction Projects (LIC NQF Level 5 – SAQA ID: 15162) and Bachelor's Degree in Civil Engineering / Advanced Diploma in Engineering Technology (NQF Level 7) or Equivalent	15	Good	Between 2 and 4 years of relevant construction experience, Certificate: Manage Labour Intensive Construction Projects (LIC NQF Level 5 – SAQA ID: 15162) and Bachelor's Degree in Civil Engineering / Advanced Diploma in Engineering Technology (NQF Level 7) or Equivalent	10	Fair	35	25
Requirements	Pts	Scoring													
10 years or more of relevant construction experience, Certificate: Manage Labour Intensive Construction Projects (LIC NQF Level 5 – SAQA ID: 15162) and Bachelor's Degree in Civil Engineering / Advanced Diploma in Engineering Technology (NQF Level 7) or Equivalent	20	Excellent													
Between 5 and 9 years of relevant construction experience, Certificate: Manage Labour Intensive Construction Projects (LIC NQF Level 5 – SAQA ID: 15162) and Bachelor's Degree in Civil Engineering / Advanced Diploma in Engineering Technology (NQF Level 7) or Equivalent	15	Good													
Between 2 and 4 years of relevant construction experience, Certificate: Manage Labour Intensive Construction Projects (LIC NQF Level 5 – SAQA ID: 15162) and Bachelor's Degree in Civil Engineering / Advanced Diploma in Engineering Technology (NQF Level 7) or Equivalent	10	Fair													

	Less than 2 years of relevant construction experience, Certificate: Manage Labour Intensive Construction Projects (LIC NQF Level 5 – SAQA ID: 15162) and Bachelor's Degree in Civil Engineering / Advanced Diploma in Engineering Technology (NQF Level 7) or Equivalent	5	Poor		
	Total Points	Max 20: Min 15			
2. Construction Manager:					
	Requirements	Pts	Scoring		
	10 years or more of relevant construction experience as a Construction Manager (Site Agent), Certificate: Manage Labour Intensive Construction Projects (LIC NQF Level 5 – SAQA ID: 15162) and National Diploma in Civil Engineering (NQF Level 6) or Equivalent	15	Excellent		
	Between 5 and 9 years of relevant construction experience as a Construction Manager (Site Agent), Certificate: Manage Labour Intensive Construction Projects (LIC NQF Level 5 – SAQA ID: 15162) and National Diploma in Civil Engineering (NQF Level 6) or Equivalent	10	Good		
	Between 2 and 4 years of relevant construction experience as a Construction Manager (Site Agent), Certificate: Manage Labour Intensive Construction Projects (LIC NQF Level 5 – SAQA ID: 15162) and National Diploma in Civil Engineering (NQF Level 6) or Equivalent	5	Fair		
	Less than 2 years of relevant construction experience as a Construction Manager (Site Agent), Certificate: Manage Labour Intensive Construction Projects (LIC NQF Level 5 – SAQA ID: 15162) and National Diploma in Civil Engineering (NQF Level 6) or Equivalent	0	Poor		
	Total Points	Max 15: Min 10			

4. Methodology

Construction Services: Methodology of how construction will be undertaken by the Main Contractor. Methodology should also detail how the local SMMEs will be involved during construction.

Pre-qualification Description	Deliverables			Points	
				Max	Min
The proposed methodology will be evaluated as detailed under Deliverables.	Technical approach and methodology	Pts	Scoring	15	10
	The methodology is exceptional, and the main scope tasks are approached innovatively and efficiently. (1) Details how to undertake the <u>specific scope of the project</u> . (2) Clearly detail how to undertake each task (including the Gantt chart with planned machinery	15	Excellent		

	and personnel). (3) Show an understanding of the <u>project specifics and site area</u> . (4) Highlighting the possible <u>challenges</u> and how they will be <u>mitigated</u> . (5) Provides strategies on how to involve local <u>businesses</u> and <u>SMMEs</u> will be involved in the project.				
	The methodology is specifically tailored to address the project's objectives and methods of work. (1) Details how to undertake the <u>specific scope of the project</u> . (2) Clearly detail <u>how to undertake each task</u> . (3) Provide some level of detail on how the SMMEs will be involved in the project. (4) <u>No Gantt chart attached</u> .	10	Marginal		
	Methodology is generic and not tailored to address the specific project objectives. Does not adequately deal with the critical characteristics of the project.	5	Poor		
	The methodology is poor and unlikely to satisfy the project objectives. The bidder may have misunderstood certain aspects of the scope of work.	0	Unacceptable		
TOTAL POSSIBLE SCORE FOR QUALITY				100	65

C3.11.5 Specific Goals**Add the following:**

A maximum of 10 points will be awarded for Specific Goals. Points scored for Specific Goals will be added to the points scored for Price.

Tenderers shall submit the supporting documentation indicated below in order to claim points. Failure to submit the required supporting documentation will result in no points being awarded for the relevant Specific Goal.

Specific Goals	Points	Points Claimed (Tenderer must claim points)	Evidence Required
1. Ownership-Based Specific Goals (Tenderer to indicate all categories with which it complies)			
1.1 51% or more Black ownership	2		• Central Supplier Database (CSD) Registration Report; • Company Registration Documents; and • Copies of identity documents of the relevant directors, members, shareholders or owners.
1.2 51% or more Women ownership	1		
1.3 51% or more Youth ownership	1		
1.4 51% or more Disability ownership	1		
2. LOCALITY (Tenderer to indicate all applicable categories.)			
Within the boundaries of the Joe Gqabi District Municipality	3		• Municipal account not older than 90 days; or • Municipal clearance certificate; or • Registered lease agreement; or • Title deed; or • Proof of address accompanied by a sworn affidavit (applicable to village residents only).
Within the boundaries of the Eastern Cape	2		
Outside the boundaries of the Eastern Cape	0		
Total	10		

NB: Failure to submit the required evidence will result in bidders not being awarded points.

C.3.11.6 Risk Analysis

Add the following:

Notwithstanding compliance with the CIDB grading designation and any other requirements of the tender, the Employer reserves the right to conduct a risk analysis in respect of the preferred Tenderer prior to the award of the Contract. Such analysis may include, but is not limited to, an assessment of:

- a) the reasonableness of the tendered amount;
- b) the reasonableness of the rates and prices contained in the Bill of Quantities;
- c) the reasonableness and achievability of any contract participation goals tendered;
- d) the Tenderer's ability to fulfil its obligations in terms of the contract, including its technical capability, managerial capability, personnel, plant, equipment, experience and available resources;
- e) the Tenderer's financial standing and financial capacity based on the financial information submitted with the tender; and
- f) the verification of experience claimed for functionality purposes, including site visits to previously completed projects and consultation with Employers, Engineers or Consultants associated with such projects.

Should the Employer identify material risks which, in its opinion, could adversely affect the successful completion of the Works, the Employer reserves the right to request clarification or additional supporting documentation from the Tenderer and to take such risks into consideration when determining whether the Tenderer is capable of performing the contract.

No tender will be recommended for award unless the Employer is satisfied that the Tenderer has the resources, capacity, experience and capability required to perform the Works successfully.

C.3.12 Insurance provided by the Employer

Replace the contents of the clause with the following:

No insurance will be provided by the Employer. The Contractor shall be responsible for arranging and maintaining all insurances required in terms of the Contract. The Contractor shall submit copies of the insurance policies and certificates of insurance to the Employer for review prior to the commencement of the Works and whenever such policies are renewed or amended during the Contract Period.

C.3.17 Provide copies of the contracts

Add the following:

The Employer shall provide the successful Tenderer with one (1) paper copy of the signed contract.

T1.2.3 Additional Conditions of Tender

The additional conditions of tender are:

T.1.2.3.1 Compliance with the Occupational Health and Safety Act

The Tenderer is to note the requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), as amended, and the Construction Regulations, 2014, promulgated thereunder. The Tenderer shall be deemed to have read and fully understood the requirements of the Act and Regulations and to have made due allowance in their tendered rates and prices for compliance therewith.

The Tenderer shall submit a preliminary Health and Safety Plan with the tender in respect of the Works in order to demonstrate the necessary competencies and resources to perform the construction work in accordance with the Act and Regulations. The preliminary Health and Safety Plan shall, as a minimum, address the following:

- 1) Management structure, site supervision and responsible persons, including a succession plan.
- 2) The Contractor's induction and training programme for employees, subcontractors and visitors to the Site.
- 3) Health and safety precautions, procedures and controls to ensure compliance with the Act, Regulations and Safety Specifications.
- 4) Monitoring, inspection and reporting procedures.
- 5) Liaison, consultation and review meetings with all relevant parties.
- 6) Site security, welfare facilities and first-aid arrangements.
- 7) Site rules and emergency preparedness arrangements, including fire and emergency response procedures.

The successful Tenderer shall submit a detailed Health and Safety Plan prior to the Commencement Date.

T.1.2.3.2 Eligibility with Respect to Expanded Public Works Programme

This Contract does not qualify for consideration as an Expanded Public Works Programme project.

T.1.2.3.3 Claims Arising after Submission of Tender

No claim for any extras arising out of any doubt or obscurity as to the true intent and meaning of anything shown on the Contract Drawings or contained in the Conditions of Contract, Scope of Work and Pricing Data, will be admitted by the Employer/Employer's Agent after the submission of any tender and the Tenderer shall be deemed to have:

- 1) inspected the Contract Drawings and read and fully understood the Conditions of Contract.
- 2) read and fully understood the whole text of the Scope of Work and Pricing Data and thoroughly acquainted himself with the nature of the works proposed and generally of all matters which may influence the Contract.
- 3) visited the site of the proposed works, carefully examined existing conditions, the means of access to the site, the conditions under which the work is to be done, and acquainted himself with any limitations or restrictions that may be imposed by the Municipal or other Authorities in regard to access and transport of materials and plant to and from the site and made the necessary provisions for any additional costs involved thereby.
- 4) requested the Employer or his duly authorised agent to make clear the actual requirements of anything shown on the Contract Drawings or anything contained in the Scope of Work and Pricing Data, the exact meaning or interpretation of which is not clearly intelligible to the Tenderer.

Before submission of any tender, the Tenderer should check the number of pages, and if any are found to be missing or duplicated, or the figures or writing indistinct, or if the Pricing Data contain any obvious errors, the tenderer must apply to the Employer/Employer's Agent at once to have the same rectified, as no liability will be admitted by the Employer/Employer's Agent in respect of errors in any tender due to the foregoing.

T.1.2.3.4 Imbalance in Tendered Rates

In the event of tendered rates or lump sums being declared by the Employer to be unacceptable to it because they are either excessively low or high or not in proper balance with other rates or lump sums, the Tenderer

may be required to produce evidence and advance arguments in support of the tendered rates or lump sums objected to. If, after submission of such evidence and any further evidence requested, the Employer is still not satisfied with the tendered rates or lump sums objected to, it may request the tenderer to amend these rates and lump sums along the lines indicated by it.

The Tenderer will then have the option to alter and/or amend the rates and lump sums objected to and such other related amounts as are agreed on by the Employer, but this shall be done without altering the Contract Price.

Should the Tenderer fail to amend the Tender in a manner acceptable to the Employer, the Employer may reject the Tender.

T.1.2.3.5 Community Liaison Officer

A Community Liaison Officer shall be appointed where required by the Employer.

T.1.2.3.6 Labour Intensive Construction/Use of Local Labour

This Contract does not require the use of labour intensive construction. The use of local labour shall, however, be maximised.

T.1.2.3.7 Scope of Mandatory Subcontract Works

The Joe Gqabi District Municipality is committed to ensuring the development of Small, Medium and Micro Enterprises (SMMEs) within the district. Contractor is encouraged to provide work packages for SMMEs.

T.1.2.3.8 Negotiations with Preferred Tenderers

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

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

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

T.1.2.3.9 UIF Payments

The Tenderer shall submit to the Employer, upon request, a valid Letter of Good Standing issued by the Compensation Commissioner or a licensed compensation insurer.

T.1.2.3.10 Registration with Bargaining Council

Tenderers shall be registered with the Bargaining Council for the Civil Engineering Industry (BCCEI) and shall provide a valid BCCEI Certificate of Registration.

Where a Joint Venture is tendering, each Joint Venture member undertaking civil engineering work shall provide a valid BCCEI Certificate of Registration.

Where specialist subcontractors are proposed whose activities do not fall within the scope of the BCCEI, such subcontractors shall provide proof of registration with the relevant Bargaining Council applicable to their industry, where required by law.

The Employer reserves the right to require proof that any contractor or subcontractor is registered with the Bargaining Council applicable to its activities.

Part T2: Returnable Documents

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T2.2 Returnable Schedules	35 - 84

T2.1 LIST OF RETURNABLE DOCUMENTS

The Tenderer must complete and return the documents listed below as part of his/her tender submission:

VOLUME 1	DESCRIPTION	PAGE
	Returnable documents required for tender evaluation purposes	
Schedule A	Documents incorporated in this tender document that must be completed and signed by all Tenderers	
A1	Authority To Sign Documents	36
A2	Letter Of Good Standing	37
A3	Legal Status Of Tenderer	38
A4	Certificate Of Attendance At Compulsory Clarification Meeting	39
A5	Certificate Of Authority And Particulars For Joint Ventures (only if Tenderer is a JV)	40
A6	Schedule Of Work Experience Of Tenderer	42
A7	Current And Recent Projects Undertaken For Jgdm	45
A8	Schedule Of Construction Equipment	47
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A12	Alterations / Amendments By Tenderer	55
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A18	Declaration Of Validity Of Information Provided	64
A19	Declaration Of Interest (Mbd 4)	64
A20	Declaration Of Tenderer's Past Supply Chain Management Practices (Mbd 8)	67
A21	Declaration For Procurement Above R10 Million (All Applicable Taxes Included (Mbd 5))	69
A22	Certificate Of Independent Tender Determination (Mbd 9)	71
A23	Form Concerning Fulfilment Of The Construction Regulations 2014	74
A24	Preference Points Claim Form In Terms Of The Preferential Procurement Regulations 2022 (Mbd 6.1)	76
Schedule B	Additional Documents to be provided by the Tenderer and attached to the tender	
B1	Cidb Contractor Registration	79
B2	Tax Compliance Status	80
B3	Financial Statements	81
B4	Preliminary Programme	82
B5	Municipal Levy Clearance Certificate, Not Older Than Three (3) Months From A Municipality Where The Entity Operates (Lease Agreements And Sworn Statement / Affidavits Are Also Accepted)	83
B6	Bargaining Council Certificate	84
Schedule C	Other Documents that will form part of The Contract and which are to be completed	
C1.1	Form Of Offer And Acceptance	86
C1.2	Contract Data (Part 2: Contract Data Provided by the Contractor)	91
C2.2	Bill of Quantities	107

NB: TENDERER MUST COMPLETE THESE DOCUMENTS / DATA SHEETS / FORMS IN BLACK INK

T2.2 RETURNABLE SCHEDULES

A1. AUTHORITY TO SIGN DOCUMENTS

I/We*, the undersigned, hereby confirm that I/we am/are duly authorised to sign this tender and all associated documentation on behalf of:

.....
(Name of Tenderer)

by virtue of:

- a Resolution of the Board of Directors / Members / Trustees*;
 - the Memorandum of Incorporation (MOI), Partnership Agreement or Trust Deed*; or
 - my/our capacity as Sole Proprietor / Owner*; or
-
-

Documentary proof of such authority is attached to this tender.

*Delete whichever is not applicable.

1.			
	NAME	SIGNATURE	DATE

2.			
	NAME	SIGNATURE	DATE

WITNESSES:

1.			
	NAME	SIGNATURE	DATE

2.			
	NAME	SIGNATURE	DATE

A2. LETTER OF GOOD STANDING

The Tenderer shall attach to this page a valid Letter of Good Standing issued by the Compensation Commissioner or a licensed compensation insurer in terms of the Compensation for Occupational Injuries and Diseases Act, 1993 (Act No. 130 of 1993).

In the case of a Joint Venture, each member of the Joint Venture shall submit a separate valid Letter of Good Standing.

A3. LEGAL STATUS OF TENDERER

The Tenderer shall attach documentary proof of its legal status applicable to the form of business entity, as follows:

- Company: Certified copy of the Certificate of Incorporation and/or registration documents issued by the Companies and Intellectual Property Commission (CIPC);
- Close Corporation: Certified copy of the CK registration document;
- Partnership: Certified copy of the Partnership Agreement;
- Joint Venture: Certified copy of the Joint Venture Agreement;
- Trust: Certified copy of the Trust Deed and Letters of Authority;
- Sole Proprietor: Certified copy of the identity document of the owner.

A4. CERTIFICATE OF ATTENDANCE AT COMPULSORY CLARIFICATION MEETING

This is to certify that (Name of Tenderer)
of
.....(address)

was represented by the person(s) named below at the compulsory clarification meeting held for prospective
Tenderers at (location)
on (date)
commencing at(time)

The purpose of the meeting was to acquaint Tenderers with the Site of the Works and matters relating to the Contract in order to enable Tenderers to take such information into account when preparing their tenders.

Particulars of person(s) attending the meeting: ***(The names shall correspond with those recorded on the attendance register.)***

Name Signature

Capacity

Name Signature

Capacity

Attendance of the above person(s) at the compulsory clarification meeting is hereby confirmed:

Employer's Representative:

Name Signature

Capacity Date

A5. CERTIFICATE OF AUTHORITY AND PARTICULARS FOR JOINT VENTURES

This Returnable Schedule shall be completed only where the Tenderer is a Joint Venture.

We, the undersigned, are submitting this tender offer in Joint Venture and hereby authorise:

Mr/Ms, being the duly authorised signatory of the company, close corporation, partnership or trust acting in the capacity of Lead Partner of the Joint Venture, to sign all documents in connection with this tender and any contract resulting therefrom and to act on behalf of the Joint Venture in all matters relating to the tender and the Contract.

1. JOINT VENTURE PARTICULARS

Joint Venture Name:

Lead Partner:

Joint Venture Address:

Contact Person:

Telephone Number:

Email Address:

2. JOINT VENTURE MEMBERS

Member Name	Percentage Participation	CIDB Contractor Grading Designation	Role in Joint Venture (e.g. Lead Partner, Civil Works, Mechanical Works, Electrical Works)

The total percentage participation of all Joint Venture members shall equal 100%.

3. SUPPORTING DOCUMENTATION

The following shall be attached:

- Signed Joint Venture Agreement;
- Documentary proof of authority of each signatory;
- CSD Registration Number for each member;
- TCS PIN for each member;
- Proof of CIDB registration for each member (where applicable).

Where functionality points are claimed based on the experience, resources or personnel of a Joint Venture member, sufficient supporting documentation shall be provided to substantiate such claims.

The Joint Venture Agreement shall clearly indicate:

- the percentage participation of each member;
- the roles and responsibilities of each member;
- the allocation of work between the members; and
- the lead partner responsible for the administration of the Joint Venture.

4. DECLARATION

We hereby confirm that the information provided in this Schedule is true and correct and that the Joint Venture Agreement attached to this tender accurately reflects the intended relationship between the Joint Venture members.

NAME OF FIRM	ADDRESS	DULY AUTHORISED SIGNATORY
Lead Partner		Signature : Name : Designation :
Member 2		Signature : Name : Designation :
Member 3		Signature : Name : Designation :
Member 4		Signature : Name : Designation :

Note: This Schedule shall be signed by the duly authorised representative of each Joint Venture member.

A6. SCHEDULE OF WORK EXPERIENCE OF TENDERER

Tenderers shall provide details of similar projects successfully completed during the last ten (10) years.

Similar projects shall include the construction, refurbishment or upgrade of Water Treatment Works, Wastewater Treatment Works, reservoirs, pump stations, reinforced concrete water-retaining structures and similar municipal water infrastructure projects.

For each project listed, the Tenderer shall provide proof of appointment to the project in the form of a Letter of Acceptance, Contract Agreement, Appointment Letter, Purchase Order, Work Order or similar documentary evidence, together with at least one of the following:

- Completion Certificate;
- Certificate of Practical Completion;
- Taking-Over Certificate;
- Final Completion Certificate.

Failure to complete this Schedule will be taken to indicate that the Tenderer has no relevant experience in this class of work. **Value of work to be given to the nearest R million.**

COMPLETED CONTRACTS					
Employer (Name, Tel, Fax, Email)	Employer's Agent (Name, Tel, Fax, Email)	Project Description	Tenderer's Role (Indicated if Main Contractor / JV Partner / Subcontractor)	Contract Value (R)	Completion Date
Name:					
Tel:					
Fax:					
Email:					
Name:					
Tel:					
Fax:					
Email:					
Name:					
Tel:					
Fax:					
Email:					
Name:					
Tel:					
Fax:					
Email:					
Name:					
Tel:					
Fax:					
Email:					

SIGNED BY/ON BEHALF OF TENDERER :

NAME

SIGNATURE

DATE

CURRENT CONTRACTS					
Employer (Name, Tel, Fax, Email)	Employer's Agent (Name, Tel, Fax, Email)	Project Description	Tenderer's Role (Indicated if Main Contractor / JV Partner / Subcontractor)	Contract Value (R)	Anticipated Completion Date and Percentage Complete (%)
Name:					
Tel:					
Fax:					
Email:					
Name:					
Tel:					
Fax:					
Email:					
Name:					
Tel:					
Fax:					
Email:					
Name:					
Tel:					
Fax:					
Email:					
Name:					
Tel:					
Fax:					
Email:					

If there is insufficient space above, the Tenderer may append additional sheets.

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

SIGNED BY/ON BEHALF OF TENDERER :

NAME

SIGNATURE

DATE

A7. CURRENT AND RECENT PROJECTS UNDERTAKEN FOR JGDM

Tenderer must furnish hereunder details of similar works / service, which they have satisfactorily completed in the past 5 years. The information shall include a description of the Works, the Contract value, the Contract start date and completion date.

CURRENT PROJECTS			
PROJECT NAME	AWARDED AMOUNT	CONTRACT START DATE	ANTICIPATED / ACTUAL COMPLETION DATE
TOTAL AMOUNT OF PROJECTS CURRENTLY UNDERTAKEN FOR JGDM			R

SIGNED BY/ON BEHALF OF TENDERER :

NAME

SIGNATURE

DATE

RECENT PROJECTS			
PROJECT NAME	AWARDED AMOUNT	CONTRACT START DATE	ANTICIPATED / ACTUAL COMPLETION DATE
TOTAL AMOUNT OF PROJECTS RECENTLY UNDERTAKEN FOR JGDM			R

SIGNED BY/ON BEHALF OF TENDERER :

NAME

SIGNATURE

DATE

A8. SCHEDULE OF CONSTRUCTION EQUIPMENT

The Tenderer shall provide details of the construction equipment that will be available for the execution of the Works. The Tenderer shall distinguish between construction equipment currently available to the Tenderer and construction equipment that will be acquired, leased or hired should the Tenderer be awarded the Contract.

The information provided may be used by the Employer during the risk assessment of the Tenderer's capability and capacity to execute the Works.

[illegible]

[illegible]

If there is insufficient space above, the Tenderer may append additional sheets.

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

SIGNED BY/ON BEHALF OF TENDERER :

DATE _____

A9. SCHEDULE OF ESTIMATED MONTHLY EXPENDITURE

The Tenderer shall state the estimated monthly value of work to be executed. The estimated monthly expenditure shall:

- be based on the Tenderer's preliminary programme;
- reflect the anticipated value of work to be executed during each month of the Contract;
- be expressed exclusive of VAT; and
- total the Tender Sum exclusive of VAT.

MONTH	VALUE (EXCLUDING VAT)
1	R
2	R
3	R
4	R
5	R
6	R
7	R
8	R
9	R
10	R
11	R
12	R
13	R
14	R
15	R
16	R
17	R
18	R
19	R
20	R
21	R
22	R
23	R
24	R
25	R
26	R
27	R
28	R
29	R
30	R

MONTH	VALUE (EXCLUDING VAT)
31	R
32	R
33	R
34	R
35	R
36	R
TOTAL	R

SIGNED BY/ON BEHALF OF TENDERER:**NAME****SIGNATURE****DATE**

A10. SCHEDULE OF SUBCONTRACTORS

The Tenderer shall provide details of all subcontractors proposed for the execution of the Works, including the nature and estimated value of the work to be undertaken by each subcontractor. Where functionality points are claimed based on the experience of a specialist subcontractor, sufficient supporting information shall be provided to enable the Employer to assess such experience.

SUBCONTRACTORS			
Category / Type of Work	Proposed Subcontractor	Portion of the Works to be Undertaken	Estimated Value (Excl. VAT)
	Name: Address: Contact Person: Contact Number: Relevant Experience:		
	Name: Address: Contact Person: Contact Number: Relevant Experience:		
	Name: Address: Contact Person: Contact Number: Relevant Experience:		

	Name: Address: Contact Person: Contact Number: Relevant Experience:		
	Name: Address: Contact Person: Contact Number: Relevant Experience:		
	Name: Address: Contact Person: Contact Number: Relevant Experience:		
TOTAL (Excluding VAT)			

If there is insufficient space above, the Tenderer may append additional sheets.

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

Acceptance of a tender shall not be construed as approval of any proposed subcontractor. The Employer reserves the right to accept or reject any proposed subcontractor. Should a proposed subcontractor not be approved, the Tenderer shall nominate a suitable alternative subcontractor for approval by the Employer's Agent. The rejection of a proposed subcontractor shall not constitute grounds for any adjustment to the Tender Sum, rates, prices or Time for Completion.

Where specialist mechanical and electrical subcontractors are proposed, the Tenderer shall provide details of the subcontractor's relevant experience and qualifications in support of the functionality assessment.

SIGNED BY/ON BEHALF OF TENDERER:

NAME

SIGNATURE

DATE

A11. COMPULSORY ENTERPRISE QUESTIONNAIRE

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

Section 1: Name of enterprise:

Section 2: VAT registration number, if any:

Section 3: CIDB registration number, if any:

Section 4: CSD number:

Section 5: Particulars of sole proprietors and partners in partnerships:

Name*	Identity number*	Personal income tax number*

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

Section 6: Particulars of companies and close corporations

Company registration number:

Close corporation number:

Tax reference number:

Section 7: Complete MBD 4. Refer to Schedule A19.

Section 8: Complete MBD 6.1. Refer to Schedule A24.

Section 9: Complete MBD 8. Refer to Schedule A20.

Section 10: Complete MBD 9. Refer to Schedule A22.

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

- i) authorizes the employer to verify the tenderers tax compliance status from the South African Revenue Services that it is in order;
- ii) confirms that neither the name of the enterprise nor the name of any partner, manager, director or other person, who wholly or partly exercises or may exercise, control over the enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004;
- iii) confirms that no partner, member, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise has within the last five years been convicted of fraud or corruption;
- iv) confirms that I / we are not associated, linked or involved with any other tendering entities submitting tender offers and have no other relationship with any of the tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest; and
- v) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of my belief both true and correct.

SIGNED:

ENTERPRISE NAME

DATE

NAME

POSITION

SIGNATURE

A12. ALTERATIONS / AMENDMENTS BY TENDERER

The Tenderer shall record in the Schedule below any qualifications, deviations or proposed amendments to the tender documents.

Alternatively, the Tenderer may record such deviations and qualifications in a covering letter attached to the tender and reference such letter in this Schedule.

The Tenderer's attention is drawn to Clause C.2.11 of the Standard Conditions of Tender regarding alterations to tender documents and the Employer's handling of material deviations and qualifications.

If no qualifications, deviations or amendments are proposed, the Tenderer shall enter "NIL" in the Schedule below and sign the Schedule.

No alternative tender will be considered unless a tender strictly in accordance with the requirements of the tender documents is also submitted.

Page / Clause Reference	Description of Deviation, Qualification or Amendment

If there is insufficient space above, the Tenderer may append additional sheets.

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

SIGNED BY/ON BEHALF OF TENDERER :

NAME

SIGNATURE

DATE

A13. SCHEDULE OF DAYWORK RATES

This Daywork Schedule will be used at the discretion of the Employer's Agent for valuation of extra work, which cannot conveniently be valued at rates submitted in the Bill of Quantities. All price rates shall be exclusive of VAT.

The rates entered for labour and materials shall be exclusive of overhead charges and profit, site supervision of staff, insurance, holidays with pay and use and maintenance of small hand tools and non-mechanical plant, travelling allowances, other emoluments and allowances. Provision will be made for the insertion of percentages to cover all these items which are henceforth termed "on-costs", consumable stores, maintenance, etc.

In the case of plant no "on-costs" item is provided. The rate entered shall include any of the above "on-costs" which are pertinent and shall include profit, operator's costs, consumable stores, maintenance, depreciation, etc.

Failure to complete this Schedule may result in the tender not being considered.

A. LABOUR

Normal Working Time:

1	Labourers	R.....	per hour plus	 %	"On-Cost"
2	Gangers	R.....	per hour plus	 %	"On-Cost"
3	Tradesmen	R.....	per hour plus	 %	"On-Cost"
4	Other				
	(a).....	R.....	per hour plus	 %	"On-Cost"
	(b).....	R.....	per hour plus	 %	"On-Cost"

Overtime

1	Labourers	R.....	per hour plus	 %	"On-Cost"
2	Gangers	R.....	per hour plus	 %	"On-Cost"
3	Tradesmen	R.....	per hour plus	 %	"On-Cost"
4	Other				
	(a).....	R.....	per hour plus	 %	"On-Cost"
	(b).....	R.....	per hour plus	 %	"On-Cost"

B. PLANT

DESCRIPTION	TYPE	ESTABLISHMENT AND DISESTABLISHMENT COST	RATE PER HOUR	
			WORKING	STANDING
Trucks and ADTs				
Bulldozers				
Excavators				
Motor Grader				
			WORKING	STANDING
Tractor & Trailer				

DESCRIPTION	TYPE	ESTABLISHMENT AND DISESTABLISHMENT COST	RATE PER HOUR	
			WORKING	STANDING
Loaders				
Tractor – Loader- Backhoe				
Revolving drum type concrete mixer (Min capacity 0.25m ³)				
Water Pumps and Leadings				
Pedestrian Type Vibrating Roller (Bomag 45 or equal)				
Plate Compactor				
Compressor including Hammers and Hoses				
Pipe Testing Equipment				
Other				

C. MATERIAL

The Tenderer shall state here the percentage “On-costs” that should be added to the nett cost of materials:

..... %

SIGNED BY/ON BEHALF OF TENDERER :

NAME

SIGNATURE

DATE

A14. RECORD OF ADDENDA TO TENDER DOCUMENTS

The undersigned confirm that the following communications received from the employer before the submission of this tender offer, amending the tender documents, have been taken into account in this tender offer:		
No.	Date	Title or Details
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		

If there is insufficient space above, the Tenderer may append additional sheets.

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

SIGNED BY/ON BEHALF OF TENDERER :

NAME

SIGNATURE

DATE

A15. SIZE OF ENTERPRISE AND CURRENT WORKLOAD

What was your turnover in the previous financial year? R.....

What is the estimated turnover for your current financial year? R.....

Physical facilities:

Provide information on offices, factories, yards and warehouses occupied by your enterprise (attach details if the space provided is not enough)

Description	Address	Area (m ²)

List your current contracts and obligations:

Description	Value (R)	Start date	Duration	Expected completed date

Do you have the capacity to supply the goods and services described in this tender, should the contract be awarded to you?

Yes ☐ No ☐

POSITION

SIGNATURE

DATE

A16. STAFFING PROFILE

Provide information on the staff that you have available to execute this contract (attach a separate list if the space provided is insufficient)

Own staff: gender and race	Number of staff
Staff to be employed for the project: gender and race	Number of staff

If there is insufficient space above, the Tenderer may append additional sheets.

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

SIGNED BY/ON BEHALF OF TENDERER :

NAME

SIGNATURE

DATE

A17. PROPOSED KEY PERSONNEL

The Tenderer shall provide details of the key personnel proposed for the execution of the Works.

The Tenderer shall attach:

- Curriculum Vitae;
- Certified copies of qualifications;
- Copies of professional registrations (where applicable); and
- Proof of relevant project experience.

Relevant experience shall include experience gained on Water Treatment Works, Wastewater Treatment Works, reservoirs, pump stations, reinforced concrete water-retaining structures and similar municipal water infrastructure projects.

The personnel nominated in this Schedule shall be the personnel evaluated under the Functionality Criteria.

The Employer reserves the right to verify the qualifications, registrations and experience of the proposed personnel and to require supporting documentation where considered necessary.

Substitution of any key person after award shall be subject to the prior approval of the Employer's Agent and any proposed replacement shall possess qualifications and experience equal to or better than those of the person originally proposed.

CONTRACTS MANAGER				
Name				
Highest Qualification				
Years of Relevant Experience				
Contract and Employer	Nature of Work	Position Held	Contract Value (R)	Year Completed

CONSTRUCTION MANAGER				
Name				
Highest Qualification				
Years of Relevant Experience				
Contract and Employer	Nature of Work	Position Held	Contract Value (R)	Year Completed

MECHANICAL AND ELECTRICAL MANAGER				
Name				
Highest Qualification				
Years of Relevant Experience				
Contract and Employer	Nature of Work	Position Held	Contract Value (R)	Year Completed

GENERAL FOREMAN				
Name				
Highest Qualification				
Years of Relevant Experience				
Contract and Employer	Nature of Work	Position Held	Contract Value (R)	Year Completed

If there is insufficient space above, the Tenderer may append additional sheets.

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

SIGNED BY/ON BEHALF OF TENDERER :

NAME

SIGNATURE

DATE

A18. DECLARATION OF VALIDITY OF INFORMATION PROVIDED

I/We, the undersigned:

- a) tender to supply and deliver to the JOE GQABI DISTRICT MUNICIPALITY (hereafter "JGDM") all or any of the supplies and to render all or any of the articles, goods, materials, services or the like described both in this and the other Schedules to this Contract;
- b) Agree that we will be bound by the specifications, prices, terms and conditions stipulated in those Schedules attached to this tender document, regarding delivery and execution;
- c) further agree to be bound by those conditions, set out in, "PARTS T1; T2; C1; C2; C3 and C4", attached hereto, should this tender be accepted in whole or in part;
- d) confirm that this tender may only be accepted by the JGDM by way of a duly authorised Letter of Acceptance;
- e) declare that we are fully acquainted with the tender document and Schedules, and the contents thereof and that we have signed the Bill of Quantities and completed the Returnable Schedules and declarations, attached hereto;
- f) declare that all amendments to the tender document have been initialled by the relevant authorised person and that the document constitutes a proper contract between the JGDM and the undersigned;
- g) certify that the item/s mentioned in the tender document, qualifies/qualify for the preference(s) shown;
- h) acknowledge that the information furnished is true and correct;
- i) accept that in the event of the contract being awarded as a result of preference claimed in this tender document, I may be required to furnish documentary proof to the satisfaction of the JGDM that the claims are correct. If the claims are found to be inflated, the JGDM may, in addition to any other remedy it may have, recover from me all cost, losses or damages incurred or sustained by the JGDM as a result of the award of the contract and/or cancel the contract and claim any damages which the JGDM may suffer by having to make less favourable arrangements after such cancellation;
- j) declare that no municipal rates and taxes or municipal service charges owed by the Tenderer or any of its directors to the municipality, or to any other municipality or municipal entity, are in arrears for more than three (3) months; and
- k) declare that I have not failed to perform satisfactorily during the last five (5) years on a previous contract with the Municipality, Municipal entity or any other organ of state, after written notice was given to me that my performance was unsatisfactory.
- l) the signatory to the tender document is duly authorised; and
- m) documentary proof regarding any tendering issue will, when required, be submitted to the satisfaction of the JGDM.

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

Name of Authorised Person :

Authorised Signature :

Name of Tendering Entity :

Date :

As witness :

A19. DECLARATION OF INTEREST (MBD 4)

DECLARATION OF INTEREST

1. No bid will be accepted from persons in the service of the state¹.
2. Any person, having a kinship with persons in the service of the state, including a blood relationship, may make an offer or offers in terms of this invitation to bid. In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons connected with or related to persons in service of the state, it is required that the bidder or their authorised representative declare their position in relation to the evaluating/adjudicating authority.
- 3 **In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.**

3.1 Full Name of bidder or his or her representative:.....

3.2 Identity Number:

3.3 Position occupied in the Company (director, trustee, shareholder²):.....

3.4 Company Registration Number:

3.5 Tax Reference Number:.....

3.6 VAT Registration Number:

3.7 The names of all directors / trustees / shareholders members, their individual identity numbers and state employee numbers must be indicated in paragraph 4 below.

3.8 Are you presently in the service of the state? **YES / NO**

3.8.1 If yes, furnish particulars.

.....

¹MSCM Regulations: "in the service of the state" means to be –

- (a) a member of –
 - (i) any municipal council;
 - (ii) any provincial legislature; or
 - (iii) the national Assembly or the national Council of provinces;
- (b) a member of the board of directors of any municipal entity;
- (c) an official of any municipality or municipal entity;
- (d) an employee of any national or provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No.1 of 1999);
- (e) an executive member of the accounting authority of any national or provincial public entity; or
- (f) an employee of Parliament or a provincial legislature.

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

3.9 Have you been in the service of the state for the past twelve months?**YES / NO**

3.9.1 If yes, furnish particulars.....

.....

3.10 Do you have any relationship (family, friend, other) with persons in the service of the state and who may be involved with the evaluation and or adjudication of this bid? **YES / NO**

3.10.1 If yes, furnish particulars.

.....
.....

3.11 Are you, aware of any relationship (family, friend, other) between any other bidder and any persons in the service of the state who may be involved with the evaluation and or adjudication of this bid? **YES / NO**

3.11.1 If yes, furnish particulars

.....
.....

3.12 Are any of the company's directors, trustees, managers, principle shareholders or stakeholders in service of the state? **YES / NO**

3.12.1 If yes, furnish particulars.

.....
.....

3.13 Are any spouse, child or parent of the company's directors trustees, managers, principle shareholders or stakeholders in service of the state? **YES / NO**

3.13.1 If yes, furnish particulars.

.....
.....

3.14 Do you or any of the directors, trustees, managers, principle shareholders, or stakeholders of this company have any interest in any other related companies or business whether or not they are bidding for this contract. **YES / NO**

3.14.1 If yes, furnish particulars:

.....
.....

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

Full Name	Identity Number	State Employee Number

CAPACITY	NAME OF TENDERER	SIGNATURE	DATE

A20. DECLARATION OF TENDERER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES (MBD 8)

- 1 This Municipal Bidding Document must form part of all bids invited.
- 2 It serves as a declaration to be used by municipalities and municipal entities in ensuring that when goods and services are being procured, all reasonable steps are taken to combat the abuse of the supply chain management system.
- 3 The bid of any bidder may be rejected if that bidder, or any of its directors have:
 - a. abused the municipality's / municipal entity's supply chain management system or committed any improper conduct in relation to such system;
 - b. been convicted for fraud or corruption during the past five years;
 - c. willfully neglected, reneged on or failed to comply with any government, municipal or other public sector contract during the past five years; or
 - d. been listed in the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004).
- 4 In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.

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

Item	Question	Yes	No
4.4	Is the bidder or any of its directors owe any municipal rates and taxes or municipal charges to the municipality / municipal entity, or to any other municipality / municipal entity, that is in arrears for more than three months?	Yes ☐	No ☐
4.4.1	If so, furnish particulars:		
4.5	Was any contract between the bidder and the municipality / municipal entity or any other organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes ☐	No ☐
4.7.1	If so, furnish particulars:		

CERTIFICATION

I, THE UNDERSIGNED (FULL NAME) CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM TRUE AND CORRECT.

I ACCEPT THAT, IN ADDITION TO CANCELLATION OF A CONTRACT, ACTION MAY BE TAKEN AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

POSITION	NAME OF TENDERER	SIGNATURE	DATE

A21. DECLARATION FOR PROCUREMENT ABOVE R10 MILLION (ALL APPLICABLE TAXES INCLUDED (MBD 5))

For all procurement expected to exceed R10 million (all applicable taxes included), bidders must complete the following questionnaire:

**Delete if not applicable*

1. Are you by law required to prepare annual financial statements for auditing? ***YES / NO**
 - 1.1. If yes, submit audited annual financial statements for the past three years or since the date of establishment if established during the past three years.
.....
.....
 - 1.2. If no, annual financial statements for the past three financial years, or since the date of establishment if established during the past three years, shall be submitted with the tender.
.....
.....
2. Do you have any outstanding undisputed commitments for municipal services, towards any municipality for more than three months or any other service provider, in respect of which payment is overdue for more than 30 days? ***YES / NO**
 - 2.1. If no, this serves to certify that the bidder has no undisputed commitments for municipal services, towards any municipality for more than three months or other service provider, in respect of which payment is overdue for more than 30 days.
 - 2.2. If yes, provide particulars.
.....
.....
3. Has any contract been awarded to you by an organ of state during the past five years, including particulars of any material non-compliance or dispute concerning the execution of such contract? ***YES / NO**
 - 3.1. If yes, furnish particulars.
.....
.....
4. Will any portion of goods or services be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality / municipal entity is expected to be transferred out of the Republic? ***YES / NO**
 - 4.1. If yes, furnish particulars.
.....
.....

CERTIFICATION

I, THE UNDERSIGNED (FULL NAME)

CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM IS TRUE AND CORRECT.

I ACCEPT THAT THE STATE MAY ACT AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

POSITION

NAME OF TENDERER

SIGNATURE

DATE

A22. CERTIFICATE OF INDEPENDENT TENDER DETERMINATION (MBD 9)

1. This Municipal Bidding Document (MBD) must form part of all bids¹ invited.
2. Section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998, as amended, prohibits an agreement between, or concerted practice by, firms, or a decision by an association of firms, if it is between parties in a horizontal relationship and if it involves collusive bidding (or bid rigging).² Collusive bidding is a *pe se* prohibition meaning that it cannot be justified under any grounds.
3. Municipal Supply Regulation 38 (1) prescribes that a supply chain management policy must provide measures for the combating of abuse of the supply chain management system, and must enable the accounting officer, among others, to:
 - a. take all reasonable steps to prevent such abuse;
 - b. reject the bid of any bidder if that bidder or any of its directors has abused the supply chain management system of the municipality or municipal entity or has committed any improper conduct in relation to such system; and
 - c. cancel a contract awarded to a person if the person committed any corrupt or fraudulent act during the bidding process or the execution of the contract.
4. This MBD serves as a certificate of declaration that would be used by institutions to ensure that, when bids are considered, reasonable steps are taken to prevent any form of bid-rigging.
5. In order to give effect to the above, the attached Certificate of Bid Determination (MBD 9) must be completed and submitted with the bid.

¹ Includes price quotations, advertised competitive bids, limited bids and proposals.

² Bid rigging (or collusive bidding) occurs when businesses, that would otherwise be expected to compete, secretly conspire to raise prices or lower the quality of goods and / or services for purchasers who wish to acquire goods and / or services through a bidding process. Bid rigging is, therefore, an agreement between competitors not to compete.

MBD 9

CERTIFICATE OF INDEPENDENT BID DETERMINATION

I, the undersigned, in submitting the accompanying bid:

(Bid Number and Description)

in response to the invitation for the bid made by:

(Name of Municipality / Municipal Entity)

do hereby make the following statements that I certify to be true and complete in every respect:

I certify, on behalf of: _____ that:

(Name of Bidder)

1. I have read and I understand the contents of this Certificate;
2. I understand that the accompanying bid will be disqualified if this Certificate is found not to be true and complete in every respect;
3. I am authorized by the bidder to sign this Certificate, and to submit the accompanying bid, on behalf of the bidder;
4. Each person whose signature appears on the accompanying bid has been authorized by the bidder to determine the terms of, and to sign, the bid, on behalf of the bidder;
5. For the purposes of this Certificate and the accompanying bid, I understand that the word "competitor" shall include any individual or organization, other than the bidder, whether or not affiliated with the bidder, who:
 - a. has been requested to submit a bid in response to this bid invitation;
 - b. could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience; and
 - c. provides the same goods and services as the bidder and/or is in the same line of business as the bidder
6. The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However communication between partners in a joint venture or consortium³ will not be construed as collusive bidding.
7. In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
 - a. prices;
 - b. geographical area where product or service will be rendered (market allocation)
 - c. methods, factors or formulas used to calculate prices;
 - d. the intention or decision to submit or not to submit, a bid;
 - e. the submission of a bid which does not meet the specifications and conditions of the bid; or
 - f. bidding with the intention not to win the bid.
8. In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the products or

services to which this bid invitation relates.

9. The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.
10. I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

POSITION	NAME OF TENDERER	SIGNATURE	DATE

A23. FORM CONCERNING FULFILMENT OF THE CONSTRUCTION REGULATIONS 2014

In terms of the Construction Regulations, 2014, promulgated under the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), as amended, the Employer shall not appoint a Contractor unless satisfied that the Contractor has the necessary competencies and resources to carry out the Works safely and has made adequate provision in the tender for compliance with the applicable requirements of the Act and Regulations.

1. I confirm that I am familiar with the requirements of the Occupational Health and Safety Act, 1993, and the Construction Regulations, 2014, and that the Tenderer has, or will procure, the necessary competencies and resources required to comply with the Act and Regulations. (Tick)

YES	
NO	

2. Proposed approach to achieve compliance with the Regulations (Tick)

Own resources, competent in terms of the Regulations (refer to 3 below)	
Own resources, still to be hired and/or trained (until competency is achieved)	
Specialist subcontract resources (competent) - specify:	
.....	
.....	
.....	
.....	
.....	
.....	

3. Provide details of proposed key persons, competent in terms of the Regulations, who will form part of the Contract team as specified in the Regulations (CVs to be attached):

.....

.....

.....

4. Provide details of proposed training (if any) that will be undergone:

.....

.....

.....

.....

5. Potential key risks identified and measures for addressing risks:

.....

.....

.....

.....

6. I have fully included in my tender rates and prices (in the appropriate payment items provided in the Bill of Quantities) for all resources, actions, training and any other costs required for the due fulfilment of the Regulations for the duration of the construction and defects repair period.
(Tick)

YES	
NO	

SIGNATURE OF PERSON(S) AUTHORISED TO SIGN THIS TENDER:

1 ID NO:

2 ID NO:

A24. PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2022 (MBD 6.1)

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

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

1. GENERAL CONDITIONS

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

- the 80/20 system for requirements with a Rand value of up to R50,000,000.00 (all applicable taxes included); and
- the 90/10 system for requirements with a Rand value above R50,000,000.00 (all applicable taxes included).

1.2 The applicable preference point system for this tender is the 90/10 preference point system.

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

- (a) Price; and
- (b) Specific Goals.

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

DESCRIPTION	POINTS
PRICE	90
SPECIFIC GOALS	10
Total points for Price and Specific Goals	100

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

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

2. DEFINITIONS

- (a) **“tender”** means a written offer in the form determined by an organ of state in response to an invitation to provide goods or services through price quotations, competitive tendering process or any other method envisaged in legislation;
- (b) **“price”** means an amount of money tendered for goods or services, and includes all applicable taxes less all unconditional discounts;
- (c) **“rand value”** means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes;
- (d) **“tender for income-generating contracts”** means a written offer in the form determined by an organ of state in response to an invitation for the origination of income-generating contracts through any method envisaged in legislation that will result in a legal agreement between the organ of state and a third party that produces revenue for the organ of state, and includes, but is not limited to, leasing and disposal of assets and concession contracts, excluding direct sales and disposal of assets through public auctions; and
- (e) **“the Act”** means the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000).

3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

3.1 POINTS AWARDED FOR PRICE

3.1.1 A maximum of 80 or 90 points is allocated for price on the following basis:
80/20 or 90/10

$$P_s = 80 \left(1 - \frac{P_t - P_{\min}}{P_{\min}} \right) \quad \text{or} \quad P_s = 90 \left(1 - \frac{P_t - P_{\min}}{P_{\min}} \right)$$

Where

P_s = Points scored for price of tender under consideration
 P_t = Price of tender under consideration
 $P_{\min}$ = Price of lowest acceptable tender

4. FORMULAE FOR DISPOSAL OR LEASING OF STATE ASSETS AND INCOME GENERATING PROCUREMENT

4.1 POINTS AWARDED FOR PRICE

4.1.1 A maximum of 80 or 90 points is allocated for price on the following basis:
80/20 or 90/10

$$P_s = 80 \left(1 - \frac{P_t - P_{\min}}{P_{\min}} \right) \quad \text{or} \quad P_s = 90 \left(1 - \frac{P_t - P_{\min}}{P_{\min}} \right)$$

Where

P_s = Points scored for price of tender under consideration
 P_t = Price of tender under consideration
 $P_{\min}$ = Price of lowest acceptable tender

5. POINTS AWARDED FOR SPECIFIC GOALS

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

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

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

Specific Goals	Points	Points Claimed (Tenderer must claim points)	Evidence Required
1. Ownership-Based Specific Goals (Tenderer to indicate all categories with which it complies)			
1.1 51% or more Black ownership	2		- Central Supplier Database (CSD) Registration Report; - Company Registration Documents; and - Copies of identity documents of the relevant directors, members, shareholders or owners.
1.2 51% or more Women ownership	1		
1.3 51% or more Youth ownership	1		
1.4 51% or more Disability ownership	1		
2. LOCALITY (Tenderer to indicate all applicable categories.)			
Within the boundaries of the Joe Gqabi District Municipality	3		- Municipal account not older than 90 days; or - Municipal clearance certificate; or - Registered lease agreement; or - Title deed; or - Proof of address accompanied by a sworn affidavit (applicable to village residents only).
Within the boundaries of the Eastern Cape	2		
Outside the boundaries of the Eastern Cape	0		
Total	10		

6. DECLARATION WITH REGARD TO COMPANY/FIRM

6.1 Name of company/firm:.....

6.2 VAT registration number:.....

6.3 Company registration number:.....

6.4 TYPE OF COMPANY/ FIRM

- ☐ Partnership/Joint Venture / Consortium
☐ One-person business / Sole Propriety
☐ Close corporation
☐ Public Company
☐ Personal Liability Company
☐ (Pty) Limited
☐ Non-Profit Company
☐ State Owner Company

[TICK APPLICABLE BOX]

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

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

SIGNED BY/ON BEHALF OF THE TENDERER:

NAME

SIGNATURE

DATE

ADDRESS:

B1. CIDB CONTRACTOR REGISTRATION

The Tenderer shall attach proof of current registration with the Construction Industry Development Board (CIDB), indicating the Tenderer's contractor grading designation.

Where a Tenderer satisfies the required CIDB contractor grading designation through a Joint Venture, the Tenderer shall submit proof of CIDB registration for each Joint Venture member.

SIGNED BY/ON BEHALF OF TENDERER :

NAME

SIGNATURE

DATE

B2. TAX COMPLIANCE STATUS

The Tenderer shall provide:

- South African Revenue Service (SARS) Tax Compliance Status (TCS) PIN;
- Tax Reference Number; and
- Central Supplier Database (CSD) Registration Number.

In the case of a Consortium or Joint Venture, each member shall provide its own TCS PIN, Tax Reference Number and CSD Registration Number.

The Employer reserves the right to verify the Tenderer's tax compliance status directly with SARS.

SIGNED BY/ON BEHALF OF TENDERER:

NAME

SIGNATURE

DATE

B3. FINANCIAL STATEMENTS

Tenderers shall attach annual financial statements for the latest three (3) financial years, or since the date of establishment if established during the preceding three (3) years.

Where audited financial statements are required by law, audited financial statements shall be submitted. Where audited financial statements are not required by law, annual financial statements shall be submitted.

Each member of a Consortium or Joint Venture shall submit a separate set of financial statements.

The Employer may use the submitted information for risk assessment purposes.

SIGNED BY/ON BEHALF OF TENDERER:

NAME

SIGNATURE

DATE

B4. PRELIMINARY PROGRAMME

The Tenderer shall submit a preliminary programme demonstrating how the Works will be completed within the Time for Completion.

The preliminary programme shall, as a minimum, indicate:

- i. The proposed construction sequence and methodology for the major components of the Works.
- ii. The key activities and work packages, including civil, mechanical, electrical, testing and commissioning activities.
- iii. Critical activities and the anticipated critical path.
- iv. Key milestones, including but not limited to:
 - Site establishment;
 - Completion of bulk earthworks;
 - Completion of major concrete structures;
 - Completion of reservoirs;
 - Completion of pump stations;
 - Completion of mechanical installations;
 - Completion of electrical and instrumentation installations;
 - Commencement of testing and commissioning;
 - Completion of commissioning; and
 - Achievement of Practical Completion.
- v. The interfaces between the various work sections, disciplines, subcontractors and suppliers.
- vi. The proposed completion strategy demonstrating how the Time for Completion will be achieved.
- vii. The allowance made for procurement of long-lead items, specialist equipment and electrical and mechanical components.
- viii. Any assumptions, constraints or dependencies that may affect the execution of the Works.

The programme shall be presented in the form of a bar chart (Gantt Chart) and shall clearly indicate activity durations, sequencing, milestone dates and the anticipated critical path.

The Tenderer shall also take into account the requirements of Clause C3.5.1.2 (Construction Programme) when preparing the preliminary programme.

Details of the preliminary programme shall be appended to this Schedule.

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

SIGNED BY/ON BEHALF OF TENDERER :

NAME

SIGNATURE

DATE

B5. MUNICIPAL LEVY CLEARANCE CERTIFICATE, NOT OLDER THAN THREE (3) MONTHS FROM A MUNICIPALITY WHERE THE ENTITY OPERATES (LEASE AGREEMENTS AND SWORN STATEMENT / AFFIDAVITS ARE ALSO ACCEPTED)

Details of Municipal Levy Clearance Certificate shall be appended to this Schedule.

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

SPECIAL CONDITIONS

The recommended bidder will be required to submit proof of company office address (Municipal account not older than 90 days or Municipal Clearance certificate or lease agreement (if the tenant is responsible for rates and services), account must be attached) or proof of address and affidavit from village residents only) FOR LOCAL MUNICIPALITY AND DISTRICT MUNICIPALITY **before the award of tender**. Failure to provide the municipality with the required information within the stipulated time, the second bidder will be considered.

B6. BARGAINING COUNCIL CERTIFICATE

Tenderers shall be registered with the Bargaining Council for the Civil Engineering Industry (BCCEI) and shall attach a valid BCCEI Certificate of Registration to this schedule.

Where a Joint Venture is tendering, each Joint Venture member undertaking civil engineering work shall attach a valid BCCEI Certificate of Registration to this schedule.

Where specialist subcontractors are proposed whose activities do not fall within the scope of the BCCEI, such subcontractors shall attached proof of registration with the relevant Bargaining Council applicable to their industry, where required by law.

The Employer reserves the right to require proof that any contractor or subcontractor is registered with the Bargaining Council applicable to its activities.

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

SIGNED BY/ON BEHALF OF TENDERER :

NAME

SIGNATURE

DATE

Part C1: Agreements and Contract Data

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C1.3	Pro Forma Performance Guarantee	98
C1.4	Adjudication	103

C1.1. Form of Offer and Acceptance

Offer

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

CONTRACT NO.: JGDM2026/27-002: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

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

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

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

.....

.....Rand (in words); R..... (in figures)

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

Signature(s)			
Name(s)			
Capacity			
for the tenderer			
	(Name and address of tenderer)		
Name and signature of witness			Date

Acceptance

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

The terms of the contract, are contained in:

- Part C1 Agreements and contract data, (which includes this agreement)
- Part C2 Pricing data
- Part C3 Scope of work
- Part C4 Site information and drawings and documents or parts thereof, which may be incorporated by reference into the above listed Parts.

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

The tenderer shall within fourteen (14) days after receiving a completed copy of this agreement, including the schedule of deviations (if any), contact the employer's agent (whose details are given in the contract data) to arrange the delivery of any securities, bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the conditions of contract identified in the contract data. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.

Notwithstanding anything contained herein, this agreement comes into effect on the date when the tenderer receives one fully completed original copy of this document, including the schedule of deviations (if any). Unless the tenderer (now contractor) within five (5) working days of the date of such receipt notifies the employer in writing of any reason why he/she cannot accept the contents of this agreement, this agreement shall constitute a binding contract between the parties.

Signature(s)			
Name(s)			
Capacity			
for the Employer			
	(Name and address of employer)		
Name and signature of witness		Date	

Schedule of Deviations

Notes:

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

1.	Subject
	Details
	
	
	
2.	Subject
	Details
	
	
	
3.	Subject
	Details
	
	
	
4.	Subject
	Details
	
	
	

By the duly authorised representatives **signing this Schedule of Deviations, the Employer and the Tenderer agree to and accept the foregoing Schedule of Deviations as the only deviations from and amendments to the documents,** listed in the tender data and addenda thereto (as listed in the Returnable Documents). As well as any confirmation, clarification or changes to the terms of the offer agreed by the Tenderer and the Employer, during this process of Offer and Acceptance.

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

SIGNED ON BEHALF OF/BY THE TENDERER :

NAME

SIGNATURE

CAPACITY

DATE

SIGNED BY WITNESS :

NAME

SIGNATURE

DATE

SIGNED ON BEHALF OF THE EMPLOYER :

NAME

SIGNATURE

CAPACITY

DATE

SIGNED BY WITNESS:

NAME

SIGNATURE

DATE

CONFIRMATION OF RECEIPT

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

the(day) of (month) (year)

at (place)

SIGNED ON BEHALF OF/BY THE CONTRACTOR :

NAME

SIGNATURE

CAPACITY

SIGNED BY WITNESS :

NAME

SIGNATURE

C1.2. Contract Data (Part 1: Contract Data Provided by the Employer)

CONDITIONS OF CONTRACT

The General Conditions of Contract for Construction Works, Fourth Edition (2025), 2nd Print, published by the South African Institution of Civil Engineering, Private Bag X200, Halfway House, 1685, is applicable to this Contract and is obtainable from www.saice.org.za.

Copies of the General Conditions of Contract for Construction Works, Fourth Edition (2025) are available for inspection at the offices of the Employer's Agent.

AMENDMENTS

The following amendments to the General Conditions of Contract for Construction Works, Fourth Edition (2025), shall be applicable to this Contract:

Clause 1.1 Definitions

Clause 1.1.1.1

Replace the entire clause with:

"1.1.1.1 **"agreed"** means agreed by the Employer and the Contractor; or the Employer's Agent and the Contractor where expressly authorised in terms of the Contract, unless specifically stated otherwise."

Clause 1.1.1.5

Replace the entire clause with:

"1.1.1.5 **"Commencement Date"** means the date on which the Contract comes into effect in accordance with the Form of Offer and Acceptance, being the date on which the Tenderer receives one fully completed original copy of the Contract, including the Schedule of Deviations (if any)."

Add the following new Clauses:

*1.1.1.37 **"Accepted Programme"** means the latest programme submitted by the Contractor and accepted by the Employer's Agent in accordance with the Contract. The latest Accepted Programme supersedes all previously accepted programmes.

*1.1.1.38 **"Drawings"** means the drawings, calculations and technical information forming part of the Contract, excluding information contained in the Specifications, together with any modifications or additions issued by the Employer's Agent from time to time in accordance with the Contract. Tender Drawings are issued for tender purposes only and shall not be used for construction unless expressly authorised by the Employer's Agent.

Clause 5.4 Access to Site

Add the following clause:

*5.4.4 The Contractor shall bear all costs and charges associated with any special or temporary rights of way required in connection with access to the Site. The Contractor shall also provide, at its own cost, any additional facilities outside the Site required for the execution of the Works.

CONTRACT SPECIFIC DATA

The following contract-specific data, referring to the General Conditions of Contract for Construction Works, Fourth Edition (2025), are applicable to this Contract:

Clause 1.1.1.13: The defects liability period is **12 months**.

Clause 1.1.1.15: The name of the Employer is **Joe Gqabi District Municipality**.

Clause 1.1.1.16: The name of the Employer's Agent is **GIBB (Pty) Ltd**.

Clause 1.1.1.27: The Pricing Strategy is **Re-measurement Contract**.

Clause 1.2.1.2:

The address of the Employer is:

Physical Address:	Corner of Cole and Graham Streets, Ekhephini
Postal Address:	Private Bag X 102, Ekhephini, 9786
Email Address:	lumanyano@jgdm.gov.za

The address of the Employer's Agent is:

Physical Address:	GIBB House, 9 Pearce Street, Berea, KuGompo City, 5241
Postal Address:	PO Box 2700, Rivonia, 2128
Email Address:	lsmit@gibb.co.za

Clauses 5.1.1 / 5.8.1:

The non-working days are **Sundays**.

The special non-working days are:

- **Public holidays**
- The annual **year-end shutdown period**. Unless otherwise agreed by the Employer's Agent, the year-end shutdown period shall be fourteen (14) calendar days and shall generally coincide with the annual industry shutdown period.

Clause 5.3.1: The documentation required before commencing with the Works are:

- 1) Health and Safety Plan (Refer to Clause 4.3), together with any associated notifications, permits, approvals and other documentation required in terms of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), and the Construction Regulations, 2014, including, where applicable, a Notification of Commencement of Construction Work and a Construction Work Permit.
- 2) Initial programme (Refer to Clause 5.6.1)
- 3) Security (Refer to Clause 6.2.1)
- 4) Insurances (Refer to Clause 8.6.1)
- 5) Valid Letter of Good Standing issued by the Compensation Fund or approved licensed compensation insurer.
- 6) Confirmation of the Key Personnel proposed for the Contract (Contracts Manager, Construction Manager, Mechanical and Electrical Manager, and General Foreman), together with supporting qualifications, registrations and curriculum vitae.
- 7) Proof of Registration with the Relevant Bargaining Council and a valid Certificate of Compliance, where applicable.

The Contractor shall not commence carrying out the Works until the above documentation has been submitted and, where applicable, accepted by the Employer's Agent.

Clause 5.3.2: The time to submit the documentation required before commencement of the Works is within fourteen (14) calendar days from the Commencement Date.

Clause 5.13.1: The penalty for failing to complete the Works on time is 0.01 % of the Contract Sum, excluding VAT, per calendar day.

Clause 5.14.1: The requirements for achieving Practical Completion are that the Works have been completed to such an extent that it can be safely and effectively used for its intended purpose.

Clause 5.14.6: The work and/or rectification of certain defects and/or the clearing of the Site that may be completed by a later date than the date of the Certificate of Completion shall be any items specifically identified by the Employer's Agent in the Certificate of Completion as work to be completed after the date of the Certificate of Completion and which do not materially affect the safe operation or intended use of the Works.

Clause 5.16.3: The latent defects liability period is 10 years for civil engineering works, 5 years for building works and 3 years for electrical and mechanical engineering works.

Clause 6.2.1: The Contractor shall select one security in PART 2 of which the percentages shall be as follows:

- Fixed Performance Guarantee being 10 % of the Contract Sum, or
- Variable Performance Guarantee being 10 % of the Contract Sum for the first period and being 5 % for the Contract Sum for the second period, or
- Cash Deposit being 10 % of the Contract Sum.

The Performance Guarantee, where applicable, shall be substantially in the form set out in Section C1.3 of the Contract Data or in another form acceptable to the Employer.

The Performance Guarantee shall be issued by a financial institution or insurer listed in Section C1.3 of the Contract Data or by another financial institution or insurer approved by the Employer.

Clause 6.5.1.1.3:

The percentage allowance on the net cost of materials actually used in the completed work is 15%.

The percentage allowance on the gross remuneration of the workmen and foremen actually engaged is 20%.

Clause 6.8.2: The value of the certificates issued shall be adjusted in accordance with the Contract Price Adjustment Schedule provided in the General Conditions of Contract for Construction Works, Fourth Edition (2025) on page 95 and reproduced below for ease of reference.

CONTRACT PRICE ADJUSTMENT SCHEDULE

1. The value of each monthly statement for payment, submitted to the Employer's Agent by the Contractor, shall be increased or decreased by the amount obtained by multiplying "A_c" (defined in Clause 2 of this Contract Price Adjustment Schedule) by Contract Price Adjustment Factor, rounded off to the fourth decimal place, determined according to the formula:

$$(1 - x) \left[\frac{aL_t}{L_0} + \frac{bE_t}{E_0} + \frac{cM_t}{M_0} + \frac{dF_t}{F_0} - 1 \right]$$

in which the symbols have the following meaning:

- "x" is the proportion of "A_c" which is not subject to adjustment. Unless otherwise stated in the Contract Data, this proportion shall be **0.10**.
- "a", "b", "c" and "d" are the coefficients contained in the Contract Data, which are deemed, irrespective of the actual constituents of the work, to represent the proportionate value of labour, Contractor's Equipment, material (other than "special materials" specified in the Contract Data) and fuel respectively. The arithmetical sum of "a", "b", "c" and "d" shall be unity.
- "L" is the "Labour Index", "E" is the "Contractor's Equipment Index", "M" is the "Materials Index" and "F" is the "Fuel Index", all as defined in the Contract Data.
- The suffix "0" denotes the base indices applicable to the base month as stated in the Contract Data.
- The suffix "t" denotes the current indices applicable to the month in which the last day of the period falls to which the relevant monthly statements relates.

If an index relevant to any particular monthly statement is unknown at the time when the monthly statement is prepared, the Contractor shall estimate the value of such index. Any correction required, when the correct indices become known, shall be made by the Contractor in subsequent monthly statements.

If the organisation publishing the indices, changes any of the indices set out in the Contract Data, the Contractor shall use a correlation factor, which integrates the old and the new indices, for adjustment of subsequent payment certificates.

2. For the purposes of calculating the adjustment to the value of the relevant monthly statement, the amount “**A_c**” shall be determined by the formula:

$$A_c = T - S - N - D - G - A_p$$

In which formula the symbols shall have the following meaning:

- “**T**” is the summation of the total value of :

- (i) General Items
- (ii) Work done, and
- (iii) the materials on Site

as certified in the monthly statement under consideration without any deduction whatsoever and before any adjustment is made in terms of this Schedule.

- “**S**” is the aggregate of (i), (ii), (iii) and (iv) referred to below and included in “**T**”:

- (i) The amounts actually expended and substituted for any Prime Cost Sums
- (ii) The value of any work done by Selected Subcontractors;
- (iii) The value of any work done against Provisional Sums;
- (iv) The value of any extra or additional work;

where special arrangements for price adjustments in respect of those amounts were made and recorded at the time the work was ordered.

- “**N**” is the value of Work included in “**T**” and done at new fixed rates, where those rates were not based on labour, Contractors’ Equipment or materials costs in force at the time of tendering. Generally new rates may be based on current costs and de-escalated to the base month of the indices, in which case work done at these rates shall not be included in the value of “**D**”.
- “**D**” is the amount included in “**T**” and paid for any daywork carried out at cost plus percentage allowances as set out in General Conditions of Contract Clause 6.5.1.1.3.
- “**G**” is the amount included in “**T**” for materials classified and dealt with as “special materials”.
- “**A_p**” is the summation of all “**A_c**” amounts, determined in terms of Clause 2 of this Contract Price Adjustment Schedule for all monthly statements preceding in time the monthly statement under consideration.

3. Save only for additional work, or variations ordered to be carried out after the Due Practical Completion Date, the increase or decrease applied to a monthly statement in terms of this Contract Price Adjustment Schedule, relating to work done, Plant and/or materials supplied after the Due Practical Completion Date, shall be half the factor calculated by inserting the formula referred to in Clause 1 hereof, the indices L_t , E_t , M_t and F_t applicable at the Due Practical Completion Date.

- 4.1 The price of each “special material” specified in the Contract Data shall be increased or decreased by the net amount of any variation incurred after the date of tender on the basis set out in the Contract Data, provided that any claim for adjustment in terms hereof shall be substantiated by the submission of acceptable invoices and any other supporting documents that the Employer’s Agent considers necessary for the purpose, and provided also that no further adjustment be permitted to the price of any “special material” after the Due Practical Completion Date unless such material forms part of any additional work or variation ordered to be carried out after that date.

- 4.2 For the purposes of Clause 4.1 hereof, “the net amount of any variations” in respect of a particular “special material” shall be calculated by multiplying the difference between the rate or price entered in the Contract

Data by the Contractor for that material and the equivalent rate or price actually paid by the Contractor for the material by the quantity of the material in question.

5. If more than 1 month intervenes between the month applicable to any monthly statement and the month applicable to the succeeding monthly statement, then the indices L_t , E_t , M_t and F_t applicable to such succeeding monthly statement shall each be the arithmetic mean, rounded off to the second decimal place, of the relevant indices applicable to the month of measurement and to such intervening months.

The value of "x" is **0,15**.

The values of the coefficients are:

a = 0,25 Labour

b = 0,15 Contractor's Equipment

c = 0,55 Material

d = 0,05 Fuel

The indices for "L", "E", "M" and "F" are as published by Statistics South Africa.

The urban area nearest to the Site is Nqanqarhu.

The base month is the month before tenders close.

Clause 6.8.3: Price adjustments for variations in the costs of special materials are not allowed.

Clause 6.10.3:

The percentage of retention being 10% (ten percent).

The limit of retention money being 5% (five percent) of the Contract Price.

Clause 6.10.1.5:

The percentage advance on materials not yet built into the Permanent Works shall be eighty percent (80%).

The percentage advance on Plant not yet supplied to Site shall be 75 %.

The value of the security bond for Plant and materials not yet supplied to Site or not yet built into the Permanent Works shall be 100% of the amount certified for such Plant and materials.

Clause 8.6.1.1.2: The value of Plant and materials supplied by the Employer to be included in the insurance sum shall be R 0.00 (zero).

Clause 8.6.1.1.3: The amount to cover professional fees for repairing damage and loss to be included in the insurance sum shall be R 0.00 (zero).

Clause 8.6.1.2: A Coupon Policy for Special Risks Insurance issued by Sasria is not required.

Clause 8.6.1.3: The limit of indemnity for liability insurance is R 5,000,000.00 for any single claim.

Clause 8.6.1.5: In addition to the insurances required in terms of General Conditions of Contract Clauses 8.6.1.1 to 8.6.1.4 the following insurance is also required:

- 1) Insurance of Construction Equipment, tools, site offices, temporary structures and other Contractor's property brought onto the Site for the execution of the Works, for an amount sufficient to provide for their replacement.
- 2) Motor Vehicle Liability Insurance including, as a minimum, Balance of Third Party Risks and Passenger Liability Indemnity.
- 3) Where the Contractor manufactures and/or fabricates any portion of the Works at premises other than the Site, the Contractor shall satisfy the Employer that all materials and equipment intended for incorporation into the Works are adequately insured during manufacture and/or fabrication. Where the Employer has an insurable interest in such materials or equipment, such interest shall be noted by endorsement to the Contractor's insurance policies.

Clause 10.5.1: Dispute resolution shall be by standing adjudication.

Clause 10.5.3: The number of Adjudication Board Members to be appointed is one (1).

Clause 10.7.1: The determination of disputes shall be by arbitration.

C1.2 Contract Data (Part 2: Contract Data Provided by the Contractor)

Clause 1.1.1.9: The name of the Contractor is:

Clause 1.2.1.2: The address of the Contractor is:

Physical Address

Postal Address

.....
.....
.....
.....

.....
.....
.....
.....

Telephone:

Email:

Clauses 1.1.1.14 / 5.5.1: The time for achieving Practical Completion is:

Clause 6.2.1: The security to be provided by the Contractor shall be one of the following below to be selected by the Contractor. The percentages shall be as the Employer has stated under Clause 6.2.1 in Part 1.

Type of Security	Contractor's selection (Indicate "Yes" or "No")
Fixed Performance Guarantee.	
Variable Performance Guarantee.	
Cash Deposit.	

SIGNED ON BEHALF OF/BY THE TENDERER :

NAME

SIGNATURE

CAPACITY

DATE

C1.3. Pro Forma Performance Guarantee

GUARANTOR DETAILS AND DEFINITIONS

“Guarantor” means:

.....

Physical address:

.....

“Employer” means: Joe Gqabi District Municipality

“Contractor” means:

.....

“Employer’s Agent” means: GIBB (Pty) Ltd

“Works” means:

.....

“Site” means:

.....

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

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

Amount in words:

.....

“Guaranteed Sum” means: The maximum aggregate amount of R.....

“Guaranteed Amount” in words:

.....

Type of Performance Guarantee:(*Insert Variable or Fixed*)

“Expiry Date” means: *the delivery date of the Completion Certificate.*

1. VARIABLE PERFORMANCE GUARANTEE

1.1. Where a Variable Performance Guarantee has been selected, the Guarantor's liability shall be limited during the following periods as follows:

1.1.1. To the Guaranteed Sum for the period from and including the date of issue of the Performance Guarantee up to and including the date of issue of the interim payment certificate certifying, for the first time, more than 50 % of the Contract Sum:

R.....

Amount in words

1.1.2. To the Reduced Amount set out below for the period from the day following the date of issue of the said interim payment certificate up to and including the date of issue by the Employer's Agent of the Certificate of Completion of the Works, or the date of payment in full of the Guaranteed Sum, or the Expiry Date, whichever occurs first:

Reduced amount: R.....

Reduced Amount in words

1.2. The Employer's Agent and/or the Employer shall advise the Guarantor in writing of the date on which the interim payment certificate certifying, for the first time, more than 50% of the Contract Sum, has been issued and the date on which the Certificate of Completion of the Works has been issued.

2. FIXED PERFORMANCE GUARANTEE

2.1. Where a Fixed Performance Guarantee has been selected, the Guarantor's liability shall be limited to the amount of the Guaranteed Sum.

2.2. The Guarantor's period of liability shall be from and including the date of issue of the Performance Guarantee, up to the date of issue by the Employer's Agent of the Certificate of Completion of the Works, or the date of payment in full of the Guaranteed Sum, or the Expiry Date, whichever occurs first.

3. CONDITIONS APPLICABLE TO VARIABLE AND FIXED PERFORMANCE GUARANTEES

3.1. The Guarantor hereby acknowledges that:

3.1.1. Any reference in this Performance Guarantee to the Contract is made for the purpose of convenience and shall not be construed as any intention whatsoever to create an accessory obligation or any intention whatsoever to create a suretyship.

3.1.2. Its obligation under this Performance Guarantee is restricted to the payment of money.

3.2. Subject to the Guarantor's maximum liability referred to in 1.1 or 2.1, the Guarantor hereby undertakes to pay the Employer the sum certified upon receipt of the documents identified in 3.2.1 to 3.2.3:

3.2.1. A copy of a first written demand issued by the Employer to the Contractor stating that payment of a sum certified by the Employer's Agent in an Interim or Final Payment Certificate has not been made in terms of the Contract and failing such payment within 7 calendar days, the Employer intends to call upon the Guarantor to make payment in terms of 3.2.2;

3.2.2. A first written demand issued by the Employer to the Guarantor at the Guarantor's physical address with a copy to the Contractor stating that a period of 7 days has elapsed since the first written demand in terms of 3.2.1 and the sum certified has still not been paid;

3.2.3. A copy of the aforesaid payment certificate which entitles the Employer to receive payment in terms of the Contract of the sum certified in 3.2.

3.3. Subject to the Guarantor's maximum liability referred to in 1.1 or 2.1, the Guarantor undertakes to pay to the Employer the Guaranteed Sum or the full outstanding balance upon receipt of a first written demand from the Employer to the Guarantor at the Guarantor's physical address calling up this Performance Guarantee, such demand stating that:

3.3.1. the Contract has been terminated due to the Contractor's default and that this Performance Guarantee is called up in terms of 3.3; or

- 3.3.2. a provisional or final sequestration or liquidation court order has been granted against the Contractor and that the Performance Guarantee is called up in terms of 3.3; or
- 3.3.3. a voluntary winding-up resolution has been filed by the Contractor and that the Performance Guarantee is called up in terms of 3.3; or
- 3.3.4. a resolution to commence business rescue proceedings has been filed by the Contractor and that the Performance Guarantee is called up in terms of 3.3; or
- 3.3.5. a court order has been granted placing the Contractor under supervision and the commencement of business rescue proceedings and that the Performance Guarantee is called up in terms of 3.3.
- 3.3.6. The written demand to be accompanied by a copy of:
 - 3.3.6.1. the notice of termination or
 - 3.3.6.2. the relevant court order or
 - 3.3.6.3. the relevant notification issued by the Companies and Intellectual Properties Commission or
 - 3.3.6.4. the relevant notification by the applicable government authority.
- 3.4. Where the Employer is not in possession or unable to submit the documents in terms of 3.3.6 above, the Employer shall be allowed a 60-calendar-day period to submit the documents subject to the following:
 - 3.4.1. The demand in terms of 3.3 must be received by the Guarantor before the expiry date.
 - 3.4.2. The effective date as evidenced in the document in terms of 3.3.6 is prior to the Expiry Date
 - 3.4.3. Payment by the Guarantor shall be made within 7 calendar days after receipt of the documents.
 - 3.4.4. Failure to submit the documents within the 60-calendar-day period will result in the demand being null and void.
- 3.5. It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 3.2 and 3.3 shall not exceed the Guarantor's maximum liability in terms of 1.1 or 2.1.
- 3.6. Where the Guarantor has made payment in terms of 3.3, the Employer shall upon the date of issue of the Final Payment Certificate submit an expense account to the Guarantor showing how all monies received in terms of this Performance Guarantee have been expended and shall refund to the Guarantor any resulting surplus. All monies refunded to the Guarantor in terms of this Performance Guarantee shall bear interest at the prime overdraft rate of the Employer's bank compounded monthly and calculated from the date payment was made by the Guarantor to the Employer until the date of refund.
- 3.7. Payment by the Guarantor in terms of 3.2 or 3.3 shall be made within 7 calendar days upon receipt of the first written demand to the Guarantor.
- 3.8. Payment by the Guarantor in terms of 3.3 will only be made against the return of the original Performance Guarantee by the Employer.
- 3.9. The Employer shall have the absolute right to arrange his affairs with the Contractor in any manner which the Employer may consider fit and the Guarantor shall not have the right to claim his release from this Performance Guarantee on account of any conduct alleged to be prejudicial to the Guarantor.
- 3.10. The Guarantor chooses the physical address as stated above for the service of all notices for all purposes in connection herewith.
- 3.11. This Performance Guarantee is neither negotiable nor transferable and shall expire in terms of 1.1.2 or 2.2, where after no claims will be considered by the Guarantor. The original of this Guarantee shall be returned to the Guarantor after it has expired.
- 3.12. This Performance Guarantee, with the required demand notices in terms of 3.2 or 3.3, shall be regarded as a liquid document for the purposes of obtaining a court order.
- 3.13. Where this Performance Guarantee is issued in the Republic of South Africa the Guarantor hereby consents in terms of Section 45 of the Magistrates' Courts Act No 32 of 1944, as amended, to the jurisdiction of the Magistrate's

Court of any district having jurisdiction in terms of Section 28 of the said Act, notwithstanding that the amount of the claim may exceed the jurisdiction of the Magistrate's Court.

SIGNED AT:.....

GUARANTOR (1)

SIGNATURE

DATE

CAPACITY

GUARANTOR (2)

SIGNATURE

DATE

CAPACITY

WITNESS (1)

SIGNATURE

WITNESS (2)

SIGNATURE

LIST APPROVED FINANCIAL INSTITUTIONS

The following financial institutions are currently approved for the issue of contract guarantees:

National Banks:

ABSA Bank Ltd.
FirstRand Bank Ltd.
Investec Bank Ltd.
Nedbank Ltd.
Standard Bank of South Africa Ltd.

International Banks (with branches in SA):

Citibank N.A.
Crédit Agricole Corporate and Investment Bank
Deutsche Bank AG
HSBC Bank plc
JPMorgan Chase Bank
Société Générale
Standard Chartered Bank

Insurance companies:

AIG South Africa
Coface South Africa
Compass Insurance Company Ltd.
Constantia Insurance Company Ltd.
Credit Guarantee Insurance Corporation (CGIC)
Guardrisk Insurance Company Ltd.
Hollard Insurance Company Ltd.
Infiniti Insurance Ltd.
Lombard Insurance Company Ltd.
Old Mutual Insure Ltd.
Regent Insurance Company Ltd.
Renasa Insurance Company Ltd.
Santam Limited

C1.4. Adjudication

Adjudication shall be carried out in accordance with Clause 10.5 of the General Conditions of Contract for Construction Works, Fourth Edition (2025), and the Contract Data.

Part C2: Pricing Data and Bill of Quantities

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C2.1. Pricing Assumptions

1. Measurement and payment shall be in accordance with the relevant provisions of Clause 8 of each of the SANS 1200 Specifications for Civil Engineering Construction, referred to in the Scope of Work. The Preliminary and General items shall be measured in accordance with the provisions of SANS 1200 A: General.

2. The units of measurement described in the Bill of Quantities are metric units.
 Abbreviations used in the Bill of Quantities are as follows:

%	=	per cent	m ² .pass	=	square metre-pass
h	=	hour	m ³	=	cubic metre
ha	=	hectare	m ³ .km	=	cubic metre-kilometre
kg	=	kilogram	MN	=	meganewton
kℓ (kL)	=	kilolitre	MN.m	=	meganewton-metre
km	=	kilometre	MPa	=	megapascal
km-pass	=	kilometre-pass	No.	=	number
kPa	=	kilopascal	Prov sum	=	Provisional sum
kW	=	kilowatt	P C sum	=	Prime Cost sum
ℓ (L)	=	litre	sum	=	lump sum
m	=	metre	t	=	ton (1 000 kg)
mm	=	millimetre	W/day	=	Work day
m ²	=	square metre			

3. The Tender Data, Contract Data, Scope of Work and Site Information shall be read in conjunction with the Bill of Quantities.
4. Unless otherwise stated, items are measured net in accordance with the drawings, and no allowance is made for waste.
5. The Tenderer is free to insert rates and prices of its own choosing for each item in the Bill of Quantities. Tenderers are reminded that rates and prices entered in the Bill of Quantities may be used in the valuation of variations and additional work.
6. The prices and rates to be inserted in the Bill of Quantities are to be the full, inclusive prices for the Work described under the items. Such prices and rates shall cover all costs and expenses that may be required in accordance with the provisions of the Scope of Work; and shall cover the cost of all general risks, liabilities, and obligations set forth or implied in the Contract Data; as well as overhead charges and profit. These prices shall be used as a basis for assessment of payment for additional Work that may have to be carried out.
7. It will be assumed that prices included in the Bill of Quantities are based on Acts, Regulations, By-laws, International Standards and National Standards that were published 28 days before the closing date of the Tender. (Refer to **www.sabs.co.za** or **www.iso.org** for information on standards).
8. Where the Scope of Work requires detailed drawings and designs or other information to be provided, all costs associated therewith shall be deemed to be included in the rates, prices and lump sums tendered for such items.
9. An item against which no price is entered will be considered to be covered by the other prices or rates in the Bill of Quantities. A single lump sum will apply should a number of items be grouped together for pricing purposes.
10. The quantities set out in the Bill of Quantities are approximate and do not necessarily represent the actual amount of Work to be done. The quantities of Work accepted and certified for payment shall be used for determining payments due and not the quantities given in the Bill of Quantities. In accordance with Clause 6.7.1 of the General Conditions of Contract for Construction Works, Fourth Edition (2025), the Contractor shall not order quantities of materials based solely on the quantities stated in the Bill of Quantities and shall verify such quantities from the Drawings and Site conditions.
11. Where work is required in terms of the Contract and no applicable pay item exists in the Bill of Quantities, such work shall be valued in accordance with the provisions of the Contract.
12. The short descriptions of the items of payment given in the Bill of Quantities are only for the purposes of identifying the items. More details regarding the extent of the Work entailed under each item's description appear in the Scope of Work and Specification Data.
13. Descriptions in the Bill of Quantities are abbreviated and comply generally with those in the SANS 1200 Standardised Specifications.

14. The clauses in the Specification Data in which further information is provided regarding a schedule item appear under the “**reference clause**” column in the Bill of Quantities. The reference clauses indicated are not necessarily the only sources of information in respect of the scheduled items. Further information and specifications may be found elsewhere in the contract documents.
15. The rates and prices entered in the Bill of Quantities shall exclude VAT. Provision is made in the Summary of the Bill of Quantities for VAT to be added.
16. The Tenderer shall price and extend each item, total each page and carry the total of each section of the Bill of Quantities to the Summary. The Gross Total of the Tender shall be carried to the Offer.

C2.2. Bill of Quantities

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 01 PRELIMINARY AND GENERAL

SECTION: 1 PRELIMINARY AND GENERAL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
1.1	SANS 1200 A 8.3 PSA 8.3	FIXED-CHARGE ITEMS				
1.1.1	8.3.1	Contractual Requirements	Sum	1		
	8.3.2	Establish Facilities on the Site :				
	8.3.2.1	a) Facilities for Employer's Agent				
1.1.2	PSAB 8.2	Offices: 1 furnished offices and a boardroom including heating/ cooling and lighting	Sum	1		
1.1.3	PSAB 8.2	Garages: 2 Covered carports	Sum	1		
1.1.4	PSAB 8.2	Survey Assistants and equipment	Sum	1		
1.1.5	PSAB 8.2	Provide a cellular phone	Sum	1		
1.1.6	PSAB 8.2	Provide a computer	Sum	1		
1.1.7	PSAB 8.2	Provide and erect 2 Employer's Agent's nameboards as per drawing	No	2		
	8.3.2.2	b) Facilities for Contractor including Electrical and Mechanical Subcontractor				
1.1.8	PSA 8.3.2.2 (a)	Offices and storage sheds	Sum	1		
1.1.9		Workshops	Sum	1		
1.1.10		Ablution and latrine facilities	Sum	1		
1.1.11		Tools and equipment	Sum	1		
1.1.12		Water supplies, electric power and communications	Sum	1		
1.1.13	PSA 8.3.2.2 (h)	Dealing with water	Sum	1		
1.1.14		Access	Sum	1		
1.1.15	8.3.3 PSA 8.3.3	Contractors initial obligations to ensure compliance with the health and safety requirements of JGDM and the Construction Regulations 2014 including the cost of carrying out a risk assessment, the preparations of a health and safety plan, the appointment of a safety officer, training, medical assessment of employees and any other obligations not covered elsewhere	Sum	1		
1.1.16	8.3.3 PSA 8.3.3	Contractors initial obligations in respect of the employment of a Community Liaison Officer (CLO)	Prov.Sum	1	24 200.00	24 200.00
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 01 PRELIMINARY AND GENERAL

SECTION: 1 PRELIMINARY AND GENERAL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
1.1.17	8.3.3 PSA 8.3.3	Contractors initial obligations to ensure compliance with the Environmental Management Plan and the National Environmental Management Act.	Sum	1		
1.1.18	8.3.3	Other fixed-charge obligations	Sum	1		
1.1.19	8.3.4 PSA 8.3.4	Remove Employer's Agent's and Contractor's Site establishment on completion	Sum	1		
1.2	8.4 PSA 8.4 PSA8.2.2	TIME-RELATED ITEMS				
1.2.1	8.4.1	Contractual Requirements	Sum	1		
	8.4.2	Operate and maintain facilities on the Site:				
	8.4.2.1	a) Facilities for Employer's Agent for duration of construction				
1.2.2	PSAB 8.2	Offices: 1 furnished offices and a boardroom including heating/ cooling and lighting	Sum	1		
1.2.3	PSAB 8.2	Survey assistants and equipment	Sum	1		
1.2.4	PSAB 8.2	Garages: 2 Covered carports	Sum	1		
1.2.5	PSAB 8.2	Maintain a cellular phone	Sum	1		
1.2.6	PSAB 8.2	Maintain a computer	Sum	1		
	8.4.2.2	b) Facilities for Contractor for duration of construction, except where otherwise stated				
1.2.7	PSA 8.4.2.2 (a)	Offices and storage sheds	Sum	1		
1.2.8		Workshops	Sum	1		
1.2.9		Ablution and latrine facilities	Sum	1		
1.2.10		Tools and equipment	Sum	1		
1.2.11		Water supplies, electric power and communications	Sum	1		
1.2.12	PSA 8.4.2.2 (h)	Dealing with water	Sum	1		
1.2.13		Access	Sum	1		
1.2.14	8.4.3 PSA 8.4.3	Supervision	Sum	1		
1.2.15	8.4.4	Company and head office overhead costs	Sum	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 01 PRELIMINARY AND GENERAL

SECTION: 1 PRELIMINARY AND GENERAL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
1.2.16	8.4.5 PSA 8.4.5	Contractors time related obligations to ensure compliance with the health and safety requirements of JGDM and the Construction Regulations 2014 including the cost of carrying out a risk assessment, the preparations of a health and safety plan, the appointment of a safety officer, training, medical assessment of employees and any other obligations not covered elsewhere	Sum	1		
1.2.17	8.4.5 PSA 8.4.5	Provision for a full time Site Safety Officer	Sum	1		
1.2.18	8.4.5 PSA 8.4.5	Employment of Community Liaison Officer (CLO) for the duration of construction	Prov.Sum	1	306 000.00	306 000.00
1.2.19	8.4.5 PSA 8.4.5	Employment of PSC @ R300/month/member with maximum 6 members for the duration of construction	Prov.Sum	1	64 800.00	64 800.00
1.2.20	8.4.5 PSA 8.4.5	Contractors Time-related obligations to ensure compliance with the Environmental Management Plan and the National Environmental Management Act.	Sum	1		
1.2.21	8.4.5 PSA 8.4.5	Other time-related obligations	Sum	1		
1.3	8.5	SUMS STATED PROVISIONALLY BY EMPLOYER'S AGENT For work to be done by Contractor and valued in terms of Clause 6.6 of the conditions of contract				
1.3.1	8.5	a) Work to be done by a nominated subcontractor				
1.3.1.1		PLC Control system equipment supply and installation	PSum	1	200 000.00	200 000.00
1.3.1.2		Percentage adjustment for the Contractor's overheads, profits and for attendance on PLC Control equipment 1.3.1.1	%	200 000.00		
1.3.1.3		Level Control equipment supply and installation	PSum	1	100 000.00	100 000.00
1.3.1.4		Percentage adjustment for the Contractor's overheads, profits and for attendance on Level Control equipment 1.3.1.3	%	100 000.00		
1.3.1.5		Supply and install SCADA type telemetry system inclusive of data links, site cabling and labour	PSum	1	500 000.00	500 000.00
1.3.1.6		Percentage adjustment on item 1.3.1.5 for overheads and profit on telemetry system	%	500 000.00		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 01 PRELIMINARY AND GENERAL

SECTION: 1 PRELIMINARY AND GENERAL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
1.3.1.7		Accommodation for the Engineer for the Duration of Construction	PSum	1	300 000.00	300 000.00
1.3.1.8		Percentage adjustment on item 1.3.1.7 for overheads and profit and for attendance on Accommodation	%	300 000.00		
1.3.1.9		Accommodation for the two Trainee Technicians for the Duration of Construction	PSum	1	910 500.00	910 500.00
1.3.1.10		Percentage adjustment on item 1.3.1.9 for overheads and profit and for attendance on Accommodation	%	910 500.00		
1.3.1.11		Two computers for the two Trainee Technicians for the Duration of Construction	PSum	1	40 000.00	40 000.00
1.3.1.12		Percentage adjustment on item 1.3.1.11 for overheads and profit and for attendance on Computer	%	40 000.00		
1.3.1.13		Allow for bulk electrical supply by Elundini LM, including connection fee	PSum	1	200 000.00	200 000.00
1.3.1.14		Percentage adjustment on item 1.3.1.13 for overheads and profit and for attendance on Elundini LM	%	200 000.00		
1.3.1.15		Allow for relocation of overhead lines by TELKOM	PSum	1	50 000.00	50 000.00
1.3.1.16		Percentage adjustment on item 1.3.1.15 for overheads and profit and for attendance on TELKOM	%	50 000.00		
1.3.1.17	PSA 8.5 (b)	b) Additional testing required by the Employer's Agent	PSum	1	100 000.00	100 000.00
1.3.1.18		Percentage adjustment on item 1.3.1.17 for Additional Testing	%	100 000.00		
1.3.1.19		Employment of two Trainee Technicians for the duration of the contract (Salary = R7500pm, living allowance = R2500pm)	PSum	1	360 000.00	360 000.00
1.3.1.20		Percentage adjustment on item 1.3.1.19 for Trainee Technicians	%	360 000.00		
1.3.1.21		Allowance for Lightning Protection	PSum	1	50 000.00	50 000.00
1.3.1.22		Percentage adjustment on item 1.3.1.21 for Lightning Protection	%	50 000.00		
1.3.1.23		Allow for the training of eight operators to operate the water treatment works	PSum	1	50 000.00	50 000.00
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 01 PRELIMINARY AND GENERAL

SECTION: 1 PRELIMINARY AND GENERAL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
1.3.1.24		Percentage adjustment on item 1.3.1.23 for cost and profit	%	50 000.00		
1.3.1.25		Remedial work on the existing 315mm diameter uPVC Maclear Dam gravity main	PSum	1	200 000.00	200 000.00
1.3.1.26		Percentage adjustment on item 1.3.1.25 for cost and profit	%	200 000.00		
1.3.1.27		Pigging of the existing 315mm diameter uPVC Maclear Dam gravity main	PSum	1	30 000.00	30 000.00
1.3.1.28		Percentage adjustment on item 1.3.1.27 for cost and profit	%	30 000.00		
1.3.1.29		Dealing with and connecting to the existing 315mm diameter uPVC Maclear Dam gravity main	PSum	1	20 000.00	20 000.00
1.3.1.30		Percentage adjustment on item 1.3.1.29 for cost and profit	%	20 000.00		
1.3.1.31		Supply of and installation of Safety signage and other safety related equipment	PSum	1	80 000.00	80 000.00
1.3.1.32		Percentage adjustment on item 1.3.1.31 for cost and profit	%	80 000.00		
1.3.2		Supply and deliver to the water treatment works the following items:				
1.3.2.1		Supply of First Aid kit	No	1		
1.3.2.2		Aluminium ladder 4m extendable to 7m in length	No	1		
1.3.2.3		Valve keys	No	2		
1.3.2.4		Petrol Lawn mower (Yamaha PR46G or similar approved)	No	1		
1.3.2.5		Petrol Weedeater (Stihl FS85 or similar approved)	No	1		
1.3.2.6		Supply of and complete installation of rain gauge	No	1		
1.3.3		Power Factor Correction Equipment				
1.3.3.1		Allow for evaluating the power factor correction requirements of the plant	PSum	1	10 000.00	10 000.00
1.3.3.2		Percentage adjustment on item 1.3.3.1 for overheads and profit	%	10 000.00		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 01 PRELIMINARY AND GENERAL

SECTION: 1 PRELIMINARY AND GENERAL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
1.3.4		Supply, install, test and commission automatic 100 KVAR de-tuned power factor correction unit				
1.3.4.1		Supply (1 No)	PSum	1	70 000.00	70 000.00
1.3.4.2		Percentage adjustment on item 1.3.4.1 for overheads and profit	%	70 000.00		
1.3.4.3		Install (1 No)	PSum	1	2 000.00	2 000.00
1.3.4.4		Percentage adjustment on item 1.3.4.3 for overheads and profit	%	2 000.00		
1.3.4.5		Testing required by Employers Agent	PSum	1	50 000.00	50 000.00
1.3.4.6		Percentage adjustment on item 1.3.4.5 for overheads and profit	%	50 000.00		
1.4	8.7	DAYWORK				
1.4.1		Labour				
1.4.1.1		Electrical Foreman	h	100		
1.4.1.2		Skilled	h	200		
1.4.1.3		Semi-skilled	h	500		
1.4.1.4		Unskilled	h	1000		
1.4.2		Materials				
1.4.2.1		Materials	PSum	1	50 000.00	50 000.00
1.4.2.2		Percentage adjustment to item 1.4.2.1 for materials	%	50 000.00		
1.4.3		Plant				
1.4.3.1		Contractors own Plant	PSum	1	50 000.00	50 000.00
1.4.3.2		Plant hired by Contractor	PSum	1	50 000.00	50 000.00
1.4.3.3		Percentage adjustment to item 1.4.3.2 for plant	%	50 000.00		
1.5	8.8	TEMPORARY WORKS				
	8.8.4	Existing services				
1.5.1	PSDB	c) Excavate by hand in soft material to expose existing services	m³	30		
	8.3.2					
	8.8.5	Land Survey Act				
1.5.2		a) Search for and record trigonometrical survey beacons, bench marks and plot boundary pegs, and expose on completion of Works	Sum	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 01 PRELIMINARY AND GENERAL

SECTION: 1 PRELIMINARY AND GENERAL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
1.5.3		BROUGHT FORWARD b) Protect beacons, etc., located under item 1.5.2 and reposition or re-establish, as ordered, the same by a Registered Land Surveyor on completion of the Works	Sum	1		
TOTAL FOR SECTION 1 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 02 SITE CLEARANCE AND EARTHWORKS

SECTION: 1 SITE CLEARANCE AND EARTHWORKS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
1.1	SANS 1200 C	SITE CLEARANCE				
1.1.1	8.2.1 PSC 8.2.1	Clear and grub	ha	1		
1.1.2	8.2.2	Remove and grub large trees and tree stumps of girth				
1.1.2.1		Over and up to 1 m 2 m	No.	3		
1.1.3	8.2.7	Dismantle, remove from trench and store existing 315mmø PVC gravity pipeline	m	100		
1.1.4	8.2.10 PSC 8.2.10	Remove topsoil to nominal depth of 150 mm and stockpile	m³	1500		
1.2	SANS 1200 D PSD 8.3.2	EARTHWORKS				
1.2.1	8.3.2 PSD 8.3.2	Bulk Excavation				
	8.3.2(a)	Excavate in all materials, select and use for embankment or backfill or dispose, as ordered:				
1.2.1.1		Forming of platforms	m³	4000		
1.2.1.2		Gate House	m³	40		
1.2.1.3		Office/Laboratory	m³	140		
1.2.1.4		Supervisor Living Quarters	m³	0		
1.2.1.5		Operator Living Quarters	m³	0		
1.2.1.6		Inlet/Dosing building	m³	80		
1.2.1.7		Flocculation channel	m³	140		
1.2.1.8		Sedimentation tank	m³	2250		
1.2.1.9		Filter building	m³	225		
1.2.1.10		Clear water reservoir	m³	1750		
1.2.1.11		Pumpstation	m³	750		
1.2.1.12		Sludge lagoons	m³	950		
	8.3.2(b)	Extra-over for Items 1.2.1.2 to 1.2.1.12:				
1.2.1.13		Hard rock excavation (Prov) including disposal within 5km radius	m³	3000		
1.2.2	8.3.3 PSD 8.3.3, 8.2.3	Restricted Excavation				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 02 SITE CLEARANCE AND EARTHWORKS

SECTION: 1 SITE CLEARANCE AND EARTHWORKS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
	8.3.3(a)	Excavate for restricted foundations and footings in all materials, select and use for backfill or embankment or dispose, as ordered:				
1.2.2.1		Gate House	m³	10		
1.2.2.2		Office/Laboratory	m³	35		
1.2.2.3		Inlet/Dosing building	m³	35		
1.2.2.4		Supervisor Living Quarters	m³	0		
1.2.2.5		Operator Living Quarters	m³	0		
1.2.2.6		Flocculation channel	m³	5		
1.2.2.7		Sedimentation tank	m³	27		
1.2.2.8		Filter building	m³	5		
1.2.2.9		Clear water reservoir	m³	5		
1.2.2.10		Pumpstation	m³	65		
1.2.2.11		Sludge lagoons	m³	25		
	8.3.3(b)	Extra-over for items 1.2.2.1 to 1.2.2.11:				
1.2.2.12		Hard rock excavation (Prov) including disposal within 5km radius	m³	65		
1.2.3	8.3.4	Importing of Material				
1.2.3.1		a) Extra-over for importation from commercial sources of G5 quality material placed in 150 mm layers and compacted to 98% MOD AASHTO density	m³	320		
1.2.3.2		a) Extra-over for importation from commercial sources of G7 subgrade quality material placed in 150 mm layers and compacted to 95% MOD AASHTO density	m³	820		
1.2.4	8.3.5 PSD	Extra excavation in all materials to provide working space around structures	m²	1500		
1.2.5	8.3.5	Extra-over item 1.2.4 for extra excavation in hardrock to provide working space	m²	400		
1.2.6	8.3.8	Existing services				
1.2.6.1	8.3.8.1	c) Excavate by hand in soft material to expose existing 315mm water pipe	m³	60		
1.2.7	8.3.9	Extra-over for backfill or fill material against structures	m³	1500		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 02 SITE CLEARANCE AND EARTHWORKS

SECTION: 1 SITE CLEARANCE AND EARTHWORKS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
1.2.8	8.3.10 PSD 8.3.10	Topsoiling to a minimum thickness of 100mm after compaction	m ²	7500		
1.3	PSER	REVEGATATION				
1.3.1	PSER 8.1	Commercial seed	kg	20		
1.3.2	PSER 8.2	Mulch	kg	20		
1.3.3	PSER 8.3	Soil stabilizer				
1.3.3.1		Soil stabilizer (chemical)	kg	12		
1.3.4	PSER 8.4	Fertilizer	kg	600		
1.3.5	PSER 8.5	Hydroseeding	m ²	10000		
1.3.6	PSER 8.6	Maintenance of planted area	m ²	10000		
TOTAL FOR SECTION 1 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 03 ROADWORKS

SECTION: 3 ROADWORKS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
3.1	SANS 1200DM	EARTHWORKS (ROADS, SUBGRADE)				
3.1.1	8.3.4 PSDM	Cut to fill in all materials and compact to 93% mod. AASHTO maximum density	m³	100		
3.1.2	8.3.7 PSDM 8.3.7	Cut to spoil or stockpile as instructed by the Employer's Agent	m³	1050		
3.1.3		Extra-over on items 3.1.1 and 3.1.2 for hard ~~rock~~	m³	50		
3.1.4	8.3.4 PSDM 8.3.4	Borrow from available excavations on site to fill a 600mm selected layer from rockfill compacted by 8 roller passes where ordered by the Engineer	m³	400		
3.1.5	8.3.3 PSDM 8.3.3	Treatment of road-bed				
3.1.5.1	8.3.3(a) PSD8.3.6	Road-bed preparation and compaction of material to 93 % mod. AASHTO maximum density	m³	300		
3.1.6	8.3.5	Selected layer				
3.1.6.1	PSD8.3.6 PSDM 8.3.6	150mm Imported G7 selected subgrade layer compacted to 95% mod. AASHTO density	m³	100		
3.1.6.2	PSD8.3.6 PSDM 8.3.6	150mm Imported gravel layer, G5 equivalent with a minimum CBR of 45 and maximum PI of 10 compacted to 95% MOD AASHTO	m³	300		
3.2	SANS 1200 LC	CABLE DUCTS				
3.2.1	8.2.2	Excavation				
3.2.1.1		a) Excavation in all materials for trenches backfill, compact, and dispose of surplus material	m	100		
3.2.2	8.2.5 PSLC 8.2.5	Supply, lay, bed and prove duct				
3.2.2.1		160 mm diam. uPVC pipes Class 9	m	50		
3.2.2.2		100 mm diam. uPVC pipes Class 9	m	10		
3.2.3	8.2.8 PSLC 8.2.8	Cable route markers complete, installed, and record submitted	No.	10		
3.3	SANS 1200 G	CONCRETE (STRUCTURAL)				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 03 ROADWORKS

SECTION: 3 ROADWORKS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
3.3.1	8.1.1 PSG 8.1.1	Formwork				
3.3.1.1	8.2.1	Rough vertical to: Slabs	m ²	200		
3.3.2	8.1.2 PSG 8.1.2	Reinforcement				
3.3.2.1	8.3.2	High-tensile welded mesh ref #193 reinforcement	m ²	1800		
3.3.3	8.1.3 PSG 8.1.3	Concrete				
3.3.3.1	8.4.3	Slabs of 25 MPa/19mm	m ³	250		
3.3.3.2	8.4.4	Surface finishes - Broom swept	m ²	1800		
3.3.4	8.5 PSG 8.5	Joints				
3.3.4.1		Saw cut joint, as shown on typical road detail drawing J35030/111/0	m	380		
3.3.4.2		Expansion joint, as shown on typical road detail drawing J35030/111/0	m	150		
3.3.4.3		Construction joint, as shown on typical road detail drawing J35030/111/0	m	15		
3.3.4.4		Joint between kerb and concrete paving, as shown on typical road detail drawing J35030/111/0	m	705		
3.4	SANS 1200 MK	KERBING AND CHANNELLING				
3.4.1	8.2.1 PSMK 8.1.4	Concrete kerbing				
		a) Pre-cast Fig 8 mountable kerb				
3.4.1.1		i) 4m to 20m radius	m	130		
3.4.1.2		ii) Exceeding 20m radius	m	190		
3.4.2	8.2.2 PSMK 8.1.4	Concrete kerbing and channelling combined				
		a) Pre-cast Fig 8 mountable kerb and Fig 14 channel				
3.4.2.1		i) 4m to 20m radius	m	150		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 03 ROADWORKS

SECTION: 3 ROADWORKS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
3.4.2.2		ii) Exceeding 20m radius	m	220		
3.5	SANS 1200 MM	ANCILLARY ROADWORKS				
3.5.1	8.3	Permanent road signs				
3.5.1.1	8.3.1	Sign faces with painted or galvanized (as stated) background. Symbols, characters, legend, and borders in engineering grade retroreflective material with signboards				
3.5.1.1.1		a) Aluminium sheet (2,0 mm thick), of area up to 2 m2	m ²	2		
3.5.1.2	8.3.3	Sign Supports				
3.5.1.2.1		c) Timber diameter 145 mm - 175 mm pine	m	12		
3.5.1.3	8.1.1 & 8.3.4 PSMM 8.3.4	Excavation for sign supports, concreting and backfilling with in-situ material	No	4		
3.5.2		Miscellaneous				
3.5.2.1		Install subsurface drain complete as per typical road detail drawing J35030/111/0 where instructed by the Employer's Agent	m	50		
TOTAL FOR SECTION 3 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 04 INLET/DOSING BUILDING

SECTION: 4 INLET/DOSING BUILDING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
4.1	SANS 1200 G	CONCRETE (STRUCTURAL)				
4.1.1	8.1.1 PSG 8.1.1	Formwork				
4.1.1.1	8.2.1	Rough vertical to (below final ground level):				
4.1.1.1.1		Footings	m ²	34		
4.1.1.1.2		Walls	m ²	94		
4.1.1.2	8.2.2	Smooth vertical to:				
4.1.1.2.1		Walls	m ²	93		
4.1.1.2.2		Pier	m ²	13		
4.1.1.2.3		Slabs	m ²	6		
4.1.1.2.4		Stairs and landings	m ²	2		
4.1.1.2.5		Pipe support columns	m ²	1.2		
4.1.1.3	8.2.2	Smooth horizontal to:				
4.1.1.3.1		Slab soffits	m ²	2		
4.1.1.3.2		Nib over openings	m ²	0.5		
4.1.1.3.3		Baffle wall	m ²	0.3		
4.1.1.3.4		Narrow widths up to 300mm	m ²	0.5		
4.1.1.4	8.2.6	Box out holes/form voids of any depth				
4.1.1.4.1		Circular, 350mm up to 700mm diam	No.	2		
4.1.2	8.1.2 PSG 8.1.2	Reinforcement				
4.1.2.1	8.3.1	Mild steel bars	t	1		
4.1.2.2	8.3.1	High tensile steel bars	t	8		
4.1.2.3	8.3.2	High-tensile welded mesh ref #245 reinforcement	m ²	40		
4.1.3	8.1.3 PSG 8.1.3	Concrete				
4.1.3.1	8.4.2	Blinding layer in 15 MPa/19 mm concrete				
4.1.3.1.1		50 mm minimum thickness	m ²	98		
4.1.3.2	8.4.3	Strength concrete: 20 MPa/19mm				
4.1.3.2.1		Strip footings	m ³	12		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 04 INLET/DOSING BUILDING

SECTION: 4 INLET/DOSING BUILDING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
4.1.3.3	8.4.3	Strength concrete: 35 MPa/19mm				
4.1.3.3.1		Floor slabs	m³	13		
4.1.3.3.2		Internal stairs	m³	1		
4.1.3.3.3		Walls	m³	26		
4.1.3.3.4		Suspended slabs	m³	0.3		
4.1.3.3.5		Pipe support columns	m³	0.1		
4.1.3.3.6		Pier	m³	3		
4.1.3.3.7		Baffle walls	m³	1		
4.1.3.4	8.4.4 PSG 8.4.4	Unformed surface finishes				
		Wood-floated finish to:				
4.1.3.4.1		Foundations	m²	23		
		Steel-floated finish to:				
4.1.3.4.2		Internal steps	m²	3		
4.1.3.4.3		Mixing chamber floor	m²	9		
4.1.3.4.4		Wall tops	m²	13		
4.1.3.4.5		Top of pier	m²	1		
4.1.3.4.6		Pipe support columns	m²	0.2		
		Power-floated finish to:				
4.1.3.4.7		Floor slabs	m²	55		
4.1.4	8.5 PSG 8.5	Joints				
4.1.4.1		Construction joint	m	10		
4.1.5	PSG 8.10	Items cast into concrete				
		Setting puddle pipes or specials into or through concrete work, incl. for formwork around the pipes and fixing the pipes to the designated lines and levels using ABE Durated expansive cementitious grout (pipes measured elsewhere) for diameters:				
4.1.5.1		150mm up to 250mm	No	1		
4.1.5.2		300mm up to 400mm	No	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 04 INLET/DOSING BUILDING

SECTION: 4 INLET/DOSING BUILDING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
4.1.6	PSG 8.14	Watertightness test to channel	No	1		
4.1.7	PSG 8.15	Slurry coat and curing: Supply and apply waterproof treatment with Xypex concentrate and Xypex modified to all areas as specified	m²	40		
4.1.8	PSG 8.16	Bond breaker, 250 micron DPM	m²	66		
4.2	SANS 1200 HA	STRUCTURAL STEELWORK (SUNDRY ITEMS)				
4.2.1	8.3.1 PSHA 8.3.1 & 8.3.6	Structural steel				
		Supply, fabricate, deliver and install structural steelwork for				
4.2.1.1		Provisional Sum for Filter Covers	PSum	1	400 000.00	400 000.00
4.2.2	8.3.2 PSHA 8.3.2 & 8.3.6	Supply and install handrails complete as shown on Drg J35030-133C	m	4		
4.2.3	PSHA 8.3.7	Supply and install hand stops complete as detailed on Drg J35030-133C	No	2		
4.2.4		Supply and install aluminium V-notch weir complete as detailed on Drg J35030-133C including flow depth markings engraved	No	1		
4.3	SANS 1200 L	MEDIUM-PRESSURE PIPELINES				
4.3.1	8.2.5 PSL 8.2.5	Supply and install pipes, valves, and specials as per Drg J35030-133B				
4.3.1.1		IW1: 300mm Ø ST/uPVC VJ flange adaptor	No	1		
4.3.1.2		IW2: 300mm Ø 45° GMS & FBE coated long radius bend, flanged on both ends	No	2		
4.3.1.3		IW3: 300mm Ø x 2000mm long GMS & FBE coated straight pipe flanged on both ends	No	1		
4.3.1.4		IW4: 300mm Ø x 1000mm long GMS & FBE coated puddle pipe flanged on both ends with puddle flange 625mm from one end	No	1		
4.3.1.5		IW5: 300mm Ø RSV flanged Class 16	No	1		
4.3.1.6		IW6: 300mm Ø VJ flange adaptor	No	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 04 INLET/DOSING BUILDING

SECTION: 4 INLET/DOSING BUILDING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
4.3.1.7		IW7: 300mm Ø x 690mm long GMS & FBE coated straight pipe plain ended on both ends and incorporating a 230mm long 300mm Ø x 250mm Ø GMS reducer, plain ended on 300mm Ø end and flanged on 250mm Ø end	No	1		
4.3.1.8		IW9: 250mm Ø VJ flange adaptor	No	1		
4.3.1.9		IW10: 250mm Ø x 910mm long GMS & FBE coated straight pipe, plain ended on one end and flanged on the other	No	1		
4.3.1.10		IW11: 250mm Ø control valve, flanged Bermad or similar Engineer approved	No	1		
4.3.1.11		IW12: 250mm Ø x 735mm long GMS & FBE coated puddle pipe flanged on one end with puddle flange 125mm from plain end	No	1		
4.3.1.12		Potable water supply connection to Control valve	PSum	1	5 000.00	5 000.00
4.4	PSA 8.10	BRICKWORK	%			
4.4.1		Cathcart Taverline:				
4.4.1.1		115 mm brick to walls	m²	63		
4.4.1.2		230 mm brick to walls	m²	99		
4.4.1.3		External steps	m²	1		
4.4.1.4		Extra over brickwork for face brickwork	m²	145		
4.4.1.5		Extra over brickwork for header course	m	43		
4.4.1.6		Fair raking cutting	m	17		
4.4.1.7		Extra over brickwork for brick-on-edge header course lintels one course high, pointed on face and 230mm soffit.	m	4		
4.4.1.8		Fair cutting and fitting around pipe not exceeding 200mm diameter	No	1		
4.4.1.9		Fair cutting and fitting around pipe exceeding 200mm and not exceeding 500mm diameter	No	1		
4.4.2		Stock brick:				
4.4.2.1		115 mm brickwork	m²	2		
4.4.3		Brickwork reinforcement:				
4.4.3.1		75mm Wide reinforcement built in horizontally	m	150		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 04 INLET/DOSING BUILDING

SECTION: 4 INLET/DOSING BUILDING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
4.4.3.2		150mm Wide reinforcement built in horizontally	m	350		
4.4.4		Galvanised hoop iron cramps, ties, etc.:				
4.4.4.1		2 x 30mm galvanised hoop iron tie 750mm long with one end wrapped around rafter and spiked to plate and other end built 340mm deep into top of brickwork	No.	16		
4.4.5		Lintels, DPC and sills:				
4.4.5.1		Prestressed fabricated lintel, 110 x 75mm, in lengths not exceeding 3m	m	13		
4.4.5.2		Internal Fibre-Cement window sills, natural grey in single lengths not exceeding 3.6m, bedded in class I mortar including fixing lugs screwed to underside with self tapping screws	m	4		
4.4.5.3		External facebrick window sills	m	4.2		
4.4.6		Air bricks, Etc.				
4.4.6.1		Set of two 220 x 160 mm Precast concrete vermin proofed louvered airbricks, colour to match facebrick.	No	8		
4.5	PSA 8.10	ROOF SHEETING AND ACCESSORIES				
		Klip-Lok 406 sheeting shall be laid in strict accordance with manufacturer's specification by Brownbuilt approved erector. A five year guarantee of site-workmanship and water-tightness shall be issued after approval by Global Roofing Solutions (Pty) Ltd				
4.5.1		Klip-Lok 406' 0,8mm thick light industrial Z275 galvanised steel sheeting with 2 sides colour coated	m²	111		
4.5.2		0.8mm Ridge Capping to match roof sheeting	m	11		
4.5.3		0.8mm Barge Flashing to match roof sheeting	m	20		
4.5.4		12mm x 225mm FC fascia boards	m	20		
4.6	PSA 8.10	RAINWATER GOODS				
4.6.1		Gutters complete, Industrial Ogee profile, 0.8mm Aluminium, 150mm x 125mm, includes brackets	m	23		
4.6.2		Downpipes complete, Rectangular Aluminium Fluted, 100mm x 75mm	No	4		
4.7	PSA 8.10	ROOF TIMBERWORK				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 04 INLET/DOSING BUILDING

SECTION: 4 INLET/DOSING BUILDING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
4.7.1		Timberwork to be Grade 5 SA Pine with trusses spaced at approximately 1173 centres. The contractor will be required to provide a certificate of approval signed by a registered Professional Engineer that the trusses have been designed, manufactured and installed in accordance with the relevant SABS specifications. Roof construction to double pitched roof for Inlet/dosing building including all wall plates, trusses, girders, jack rafters, permanent bracing, loose connectors, galvanised steel shoes, hangers, bolts, ties and 50 x 76mm purlins at 1050mm centres and 50 x 114mm purlins over eaves, installed complete as per architectural drawing	No	1		
4.8	PSA 8.10	CEILING				
4.8.1		Cladit ceiling complete with profile jointing strips and cornice	m²	72		
4.8.2		Compressible mineral insulation, 75mm thick, placed on top of ceiling in between rafters	m²	72		
4.9	PSA 8.10	PAINTING				
		Prepare, stop and apply				
4.9.1		2 coats polyacrylic emulsion (white) to ceiling	m²	72		
4.9.2		1 coat plaster primer internally	m²	100		
4.9.3		3 coats polyacrylic emulsion internally	m²	100		
4.9.4		1 coat general purpose undercoat externally and 2 coats Plascon high gloss enamel externally on fascias	m²	5		
4.10	PSA 8.10	PLASTERWORK				
		Internal plaster				
4.10.1		4:1 Cement plaster on brickwork	m²	100		
4.10.2		3:1 Cement plaster on Concrete	m²	5		
4.11	PSA 8.10	SCREEDS AND FLOOR TOPPING				
4.11.1		Supply and apply 2 part epoxy floor paint - grease and oil resistant according to the manufacturers specifications. 3 coats ABE or similar Employers Agent approved	m²	60		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 04 INLET/DOSING BUILDING

SECTION: 4 INLET/DOSING BUILDING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
4.12	PSA 8.10	DOORS				
4.12.1		Single hardwood FLB external door and frame complete including sealing, parliament hinges, cabin hooks, barrel bolts, yale lock, handles, stops	No	1		
4.12.2		Powder coated aluminium roller shutter door for 2400mm x 2100mm with door set ironmongery, guides and canopy cover as per manufacturer installed complete (Wispeco or	No	2		
4.12.3		Door closer (Dorma TS 73 V EN 2-4 or similar approved)	No	1		
4.13	PSA 8.10	WINDOWS				
		Steel windows supply and install including hot dip galvanizing after fabrication painting, glazing and burglar bars:				
4.13.1		Type NC11F	No	1		
4.13.2		Type ND11	No	1		
4.14	PSA 8.10	MISCELLANEOUS				
4.14.1		Supply and install 5 kl high density polyethylene bulk storage tank complete including outlet taps	No	1		
4.14.2		Supply and install 100l high density polyethylene day tank complete including outlet	No	1		
4.14.3		Supply and fix in place a 7.5l fire extinguisher complete including bracket	No	2		
TOTAL FOR SECTION 4 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 05 FLOCCULATION CHANNELS

SECTION: 5 FLOCCULATION CHANNELS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
5.1	SANS 1200 G	CONCRETE (STRUCTURAL)				
5.1.1	8.1.1 PSG 8.1.1	Formwork				
5.1.1.1	8.2.1	Rough vertical to (below final ground level):				
5.1.1.1.1		Footings	m ²	18		
5.1.1.1.2		Walls	m ²	10		
5.1.1.2	8.2.2	Smooth vertical to:				
5.1.1.2.1		Walls	m ²	246		
5.1.2	8.1.2 PSG 8.1.2	Reinforcement				
5.1.2.1	8.3.1	Mild steel bars	t	1		
5.1.2.2	8.3.1	High tensile steel bars	t	11		
5.1.3	8.1.3 PSG 8.1.3	Concrete				
5.1.3.1	8.4.2	Blinding layer in 15 MPa/19 mm concrete				
5.1.3.1.1		50 mm minimum thickness	m ²	150		
5.1.3.2	8.4.3	Strength concrete: 20 MPa/19mm				
5.1.3.2.1		Mass concrete	m ³	10		
5.1.3.3	8.4.3	Strength concrete: 35 MPa/19mm				
5.1.3.3.1		Floor slabs	m ³	38		
5.1.3.3.2		Walls	m ³	18		
5.1.3.3.3		Baffle walls	m ³	12		
5.1.3.4	8.4.4 PSG 8.4.4	Unformed surface finishes				
5.1.3.4.1		Wood-floated finish to:				
		Foundations	m ²	20		
5.1.3.4.2		Steel-floated finish to:				
		Floor slabs	m ²	100		
5.1.3.4.3		Wall tops	m ²	30		
5.1.4	8.5 PSG 8.5	Joints				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 05 FLOCCULATION CHANNELS

SECTION: 5 FLOCCULATION CHANNELS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
5.1.4.1		Isolation joint , as shown on dwg. no.J35030-134	m	20		
5.1.4.2		Construction joint, as shown on dwg. no.J35030-134	m	68		
5.1.5	PSG 8.14	Watertightness test	No	2		
5.1.6	PSG 8.15	Slurry coat and curing: Supply and apply waterproof treatment with Xypex concentrate and Xypex modified to all areas as specified	m ²	184		
5.1.7	PSG 8.16	Bond breaker: 250 micron DPC	m ²	150		
5.2	SANS 1200 HA	STRUCTURAL STEELWORK (SUNDRY ITEMS)				
5.2.1	8.3.2 PSHA 8.3.2 & 8.3.6	Supply and install handrails complete as shown on Drg J35030-134	m	40		
TOTAL FOR SECTION 5 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 06 SEDIMENTATION TANK

SECTION: 6 SEDIMENTATION TANK

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
6.1	SANS 1200 G	CONCRETE (STRUCTURAL)				
6.1.1	8.1.1 PSG 8.1.1	Formwork				
6.1.1.1	8.2.1	Rough vertical to (below final ground level):				
6.1.1.1.1		Hopper footings	m ²	88		
6.1.1.1.2		Walls and slabs	m ²	282		
6.1.1.2	8.2.1	Rough sloping to:				
6.1.1.2.1		External sloping sides of hoppers	m ²	206		
6.1.1.3	8.2.2	Smooth vertical to:				
6.1.1.3.1		Laundry walls	m ²	60		
6.1.1.3.2		Walkway overhangs	m ²	28		
6.1.1.3.3		Walls	m ²	1078		
6.1.1.3.4		Pipe support	m ²	6		
6.1.1.4	8.2.2	Smooth horizontal to:				
6.1.1.4.1		Walkway overhangs	m ²	30		
6.1.1.4.2		Laundry	m ²	12		
6.1.1.4.3		Channel soffit	m ²	10		
6.1.1.4.4		Baffle wall	m ²	4		
6.1.1.5	8.2.2	Smooth sloped to:				
6.1.1.5.1		Sloping insides of hoppers	m ²	512		
6.1.1.5.2		Baffle wall	m ²	10		
6.1.1.6	8.2.6	Box out holes/form voids for all depths				
6.1.1.6.1		Small, circular, diam. up to 0,35 m	No.	40		
6.1.1.6.2		Large, circular, diam. 0,35 - 0,7 m	No.	4		
6.1.1.7	8.2.7	Form slots for handstops	No	4		
6.1.2	8.1.2 PSG 8.1.2	Reinforcement				
6.1.2.1	8.3.1	Mild steel bars	t	10		
6.1.2.2	8.3.1	High tensile steel bars	t	66		
6.1.3	8.1.3 PSG 8.1.3	Concrete				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 06 SEDIMENTATION TANK

SECTION: 6 SEDIMENTATION TANK

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
6.1.3.1	8.4.2	Strength concrete: 15 MPa/19 mm concrete				
6.1.3.1.1		Blinking layer 50 mm minimum thickness	m ²	294		
6.1.3.1.2		Mass concrete benching	m ³	500		
6.1.3.2	8.4.3	Strength concrete: 20 MPa/19mm				
6.1.3.2.1		Mass concrete	m ³	210		
6.1.3.3	8.4.3	Strength concrete: 35 MPa/19mm				
6.1.3.3.1		Hopper footings	m ³	66		
6.1.3.3.2		Slabs	m ³	36		
6.1.3.3.3		Launder	m ³	10		
6.1.3.3.4		Walkways	m ³	16		
6.1.3.3.5		Walls	m ³	184		
6.1.3.3.6		Pipe support	m ³	1		
6.1.3.3.7		Suspended channel slab	m ³	2		
6.1.3.3.8		Sloping slabs to hoppers	m ³	116		
6.1.3.3.9		Baffle wall	m ³	12		
6.1.3.4	PSG 8.9	No-Fines Concrete 75mm thickness	m ³	22		
6.1.3.5	8.4.4 PSG 8.4.4	Unformed surface finishes				
		Wood-floated finish to:				
6.1.3.5.1		Foundations	m ²	156		
6.1.3.5.2		Walkways	m ³	64		
		Steel-floated finish to:				
6.1.3.5.3		Slabs	m ²	76		
6.1.3.5.4		Channel slab	m ²	14		
6.1.3.5.5		Launder slab and launder wall tops	m ²	12		
6.1.3.5.6		Pipe supports	m ²	1		
6.1.3.5.7		Wall tops	m ²	28		
6.1.4	8.5 PSG 8.5	Joints				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 06 SEDIMENTATION TANK

SECTION: 6 SEDIMENTATION TANK

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
6.1.4.1		Horizontal construction joint in wall, as shown on drg no. J35030-135C	m	92		
6.1.4.2		Construction joint at the base of wall, as shown on drg no. J35030-135C	m	110		
6.1.4.3		Construction joint at the base of inclined wall, as shown on drg no. J35030-135C	m	100		
6.1.4.4		Joint detail between structures, as shown on drg no. J35030-135C	m	4		
6.1.5	PSG 8.10	Items cast into concrete				
		Setting puddle pipes or specials into or through concrete work, incl. for formwork around the pipes and fixing the pipes to the designated lines and levels using ABE Durated expansive cementitious grout (pipes measured elsewhere) for diameters:				
6.1.5.1		150mm up to 250mm	No	40		
6.1.5.2		300mm up to 400mm	No	4		
6.1.6	PSG 8.14	Watertightness test including provision of water	No	2		
6.1.7	PSG 8.15	Slurry coat and curing: Supply and apply waterproof treatment with Xypex concentrate and Xypex modified to all areas as specified	m²	1200		
6.1.8	PSG 8.16	Bond breaker: 250 micron DPC	m²	256		
6.2	SANS 1200 HA	STRUCTURAL STEELWORK (SUNDRY ITEMS)				
6.2.1	8.3.2 PSHA 8.3.2 & 8.3.6	Supply and install handrails complete as shown on Drg J35030-135C	m	220		
6.2.2	8.3.3 PSHA 8.3.6	Supply and install staircase complete as shown on Drg J35030-135C and J35030-135D	No	2		
6.2.3	8.3.4 PSHA 8.3.6	Supply and install flooring, complete with frames as shown on Drg J35030-135C and J35030-135D				
6.2.3.1		Open grid floors	m²	55		
6.2.4	PSHA 8.3.7	Supply and install hand stops as detailed on Drg J35030-135B	No	4		
6.2.5		Stainless Steel V-notch overflow as detailed on Drg J35030-135A	No	4		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 06 SEDIMENTATION TANK

SECTION: 6 SEDIMENTATION TANK

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
6.3	SANS 1200 L	MEDIUM-PRESSURE PIPELINES				
6.3.1	8.2.5 PSL 8.2.5	Supply and install pipes, valves, and specials as per Drg J35030-135B				
6.3.1.1		ST1: 150mm Ø x 2600mm long 316 Stainless Steel straight pipe, flanged on one end and bellmouth on the other	No	20		
6.3.1.2		ST2: 150mm Ø 316 Stainless Steel medium radius 60° bend with both ends flanged	No	10		
6.3.1.3		ST3: 2615mm long 316 Stainless Steel straight pipe with both ends flanged	No	10		
6.3.1.4		ST4: 150mm Ø x 900mm long 316 Stainless Steel lateral with all ends flanged and puddle flange 300mm from long end	No	10		
6.3.1.5		ST5: 150mm Ø de-sludge valves with NUTORK NTE 20 or similar approved electric actuators for automatic de-sludging	No	12		
6.3.1.6		ST5: 150mm Ø RSV with extension spindle	No	-		Rate Only
6.3.1.7		ST6: 150mm Ø 316 Stainless Steel medium radius 90° bend with one end flanged and the other bellmouth	No	2		
6.3.1.8		ST7: 150mm Ø x 2795mm long 316 Stainless Steel straight pipe with both ends flanged	No	2		
6.3.1.9		ST8: 150mm Ø 316 Stainless Steel medium radius sweep tee with two ends flanged and one bellmouth	No	2		
6.3.1.10		ST9: 150mm Ø x 1910mm long 316 Stainless Steel straight pipe, both ends flanged with puddle flange 450mm from one end	No	2		
6.3.1.11		ST10: 150mm Ø 90° medium radius bend of 316 Stainless Steel, four segments with both ends flanged and a radius of 300mm	No	2		
6.3.1.12		ST11: 150mm Ø x 1100mm long 316 Stainless Steel straight pipe, flanged on both ends with puddle flange 300mm from one end	No	2		
6.3.1.13		ST12: 315mm Ø x 1600mm long GMS and FBE coated pipe, flanged on one end only with two puddle flanges at 125mm and 1300mm from plain end respectively	No	2		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 06 SEDIMENTATION TANK

SECTION: 6 SEDIMENTATION TANK

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
6.3.1.14		ST13: 150mm Ø x 450mm long GMS and FBE coated straight pipe, flanged on one end only with puddle flange 150mm from plain end	No	2		
6.3.1.15		ST14: 75mm Ø x 550mm long 316 Stainless Steel straight pipe with 135mm Ø flange on one end only. 3mm wall thickness.	No	2		
6.3.1.16		ST15: 150mm Ø VJ flange adaptor	No	2		
		Supply and fit Stainless Steel brackets and bolts as detailed on Drg J35030-135C				
6.3.1.17	PSA 8.10	Pipe brackets for hopper pipes	No	48		
6.3.1.18		Pipe strap for flocculation pipes	No	6		
6.4		MISCELLANEOUS				
6.4.1		Supply, deliver and install MEGAFLO subsoil drainage system including excavation, stone fill and geofabric blanket	m	200		
6.4.2		Precast coping with 500mm x 500mm base	No	24		
6.4.3		150mm Ø precast half round channel	m	40		
TOTAL FOR SECTION 6 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 07 FILTER BUILDING

SECTION: 7 FILTER BUILDING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
7.1	SANS 1200 G	CONCRETE (STRUCTURAL)				
7.1.1	8.1.1 PSG 8.1.1	Formwork				
7.1.1.1	8.2.1	Rough vertical to (below final ground level):				
7.1.1.1.1		Footings	m ²	6		
7.1.1.1.2		Walls	m ²	56		
7.1.1.2	8.2.2	Smooth vertical to:				
7.1.1.2.1		Walls	m ²	419		
7.1.1.2.2		Slabs	m ²	7		
7.1.1.2.3		Stairs and landings	m ²	10		
7.1.1.2.4		Beams	m ²	18		
7.1.1.3	8.2.2	Smooth horizontal to:				
7.1.1.3.1		Slab soffits	m ²	141		
7.1.1.3.2		Beams	m ²	4		
7.1.1.4	8.2.2	Smooth sloping to:				
7.1.1.4.1		Stair soffits	m ²	11		
7.1.1.5	8.2.6	Box out holes/form voids of any depth				
7.1.1.5.1		Rectangular, 200mm x 1200mm	No.	6		
7.1.1.5.2		Rectangular, 300mm x 500mm	No.	3		
7.1.1.5.3		Rectangular, 450mm x 600mm	No.	1		
7.1.1.5.4		Rectangular, 300mm x 550mm	No.	3		
7.1.1.5.5		Rectangular, 200mm x 550mm	No.	3		
		Large, circular, diam. 0,35 - 0,7 m : depths over and up to				
7.1.1.5.6		0 m 0,5 m	No.	5		
7.1.1.6		Permanent shutter to soffit of launder channel	m ²	65		
7.1.2	8.1.2 PSG 8.1.2	Reinforcement				
7.1.2.1	8.3.1	Mild steel bars	t	2		
7.1.2.2	8.3.1	High tensile steel bars	t	15		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 07 FILTER BUILDING

SECTION: 7 FILTER BUILDING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
7.1.3	8.1.3 PSG 8.1.3	Concrete				
7.1.3.1	8.4.2	Blinking layer in 15 MPa/19 mm concrete				
7.1.3.1.1		50 mm minimum thickness	m ²	58		
7.1.3.2	8.4.3	Strength concrete: 20 MPa/19mm				
7.1.3.2.1		Strip footings	m ³	6		
7.1.3.3	8.4.3	Strength concrete: 35 MPa/19mm				
7.1.3.3.1		Floor slabs	m ³	6		
7.1.3.3.2		Internal stairs	m ³	3		
7.1.3.3.3		Walls	m ³	57		
7.1.3.3.4		Suspended slabs	m ³	24		
7.1.3.3.5		Beams	m ³	4		
7.1.3.4	8.4.4 PSG 8.4.4	Unformed surface finishes				
		Wood-floated finish to:				
7.1.3.4.1		Foundations	m ²	3		
		Steel-floated finish to:				
7.1.3.4.2		Inspection boxes (internal)	m ²	5		
7.1.3.4.3		Invert	m ²	83		
7.1.3.4.4		Wall tops	m ²	6		
7.1.3.4.5		Weir	m ²	11		
7.1.3.4.6		Beam tops	m ²	10		
7.1.3.4.7		Stairs	m ²	13		
		Power-floated finish to:				
7.1.3.4.8		Floor slabs	m ²	49		
7.1.3.4.9		Suspended slabs	m ²	63		
7.1.3.5		Extra over for forming of top of launder wall	m ²	5		
7.1.4	8.5 PSG 8.5	Joints				
7.1.4.1		Saw-Cut joint, as shown on dwg no. J35030-136D	m	15		
CARRIED FORWARD						

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BILL: 07 FILTER BUILDING

SECTION: 7 FILTER BUILDING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
7.1.4.2		Construction joint in floor, as shown on dwg no. J35030-136D	m	15		
7.1.4.3		Wall horizontal construction joint, as shown on dwg no. J35030-136D	m	25		
7.1.4.4		Footing detail construction joint, as shown on dwg no. J35030-136D	m	50		
7.1.5	PSG 8.9	No-Fines Concrete	m ²	50		
7.1.6	PSG 8.10	Items cast in concrete				
		Setting puddle pipes or specials into or through concrete work, incl. for formwork around the pipes and fixing the pipes to the designated lines and levels using ABE Durated expansive cementitious grout (pipes measured elsewhere) for diameters:				
7.1.6.1		110mm dia PVC sockets to be cast into filter walls	No	45		
7.1.6.2		150mm up to 250mm	No	2		
7.1.6.3		300mm up to 400mm	No	8		
7.1.7	PSG 8.14	Watertightness test to inlet channel	No	1		
7.1.8	PSG 8.14	Watertightness test to inspection box	No	3		
7.1.9	PSG 8.14	Watertightness test to filter	No	3		
7.1.10	PSG 8.15	Slurry coat and curing: Supply and apply waterproof treatment with Xypex concentrate and Xypex modified to all areas as specified	m ²	300		
7.1.11	PSG 8.16	Bond breaker: 250 micron DPC	m ²	58		
7.2	SANS 1200 HA	STRUCTURAL STEELWORK (SUNDRY ITEMS)				
7.2.1	8.3.1 PSHA 8.3.1 & 8.3.6	Structural steel				
		Supply, fabricate, deliver and install structural steelwork for				
7.2.1.1		152 x 89 x 17 kg crawl beam 5.2m long including block and tackle capable of lifting 1 ton load	No	1		
7.2.1.2		152 x 89 x 16 kg beam 3.6m long	No	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

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CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 07 FILTER BUILDING

SECTION: 7 FILTER BUILDING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
		Hot rolled sections for filter canopy				
7.2.1.3		Columns and rafters IPE 180	m	79		
7.2.1.4		Door surrounds 200x75 PFC	m	11		
7.2.1.5		Door frames 50x50x5 angle	m	10		
7.2.1.6		Trim angles 40x40x5 angle	m	13		
7.2.1.8		Flange bracing angles 30x30x5 angle	m	7		
7.2.1.9		Sag angles 30x30x3 angle	m	13		
7.2.1.10		Bracing angles 70x70x6 angle	m	44		
7.2.1.11		Base plates, cap plates, cleats, flat plate, nuts, bolts etc.	kg	250		
		Cold rolled sections for filter canopy				
7.2.1.12		Purlins 150x75x20x2.5	m	116		
7.2.1.13		Cladding rails 150x75x20x2.5	m	129		
		Filter canopy cladding				
7.2.1.14		Roof cladding with bullnose Klip-lok 406	m ²	130		
7.2.1.15		Side cladding Klip-Lok 406	m ²	128		
7.2.1.16		Translucent sheeting Polycarbonate	m ²	10		
7.2.1.17		Corner flashing 200x200mm	m	35		
7.2.1.18		Ridge capping	m	20		
7.2.1.19		Door hinges, handles, locks	Sum	1		
7.2.2	8.3.2 PSHA	Supply and install handrails complete as shown on Drg J35030-136D	Sum	1		
	8.3.2 & 8.3.6					
7.2.3	8.3.2 PSHA	Supply and install GMS stairs and walkway complete including handrailing complete as shown on Drg J35030-136F	Sum	1		
	8.3.2 & 8.3.6					
7.2.4	8.3.4 PSHA	Flooring, complete and installed with frames as shown on Drgs J35030-136A & J35030-136B				
	8.3.6					
7.2.4.1		Open grid floors: 1500 x 1000 mm galvanised RS40 Type 40x4.5 bearer bars bended rectagrid (removable)	No	1		
CARRIED FORWARD						

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CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 07 FILTER BUILDING

SECTION: 7 FILTER BUILDING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
7.2.4.2		Open grid floors: 1000 x 750 mm galvanised RS40 Type 40x4.5 bearer bars bended rectagrid (removable)	No	3		
7.3	SANS 1200 L	MEDIUM-PRESSURE PIPELINES				
7.3.1	8.2.5 PSL 8.2.5	Supply and place pipes, valves, and specials as per DRG J35030-136D				
7.3.1.1		SF 1 - Ø300mm 90° GMS medium radius bend. 4 segments with both ends flanged and a radius of 610mm	No	2		
7.3.1.2		SF2 - Ø300mm GMS x 110mm long GMS spacer pipe with both ends flanged	No	1		
7.3.1.3		SF 3 - Ø300mm x 1050mm long GMS pipe with 1 end flanged and puddle flange 125mm from plain end	No	1		
7.3.1.4		SF 4 - Ø400mm x 430mm long GMS pipe with 1 end flanged and puddle flange 125mm from plain end	No	1		
7.3.1.5		SF 5 - Ø400mm 90° GMS medium radius bend. 4 segments with both ends flanged and a radius of 815mm	No	1		
7.3.1.6		SF 6 - Ø400mm x 17075mm long GMS pipe (in sections) with both ends flanged	No	1		
7.3.1.7		SF 7 - Ø400mm VJ flange adaptor	No	1		
7.3.1.8		SF 8 & 9 - 300mm Ø x 250mm long GMS & FBE coated puddle pipe plain ended on both ends with puddle flange 125mm from plain end incorporating a 300mm Ø 90° GMS & FBE coated medium radius segmented bend plain ended on one end and flanged on the other	No	3		
7.3.1.9		SF 10 - 300mm Ø x 410mm long GMS & FBE coated straight pipe flanged on both ends	No	3		
7.3.1.10		SF 11 - 300mm Ø GMS & FBE coated short tee with all ends flanged	No	3		
7.3.1.11		SF 12 - 300mm Ø x 465mm long GMS & FBE coated straight pipe bellmouth on one end and flanged on the other	No	3		
7.3.1.12		SF 13 - 300mm Ø x 480mm long GMS & FBE coated straight pipe flanged on both ends with puddle flange 155mm from one flanged end	No	3		
7.4	PSA 8.10	BRICKWORK				
CARRIED FORWARD						

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BILL: 07 FILTER BUILDING

SECTION: 7 FILTER BUILDING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
7.4.1		Cathcart Taverline:				
7.4.1.1		230 mm brick to walls	m ²	66		
7.4.1.2		Extra over brickwork for face brickwork	m ²	66		
7.4.1.3		Extra over brickwork for header course	m	22		
7.4.1.4		Fair raking cutting	m	10		
7.4.1.5		Extra over brickwork for brick-on-edge header course lintels one course high, pointed on face and 230mm soffit.	m	8		
7.4.2		Stock brick:				
7.4.2.1		115 mm brickwork	m ²	2		
7.4.3		Joint forming material in movement joints				
7.4.3.1		10mm Expansion joints with low density (33kg/m ³), cross linked, closed cell, expanded polyethylene joint former, 115mm wide with one tear off strip, built in vertically through brick walls	m	10		
7.4.4		Brickwork reinforcement:				
7.4.4.1		150mm Wide reinforcement built in horizontally	m	50		
7.4.5		Galvanised hoop iron cramps, ties, etc.:				
7.4.5.1		2 x 30mm galvanised hoop iron tie 750mm long with one end wrapped around rafter and spiked to plate and other end built 340mm deep into top of brickwork	No.	30		
7.4.6		Lintels, DPC and sills:				
7.4.6.1		Prestressed fabricated lintel, 110 x 75mm, in lengths not exceeding 3m	m	12		
7.4.6.2		Internal Fibre-Cement window sills, natural grey in single lengths not exceeding 3.6m, bedded in class I mortar including fixing lugs screwed to underside with self tapping screws	m	12		
7.4.6.3		External facebrick window sills	m	12		
7.4.7		Air bricks, Etc.				
7.4.7.1		Set of two 220 x 160 mm Precast concrete vermin proofed louvered airbricks, colour to match facebrick.	No	8		
7.5	PSA 8.10	ROOF SHEETING AND ACCESSORIES				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

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CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
7.5.1		Klip-Lok 406 sheeting shall be laid in strict accordance with manufacturer's specification by Brownbuilt approved erector. A five year guarantee of site-workmanship and water-tightness shall be issued after approval by Global Roofing Solutions (Pty) Ltd Klip-Lok 406' 0,8mm thick light industrial Z275 galvanised steel sheeting with 2 sides colour coated	m ²	100		
7.5.2		0.8mm Ridge Capping to match roof sheeting	m	16		
7.5.3		0.8mm Barge Flashing to match roof sheeting	m	20		
7.5.4		12mm x 225mm FC fascia boards	m	20		
7.6	PSA 8.10	RAINWATER GOODS				
7.6.1		Gutters complete, Industrial Ogee profile, 0.8mm Aluminium, 150mm x 125mm, includes brackets	m	30		
7.6.2		Downpipes complete, Rectangular Aluminium Fluted, 100mm x 75mm	No	6		
7.6.3		200 x 75 mm precast concrete channel	m	25		
7.7	PSA 8.10	ROOF TIMBERWORK				
7.7.1		Timberwork to be Grade 5 SA Pine with trusses spaced at approximately 1173 centres. The contractor will be required to provide a certificate of approval signed by a registered Professional Engineer that the trusses have been designed, manufactured and installed in accordance with the relevant SABS specifications. Roof construction to double pitched roof for Filter building including all wall plates, trusses, girders, jack rafters, permanent bracing, loose connectors, galvanised steel shoes, hangers, bolts and 50 x 76mm purlins at 1050mm centres and 50 x 114mm purlins over eaves, installed complete as per architectural drawing	No	1		
7.8	PSA 8.10	CEILING				
7.8.1		Cladit ceiling complete with profile jointing strips and cornice	m ²	20		
7.8.2		Compressible mineral insulation, 75mm thick, placed on top of ceiling in between rafters	m ²	20		
CARRIED FORWARD						

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CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 07 FILTER BUILDING

SECTION: 7 FILTER BUILDING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
7.9	PSA 8.10	PAINTING Prepare, stop and apply				
7.9.1		2 coats polyacrylic emulsion (white) to ceiling	m ²	20		
7.9.2		1 coat plaster primer internally	m ²	150		
7.9.3		3 coats polyacrylic emulsion internally	m ²	150		
7.9.4		1 coat general purpose undercoat externally and 2 coats Plascon high gloss enamel externally on fascias	m ²	5		
7.10	PSA 8.10	PLASTERWORK Internal plaster				
7.10.1		4:1 Cement plaster on brickwork	m ²	150		
7.10.2		3:1 Cement plaster on Concrete	m ²	120		
7.11	PSA 8.10	SCREEDS AND FLOOR TOPPING				
7.11.1		Supply and apply 2 part epoxy floor paint (grease and oil resistant) according to the manufacturers specifications. 3 coats ABE or similar Employers Agent approved	m ²	50		
7.12	PSA 8.10	DOORS				
7.12.1		Double hardwood FLB external door and frame complete including sealing, parliament hinges, cabin hooks, barrel bolts, yale lock, handles, stops	No	1		
7.12.2		Single hardwood FLB external door and frame complete including sealing, parliament hinges, cabin hooks, barrel bolts, yale lock, handles, stops	No	1		
7.12.3		Door closer (Dorma TS 73 V EN 2-4 or similar approved)	No	2		
7.13	PSA 8.10	WINDOWS Steel windows supply and install including hot dip galvanizing after fabrication painting, glazing and burglar bars:				
7.13.1		Type NC11F	No	1		
7.13.2		Type NE11	No	3		
7.14	PSA 8.10	EAVES ENCLOSURE				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 07 FILTER BUILDING

SECTION: 7 FILTER BUILDING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
7.14.1		Flexit 5 mm complete with profile jointing strips and quadrant	m	30		
7.15	PSA 8.10	TILING				
		Inclusive of adhesive and grouting with straight joints in both directions and flush pointed				
7.15.1		Wall tiling 150 x 150mm white glazed tiles to inspection boxes	m ²	35		
7.16	PSA 8.10	MISCELLANEOUS				
7.16.1		Supply and fix in place a 7.5l fire extinguisher complete including bracket	No	2		
7.16.2		Supply and install wash water cover plate as detailed on Drg J35030-136D	No	3		
7.16.3		Proof test crawl beam to 2.0 ton and supply test certificate to the Engineer. Also allow for painting the maximum allowable load on the crawl beam.	No	1		
7.16.4		Supply, deliver and install MEGAFLO subsoil drainage system	m	25		
7.16.5		Pipe GMS support bracket complete as detailed on Drg J35030-136D	No	6		
TOTAL FOR SECTION 7 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 08 1MI CLEAR WATER RESERVOIR

SECTION: 8 1 ML CLEARWATER RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
8.1	SANS 1200 DB	EARTHWORKS (PIPE TRENCHES)				
8.1.1	8.3.2 PSDB 8.3.2 8.3.2(a)	Excavation Excavate in all materials for trenches backfill, compact, and dispose of surplus/unsuitable material, for pipes: Over 100 up to 300 mm diam. for total trench depth: Exceeding but not exceeding				
8.1.1.1		0,0 m 1,0 m	m	60		
8.1.1.2		1,0 m 2,0 m	m	40		
8.2	SANS 1200 G	CONCRETE (STRUCTURAL)				
8.2.1	8.1.1 PSG 8.1.1	Formwork				
8.2.1.1	8.2.1	Rough vertical to:				
8.2.1.1.1		Wall footings	m ²	45		
8.2.1.1.2		Pipe concrete encasing	m ²	18		
8.2.1.2	8.2.2	Smooth vertical to:				
8.2.1.2.1		Wall footings	m ²	16		
8.2.1.2.2		Wall	m ²	845		
8.2.1.2.3		Slabs	m ²	88		
8.2.1.2.4		Columns, column heads and bases	m ²	65		
8.2.1.3	8.2.2	Smooth horizontal to:				
8.2.1.3.1		Slab soffits (including removal and making good)	m ²	500		
8.2.1.3.2		Column heads	m ²	15		
8.2.1.4	8.2.6	Box out holes/form voids				
8.2.1.4.1		Rectangular, 250mm x 500mm	No.	11		
8.2.1.4.2		Rectangular, 650mm x 650mm	No.	2		
8.2.1.4.3		Rectangular, 900mm x 650mm	No.	2		
8.2.1.4.4		Circular, up to 300mm diam	No.	2		
8.2.1.4.5		Circular, 300mm to 700mm diam	No.	1		
8.2.1.5	8.2.7	Kickers	m ²	10		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 08 1MI CLEAR WATER RESERVOIR

SECTION: 8 1 ML CLEARWATER RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
8.2.2	8.1.2 PSG 8.1.2	Reinforcement				
8.2.2.1	8.3.1	Mild steel bars	t	10		
8.2.2.2	8.3.1	High tensile steel bars	t	45		
8.2.3	8.1.3 PSG 8.1.3	Concrete				
8.2.3.1	8.4.2 PSG 8.9	Blinding layer in 15 MPa/19 mm concrete				
8.2.3.1.1		50 mm minimum thickness	m ²	565		
8.2.3.2	8.4.3	Strength concrete: 20 MPa/19mm				
8.2.3.2.1		Mass concrete	m ³	20		
8.2.3.3	8.4.3	Strength concrete: 35 MPa/19mm				
8.2.3.3.1		Foundations	m ³	60		
8.2.3.3.2		Column bases	m ³	7		
8.2.3.3.3		Floor slabs	m ³	72		
8.2.3.3.4		Roof slabs	m ³	72		
8.2.3.3.5		Walls	m ³	90		
8.2.3.3.6		Columns	m ³	3		
8.2.3.4	PSG 8.9	No-Fines Concrete 75mm thickness	m ²	565		
8.2.3.5		Precast roof edging kerbs (barrier figure 3) including mortar bedding and jointing to true line and level	m	100		
8.2.3.6	8.4.4 PSG 8.4.4	Unformed surface finishes				
		Wood-floated finish to:				
8.2.3.6.1		Roof slab to falls	m ²	522		
		Steel-floated finish to:				
8.2.3.6.2		No fines blinding including mortar skim	m ²	562		
8.2.3.6.3		Floor slab to falls	m ²	496		
8.2.4	8.5 PSG 8.5	Joints				
8.2.4.1		Expansion joint in floor slab, as shown on drawing J35030-137E	m	87		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 08 1MI CLEAR WATER RESERVOIR

SECTION: 8 1 ML CLEARWATER RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
8.2.4.2		Construction joint in floor slab, as shown on drawing J35030-137E	m	75		
8.2.4.3		Vertical construction joint in walls, as shown on drawing J35030-137E	m	25		
8.2.4.4		Horizontal construction joint in walls, as shown on drawing J35030-137E	m	100		
8.2.4.5		Construction joint in roof slab, as shown on drawing J35030-137E	m	65		
8.2.5	PSG 8.10	Items cast in concrete				
		Setting puddle pipes or specials into or through concrete work, incl. for formwork around the pipes and fixing the pipes to the designated lines and levels using ABE Durated expansive cementitious grout (pipes measured elsewhere) for diameters:				
8.2.5.1		150mm up to 250mm	No	7		
8.2.5.2		400mm up to 500mm	No	1		
8.2.6	PSG 8.14	Watertightness test including provision of water	No	1		
8.2.7	PSG 8.15	Slurry coat and curing: Supply and apply waterproof treatment with Xypex concentrate and Xypex modified to all areas as specified	m ²	250		
8.2.8	PSG 8.16	Bond breaker: 250 micron DPC to top of no-fines layer	m ²	562		
8.3	SANS 1200 HA	STRUCTURAL STEELWORK (SUNDRY ITEMS)				
8.3.1	8.3.3 PSHA 8.3.6	Supply and install ladders (stainless steel 316) complete as shown on drawing 137F to inside of reservoir				
8.3.1.1		4m long	No.	2		
8.4	SANS 1200 L	MEDIUM-PRESSURE PIPELINES				
8.4.1	8.2.5 PSL 8.2.5	Supply and install GMS pipes, valves, and specials				
8.4.1.1		OUTLET: 500mm Ø 90° GMS plain ended short radius bend incorporating a bellmouth with anti vortex and puddle flange on end and 500mm Ø x 1820mm long GMS pipe ending in a flange on the other as shown on drg. J35030-	No	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 08 1MI CLEAR WATER RESERVOIR

SECTION: 8 1 ML CLEARWATER RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
8.4.1.2		SCOUR: 150mm Ø 90° GMS plain ended short radius bend incorporating a bellmouth and puddle flange on one end and 150mm Ø GMS pipe extending up to the scour chamber on the other as shown on drg. J35030-137E	No	1		
8.4.1.3		OVERFLOW: 300mm Ø GMS overflow pipe with puddle flange and 90° short radius bend as shown on drg. J35030-137D	No	2		
8.4.2	8.2.1 PSL 8.2.1	Supply, lay, and bed pipes complete with couplings Supply, lay, joint, bed, test and disinfect pipes: uPVC pipes:				
8.4.2.1		i) 160mm dia class 9	m	100		
8.4.3	8.2.2	Extra over item 8.4.2.1 for supply, lay, joint, bed, test and disinfect incl cut pipes to length where required PVC class 16 complete with 160mm Bends:				
8.4.3.1		90 deg bends	No.	2		
8.4.3.2		45 deg bends	No.	2		
8.4.3.3		22.5 deg bends	No.	1		
8.4.3.4		11.25 deg bends	No.	3		
8.4.4	8.2.3 PSL 8.2.5	Extra over item 8.4.2.1 for supplying, fixing, and bedding of valves				
8.4.4.1		150mm ø flanged waterworks gate valve to scour (Class 16)	No.	1		
8.4.5	8.2.11	Anchor/Thrust blocks and pedestals				
8.4.5.1		Concrete Class 15/19	m³	10		
8.4.6	8.2.13 PSL 8.2.13	Valve chambers				
8.4.6.1	8.2.13	Construct Scour Valve chamber complete as described on drawing 137G, but excluding all pipework, covers and frames	No	1		
8.4.6.2	8.2.13	Construct Subsoil chamber complete as described on drawing 137G, but excluding all pipework, covers and frames	No	1		
8.4.7		Supply all materials and construct:				
8.4.7.1		Pipeline markers complete (Prov)	No	4		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 08 1MI CLEAR WATER RESERVOIR

SECTION: 8 1 ML CLEARWATER RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
8.5	SANS 1200 LB PSLB 8.1.2 & 8.1.3	BEDDING (PIPES)				
8.5.1	8.2.1 PSLB 8.2.1	Provision of bedding from trench excavation				
8.5.1.1	8.2.1	a) Selected granular material	m ³	30		
8.5.1.2		b) Selected fill material	m ³	40		
8.5.2		Imported from				
	8.2.2.3	c) Commercial sources (Provisional)				
8.5.2.1		1) Selected granular material	m ³	20		
8.5.2.2		2) Selected fill material	m ³	30		
8.6	PSA 8.10	MISCELLANEOUS				
8.6.1		Allow for making all connection, sterilizing and commissioning reservoir	Sum	1		
8.6.2		150mm ø GMS Airvent as per drg. J35030-137E	No	4		
8.6.3		Chlorination channel as detailed on drg. J35030-137E	No	1		
8.6.4		Supply and install GMS manhole cover and frame as detailed on drg J35030-137F				
8.6.4.1		Reservoir roof	No	3		
8.6.4.2		Scour valve chamber	No	2		
8.6.5		Supply and install level indicator complete (Town Engineering or similar Employers Agent approved)	No	1		
8.6.6		Supply, deliver and install MEGAFLO subsoil drainage system complete with Bidim	m	160		
8.6.7		Supply, and install crushed stone layer on reservoir roof (13mm stone 75mm thick)	m ²	522		
TOTAL FOR SECTION 8 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 09 PUMP STATION

SECTION: 9 PUMP STATION

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
9.1	SANS 1200 DB	EARTHWORKS (PIPE TRENCHES)				
9.1.1	8.3.2 PSDB 8.3.2 8.3.2(a)	Excavation Excavate in all materials for trenches backfill, compact, and dispose of surplus/unsuitable material, for pipes: Over 100 up to 300 mm diam. for total trench depth: Exceeding but not exceeding				
9.1.1.1		0,0 m 1,0 m	m	120		
9.1.1.2		1,0 m 2,0 m	m	80		
9.2	SANS 1200 G	CONCRETE (STRUCTURAL)				
9.2.1	8.1.1 PSG 8.1.1	Formwork				
9.2.1.1	8.2.1	Rough vertical to:				
9.2.1.1.1		Footings	m ²	40		
9.2.1.1.2		Walls	m ²	375		
9.2.1.1.3		Cable trench	m ²	35		
9.2.1.2	8.2.2	Smooth vertical to:				
9.2.1.2.1		Walls	m ²	325		
9.2.1.2.2		Slabs	m ²	50		
9.2.1.2.3		Beams	m ²	46		
9.2.1.2.4		Cable trench	m ²	58		
9.2.1.3	8.2.2	Smooth horizontal to:				
9.2.1.3.1		Slab soffits	m ²	5		
9.2.1.3.2		Beams	m ²	16		
9.2.1.4	8.2.6	Box out holes/form voids at any depth				
9.2.1.4.1		Large, circular, diam. 0,35 - 0,7 m	No.	9		
9.2.2	8.1.2 PSG 8.1.2	Reinforcement				
9.2.2.1	8.3.1	Mild steel bars	t	4		
9.2.2.2	8.3.1	High tensile steel bars	t	27		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 09 PUMP STATION

SECTION: 9 PUMP STATION

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
9.2.2.3	8.3.2	High-tensile welded mesh ref #245 reinforcement	m ²	40		
9.2.3	8.1.3 PSG 8.1.3	Concrete				
9.2.3.1	8.4.2	Blinding layer in 15 MPa/19 mm concrete				
9.2.3.1.1		50 mm minimum thickness	m ²	190		
9.2.3.2	8.4.3	Strength concrete: 20 MPa/19mm				
9.2.3.2.1		Mass concrete	m ³	20		
9.2.3.3	8.4.3	Strength concrete: 35 MPa/19mm				
9.2.3.3.1		Footings	m ³	8		
9.2.3.3.2		Floor slabs	m ³	54		
9.2.3.3.3		Plinths	m ³	2		
9.2.3.3.4		Walls	m ³	105		
9.2.3.3.5		Beams	m ³	5		
9.2.3.3.6		Cable trench	m ²	10		
9.2.3.4	8.4.4 PSG 8.4.4	Unformed surface finishes				
		Wood-floated finish to:				
9.2.3.4.1		Foundations	m ²	20		
		Steel-floated finish to:				
9.2.3.4.2		Invert	m ²	35		
9.2.3.4.3		Wall / Beam tops	m ²	35		
		Power-floated finish to:				
9.2.3.4.4		Floor slabs	m ²	230		
9.2.3.4.5		Plinths	m ²	20		
9.2.4	8.5 PSG 8.5	Joints				
9.2.4.1		Saw-Cut joint, as shown on dwg. no. J35030-139B	m	3		
9.2.4.2		Butt joint, as shown on dwg. no. J35030-139B	m	10		
9.2.4.3		Isolation joint, as shown on dwg. no. J35030-139B	m	40		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 09 PUMP STATION

SECTION: 9 PUMP STATION

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
9.2.4.4		Typical horizontal (in wall) construction joint, as shown on dwg. no. J35030-139F	m	150		
9.2.4.5		Construction joint at the base of wall with waterstop, as shown on dwg. no. J35030-139F	m	150		
9.2.5	PSG 8.10	Items cast in concrete				
		Setting puddle pipes or specials into or through concrete work, incl. for formwork around the pipes and fixing the pipes to the designated lines and levels using ABE Durated expansive cementitious grout (pipes measured elsewhere) for diameters:				
9.2.5.1		50mm up to 250mm	No	3		
9.2.5.2		300mm up to 400mm	No	2		
9.2.5.3		450mm up to 550mm	No	1		
9.2.6	PSG 8.15	Slurry coat and curing: Supply and apply waterproof treatment with Xypex concentrate and Xypex modified to all areas as specified	m ²	250		
9.2.7	PSG 8.16	Bond breaker: 250 micron DPC	m ²	250		
9.3	SANS 1200 HA	STRUCTURAL STEELWORK (SUNDRY ITEMS)				
9.3.1	8.3.1 PSHA 8.3.1 & 8.3.6	Structural steel				
		Supply, fabricate, deliver and install structural steelwork for				
9.3.1.1		203 x 133 x 30kg crawl beam 25m long complete including expanding bolts	No	1		
9.3.1.2		203 x 133 x 25kg beam 5.1m long complete including expanding bolts	No	4		
9.3.2	8.3.2 PSHA 8.3.2 & 8.3.6	Supply and install handrails complete as shown on Drg J35030-139B	m	10		
9.3.3	8.3.2 PSHA 8.3.2 & 8.3.6	Supply and install GMS stairs complete including handrailing complete as shown on Drg J35030-139B	Sum	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 09 PUMP STATION

SECTION: 9 PUMP STATION

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
9.3.4	8.3.3 PSHA 8.3.6	Supply and install ladders complete as shown on Drg J35030-139F				
9.3.4.1		6m long	No.	1		
9.3.5	8.3.4 PSHA 8.3.6	Flooring, complete and installed with frames as shown on Drg J35030-139B				
9.3.5.1		Open grid floors, Rectagrid RS40 Type 40x4.5	m²	100		
9.4	SANS 1200 L	MEDIUM-PRESSURE PIPELINES				
9.4.1	8.2.5 PSL 8.2.5	Supply and install pipes, valves, and specials				
9.4.1.1		150mm Ø 90° GMS and FBE coated plain ended short radius bend incorporating a bellmouth with anti vortex and puddle flange on end and 150mm Ø GMS and FBE coated pipe extending up to the scour chamber on the other as shown on dra.	No	1		
9.4.2	8.2.1 PSL 8.2.1	Supply, lay, and bed pipes complete with couplings Supply, lay, joint, bed, test and disinfect pipes: uPVC pipes:				
9.4.2.1		i) 160mm dia class 9	m	200		
9.4.3	8.2.2	Extra over item 9.4.2.1 for supply, lay, joint, bed, test and disinfect incl cut pipes to length where required PVC class 16 complete with 160mm Bends:				
9.4.3.1		90 deg bends	No.	2		
9.4.3.2		45 deg bends	No.	2		
9.4.3.3		22.5 deg bends	No.	1		
9.4.3.4		11.25 deg bends	No.	3		
9.4.4	8.2.3 PSL 8.2.5	Extra over item 9.4.2.1 for supplying, fixing, and bedding of valves				
9.4.4.1		150mm ø flanged waterworks gate valve to scour (Class 16)	No.	1		
9.4.5	8.2.11	Anchor/Thrust blocks and pedestals				
9.4.5.1		Concrete Class 15/19	m³	10		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 09 PUMP STATION

SECTION: 9 PUMP STATION

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
9.4.6	8.2.13 PSL 8.2.13	Valve chambers				
9.4.6.1	8.2.13	Construct Scour Valve chamber complete as described on drawing J35030/137G, but excluding all pipework, covers and frames	No	1		
9.4.7		Supply all materials and construct:				
9.4.7.1		Pipeline markers complete (Prov)	No	4		
9.5	SANS 1200 LB PSLB 8.1.2 & 8.1.3	BEDDING (PIPES)				
9.5.1	8.2.1 PSLB 8.2.1	Provision of bedding from trench excavation				
9.5.1.1	8.2.1	a) Selected granular material	m ³	60		
9.5.1.2		b) Selected fill material	m ³	80		
9.5.2		Imported from				
	8.2.2.3	c) Commercial sources (Provisional)				
9.5.2.1		1) Selected granular material	m ³	40		
9.5.2.2		2) Selected fill material	m ³	60		
9.6	PSA 8.10	BRICKWORK				
9.6.1		Cathcart Taverline:				
9.6.1.1		230 mm brick to walls	m ²	350		
9.6.1.2		Extra over brickwork for face brickwork	m ²	350		
9.6.2		Stock brick:				
9.6.2.1		115 mm brickwork	m ²	5		
9.6.3		Joint forming material in movement joints				
9.6.3.1		10mm Expansion joints with low density (33kg/m ³), cross linked, closed cell, expanded polyethylene joint former, 115mm wide with one tear off strip, built in vertically through brick walls	m	10		
9.6.4		Brickwork reinforcement:				
9.6.4.1		150mm Wide reinforcement built in horizontally	m	250		
9.6.5		Galvanised hoop iron cramps, ties, etc.:				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 09 PUMP STATION

SECTION: 9 PUMP STATION

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
9.6.5.1		2 x 30mm galvanised hoop iron tie 750mm long with one end wrapped around rafter and spiked to plate and other end built 340mm deep into top of brickwork	No.	50		
9.6.6		Lintels, DPC and sills:				
9.6.6.1		Prestressed fabricated lintel, 110 x 75mm, in lengths not exceeding 3m	m	20		
9.6.6.2		Internal Fibre-Cement window sills, natural grey in single lengths not exceeding 3.6m, bedded in class I mortar including fixing lugs screwed to underside with self tapping screws	m	20		
9.6.6.3		External facebrick window sills	m	20		
9.6.7		Air bricks, Etc.				
9.6.7.1		Set of two 220 x 160 mm Precast concrete vermin proofed louvered airbricks, colour to match facebrick.	No	16		
9.7	PSA 8.10	ROOF SHEETING AND ACCESSORIES				
		Klip-Lok 406 sheeting shall be laid in strict accordance with manufacturer's specification by Brownbuilt approved erector.				
		A five year guarantee of site-workmanship and water-tightness shall be issued after approval by Global Roofing Solutions (Pty) Ltd				
9.7.1		Klip-Lok 406' 0,8mm thick light industrial Z275 galvanised steel sheeting with 2 sides colour coated	m ²	250		
9.7.2		0.8mm Ridge Capping to match roof sheeting	m	40		
9.7.3		0.8mm Barge Flashing to match roof sheeting	m	50		
9.7.4		12mm x 225mm FC fascia boards	m	70		
9.8	PSA 8.10	RAINWATER GOODS				
9.8.1		Gutters complete, Industrial Ogee profile, 0.8mm Aluminium, 150mm x 125mm, includes brackets	m	110		
9.8.2		Downpipes complete, Rectangular Aluminium Fluted, 100mm x 75mm	No	10		
9.8.3		150mm diameter half round precast concrete channel	m	25		
9.9	PSA 8.10	ROOF TIMBERWORK				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 09 PUMP STATION

SECTION: 9 PUMP STATION

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
9.9.1		Timberwork to be Grade 5 SA Pine with trusses spaced at approximately 1173 centres. The contractor will be required to provide a certificate of approval signed by a registered Professional Engineer that the trusses have been designed, manufactured and installed in accordance with the relevant SABS specifications. Roof construction to double pitched roof for Pump Station building including all wall plates, trusses, girders, jack rafters, permanent bracing, loose connectors, galvanised steel shoes, hangers, bolts and 50 x 76mm purlins at 1050mm centres and 50 x 114mm purlins over eaves, installed complete as per architectural drawings	No	1		
9.10	PSA 8.10	CEILING				
9.10.1		Cladit ceiling complete with profile jointing strips and cornice	m²	250		
9.10.2		Compressible mineral insulation, 75mm thick, placed on top of ceiling in between rafters	m²	250		
9.11	PSA 8.10	PAINTING				
		Prepare, stop and apply				
9.11.1		2 coats polyacrylic emulsion (white) to ceiling	m²	250		
9.11.2		1 coat plaster primer internally	m²	350		
9.11.3		3 coats polyacrylic emulsion internally	m²	350		
9.11.4		1 coat general purpose undercoat externally and 2 coats Plascon high gloss enamel externally on fascias	m²	20		
9.12	PSA 8.10	PLASTERWORK				
		Internal plaster				
9.12.1		4:1 Cement plaster on brickwork	m²	350		
9.12.2		3:1 Cement plaster on Concrete	m²	350		
9.13	PSA 8.10	SCREEDS AND FLOOR TOPPING				
9.13.1		Supply and apply 2 part epoxy floor paint (grease and oil resistant) according to the manufacturers specifications. 3 coats ABE or similar Employers Agent approved	m²	250		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 09 PUMP STATION

SECTION: 9 PUMP STATION

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
9.14	PSA 8.10	DOORS				
9.14.1		Powder coated aluminium roller shutter door for 2400mm x 2400mm with door set ironmongery, guides and canopy cover as per manufacturer installed complete (Wispeco or	No	3		
9.14.2		Powder coated aluminium roller shutter door for 2400mm x 2100mm with door set ironmongery, guides and canopy cover as per manufacturer installed complete (Wispeco or	No	1		
9.14.3		Single hardwood FLB external door and frame complete including sealing, parliament hinges, cabin hooks, barrel bolts, yale lock, handles, stops	No	1		
9.14.4		Door closer (Dorma TS 73 V EN 2-4 or similar approved)	No	1		
9.15	PSA 8.10	WINDOWS				
		Steel windows supply and install including hot dip galvanizing after fabrication painting and glazing:				
9.15.1		Type ND11	No	3		
9.15.2		Type NE12	No	5		
9.16	PSA 8.10	EAVES ENCLOSURE				
9.16.1		Flexit 5 mm complete with profile jointing strips and quadrant	m	110		
9.17	PSA 8.10	LOUVERS				
		Supply and install aluminium weather resistant louvers complete with frame and 25 x 25mm galvanized steel screen (TROX AWG or similar approved):				
9.17.1		Size 1985mm x 1980mm	No	1		
9.17.2		Size 785mm x 660mm	No	6		
9.18	PSA 8.10	MISCELLANEOUS				
9.18.1		Supply and fix in place a 7.5l fire extinguisher complete including bracket	No	2		
9.18.2		Supply and install manhole cover and frame as detailed on Drg 137F	No	1		
9.18.3		Supply and install ungeared travelling trolley suitable for use with gantry beam (2000 kg)	No	5		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 09 PUMP STATION

SECTION: 9 PUMP STATION

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
9.18.4		Proof test crawl beam to 2.0 tons and supply test certificate to the Engineer. Also allow for painting the maximum allowable load on the crawl beam.	No	1		
9.18.5		Supply, deliver and install MEGAFLO subsoil drainage system	m	150		
TOTAL FOR SECTION 9 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 10 SLUDGE LAGOONS

SECTION: 10 SLUDGE LAGOONS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
10.1	SANS 1200 G	CONCRETE (STRUCTURAL)				
10.1.1	8.1.1 PSG 8.1.1	FORMWORK				
10.1.1.1	8.2.1	Rough vertical to:				
10.1.1.1.1		Footings	m ²	65		
10.1.1.1.2		Walls	m ²	270		
10.1.1.2	8.2.2	Smooth vertical to:				
10.1.1.2.1		Walls	m ²	305		
10.1.1.2.2		Slabs	m ²	20		
10.1.1.3	8.2.2	Smooth horizontal to:				
10.1.1.3.1		Slab soffits (including removal and making good)	m ²	5		
10.1.1.4	8.2.6	Box out holes/form voids				
10.1.1.4.1		Rectangular, 900mm x 650mm	No.	2		
10.1.1.4.2		Circular, up to 300mm diam	No.	7		
10.1.1.4.3		Large, circular, diam. 0,35 - 0,7 m	No.	2		
10.1.2	8.1.2 PSG 8.1.2	REINFORCEMENT				
10.1.2.1	8.3.1	Mild steel bars	t	1		
10.1.2.2	8.3.1	High tensile steel bars	t	21		
10.1.2.3	8.3.2	High-tensile welded mesh ref #395 reinforcement	t	0.02		
10.1.2.4	8.3.2	High-tensile welded mesh ref #617 reinforcement	t	0.06		
10.1.3	8.1.3 PSG 8.1.3	CONCRETE				
10.1.3.1	8.4.2	Blinding layer in 15 MPa/19 mm concrete				
10.1.3.1.1		50 mm minimum thickness	m ²	185		
10.1.3.2	8.4.3	Strength concrete: 20 MPa/19mm				
10.1.3.2.1		Footings	m ³	55		
10.1.3.2.2		Mass concrete	m ³	3		
10.1.3.3	8.4.3	Strength concrete: 35 MPa/19mm				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 10 SLUDGE LAGOONS

SECTION: 10 SLUDGE LAGOONS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
10.1.3.3.1		Floor slabs	m ³	2.5		
10.1.3.3.2		Walls	m ³	85		
10.1.3.3.3		Suspended slabs	m ³	1		
10.1.3.4	8.4.4 PSG 8.4.4	Unformed surface finishes				
		Wood-floated finish to:				
10.1.3.4.1		Footings (external)	m ²	80		
		Steel-floated finish to:				
10.1.3.4.2		Footings (internal)	m ²	75		
10.1.3.4.3		Wall tops	m ²	35		
10.1.3.4.4		Roof slabs	m ²	8		
10.1.4	8.5 PSG 8.5	JOINTS				
10.1.4.1		Construction joint, as shown on dwg. no. J35030-141	m	110		
10.1.5	PSG 8.10	ITEMS CAST IN CONCRETE				
		Setting puddle pipes or specials into or through concrete work, incl. for formwork around the pipes and fixing the pipes to the designated lines and levels using ABE Durated expansive cementitious grout (pipes measured elsewhere) for diameters:				
10.1.5.1		100mm up to 250mm	No	2		
10.1.5.2		300mm up to 600mm	No	9		
10.1.6	PSG 8.14	Watertightness test to pump station including provision of water	No	1		
10.1.7	PSG 8.15	Adding chrystaline water proofing admixture (Xypex or similar) to all areas as specified	kg	2000		
10.2	SANS 1200 HA	STRUCTURAL STEELWORK (SUNDRY ITEMS)				
10.2.1	8.3.1 PSHA 8.3.1 & 8.3.6	Structural steel				
		Supply, fabricate, deliver and install structural steelwork for				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 10 SLUDGE LAGOONS

SECTION: 10 SLUDGE LAGOONS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
10.2.1.1		HDG I-254x146x31 crawl beam, columns and footplate as per the drawings J35030/141	t	1		
10.2.2	8.3.2 PSHA	Supply and install handrails complete as shown on Drg J35030/140	m	104		
	8.3.2 & 8.3.6					
10.2.3	8.3.4 PSHA	Supply and install flooring, complete with frames as shown on Drg J35030/142				
	8.3.6					
10.2.3.1		Open grid floors, Rectagrid RS40 Type 40x4.5 Bearer Bars Banded	m ²	7		
10.3		BRICKWORK	%			
10.3.1		Brickwork to valve chamber:				
10.3.1.1		115 mm brick to walls	m ²	2		
10.3.1.2		230 mm brick to walls	m ²	6		
10.4		PLASTERWORK				
		Internal plaster				
10.4.1		4:1 Cement plaster on brickwork	m ²	6		
10.5	SANS 1200 DB	EARTHWORKS (PIPE TRENCHES)				
10.5.1	8.3.2	EXCAVATION				
	8.3.2(a) PSDB	Excavate in all materials for trenches, backfill, compact and dispose of surplus/unsuitable material within a 1km radius for PVC pipe up to 160mm dia for depths: (UP TO 760mm width)				
	8.3.2 LIC	over 0.0m up to 1.5m	m	135		
10.5.1.1	8.3.2(a) PSDB	Excavate in all materials for trenches, backfill, compact and dispose of surplus/unsuitable material within a 1km radius for PVC pipe up to 400mm dia for depths: (UP TO 1000mm width)				
	8.3.2 LIC	over 0.0m up to 1.5m	m	100		
10.5.1.2		over 1.5m up to 2.5m	m	200		
10.5.1.3		over 2.5m up to 3.5m	m	-		
10.5.1.4	8.3.2(b) PSDB	Extra over items 1.2.1 - 1.2.10 for				
	8.3.2					
CARRIED FORWARD						

Rate Only

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 10 SLUDGE LAGOONS

SECTION: 10 SLUDGE LAGOONS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
10.5.1.5		Hard Rock Excavations	m³	160		
10.5.2	SANS 1200 LB	PROVISION OF BEDDING				
	8.2.1	Provision of bedding from trench excavation within 0.5km				
10.5.2.1		Selected granular material	m³	110		
10.5.2.2		Selected fill material	m³	50		
	8.2.2.3	From commercial sources (provisional)				
10.5.2.3		Selected granular material	m³	110		
10.5.2.4		Selected fill material	m³	50		
10.6	SANS 1200 L	MEDIUM PRESSURE PIPELINES				
10.6.1		PIPEWORK				
	8.2.1	Supply, lay, joint, bed flexible, test and disinfect uPVC pipes:				
10.6.1.1		160 mm dia Class 9	m	410		
10.6.1.2		315 mm dia Class 9	m	410		
10.6.1.3		400 mm dia Class 9	m	410		
10.6.2		PIPE SPECIALS				
	8.2.2	Extra over items 10.6.1.3 to 10.6.1.3 for the supply, lay, joint, bed, test and disinfect incl cut pipe, pipe specials complete:				
		Bends (class 16 uPVC)				
10.6.2.1		160 mm dia x 90 deg	No.	11		
10.6.2.2		315 mm dia x 90 deg	No.	5		
10.6.2.3		400 mm dia x 90 deg	No.	2		
		Tees				
10.6.2.4		160 mm dia equal tee	No	2		
10.6.2.5		315 mm dia equal tee	No	4		Rate Only
10.6.2.6		400 mm dia equal tee	No	1		
		Reducing Tee				
10.6.2.7		400mm x 315mm	No.	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 10 SLUDGE LAGOONS

SECTION: 10 SLUDGE LAGOONS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
10.6.3	8.2.5 PSL 8.2.5	Supply and place pipes, valves, and specials as per DRG J35030/140				
10.6.3.1		400mm ø GMS medium radius bend piece with puddle collar	No	2		
10.6.3.2		400mm ø ST/uPVC VJ flange adaptor	No	2		
10.6.4	8.2.5 PSL 8.2.5	Supply and place pipes, valves, and specials as per DRG J35030/141				
10.6.4.1		300mm ø GMS puddle pipe 500mm long	No	2		
10.6.4.2		300mm ø ST/uPVC VJ flange adaptor	No	2		
10.6.5	8.2.5 PSL 8.2.5	Supply and place pipes, valves, and specials as per DRG J35030/142				
10.6.5.1		SL 1 - 300mm ø GMS pipe 550mm long, flanged on both ends with central puddle collar	No	2		
10.6.5.2		SL 2 - 300mm ø SG iron flange adaptor to suit uPVC pipe	No	2		
10.6.5.3		SL 3 - 300mm ø GMS pipe 300mm long, flanged on one end only with puddle collar 75mm from plain end.	No	2		
10.6.5.4		SL 4 - 300mm ø resilient seal flanged gate valve	No	2		
10.6.5.5		SL 5 - 300mm ø GMS pipe 450mm long, flanged on one end only with puddle collar 125mm from plain end	No	2		
10.6.5.6		SL 6 - 300mm ø SG iron flange adaptor to suit uPVC pipe	No	2		
10.6.5.7		SL 7 - 300mm ø resilient seal flanged gate valve	No	2		
10.6.6		VALVES				
	8.2.3 PSL 3	Supply, lay and bed Class C, joint, incl cut pipes where necessary, test and disinfect:				
10.6.6.1		Gate Valves				
		RSV Gate Valve Class 25 (excluding chamber)				
10.6.6.1.1		160 mm dia pipeline	No	2		
10.6.6.1.2		315 mm dia pipeline	No.	2		
10.6.6.1.3		400 mm dia pipeline	No	2		
10.6.7		CHAMBERS				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 10 SLUDGE LAGOONS

SECTION: 10 SLUDGE LAGOONS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
10.6.7.1	8.2.13 PSL 5	Construct valve chambers: Valve chamber complete as per DWG J35030/140	No	6		
10.6.8		ANCHORS, THRUST BLOCKS AND PEDESTALS				
	8.2.11	Thrust blocks				
10.6.8.1	PSL 6.3	15 MPa/19 Concrete	m ³	3		
10.6.8.2		Rough formwork	m ²	10		
10.7	PSA 8.10	MISCELLANEOUS				
10.7.1	PSHA 8.3.7	Supply and install Hand stops as per drawing J35030/142	No	1		
10.7.2	PSG 8.14	Testing of watertightness of pump station sump	No	1		
10.7.3	PSG 8.14	Testing of watertightness of valve chamber	No	1		
10.7.4	PSG 8.14	Testing of watertightness of outlet chamber	No	2		
10.7.5		Supply, deliver and install as indicated on the drawing 75mm diameter uPVC cable ducting.	Sum	1		
10.7.6		Supply, deliver and cast into pump station roof slab HDG 650mm x 950mm steel lockable manhole hinged cover and frame as per drawing J35030/143	No	2		
10.7.7		Supply and install 1800mm diameter Rocla rings sump 3.5m deep with step irons and sealing of all joints as per drawing J35030/141	No	1		
10.7.8		Proof test crawl beam to 2.0 ton and supply test certificate to the Engineer. Also allow for painting the maximum allowable load on the crawl beam.	No	1		
10.7.9		Supply and install pump hook as detailed on drawing J35030/141	No	1		
10.7.10		Supply, deliver and install MEGAFLO subsoil drainage system	m	110		
TOTAL FOR SECTION 10 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 11 OFFICE/LABORATORY AND GATE HOUSE BUILDINGS

SECTION: 11 OFFICE/ LABORATORY AND GATE HOUSE BUILDINGS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
11.1	SANS 1200 G	CONCRETE (STRUCTURAL)				
11.1.1	8.1.1 PSG 8.1.1	FORMWORK				
11.1.1.1	8.2.1	Rough vertical to:				
11.1.1.1.1		Footings	m ²	26		
11.1.1.2	8.2.2	Smooth vertical to:				
11.1.1.2.1		Slabs	m ²	10		
11.1.2	8.1.2 PSG 8.1.2	REINFORCEMENT				
11.1.2.1	8.3.1	Mild steel bars	t	0.5		
11.1.2.2	8.3.1	High tensile steel bars	t	5		
11.1.2.3	8.3.2	High-tensile welded mesh ref #193 reinforcement	kg	120		
11.1.2.4	8.3.2	High-tensile welded mesh ref #245 reinforcement	kg	250		
11.1.3	8.1.3 PSG 8.1.3	CONCRETE				
11.1.3.1	8.4.2	Binding layer in 15 MPa/19 mm concrete				
11.1.3.1.1		50 mm minimum thickness	m ²	35		
11.1.3.2	8.4.3	Strength concrete: 20 MPa/19mm				
11.1.3.2.1		Strip footings	m ³	10		
11.1.3.2.2		Slab thickenings	m ³	17		
11.1.3.3	8.4.3	Strength concrete: 25 MPa/19mm				
11.1.3.3.1		Apron slab including thickenings	m ³	7		
11.1.3.4	8.4.3	Strength concrete: 35 MPa/19mm				
11.1.3.4.1		Floor slabs	m ³	10		
11.1.3.5	8.4.4 PSG 8.4.4	Unformed surface finishes				
		Wood-floated finish to:				
11.1.3.5.1		Foundations	m ²	40		
11.1.3.5.2		Floor slabs	m ²	100		
11.1.3.5.3		Apron slabs	m ²	62		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 11 OFFICE/LABORATORY AND GATE HOUSE BUILDINGS

SECTION: 11 OFFICE/ LABORATORY AND GATE HOUSE BUILDINGS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
11.1.4	8.5 PSG 8.5	JOINTS				
11.1.4.1		Saw-Cut joint, as shown on dwgs no. J35030-132B and J35030-130B	m	18		
11.1.4.2		Butt joint, as shown on dwgs no. J35030-132B and J35030-130B	m	36		
11.1.4.3		Isolation joint for 100mm slab, as shown on dwgs no. J35030-132B and J35030-130B	m	50		
11.1.4.4		Isolation joint for 75mm slab, as shown on dwgs no. J35030-132B and J35030-130B	m	53		
11.1.4.5	PSG 8.5.1	Formed (Construction) joint, as shown on dwg no. J35030-132B	m	11		
11.1.5	PSG 8.16	Bond breaker: 250 micron DPC	m ²	165		
11.2	SANS 10400-K PSA 8.10	BRICKWORK	%			
11.2.1		Cathcart Taverline:				
11.2.1.1		115 mm brick to walls	m ²	120		
11.2.1.2		230 mm brick to walls	m ²	195		
11.2.1.3		Extra over brickwork for face brickwork	m ²	190		
11.2.1.4		Extra over brickwork for header course	m	54		
11.2.1.5		Fair raking cutting	m	15		
11.2.1.6		Extra over brickwork for brick-on-edge header course lintels one course high, pointed on face and 230mm soffit.	m	15		
11.2.2		Stock brick:				
11.2.2.1		115 mm brickwork	m ²	2		
11.2.3		Joint forming material in movement joints				
11.2.3.1		10mm Expansion joints with low density (33kg/m ³), cross linked, closed cell, expanded polyethylene joint former, 115mm wide with one tear off strip, built in vertically though brick walls	m	40		
11.2.4		Brickwork reinforcement:				
11.2.4.1		150mm Wide reinforcement built in horizontally	m	100		
11.2.5		Galvanised hoop iron cramps, ties, etc.:				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 11 OFFICE/LABORATORY AND GATE HOUSE BUILDINGS

SECTION: 11 OFFICE/ LABORATORY AND GATE HOUSE BUILDINGS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
11.2.5.1		2 x 30mm galvanised hoop iron tie 750mm long with one end wrapped around rafter and spiked to plate and other end built 340mm deep into top of brickwork	No.	36		
11.2.6		Lintels, DPC and sills:				
11.2.6.1		Prestressed fabricated lintel, 110 x 75mm, in lengths not exceeding 3m	m	20		
11.2.6.2		Internal Fibre-Cement window sills, natural grey in single lengths not exceeding 3.6m, bedded in class I mortar including fixing lugs screwed to underside with self tapping screws	m	20		
11.2.6.3		External facebrick window sills	m	20		
11.2.7		Air bricks, Etc.				
11.2.7.1		Set of two 220 x 160 mm Precast concrete vermin proofed louvered airbricks, colour to match facebrick.	No	12		
11.3	SANS 10400-L PSA 8.10	ROOF SHEETING AND ACCESSORIES				
		Klip-Lok 406 sheeting shall be laid in strict accordance with manufacturer's specification by Brownbuilt approved erector. A five year guarantee of site-workmanship and water-tightness shall be issued after approval by Global Roofing Solutions (Pty) Ltd				
11.3.1		Klip-Lok 406' 0,8mm thick light industrial Z275 galvanised steel sheeting with 2 sides colour coated	m ²	145		
11.3.2		0.8mm Ridge Capping to match roof sheeting	m	12		
11.3.3		0.8mm Barge Flashing to match roof sheeting	m	15		
11.3.4		12mm x 225mm FC fascia boards	m	15		
11.4	SANS 10400-L & SANS 10400-R PSA 8.10	RAINWATER GOODS				
11.4.1		Gutters complete, Industrial Ogee profile, 0.8mm Aluminium, 150mm x 125mm, includes brackets	m	30		
11.4.2		Downpipes complete, Rectangular Aluminium Fluted, 100mm x 75mm	No	5		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 11 OFFICE/LABORATORY AND GATE HOUSE BUILDINGS

SECTION: 11 OFFICE/ LABORATORY AND GATE HOUSE BUILDINGS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
11.4.3		BROUGHT FORWARD				
		150mm half round precast channel	m	75		
11.5	SANS 10400-L PSA 8.10	ROOF TIMBERWORK				
		Timberwork to be Grade 5 SA Pine with trusses spaced at approximately 1173 centres.				
		The contractor will be required to provide a certificate of approval signed by a registered Professional Engineer that the trusses have been designed, manufactured and installed in accordance with the relevant SABS specifications.				
11.5.1		Roof construction to double pitched roof for office/laboratory building including all wall plates, trusses, girders, jack rafters, permanent bracing, loose connectors, galvanised steel shoes, hangers, bolts and 50 x 76mm purlins at 1050mm centres and 50 x 114mm purlins over eaves, installed complete as per architectural drawing	No	1		
11.5.2		Roof construction to single pitched roof for gate house building including all wall plates, trusses, girders, jack rafters, permanent bracing, loose connectors, galvanised steel shoes, hangers, bolts and 50 x 76mm purlins at 1050mm centres and 50 x 114mm purlins over eaves, installed complete as per architectural drawing	No	1		
11.6	SANS 10400-L PSA 8.10	CEILING				
11.6.1		Cladit ceiling complete with profile jointing strips and cornice	m ²	90		
11.6.2		Compressible mineral insulation, 75mm thick, placed on top of ceiling in between rafters	m ²	90		
11.7	PSA 8.10	PAINTING				
11.7.1		2 coats polyacrylic emulsion (white) to ceiling	m ²	90		
11.7.2		1 coat plaster primer internally	m ²	370		
11.7.3		3 coats polyacrylic emulsion internally	m ²	370		
11.7.4		1 coat general purpose undercoat externally and 2 coats Plascon high gloss enamel externally on fascias	m ²	4		
11.8	PSA 8.10	PLASTERWORK				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 11 OFFICE/LABORATORY AND GATE HOUSE BUILDINGS

SECTION: 11 OFFICE/ LABORATORY AND GATE HOUSE BUILDINGS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
		Prepare, stop and apply				
		Internal plaster				
11.8.1		4:1 Cement plaster on brickwork	m ²	370		
11.9	PSA 8.10	FLOOR TOPPING				
11.9.1		Non slip ceramic tiles 0.35m x 0.35m	m ²	90		
11.9.2		100mm tiled skirting to match tiling	m	150		
11.10	PSA 8.10	DOORS				
11.10.1		Single hardwood FLB external door and frame complete including sealing, parliament hinges, cabin hooks, barrel bolts, yale lock, handles, stops	No	3		
11.10.2		Semi-solid core flush doors finished on both faces with approved hard wood veneer and concealed hardwood edges complete with frame and including sealing, parliament hinges, cabin hooks, barrel bolts, yale lock, handles, stops	No	9		
11.10.3		Door closer (Dorma TS 73 V EN 2-4 or similar approved)	No	6		
11.11	SANS 10400-N PSA 8.10	WINDOWS				
		Steel windows supply and install complete including hot dip galvanizing after fabrication, sealing, painting, glazing and burglar bars:				
11.11.1		NC2	No	9		
11.11.2		NE1	No	2		
11.11.3		NC1	No	2		
11.11.4		NC4	No	2		
11.12	PSA 8.10	EAVES ENCLOSURE				
11.12.1		Flexit 5 mm complete with profile jointing strips and quadrant	m	35		
11.13	PSA 8.10	MISCELLANEOUS				
11.13.1	SANS 10400-T	Supply and fix in place a 7.5l fire extinguisher complete including bracket	No	3		
11.13.2		First aid equipment including life jackets, first aid kit and 2 No. stretchers	PSum	1	30 000.00	30 000.00
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 11 OFFICE/LABORATORY AND GATE HOUSE BUILDINGS

SECTION: 11 OFFICE/ LABORATORY AND GATE HOUSE BUILDINGS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
11.13.3		Percentage adjustment on item 11.13.2 for cost and profit	%	30 000.00		
11.13.4	SANS 10400-P	Laboratory Equipment	PSum	1	100 000.00	100 000.00
11.13.5		Percentage adjustment on item 11.13.4 for cost and profit	%	100 000.00		
11.13.6	SANS 10400-P	Sanitary ware	PSum	1	60 000.00	60 000.00
11.13.7		Percentage adjustment on item 11.13.6 for cost and profit	%	60 000.00		
11.13.8		Joinery	PSum	1	40 000.00	40 000.00
11.13.9		Percentage adjustment on item 11.13.8 for cost and profit	%	40 000.00		
11.13.10	SANS 10400-P	Plumbing	PSum	1	50 000.00	50 000.00
11.13.11		Percentage adjustment on item 11.13.10 for cost and profit	%	50 000.00		
11.13.12		Furniture	PSum	1	30 000.00	30 000.00
11.13.13		Percentage adjustment on item 11.13.12 for cost and profit	%	30 000.00		
11.13.14	SANS 10400-O	Heating, ventilation and airconditioning to Office	PSum	1	15 000.00	15 000.00
11.13.15		Percentage adjustment on item 11.13.12 for cost and profit	%	15 000.00		
11.13.16		Rain gauge	No	1		
TOTAL FOR SECTION 11 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 12 SUPERVISOR/OPERATORS LIVING QUARTERS

SECTION: 12 SUPERVISOR/OPERATORS LIVING QUARTERS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
12.1	SANS 1200 G	CONCRETE (STRUCTURAL)				
12.1.1	8.1.1 PSG 8.1.1	FORMWORK				
12.1.1.1	8.2.1	Rough vertical to:				
12.1.1.1.1		Footings	m ²	65		
12.1.1.2	8.2.2	Smooth vertical to:				
12.1.1.2.1		Slabs	m ²	35		
12.1.2	8.1.2 PSG 8.1.2	REINFORCEMENT				
12.1.2.1	8.3.1	Mild steel bars	t	0.2		
12.1.2.2	8.3.1	High tensile steel bars	t	1		
12.1.2.3	8.3.2	High-tensile welded mesh ref #193 reinforcement	kg	350		
12.1.2.4	8.3.2	High-tensile welded mesh ref #245 reinforcement	kg	700		
12.1.3	8.1.3 PSG 8.1.3	CONCRETE				
12.1.3.1	8.4.2	Blinding layer in 15 MPa/19 mm concrete				
12.1.3.1.1		50 mm minimum thickness	m ²	65		
12.1.3.2	8.4.3	Strength concrete: 20 MPa/19mm				
12.1.3.2.1		Strip footings	m ³	20		
12.1.3.2.2		Slab thickenings	m ³	25		
12.1.3.3	8.4.3	Strength concrete: 25 MPa/19mm				
12.1.3.3.1		Apron slab including thickenings	m ³	15		
12.1.3.4	8.4.3	Strength concrete: 35 MPa/19mm				
12.1.3.4.1		Floor and apron slabs	m ³	30		
12.1.3.5	8.4.4 PSG 8.4.4	Unformed surface finishes				
		Wood-floated finish to:				
12.1.3.5.1		Foundations	m ²	65		
12.1.3.5.2		Floor slabs	m ²	230		
12.1.3.5.3		Apron slabs	m ²	135		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 12 SUPERVISOR/OPERATORS LIVING QUARTERS

SECTION: 12 SUPERVISOR/OPERATORS LIVING QUARTERS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
12.1.4	8.5 PSG 8.5	JOINTS				
12.1.4.1		Saw-Cut joint, as shown on dwgs no. J35030-131B and J35030-131D	m	80		
12.1.4.2		Butt joint, as shown on dwgs no. J35030-131B and J35030-131D	m	50		
12.1.4.3		Isolation joint for 100mm slab, as shown on dwgs no. J35030-131B and J35030-131D	m	140		
12.1.4.4		Isolation joint for 75mm slab, as shown on dwgs no. J35030-131B and J35030-131D	m	110		
12.1.4.5	PSG 8.5.1	Formed (Construction) joint, as shown on dwg no. J35030-131B and J35030-131D	m	25		
12.1.5	PSG 8.16	Bond breaker: 250 micron DPC	m ²	230		
12.2	SANS 10400-K PSA 8.10	BRICKWORK	%			
12.2.1		Cathcart Taverline:				
12.2.1.1		115 mm brick to walls	m ²	200		
12.2.1.2		230 mm brick to walls	m ²	400		
12.2.1.3		Extra over brickwork for face brickwork	m ²	125		
12.2.1.4		Extra over brickwork for header course	m	110		
12.2.1.5		Fair raking cutting	m	50		
12.2.1.6		Extra over brickwork for brick-on-edge header course lintels one course high, pointed on face and 230mm soffit.	m	115		
12.2.2		Stock brick:				
12.2.2.1		115 mm brickwork	m ²	10		
12.2.3		Joint forming material in movement joints				
12.2.3.1		10mm Expansion joints with low density (33kg/m ³), cross linked, closed cell, expanded polyethylene joint former, 115mm wide with one tear off strip, built in vertically though brick walls	m	20		
12.2.4		Brickwork reinforcement:				
12.2.4.1		150mm Wide reinforcement built in horizontally	m	220		
12.2.5		Galvanised hoop iron cramps, ties, etc.:				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 12 SUPERVISOR/OPERATORS LIVING QUARTERS

SECTION: 12 SUPERVISOR/OPERATORS LIVING QUARTERS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
12.2.5.1		2 x 30mm galvanised hoop iron tie 750mm long with one end wrapped around rafter and spiked to plate and other end built 340mm deep into top of brickwork	No.	70		
12.2.6		Lintels, DPC and sills:				
12.2.6.1		Prestressed fabricated lintel, 110 x 75mm, in lengths not exceeding 3m	m	100		
12.2.6.2		Internal Fibre-Cement window sills, natural grey in single lengths not exceeding 3.6m, bedded in class I mortar including fixing lugs screwed to underside with self tapping screws	m	40		
12.2.6.3		External facebrick window sills	m	40		
12.2.7		Air bricks, Etc.				
12.2.7.1		Set of two 220 x 160 mm Precast concrete vermin proofed louvered airbricks, colour to match facebrick.	No	28		
12.3	SANS 10400-L PSA 8.10	ROOF SHEETING AND ACCESSORIES				
		Klip-Lok 406 sheeting shall be laid in strict accordance with manufacturer's specification by Brownbuilt approved erector. A five year guarantee of site-workmanship and water-tightness shall be issued after approval by Global Roofing Solutions (Pty) Ltd				
12.3.1		Klip-Lok 406' 0,8mm thick light industrial Z275 galvanised steel sheeting with 2 sides colour coated	m²	350		
12.3.2		0.8mm Ridge Capping to match roof sheeting	m	40		
12.3.3		0.8mm Barge Flashing to match roof sheeting	m	70		
12.3.4		12mm x 225mm FC fascia boards	m	80		
12.4	SANS 10400-L & SANS 10400-R PSA 8.10	RAINWATER GOODS				
12.4.1		Gutters complete, Industrial Ogee profile, 0.8mm Aluminium, 150mm x 125mm, includes brackets	m	76		
12.4.2		Downpipes complete, Rectangular Aluminium Fluted, 100mm x 75mm	No	15		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 12 SUPERVISOR/OPERATORS LIVING QUARTERS

SECTION: 12 SUPERVISOR/OPERATORS LIVING QUARTERS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
12.4.3	SANS 10400-L PSA 8.10	BROUGHT FORWARD				
		150mm half round precast channel	m	120		
12.5		ROOF TIMBERWORK				
		Timberwork to be Grade 5 SA Pine with trusses spaced at approximately 1173 centres. The contractor will be required to provide a certificate of approval signed by a registered Professional Engineer that the trusses have been designed, manufactured and installed in accordance with the relevant SABS specifications.				
12.5.1	SANS 10400-L PSA 8.10	Roof construction to double pitched roof for supervisor's living quarters including all wall plates, trusses, girders, jack rafters, permanent bracing, loose connectors, galvanised steel shoes, hangers, bolts and 50 x 76mm purlins at 1050mm centres and 50 x 114mm purlins over eaves, installed complete as per architectural drawing	No	1		
12.5.2		Roof construction to single pitched roof for operator's living quarters including all wall plates, trusses, girders, jack rafters, permanent bracing, loose connectors, galvanised steel shoes, hangers, bolts and 50 x 76mm purlins at 1050mm centres and 50 x 114mm purlins over eaves, installed complete as per architectural drawing	No	2		
12.6		CEILING				
12.6.1		Cladit ceiling complete with profile jointing strips and cornice	m ²	240		
12.6.2	PSA 8.10	Compressible mineral insulation, 75mm thick, placed on top of ceiling in between rafters	m ²	240		
12.7		PAINTING				
		Prepare, stop and apply				
12.7.1		2 coats polyacrylic emulsion (white) to ceiling	m ²	240		
12.7.2		1 coat plaster primer internally	m ²	800		
12.7.3		3 coats polyacrylic emulsion internally	m ²	800		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 12 SUPERVISOR/OPERATORS LIVING QUARTERS

SECTION: 12 SUPERVISOR/OPERATORS LIVING QUARTERS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
12.7.4		1 coat general purpose undercoat externally and 2 coats Plascon high gloss enamel externally on fascias	m ²	20		
12.8	PSA 8.10	PLASTERWORK				
		Internal plaster				
12.8.1		4:1 Cement plaster on brickwork	m ²	800		
12.9	PSA 8.10	FLOOR TOPPING				
12.9.1		Non slip ceramic tiles 0.35m x 0.35m	m ²	240		
12.9.2		100mm tiled skirting to match tiling	m	230		
12.10	PSA 8.10	DOORS				
12.10.1		Single hardwood FLB external door and frame complete including sealing, parliament hinges, cabin hooks, barrel bolts, yale lock, handles, stops	No	4		
12.10.2		Semi-solid core flush doors finished on both faces with approved hard wood veneer and concealed hardwood edges complete with frame and including sealing, parliament hinges, cabin hooks, barrel bolts, yale lock, handles,	No	16		
12.10.3		Door closer (Dorma TS 73 V EN 2-4 or similar approved)	No	4		
12.11	SANS 10400-N PSA 8.10	WINDOWS				
		Steel windows supply and install complete including hot dip galvanizing after fabrication, sealing, painting, glazing and burglar bars:				
12.11.1		NC11	No	2		
12.11.2		ND4	No	8		
12.11.3		NC1	No	7		
12.11.4		ND11F	No	6		
12.12	PSA 8.10	EAVES ENCLOSURE				
12.12.1		Flexit 5 mm complete with profile jointing strips and quadrant	m	50		
12.13	PSA 8.10	MISCELLANEOUS				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 12 SUPERVISOR/OPERATORS LIVING QUARTERS

SECTION: 12 SUPERVISOR/OPERATORS LIVING QUARTERS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
12.13.1	SANS 10400-T	Supply and fix in place a 7.5l fire extinguisher complete including bracket	No	6		
12.13.2	SANS 10400-P	Sanitary ware	PSum	1	75 000.00	75 000.00
12.13.3		Percentage adjustment on item 12.13.2 for cost and profit	%	75 000.00		
12.13.4		Joinery	PSum	1	120 000.00	120 000.00
12.13.5		Percentage adjustment on item 12.13.4 for cost and profit	%	120 000.00		
12.13.6	SANS 10400-P	Plumbing	PSum	1	60 000.00	60 000.00
12.13.7		Percentage adjustment on item 12.13.6 for cost and profit	%	60 000.00		
12.13.8		Furniture	PSum	1	50 000.00	50 000.00
12.13.9		Percentage adjustment on item 12.13.8 for cost and profit	%	50 000.00		
TOTAL FOR SECTION 12 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 13 AUCAMP DAM OUTLET STRUCTURE AND PIPELINE

SECTION: 13 AUCAMP DAM OUTLET STRUCTURE & PIPELINES

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
13.1	SANS 1200C	SITE CLEARANCE				
13.1.1	8.2.1 & 8.2.3 PSC 8.2.3	Clear, grub, including trees regardless of girth and spoil from the following areas:				
13.1.1.1		Pipeline and Outlet Chamber	ha	0.25		
13.1.2	8.2.10 PSC 8.2.10	Remove topsoil to nominal depth of 150mm, stockpile and maintain				
13.1.2.1		Pipeline and Outlet Chamber	ha	0.25		
13.2	SANS 1200 D PSD 8.3	EARTHWORKS				
13.2.1	8.3.2 PSD 8.3.2	Bulk Excavation				
	8.3.2(a), 8.3.3(a)	Bulk Excavation in all materials for trenches, backfill and compact				
13.2.1.1		Inlet Chamber	m ³	150		
13.2.1.2		Outlet Chamber	m ³	140		
13.2.1.3		Outlet Pipe	m ³	3000		
	8.3.2(a), 8.3.3(a)	Bulk Excavation in all materials and dispose				
13.2.1.4		Outlet Pipe	m ³	600		
13.2.1.5		Approach Channel (provisional)	m ³	500		
	8.3.2(b), 8.3.3(b)	Extra over 8.3.2(a) and 8.3.3(a) for hard rock excavation (surface)				
13.2.1.6		Inlet Chamber	m ³	45		
13.2.1.7		Outlet Chamber	m ³	42		
13.2.1.8		Outlet Pipe	m ³	900		
13.2.1.9	8.3.4, 8.3.9	Extra over for excavation in stockpiles and import for backfilling against Structures	m ³	145		
13.2.1.10		Import suitable approved clay material for backfilling outlet pipe	m ³	180		
13.2.2	8.3.7	Additional lateral support:				
13.2.2.1		Outlet Pipe	Sum	30000		
13.2.3	8.3.10	Topsoiling from stockpiles to:				
13.2.3.1		Outlet Pipe	m ²	2500		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 13 AUCAMP DAM OUTLET STRUCTURE AND PIPELINE

SECTION: 13 AUCAMP DAM OUTLET STRUCTURE & PIPELINES

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
13.2.4	8.3.11	Grassing sourced from surrounding areas to:				
13.2.4.1		Outlet Pipe	m ²	2500		
13.3	SANS 1200 LB PSLB 8.1.2 & 813	BEDDING (PIPES)				
13.3.1	8.2.1 PSLB 8.2.1	Provision of bedding from trench excavation				
13.3.1.1	8.2.1	a) Selected granular material	m ³	60		
13.3.1.2		b) Selected fill material	m ³	40		
13.4	SANS 1200 G	CONCRETE (STRUCTURAL)				
13.4.1	8.2, 8.1.1 PSG 8.1.1	FORMWORK				
13.4.1.1	8.2.1	General (buried rough surfaces)				
13.4.1.1.1		Intake Chamber	m ²	85		
13.4.1.1.2		Outlet Chamber	m ²	38		
13.4.1.2	8.2.1	General (Smooth surfaces)				
13.4.1.2.1		Intake Chamber	m ²	135		
13.4.1.2.2		Outlet Chamber	m ²	38		
13.4.2	8.3, 8.1.2 PSG 8.1.2	REINFORCEMENT				
13.4.2.1	8.3.1	Mild Steel Bars				
13.4.2.1.1		Intake Chamber	t	0.55		
13.4.2.1.2		Outlet Chamber	t	0.1		
13.4.2.2		High-Tensile Steel Bars				
13.4.2.2.1		Intake Chamber	t	8		
13.4.2.2.2		Outlet Chamber	t	1.5		
13.4.2.3	8.3.2	High-Tensile Welded Steel Mesh ref 311	m ²	10		Rate Only
13.4.2.4	8.3.3	32mm galvanised steel anchor bars (for intake chamber uplift)	t	0.5		
13.4.3	8.4, 8.1.3 PSG 8.1.3	CONCRETE				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 13 AUCAMP DAM OUTLET STRUCTURE AND PIPELINE

SECTION: 13 AUCAMP DAM OUTLET STRUCTURE & PIPELINES

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
13.4.3.1	8.4.2	Blinding Layer in Concrete grade 10MPa / 19mm of 75mm minimum thickness for:				
13.4.3.1.1		Intake Chamber	m ³	1.1		
13.4.3.1.2		Outlet Chamber	m ³	0.6		
13.4.3.2	8.4.3	Mass Concrete grade 10MPa / 26.5mm to backfill of outlet pipe(Provisional)	m ³	25		
13.4.3.3		Strength concrete grade 30MPa / 19mm to :				
13.4.3.3.1		Intake Chamber	m ³	53		
13.4.3.3.2		Outlet Chamber	m ³	10		
13.4.4	8.5 PSG	JOINTS				
	8.5					
13.4.4.1		Construction joint for Intake Chamber	m	12		
13.4.4.2		Construction joint for Outlet Chamber	m	10		
13.4.4.3	8.6	PRECAST CONCRETE				
13.4.4.3.1		Precast removable 200mm thick concrete cover slab, including lifting hooks, galvanised air vents, 900x900 solid chamber cover with locking mechanism. See Outlet chamber drawings for details	No.	1		
13.4.5		Pipeline route markers	No.	5		
13.5	SANS 1200 HA	STRUCTURAL STEELWORK (SUNDRY ITEMS)				
13.5.1	8.3.2 PSHA 8.3.2 & 8.3.6	Galvanised handrailing as shown in Intake Chamber drawings	Sum	1		
13.5.2	8.3.3 PSHA 8.3.6	Cage Ladder, Complete and Installed as shown in Intake Chamber drawings	Sum	1		
13.5.3	8.3.4 PSHA 8.3.6	Removable steel galvanised grating floor including supporting frames, locking mechanisms and lockable 900x900mm access hatch. See Intake Chamber drawings for details	Sum	1		
		MISCELLANEOUS				
13.5.4		Supply and install 115mm galvanised manhole step irons with slip-resistant treaded step end, for Outlet Chamber	Sum	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 13 AUCAMP DAM OUTLET STRUCTURE AND PIPELINE

SECTION: 13 AUCAMP DAM OUTLET STRUCTURE & PIPELINES

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
13.5.5		Intake Opening Cover Cage (Trash racks)	Sum	1		
13.5.6		600 x 600 mm wall-mounted double sealing sluice gate with rising spindle for operation at top level of chamber as shown on Intake tower drawings.	Sum	1		
13.5.7		Steel V-Notch Weir at outlet chamber	Sum	1		
13.6	SANS 1200 L	MEDIUM-PRESSURE PIPELINES				
13.6.1	8.2.1 PSL 8.2.1	Supply, lay, and bed pipes complete with couplings				
13.6.1.1		315mm uPVC Outlet Pipe	m	140		
13.6.1.2		75 mm uPVC Drainage Pipe	mm	150		
13.6.1.3		DN315 diameter uPVC 45 deg elbow	No.	3		
13.6.1.4		DN75 diameter uPVC 45 deg elbow	No.	5		
13.6.2	8.2.5 PSL 8.2.5	Supply and place pipes, valves, and specials				
		Inlet Chamber				
13.6.2.1		DN300, 1500mm Long 316 Stainless Steel Puddle pipe, flanged one end	No.	1		
13.6.2.2		DN300, Flanged gate valve	No.	1		
13.6.2.3		DN300 Viking Johnson Dismantling Coupling OR Approved Equivalent	No.	1		
13.6.2.4		DN300, 1000mm Long 316 Stainless Steel Puddle pipe, flanged both ends	No.	1		
13.6.2.5		DN300 Viking Johnson Aquagrip Flange Adaptor OR Approved Equivalent	No.	1		
		Outlet Chamber				
13.6.2.6		DN300 Viking Johnson Aquagrip flange adaptor or approved equivalent	No.	3		
13.6.2.7		DN300, 900mm long Stainless Steel 316 puddle pipe, flanged both ends	No.	1		
13.6.2.8		DN300 galvanised steel equal branch, flanged both ends	No.	1		
13.6.2.9		DN300 wafer type butterfly valve	No.	2		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 13 AUCAMP DAM OUTLET STRUCTURE AND PIPELINE

SECTION: 13 AUCAMP DAM OUTLET STRUCTURE & PIPELINES

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
13.6.2.10		DN300 Viking Johnson dismantling coupling OR approved equivalent	No.	2		
13.6.2.11		DN300, 900mm long Stainless Steel 316 puddle pipe, flanged both ends	No.	1		
13.6.2.12		DN300, 900mm long Stainless Steel 316 puddle pipe, flanged both ends	No.	1		
13.6.3	8.2.11	Thrust Blocks				
13.6.3.1		Thrust blocks for 45 Deg Elbow	No.	3		
TOTAL FOR SECTION 13 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 14 DISTRIBUTION PIPELINES

SECTION: 14 DISTRIBUTION PIPELINES

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
14.1	SANS 1200 DB	EARTHWORKS (PIPE TRENCHES)				
	8.3.1	SITE CLEARANCE AND REMOVAL OF TOPSOIL				
14.1.1	8.3.1 (a)	Clear vegetation and trees of girth up to 1m (only where instructed by the Employers Agent)	m	3000		
14.1.2	8.3.1 (b)	Remove and grub large trees and tree stumps of girth Over and up to				
14.1.2.1		1 m 2 m	No.	5		
14.1.2.2		2 m 3 m	No.	3		
14.1.2.3		3 m upwards in 1 m steps	No.	-		Rate Only
14.1.3		Take down existing fences (Prov.)	m	500		
14.1.4		Re instate existing fence (Prov.)	m	500		
14.1.5	8.3.1 (c)	Remove topsoil incl grass to nominal depth 150mm, stockpile, maintain and replace after backfilling (Provisional)	m²	3100		
14.1.6	8.3.2	EXCAVATION				
		Excavation by machine, labour assisted backfill and compact				
	8.3.2(a) PSDB	Excavate in all materials for trenches, backfill, compact and dispose of surplus/unsuitable				
	8.3.2 LIC	material within a 1km radius for HDPE pipe up to 63mm dia for depths: (450mm width)				
14.1.6.1		over 0.0m up to 1.5m	m	480		
	8.3.2(a) PSDB	Excavate in all materials for trenches, backfill, compact and dispose of surplus/unsuitable				
	8.3.2 LIC	material within a 1km radius for O-PVC pipe up to 160mm dia for depths: (760mm width)				
14.1.6.2		over 0.0m up to 1.5m	m	500		
14.1.6.3		over 1.5m up to 2.5m	m	125		
	8.3.2(a) PSDB	Excavate in all materials for trenches, backfill, compact and dispose of surplus/unsuitable				
	8.3.2 LIC	material within a 1km radius for O-PVC pipe up to 315mm dia for depths: (915mm width)				
14.1.6.4		over 0.0m up to 1.5m	m	1900		
14.1.6.5		over 1.5m up to 2.5m	m	875		
14.1.6.6		over 2.5m up to 3.5m	m	50		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 14 DISTRIBUTION PIPELINES

SECTION: 14 DISTRIBUTION PIPELINES

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
	8.3.2(b) PSDB 8.3.2	Extra over items 1.2.1 - 1.2.10 for				
14.1.6.7		Hard Rock Excavations	m³	450		
14.1.6.8	8.3.2(c) PSDB 8.3.2	Excavate and dispose of unsuitable material in trench bottom within a 1 km radius (Provisional)	m³	450		
14.1.6.9	8.3.3.4 (b)	Extra over Item 14.1.6.1 to 14.1.6.8 for disposal of unsuitable material from trench beyond the freehaul distance.	m³/km	1000		
14.1.7	8.3.3	EXCAVATION ANCILLARIES				
		Make up deficiency in backfill material (provisional)				
14.1.7.1	8.3.3.1(a)	from other necessary excavations on site	m³	200		
14.1.7.2	8.3.3.1(b)	by designation from designated borrowpits	m³	200		
14.1.7.3	8.3.3.1 (c)	by importation from commercial sources	m³	200		
14.1.7.4	8.3.3.3	Compaction under roadways to 93% Mod AASHTO max density (Prov)	m³	100		
14.1.7.5	8.3.6.1	Reinstate surface of gravel roads	m³	100		
14.1.8		EXISTING SERVICES				
		Existing services that intersect or adjoin a pipe trench				
14.1.8.1	8.3.5(a)	Services that intersect a trench	No	5		
14.1.8.2	8.3.5(b)	Services that adjoin a trench	m	100		
14.1.9	SANS 1200 LB	PROVISION OF BEDDING				
	8.2.1	Provision of bedding from trench excavation within 0.5km				
14.1.9.1		Selected bedding material	m³	500		
14.1.9.2		Selected fill material	m³	1900		
		From approved borrowpits (Provisional)				
14.1.9.3		Selected bedding material	m³	100		
14.1.9.4		Selected fill material	m³	100		
	8.2.2.3	From commercial sources (provisional)				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 14 DISTRIBUTION PIPELINES

SECTION: 14 DISTRIBUTION PIPELINES

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
14.1.9.5		Selected granular material	m³	100		
14.1.9.6		Selected fill material	m³	100		
14.1.9.7	PSDB8.3.4 (c)	Stone Bedding (Provisional)	m³	100		
14.1.9.8		Geotextile	m²	900		
14.2	SANS 1200 L	MEDIUM PRESSURE PIPELINES				
14.2.1		PIPEWORK				
	8.2.1	Supply, lay, joint, bed flexible, test and disinfect O-PVC pipes:				
14.2.1.1		315 mm dia Class 12.5	m	1110		
14.2.1.2		315 mm dia Class 16	m	1880		
	8.2.1	Supply, lay, joint, bed flexible, test and disinfect O-PVC pipes:				
14.2.1.3		90 mm dia Class 12.5	m	640		
	8.2.1	Supply, lay, joint, bed flexible, test and disinfect HDPE pipes (incl pipe jointing):				
14.2.1.4		50 mm dia Class 10	m	530		
14.2.2		PIPE SPECIALS				
	8.2.2	Extra over items 14.2.1.1 to 14.2.1.2 for the supply, lay, joint,bed, test and disinfect incl cut pipe class 20 O-PVC bends complete:				
		Bends				
14.2.2.1		315 mm dia x 11,25 deg	No.	4		
14.2.2.2		315 mm dia x 22.5 deg	No.	13		
14.2.2.3		315 mm dia x 45 deg	No.	14		
14.2.2.4		315 mm dia x 90 deg	No.	4		
	8.2.2	Extra over items 14.2.1.3 to 14.2.1.3 for the supply, lay, joint,bed, test and disinfect incl cut pipe class 16 uPVC bends complete:				
		Bends				
14.2.2.5		90 mm dia x 11,25 deg	No.	2		
14.2.2.6		90 mm dia x 22.5 deg	No.	3		
CARRIED FORWARD						

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BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 14 DISTRIBUTION PIPELINES

SECTION: 14 DISTRIBUTION PIPELINES

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
14.2.2.7		90 mm dia x 45 deg	No.	5		
14.2.2.8		90 mm dia x 90 deg	No.	2		
	8.2.2	Extra over items 14.2.1.4 for the supply, lay, joint, bed, test and disinfect incl cut pipe class 16 HDPE bends complete: Bends				
14.2.2.9		50 mm dia x 90 deg	No.	3		
		Tees				
14.2.2.10		315 mm dia equal tee	No	1		
14.2.2.11		90 mm dia equal tee	No	2		
		Reducers				
14.2.2.12		90mm PVC x 50mm HDPE	No.	2		
14.2.3		VALVES				
	8.2.3 PSL 3	Extra over item 14.2.1.1 to item 14.2.1.4 for supply, lay and bed Class C, joint, incl cut pipes where necessary, test and disinfect, right hand closing, non rising spindle, with cap top:				
14.2.3.1		Gate Valves				
		RSV Gate Valve Class 25 (excluding chamber)				
14.2.3.1.1		315 mm dia pipeline	No.	3		
14.2.3.1.2		90 mm dia pipeline	No	1		
14.2.3.2		Air Valves				
		100mm dia RBX Vent-o-Mat double acting air valve or similar Engineer approved complete with GMS flanged tee, flanged riser pipe, flanged waterworks valve complete as per DWG J35030/113 Class 25 (excluding chamber)				
14.2.3.2.1		315 mm dia pipeline	No.	6		
		50mm dia RBX Vent-o-Mat double acting air valve or similar Engineer approved complete with GMS flanged tee, riser pipe flanged one end, threaded stainless steel ball cock valve complete as per DWG J35030/113 Class 16				
14.2.3.2.2		90 mm dia pipeline	No	1		
CARRIED FORWARD						

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BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 14 DISTRIBUTION PIPELINES

SECTION: 14 DISTRIBUTION PIPELINES

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
14.2.3.2.3		50mm dia RBX Vent-o-Mat double acting air valve or similar Engineer approved complete with GMS flanged tee, riser pipe flanged one end, threaded stainless steel ball cock valve complete as per DWG J35030/113 Class 16 50 mm dia pipeline	No	1		
14.2.3.3		Scour Valves				
		Scour valve assembly complete as per DWG J35030/113 with GMS pipework (excluding chamber)				
14.2.3.3.1		315 mm dia pipeline	No.	3		
14.2.3.3.2		90 mm dia pipeline	No	1		
14.2.3.4		Hydrants				
		Hydrant assembly complete as per DWG J35030/113 with CI scour T, riser pipe and hydrant outlet (excluding chamber)				
14.2.3.4.1		90 mm dia pipeline	No	2		
14.2.4		CHAMBERS				
	8.2.13 PSL 5 PSA8.10	Construct valve chambers:				
14.2.4.1		Construct Cementile hydrant chamber complete as per DWG J35030/113 for 90mm pipeline	No	2		
14.2.4.2		Construct Concrete gate valve chamber complete as per DWG J35030/113 for 300mm diameter valves	No	4		
14.2.4.3		Construct Cementile scour valve chamber complete as per DWG J35030/113 for 300mm pipeline	No	4		
14.2.4.4		Construct air concrete valve chamber complete inl MH cover and frame as per J35030/113	No.	8		
14.2.5		ANCHORS, THRUST BLOCKS AND PEDESTALS				
	8.2.11	Thrust blocks				
14.2.5.1	PSL 6.3	15 MPa/19 Concrete	m ³	20		
14.2.5.2		Rough formwork	m ²	50		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 14 DISTRIBUTION PIPELINES

SECTION: 14 DISTRIBUTION PIPELINES

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
	8.2.11	Concrete encasement				
14.2.5.3	PSL 6.3	20 MPa/19 Concrete	m ³	50		
14.2.5.4		Rough formwork	m ²	110		
14.2.5.5		Reinforcement	t	3		
14.2.6	PSA 8.10	MISCELLANEOUS				
14.2.6.1		Supply and install pipeline markers complete as per J35030/113(Prov).	No	60		
TOTAL FOR SECTION 14 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 15 3MI COMMAND RESERVOIR

SECTION: 15 3MI COMMAND RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
15.1	SABS 1200 C	CLEAR SITE				
15.1.1	PSC 8.2.1	Clear and grub site (Prov)	m ²	1000		
15.1.2	PSC 8.2.10	Remove topsoil to a depth of 150mm, stockpile and maintain	m ²	800		
15.2	SANS 1200 D	EARTHWORKS				
	8.3.2	Bulk Excavation				
		Excavate in all materials to bulk excavation line, stockpile and maintain, or dispose of surplus material as ordered :				
15.2.1	8.3.2 (a)	Reservoir bulk excavation to nett plan area and to underside of blinding layer Extra-over Item 15.2.1 for :	m ³	800		
15.2.2	PSD 8.3.2 (b) (2)	Hard rock excavation (Prov)	m ³	400		
	8.3.3	Restricted Excavation				
15.2.3	8.3.3 (a)	Excavate for subsoil drains, peripheral subsoil drain, pipe trenches and chambers in all materials and use for backfill or dispose as ordered	m ³	150		
	8.3.3 (b)	Extra-over Item 15.2.3				
15.2.4	PSDB 8.3.3 (b) (2)	Hard rock excavation (Prov)	m ³	30		
15.2.5	8.3.3	Trim and prepare rock surfaces to specified levels to receive concrete (Prov)	m ²	710		
		Overhaul				
15.2.6	PSD 8.3.6	Extra-over for disposal of unsuitable material beyond the freehaul distance (Provisional)	m ³ .km	1300		
		Layerworks under Reservoir				
15.2.7	8.3.4	Supply G5 material from commercial sources, mix and place, compact to 95% Mod AASHTO density, to complete foundation raft	m ³	200		
15.2.8	PSDK 8.2.4	Supply and place A4 Bidim geofabric in reservoir fill material (Provisional)	m ²	760		
		Backfill				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 15 3MI COMMAND RESERVOIR

SECTION: 15 3MI COMMAND RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
15.2.9	8.3.9	Backfill against reservoir and cut slopes with selected fill material from stockpile, compacted to 93% Mod AASHTO density	m ³	1100		
15.3		SUBSOIL DRAINAGE Supply and lay :				
15.3.1	PSDK 8.2.4	A4 Bidim geofabric to subsurface perimeter drain	m ²	230		
15.3.2		19 mm crushed stone to reservoir perimeter subsoil drain	m ³	20		
15.3.3		110mm diameter HDPE slotted perimeter drainage pipe complete with all fittings. i.e. elbows, endcaps and tee connections	m	105		
15.3.4		110mm diameter HDPE unslotted drainage pipe	m	50		
15.4	SANS 1200 G	CONCRETE WORKS				
	8.4	Unreinforced concrete				
15.4.1	8.4.2	Blinking layer in 10 MPa/19mm concrete maximum thickness 75mm to reservoir	m ²	126		
15.4.2	8.4.2	Blinking layer in 10 MPa/19mm concrete maximum thickness 50mm to valve chamber and pipe encasement	m ²	24		
15.4.3	PSG 8.9	No-fines concrete under reservoir floor and around underdrains, 75mm thick	m ²	630		
15.4.4	PSG 8.9	No-fines concrete pipe encasement	m ³	6		
15.4.5	8.4.3	25MPa/19mm concrete for splash pad	m ³	0.2		
	8.4	Reinforced concrete				
15.4.5.1	8.4.3 PSG 8.1.3	Strength concrete, Grade 35 MPa/19mm watertight concrete				
15.4.5.1.1		Pipe encasement	m ³	1.5		
15.4.5.1.2		Footings to walls	m ³	40		
15.4.5.1.3		Floor slab	m ³	113		
15.4.5.1.4		Walls	m ³	97		
15.4.5.1.5		Roof	m ³	130		
15.4.5.1.6		Column bases	m ³	4		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 15 3MI COMMAND RESERVOIR

SECTION: 15 3MI COMMAND RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
15.4.5.1.7		Columns	m ³	11		
15.5	8.1.1	FORMWORK				
	8.2.1	Rough vertical formwork to degree accuracy III				
	PSG 8.1.1					
15.5.1		Wall footing	m ²	80		
15.5.2		Pipe encasement	m ²	29		
	8.2.2	Smooth vertical formwork to degree accuracy I				
	PSG 8.1.1					
15.5.3		Walls (interior and exterior faces)	m ²	865		
15.5.4		Roof ring beam	m ²	17		
15.5.5		Beams at access hatches	m ²	3		
15.5.6		Column bases	m ²	18		
15.5.7		Columns	m ²	141		
	8.2.2	Smooth horizontal formwork to degree accuracy II				
	PSG 8.1.1					
15.5.8		Roof soffit	m ²	707		
	8.2.6	Boxing Out				
15.5.9		Box out to inlet pipe	No.	1		
15.5.10		Box out to overflow pipes	No.	3		
15.6	8.1.2; PSG 8.1.2	REINFORCEMENT				
	8.3.1	High-tensile steel bars				
15.6.1		Y10	t	15.3		
15.6.2		Y12	t	3.1		
15.6.3		Y16	t	13		
	8.3.1	Mild steel bars				
15.6.4		R8	t	0.3		
15.6.5		R10	t	0.3		
15.7	8.4.4	UNFORMED SURFACE FINISHES				
	PSG 8.4.4 (a)	Wood-floated finish (degree of accuracy II)				
CARRIED FORWARD						

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BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 15 3MI COMMAND RESERVOIR

SECTION: 15 3MI COMMAND RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
15.7.1		Top of reservoir wall footing	m ²	125		
15.7.2		Pipe encasement	m ²	12		
15.7.3		Reservoir floor	m ²	710		
15.7.4		Top of column bases	m ²	26		
15.7.5		Reservoir roof	m ²	710		
15.7.6		Top of roof ring beam upstand	m ²	35		
	PSG 8.4.4 (b)	Steel-floated finish (degree of accuracy II)				
15.7.7		Top of reservoir wall	m ²	23		
15.8	8.5; PSG 8.5	JOINTS				
		Construction joints				
15.8.1	PSG 8.5.1	Construction joints - walls : complete as per drawing J35030/144B	m	192		
		Expansion joints				
15.8.2	PSG 8.5.1	Expansion joints - floor : complete as per drawing J35030/144B	m	151		
		Contraction joints				
15.8.3	PSG 8.5.1	Contraction joints complete as per drawing J35030/144B	m	160		
		Sliding joints				
15.8.4	PSG 8.16	Black plastic bond breaker over no-fines concrete under reservoir floor (500 Micron)	m ²	623		
15.8.5	PSG 8.5.1	Joint between reservoir walls and roof complete as per drawing J35030/144B with 2 layers of 5-ply malthoid bond breaker and 1 layer of 250 Micron DPC	m	95		
15.9	SANS 1200 HA	STEELWORK ITEMS				
		Supply and install (all items except stainless steel to be double hot dip galvanised after fabrication)				
		Ladders :				
15.9.1	PSHA 8.3.1	Internal : stainless steel grade 316L, as shown on DWG J35030/144B	No.	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 15 3MI COMMAND RESERVOIR

SECTION: 15 3MI COMMAND RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
15.9.2	PSHA 8.3.1	External : hot dipped galvanised steel, as shown on DWG J35030/144B	No.	1		
		Roof ventilators :				
15.9.3	PSHA 8.3.1	As detailed on DWG J35030/144B	No.	5		
		Manhole covers :				
15.9.4	PSG 8.10	1200x600mm GMS, hinged, lockable manhole cover, including frame as detailed on DWG J35030/144C	No.	2		
		Sundries				
15.9.5	PSG 8.10	50mm diameter sleeved holes in roof for level control and telemetry equipment	No.	2		
15.9.6	PSG 8.10	100mm diameter sleeved holes in roof for sampling equipment	No.	2		
15.10	SANS 1200 L	PIPEWORK				
		Supply and install PN16 pipework with all bends, fittings and puddle flanges as shown on DWG J35030/144B				
		Reservoir Inlet				
15.10.1	8.2.5	1 - 200mm dia x 2000mm long flanged GMS pipe	No.	1		
15.10.2	8.2.5	2 - 200mm dia x 1000mm long flanged GMS pipe incorporating standard 45° bends on each end	No.	1		
15.10.3	8.2.5	3 - 200mm dia x 4500mm long flanged GMS pipe incorporating standard 90° bend on one end	No.	1		
15.10.4	8.2.5	4 - 200mm dia x 460mm long flanged GMS puddle pipe. Puddle centered	No.	1		
15.10.5	8.2.5	5 - 200mm dia x 1000mm long GMS pipe flanged one end and incorporating standard 90° bend on same end	No.	1		
		Reservoir Outlet				
15.10.6		300mm Ø 90° GMS plain ended short radius bend incorporating a bellmouth with anti vortex and puddle flange on end and 300mm Ø x 1700mm long GMS pipe ending in a flange on the other as shown	No	2		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 15 3MI COMMAND RESERVOIR

SECTION: 15 3MI COMMAND RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
15.10.7		Reservoir Scour 150mm Ø 90° GMS plain ended short radius bend incorporating a bellmouth and puddle flange on one end and 150mm Ø GMS pipe extending up to the scour chamber as shown	No	1		
15.10.8	8.2.5	Reservoir Overflow 250mm Ø GMS overflow pipe with puddle flange and 90° short radius bend as shown Supply and install PN16 pipework with all bends, fittings and puddle flanges as shown on DWG J35030/115A	No.	3		
15.10.9	8.2.5	Inlet Chamber 1 - 300mm dia Klamflex flange adaptor	No.	2		
15.10.10	8.2.5	2 - 300mm dia GMS puddle pipe	No.	1		
15.10.11	8.2.5	4 - 200mm x 300mm dia Flanged reducer	No.	1		
15.10.12	8.2.5	6 - 200mm dia Klamflex flange adaptor	No.	2		
15.10.13	8.2.5	7 - 200mm dia GMS puddle pipe	No.	1		
15.10.14	8.2.5	Outlet Chamber 9 - 300mm dia Klamflex flange adaptor	No.	4		
15.10.15	8.2.5	10 - 300mm dia GMS puddle pipe	No.	2		
15.10.16	8.2.5	14 - 300mm dia GMS puddle pipe	No.	2		
15.10.17	8.2.5	15 - 300mm dia Klamflex coupling	No.	2		
15.10.18	8.2.5	Scour Chamber 16 - 150mm dia Klamflex flange adaptor	No.	2		
15.10.19	8.2.5	17 - 150mm dia GMS pipe	No.	1		
15.10.20	8.2.5	20 - 150mm dia GMS pipe	No.	1		
15.10.21	8.2.5	21 - 150mm dia Klamflex coupling Supply and install PN16 pipework with all bends, fittings and puddle flanges as shown on DWG J35030/115B	No.	1		
15.10.22	8.2.5	Meter Chamber 1 - 300mm dia Klamflex flange adaptor	No.	2		
15.10.23	8.2.5	2 - 300mm x 250mm GMS flanged reducer	No.	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 15 3MI COMMAND RESERVOIR

SECTION: 15 3MI COMMAND RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
15.10.24	8.2.5	4 - 2500mm dia Klamflex flange adaptor	No.	1		
15.10.25	8.2.5	5 - 300mm x 250mm GMS flanged reducer	No.	1		
15.10.26	8.2.5	6 - 300mm dia flanged pipe special incorporating 2 x 45° bends	No.	1		
		Valve chamber drain				
15.10.27	8.2.1	63mm dia Class 10 HDPE pipe to terminate at headwall (length to be confirmed on site)	m	50		
15.11	8.2.3	VALVES				
		Supply and install valves as shown on DWG J35030/115A				
		Inlet				
15.11.1		3 - 100mm dia flanged resilient seal gate valve (PN16) with handwheel	No.	1		
15.11.2		3 - 100mm dia class 25 VENT-O-MAT RBXb double acting airvalve or similar approved	No.	1		
		Outlet				
15.11.3		11 - 300mm dia flanged SG iron gate valve (PN10) with handwheel	No.	2		
15.11.4		13 - 100mm dia flanged resilient seal gate valve (PN16) with handwheel	No.	2		
15.11.5		13 - 100mm dia class 25 VENT-O-MAT RBXb double acting airvalve or similar approved	No.	2		
		Scour				
15.11.6		18 - 150mm dia flanged SG iron gate valve with handwheel (PN10)	No.	1		
15.12		MISCELLANEOUS				
15.12.1		Approved 25mm quartzite stone chips from commercial source, to include placement by hand on reservoir roof, layer thickness 75 mm minimum	m ²	710		
15.12.2		Supply and install level indicator	Sum	1		
15.12.3		Clean and sterilize reservoir	Sum	1		
15.12.4	PSG 8.14	Test reservoir for watertightness	No.	1		
15.12.5	PSA 8.10	CHAMBERS				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 15 3MI COMMAND RESERVOIR

SECTION: 15 3MI COMMAND RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
15.12.5.1		Inlet valve chamber complete with cover and frame as per drg J35030/115A excluding pipework	Sum	1		
15.12.5.2		Outlet chamber complete with cover and frame as per drg J35030/115A excluding pipework	Sum	1		
15.12.5.3		Outlet and scour chamber complete with cover and frame as per drg J35030/115A excluding pipework	Sum	1		
15.12.5.4		Outlet headwall as per drg J35030/115A excluding pipework	Sum	1		
15.12.5.5		Meter Chamber complete with cover and frame as per drg J35030/115B excluding pipework	Sum	1		
15.12.6	PSA 8.10	FENCING				
15.12.6.1		Supply and install ripper wire fencing around reservoir complete with 2 No vehicle access gates (3 quotes from local contractors to be arranged)	Prov Sum	1	50 000.00	50 000.00
TOTAL FOR SECTION 15 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 16 500KI OLD TOWN RESERVOIR

SECTION: 16 500KI OLD TOWN RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
16.1	SABS 1200 C	CLEAR SITE				
16.1.1	PSC 8.2.1	Clear and grub site (Prov)	m ²	250		
16.1.2	PSC 8.2.10	Remove topsoil to a depth of 150mm, stockpile and maintain	m ²	250		
16.2	SANS 1200 D	EARTHWORKS				
	8.3.2	Bulk Excavation				
		Excavate in all materials to bulk excavation line, stockpile and maintain, or dispose of surplus material as ordered :				
16.2.1	8.3.2 (a)	Reservoir bulk excavation to nett plan area and to underside of blinding layer Extra-over Item 16.2.1 for :	m ³	500		
16.2.2	PSD 8.3.2 (b) (2)	Hard rock excavation (Prov)	m ³	100		
	8.3.3	Restricted Excavation				
16.2.3	8.3.3 (a)	Excavate for subsoil drains, peripheral subsoil drain, pipe trenches and chambers in all materials and use for backfill or dispose as ordered	m ³	80		
	8.3.3 (b)	Extra-over Item 16.2.3				
16.2.4	PSDB 8.3.3 (b) (2)	Hard rock excavation (Prov)	m ³	50		
16.2.5	8.3.3	Trim and prepare rock surfaces to specified levels to receive concrete (Prov)	m ²	170		
		Overhaul				
16.2.6	PSD 8.3.6	Extra-over for disposal of unsuitable material beyond the freehaul distance (Provisional)	m ³ .km	400		
		Layerworks under Reservoir				
16.2.7	8.3.4	Supply G5 material from commercial sources, mix and place, compact to 95% Mod AASHTO density, to complete foundation raft	m ³	50		
16.2.8	PSDK 8.2.4	Supply and place A4 Bidim geofabric in reservoir fill material (Provisional)	m ²	200		
		Backfill				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 16 500KI OLD TOWN RESERVOIR

SECTION: 16 500KI OLD TOWN RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
16.2.9	8.3.9	Backfill against reservoir and cut slopes with selected fill material from stockpile, compacted to 93% Mod AASHTO density	m ³	250		
16.3		SUBSOIL DRAINAGE Supply and lay :				
16.3.1	PSDK 8.2.4	A4 Bidim geofabric to subsurface perimeter drain	m ²	120		
16.3.2		19 mm crushed stone to reservoir perimeter subsoil drain	m ³	10		
16.3.3		110mm diameter HDPE slotted perimeter drainage pipe complete with all fittings. i.e. elbows, endcaps and tee connections	m	50		
16.3.4		110mm diameter HDPE unslotted drainage pipe	m	50		
16.4	SANS 1200 G	CONCRETE WORKS				
	8.4	Unreinforced concrete				
16.4.1	8.4.2	Blinking layer in 10 MPa/19mm concrete maximum thickness 75mm to reservoir	m ²	70		
16.4.2	8.4.2	Blinking layer in 10 MPa/19mm concrete maximum thickness 50mm to valve chamber and pipe encasement	m ²	6		
16.4.3	PSG 8.9	No-fines concrete under reservoir floor and around underdrains, 75mm thick	m ²	165		
16.4.4	PSG 8.9	No-fines concrete pipe encasement	m ³	4		
16.4.5	8.4.3	25MPa/19mm concrete for splash pad	m ³	0.2		
	8.4	Reinforced concrete				
16.4.5.1	8.4.3 PSG 8.1.3	Strength concrete, Grade 35 MPa/19mm watertight concrete				
16.4.5.1.1		Pipe encasement	m ³	1		
16.4.5.1.2		Footings to walls	m ³	32		
16.4.5.1.3		Floor slab	m ³	23		
16.4.5.1.4		Walls	m ³	36		
16.4.5.1.5		Roof	m ³	36		
16.4.5.1.6		Column bases	m ³	1.5		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 16 500KI OLD TOWN RESERVOIR

SECTION: 16 500KI OLD TOWN RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
16.4.5.1.7		Columns	m ³	1.5		
16.5	8.1.1	FORMWORK				
	8.2.1	Rough vertical formwork to degree accuracy III				
	PSG 8.1.1					
16.5.1		Wall footing	m ²	9.2		
16.5.2		Pipe encasement	m ²	14.5		
	8.2.2	Smooth vertical formwork to degree accuracy I				
	PSG 8.1.1					
16.5.3		Walls (interior and exterior faces)	m ²	321		
16.5.4		Roof ring beam	m ²	10		
16.5.5		Beams at access hatches	m ²	3		
16.5.6		Column bases	m ²	3		
16.5.7		Columns	m ²	12		
	8.2.2	Smooth horizontal formwork to degree accuracy II				
	PSG 8.1.1					
16.5.8		Roof soffit	m ²	170		
	8.2.6	Boxing Out				
16.5.9		Box out to inlet pipe	No.	1		
16.5.10		Box out to overflow pipes	No.	3		
16.6	8.1.2; PSG 8.1.2	REINFORCEMENT				
	8.3.1	High-tensile steel bars				
16.6.1		Y10	t	7		
16.6.2		Y12	t	2		
16.6.3		Y16	t	0.2		
	8.3.1	Mild steel bars				
16.6.4		R8	t	0.1		
16.6.5		R10	t	0.1		
16.7	8.4.4	UNFORMED SURFACE FINISHES				
	PSG 8.4.4 (a)	Wood-floated finish (degree of accuracy II)				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 16 500KI OLD TOWN RESERVOIR

SECTION: 16 500KI OLD TOWN RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
16.7.1		Top of reservoir wall footing	m ²	45		
16.7.2		Pipe encasement	m ²	6		
16.7.3		Reservoir floor	m ²	139		
16.7.4		Top of column bases	m ²	3.5		
16.7.5		Reservoir roof	m ²	178		
16.7.6		Top of roof ring beam upstand	m ²	17.5		
	PSG 8.4.4 (b)	Steel-floated finish (degree of accuracy II)				
16.7.7		Top of reservoir wall	m ²	12		
16.8	8.5; PSG 8.5	JOINTS				
		Construction joints				
16.8.1	PSG 8.5.1	Construction joints - walls : complete as per drawing J35030/145B	m	95		
		Expansion joints				
16.8.2	PSG 8.5.1	Expansion joints - floor : complete as per drawing J35030/145B	m	90		
		Contraction joints				
16.8.3	PSG 8.5.1	Contraction joints complete as per drawing J35030/145B	m	80		
		Sliding joints				
16.8.4	PSG 8.16	Black plastic bond breaker over no-fines concrete under reservoir floor (500 Micron)	m ²	170		
16.8.5	PSG 8.5.1	Joint between reservoir walls and roof complete as per drawing J35030/145B with 2 layers of 5-ply malthoid bond breaker and 1 layer of 250 Micron DPC	m	50		
16.9	SANS 1200 HA	STEELWORK ITEMS				
		Supply and install (all items except stainless steel to be double hot dip galvanised after fabrication)				
		Ladders :				
16.9.1	PSHA 8.3.1	Internal : stainless steel grade 316L, as shown on DWG J35030/145B	No.	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 16 500KI OLD TOWN RESERVOIR

SECTION: 16 500KI OLD TOWN RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
16.9.2	PSHA 8.3.1	External : hot dipped galvanised steel, as shown on DWG J35030/145B	No.	1		
		Roof ventilators :				
16.9.3	PSHA 8.3.1	As detailed on DWG J35030/145B	No.	4		
		Manhole covers :				
16.9.4	PSG 8.10	1200x600mm GMS, hinged, lockable manhole cover, including frame as detailed on DWG J35030/145C	No.	2		
		Sundries				
16.9.5	PSG 8.10	50mm diameter sleeved holes in roof for level control and telemetry equipment	No.	2		
16.9.6	PSG 8.10	100mm diameter sleeved holes in roof for sampling equipment	No.	2		
16.10	SANS 1200 L	PIPEWORK				
		Supply and install PN16 pipework with all bends, fittings and puddle flanges as shown on DWG J35030/145B				
		Reservoir Inlet				
16.10.1	8.2.5	1 - 200mm dia x 2000mm long flanged GMS pipe	No.	1		
16.10.2	8.2.5	2 - 200mm dia x 1000mm long flanged GMS pipe incorporating standard 45° bends on each end	No.	1		
16.10.3	8.2.5	3 - 200mm dia x 3000mm long flanged GMS pipe incorporating standard 90° bend on one end	No.	1		
16.10.4	8.2.5	4 - 200mm dia x 460mm long flanged GMS puddle pipe. Puddle centered	No.	1		
16.10.5	8.2.5	5 - 200mm dia x 1000mm long GMS pipe flanged one end and incorporating standard 90° bend on same end	No.	1		
		Reservoir Outlet				
16.10.6		300mm Ø 90° GMS plain ended short radius bend incorporating a bellmouth with anti vortex and puddle flange on end and 300mm Ø x 1700mm long GMS pipe ending in a flange on the other as shown	No	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 16 500KI OLD TOWN RESERVOIR

SECTION: 16 500KI OLD TOWN RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
16.10.7		Reservoir Scour 150mm Ø 90° GMS plain ended short radius bend incorporating a bellmouth and puddle flange on one end and 150mm Ø GMS pipe extending up to the scour chamber as shown	No	1		
16.10.8	8.2.5	Reservoir Overflow 250mm Ø GMS overflow pipe with puddle flange and 90° short radius bend as shown Supply and install PN16 pipework with all bends, fittings and puddle flanges as shown on DWG J35030/115A	No.	3		
16.10.9	8.2.5	Inlet Chamber 1 - 300mm dia Klamflex flange adaptor	No.	2		
16.10.10	8.2.5	2 - 300mm dia GMS puddle pipe	No.	1		
16.10.11	8.2.5	4 - 200mm x 300mm dia Flanged reducer	No.	1		
16.10.12	8.2.5	6 - 200mm dia Klamflex flange adaptor	No.	2		
16.10.13	8.2.5	7 - 200mm dia GMS puddle pipe	No.	1		
16.10.14	8.2.5	Outlet Chamber 9 - 300mm dia Klamflex flange adaptor	No.	2		
16.10.15	8.2.5	10 - 300mm dia GMS puddle pipe	No.	1		
16.10.16	8.2.5	14 - 300mm dia GMS puddle pipe	No.	1		
16.10.17	8.2.5	15 - 300mm dia Klamflex coupling	No.	1		
16.10.18	8.2.5	Scour Chamber 16 - 150mm dia Klamflex flange adaptor	No.	2		
16.10.19	8.2.5	17 - 150mm dia GMS pipe	No.	1		
16.10.20	8.2.5	20 - 150mm dia GMS pipe	No.	1		
16.10.21	8.2.5	21 - 150mm dia Klamflex coupling Supply and install PN16 pipework with all bends, fittings and puddle flanges as shown on DWG J35030/115B	No.	1		
16.10.22	8.2.5	Meter Chamber 1 - 300mm dia Klamflex flange adaptor	No.	2		
16.10.23	8.2.5	2 - 300mm x 250mm GMS flanged reducer	No.	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 16 500KI OLD TOWN RESERVOIR

SECTION: 16 500KI OLD TOWN RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
16.10.24	8.2.5	4 - 2500mm dia Klamflex flange adaptor	No.	1		
16.10.25	8.2.5	5 - 300mm x 250mm GMS flanged reducer	No.	1		
16.10.26	8.2.5	6 - 300mm dia flanged pipe special incorporating 2 x 45° bends	No.	1		
		Valve chamber drain				
16.10.27	8.2.1	63mm dia Class 10 HDPE pipe to terminate at headwall (length to be confirmed on site)	m	50		
16.11	8.2.3	VALVES				
		Supply and install valves as shown on DWG J35030/115A				
		Inlet				
16.11.1		3 - 100mm dia flanged resilient seal gate valve (PN16) with handwheel	No.	1		
16.11.2		3 - 100mm dia class 25 VENT-O-MAT RBXb double acting airvalve or similar approved	No.	1		
		Outlet				
16.11.3		11 - 300mm dia flanged SG iron gate valve (PN10) with handwheel	No.	1		
16.11.4		13 - 100mm dia flanged resilient seal gate valve (PN16) with handwheel	No.	1		
16.11.5		13 - 100mm dia class 25 VENT-O-MAT RBXb double acting airvalve or similar approved	No.	1		
		Scour				
16.11.6		18 - 150mm dia flanged SG iron gate valve with handwheel (PN10)	No.	1		
16.12		MISCELLANEOUS				
16.12.1		Approved 25mm quartzite stone chips from commercial source, to include placement by hand on reservoir roof, layer thickness 75 mm minimum	m ²	170		
16.12.2		Supply and install level indicator	Sum	1		
16.12.3		Clean and sterilize reservoir	Sum	1		
16.12.4	PSG 8.14	Test reservoir for watertightness	No.	1		
16.12.5	PSA 8.10	CHAMBERS				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 16 500KI OLD TOWN RESERVOIR

SECTION: 16 500KI OLD TOWN RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
16.12.5.1		Inlet valve chamber complete with cover and frame as per drg J35030/115A excluding pipework	Sum	1		
16.12.5.2		Outlet and scour chamber complete with cover and frame as per drg J35030/115A excluding pipework	Sum	1		
16.12.5.3		Outlet headwall as per drg J35030/115A excluding pipework	Sum	1		
16.12.5.4		Meter Chamber complete with cover and frame as per drg J35030/115B excluding pipework	Sum	1		
16.12.6	PSA 8.10	FENCING				
16.12.6.1		Supply and install ripper wire fencing around reservoir complete with 2 No vehicle access gates (3 quotes from local contractors to be arranged)	Prov Sum	1	50 000.00	50 000.00
TOTAL FOR SECTION 16 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 17 SEWERS

SECTION: 17 SEWERS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
17.1	SANS 1200 DB	EARTHWORKS (PIPE TRENCHES)				
17.1.1	8.3.2 PSDB 8.3.2 8.3.2(a)	Excavation Excavate in all materials for trenches backfill, compact, and dispose of surplus/unsuitable material, for pipes: Over 100 up to 160 mm diam. for total trench depth: Exceeding but not exceeding 0,0 m 1,0 m	m	20		
17.1.1.1			m	20		
17.1.1.2		1,0 m 2,0 m	m	30		
17.1.2	8.3.2(b)	Extra-over items 17.1.1.1 to 17.1.1.2 incl. for (prov):				
17.1.2.1		Hard rock excavation	m³	10		
17.2	SANS 1200 LB PSLB 8.1.2 & 8.1.3	BEDDING (PIPES)				
17.2.1	8.2.1 PSLB 8.2.1	Provision of bedding from trench excavation				
17.2.1.1	8.2.1	a) Selected granular material	m³	5		
17.2.1.2		b) Selected fill material	m³	3		
17.2.2		Imported from				
	8.2.2.3	c) Commercial sources (Provisional)				
17.2.2.1		1) Selected granular material	m³	5		
17.2.2.2		2) Selected fill material	m³	3		
17.3	SANS 1200 LD	SEWERS				
17.3.1	8.2.1 PSLD 8.2.1	Supply, lay, joint, bed Class 34 and test uPVC sewer pipes with joints and test				
17.3.1.1		110 mm diam	m	50		
17.3.2	8.2.3 PSLD 8.2.3	Manholes complete with Type 2A cover and frame, for depths over and up to				
17.3.2.1		1,0 m 1,5 m	No.	4		
17.4		MISCELLANEOUS				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 17 SEWERS

SECTION: 17 SEWERS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
17.4.1		Installation of conservancy tank	PSum	1	30 000.00	30 000.00
17.4.2	PSG 8.14	Testing conservancy tank for water tightness	No	1		
TOTAL FOR SECTION 17 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 18 STORMWATER

SECTION: 18 STORMWATER

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
18.1	SANS 1200 DB	EARTHWORKS (PIPE TRENCHES)				
18.1.1	8.3.2 PSDB 8.3.2 8.3.2(a)	Excavation Excavate in all materials for trenches backfill, compact, and dispose of surplus/unsuitable material, for pipes: Over 300 up to 4500 mm diam. for total trench depth: Exceeding but not exceeding 1,0 m 2,0 m	m	230		
18.1.1.1			m	230		
18.1.1.2		2,0 m 3,0 m	m	60		
18.1.2	8.3.2(b)	Extra-over items 18.2.1.1 to 18.1.1.2 incl. for (prov):				
18.1.2.1		Hard rock excavation	m³	110		
18.2	SANS 1200 LB PSLB 8.1.2 & 8.1.3	BEDDING (PIPES)				
18.2.1	8.2.1 PSLB 8.2.1	Provision of bedding from trench excavation				
18.2.1.1		a) Selected granular material	m³	60		
18.2.1.2		b) Selected fill material	m³	150		
18.2.2	8.2.2.3	Imported from Commercial sources (Provisional)				
18.2.2.1		1) Selected granular material	m³	-		Rate Only
18.2.2.2		2) Selected fill material	m³	-		Rate Only
18.3	SANS 1200 LE	STORMWATER DRAINAGE				
18.3.1	8.2.1 PSL 8.2.1	Supply, handle, lay, bed uPVC pipe on approved flexible pipe bedding				
18.3.1.1		315 mm diameter	m	190		
18.3.2	8.2.1 PSLE 8.2.1	Supply, handle, lay, bed Class 100D concrete pipe on approved class B pipe bedding				
18.3.2.1		450 mm diameter	m	100		
18.3.3	8.2.8	Construct manholes including covers and frames and step irons				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 18 STORMWATER

SECTION: 18 STORMWATER

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
18.3.3.1		a) Stormwater manhole as per drawing J35030/112A	No.	6		
18.3.4	8.2.8	Construct catchpits complete with grid inlets				
18.3.4.1		a) Stormwater road kerb catchpit as per drawing J35030/112C	No.	7		
18.3.5	8.2.8	Construct gully complete with grid inlets				
18.3.5.1		a) Stormwater gully as per drawing J35030/112B	No.	3		
18.3.6	PSA 8.10	Construct outlet headwall complete with apron slab and wingwalls				
18.3.6.1		a) Stormwater outlet headwall as per drawing J35030/142	No.	2		
TOTAL FOR SECTION 18 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 19 GABIONS AND FENCING

SECTION: 19 GABIONS AND FENCING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
19.1	SANS 1200 D PSD 8.3	EARTHWORKS				
19.1.1	8.3.3 PSD 8.3.3	Restricted Excavation				
	8.3.3(a)	Excavate for restricted foundations and footings in all materials and use for backfill or embankment or dispose, as ordered:				
19.1.1.1		Gabion installation	m³	50		
19.1.2	8.3.4	Importing of Material				
19.1.2.1		a) Extra-over for importation from commercial sources of G7 quality material placed and compacted to 95% MOD AASHTO density	m³	25		
19.2	SANS 1200 DK	GABIONS AND PITCHING				
19.2.1	8.2.2 PSDK 8.2.2	Supply and construct gabions using galvanized wire mesh complete including all stone fill				
19.2.1.1		a) Toe mattresses of depth 0,20 m with diaphragms providing 2 m x 1 m cells	m³	40		
19.2.1.2		c) Gabions of section 2,0 m x 1,0 m x 1,0 m for walls	m³	300		
19.2.2	8.2.4 PSDK 8.2.4	Supply and place geotextile Bidim A2/U14 or equal Engineer approved behind gabions	m²	400		
19.3	PSPG	HIGH SECURITY FENCES AND GATE FENCING				
19.3.1	PSPG 8.1	Clearing the fence line, 2,0m wide strip	km	0.4		
19.3.2	PSPG 8.2	Supply, fabricate, deliver and install security fence complete as detailed on drawing J35030/109/0	km	0.4		
19.3.3	PSPG 8.3	Supply, fabricate, deliver and install 6m wide sliding security gate as per fence manufacturer's specifications	Sum	1		
19.3.4	PSPG 8.3	Supply, fabricate, deliver and install 1m wide pedestrian gate as per fence manufacturer's specifications	Sum	1		
TOTAL FOR SECTION 19 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 20 INTERLOCKING PAVING AND RETAINING WALLS

SECTION: 20 INTERLOCKING PAVING AND RETAINING WALLS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
20.1	SANS 1200 ME	PAVING SUBBASE				
20.1.1	8.3.3	Construct subbase with material from commercial sources				
20.1.1.1		a) Gravel layer 100mm, G5 equivalent with a minimum CBR of 45 and maximum PI of 10 compacted to 95% MOD AASHTO	m³	6.5		
20.2	SANS 1200 MJ	SEGMENTED PAVING				
20.2.1	8.2.1	Provision of edge restraints	m	90		
20.2.2	8.2.2	Construction of paving complete with:				
20.2.2.1		a) 200x100x80mm grey 25Mp Interlocking paving bricks	m²	65		
20.3	PSDQ	CONCRETE RETAINING BLOCK WALL				
20.3.1	PSDQ 8.1	Sandstone CBR blocks	m²	180		
20.3.2	PSDQ 8.2	Bedding material				
20.3.2.1		Crusher-run material for bedding below concrete footings/G7 material	m³	10		
20.3.2.2		Crusher-run material for wall footings material	m³	20		
20.3.3	PSDQ 8.3	Concrete Class 35/19 for footings	m³	10		
20.3.4	PSDQ 8.4	Geotextile fabric: Bidim A2	m²	180		
20.3.5	PSDQ 8.5	Use selected material from excavations, stabilize with 2% cement and place and compact in layers of 150mm to 93% AOD AASHTO density behind retaining wall blocks	m³	135		
TOTAL FOR SECTION 20 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 21 MECHANICAL_PUMPS

SECTION: 21 PUMPS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
21.1	PSA 8.10	DOSING PUMPS FOR INLET WORKS				
		Supply and install pumps complete including all connecting pipework				
21.1.1		<u>Equipment Specification</u> TYPE: Positive displacement, diaphragm dosing pumps with variable-speed drive (GRUNDFOS DDE 15-4 B-PVC/V/C-X-32I002FG or similar Employers Agent QUANTITY: 2 MAX FLOW: 15,0l/h MIN FLOW 15,0 ml/h TURN DOWN RATIO: 1:1000 VALVE TYPE: Spring-Loaded MAXIMUM VISCOSITY AT 100%: 500mPas ACCURACY OF REPEATABILITY: 5% COMPOSITION & MATERIAL: - Dosing head: PVC - Valve ball: Ceramic - Gasket: FKM CIVIL LAYOUT: As per drawing No. J35030/133A				
21.1.2		<u>Operation</u> These pumps dose flocculant at the inlet works.				
21.1.3		<u>PRICING</u>				
21.1.3.1		Prepare a GA drawing of the dosing pumps and pipe work.	sum	1		
21.1.3.2		Supply, store and deliver on site the dosing pumps.	No	2		
21.1.3.3		Supply, manufacture, store and deliver on site the pipe work.	sum	1		
21.1.3.4		Install the dosing pumps with pipe work.	sum	1		
21.1.3.5		Commission and up-hold the dosing pumps for 12 months retention period.	sum	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 21 MECHANICAL_PUMPS

SECTION: 21 PUMPS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
21.2	PSA 8.10	BROUGHT FORWARD				
		DECANTING PUMPS FOR INLET WORKS				
		Supply and install pumps complete including all connecting pipework				
21.2.1		<u>Equipment Specification</u> TYPE: Horizontal, end suction, close coupled, seal-less centrifugal pump, driven by a permanent magnet coupling(BRUBIN MAGFLO M10 or similar Employers Agent Approved) QUANTITY: 2 FLOW: 10 000l/h HEAD : 2.5m IMPELLER DIAMETER: 80mm MAXIMUM VISCOSITY: 200cSt COMPOSITION & MATERIAL: - Connections: Threaded BSP (GAS) standard, NPT special - PP and PVDF material of construction CIVIL LAYOUT: As per drawing No. J35030/133A				
21.2.2		<u>Operation</u> These pumps transfer flocculant from bulk storage tank to dosing tank at the inlet works. Control will be by manual "deadman switch".				
21.2.3		<u>PRICING</u>				
21.2.3.1		Prepare a GA drawing of the decanting pumps and pipe work.	sum	1		
21.2.3.2		Supply, store and deliver on site the decanting pumps (including control switch).	No	2		
21.2.3.3		Supply, manufacture, store and deliver on site the pipe work.	sum	1		
21.2.3.4		Install the decanting pumps with pipe work.	sum	1		
21.2.3.5		Commission and up-hold the decanting pumps for 12 months retention period.	sum	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 21 MECHANICAL_PUMPS

SECTION: 21 PUMPS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
21.3	PSA 8.10	BROUGHT FORWARD				
		SODIUM HYPOCHLORITE DOSING PUMPS				
		Supply and install pumps complete including all connecting pipework				
21.3.1		<u>Equipment Specification</u> TYPE: Positive displacement, diaphragm dosing pumps with variable-speed drive (GRUNDFOS DMX 321-6 B-PVC/V/G-X-E1B9B9 or similar Employers Agent Approved) QUANTITY: 2 MAX FLOW: 321l/h VALVE TYPE: Not Spring-Loaded MAXIMUM VISCOSITY AT 100%: 100mPas COMPOSITION & MATERIAL: - Dosing head: PVC - Valve ball: Glass - Gasket: FKM CIVIL LAYOUT: As per drawing No. 135030/130				
21.3.2		<u>Operation</u> These pumps dose sodium hypochlorite in the clear water reservoir.				
21.3.3		<u>PRICING</u>				
21.3.3.1		Prepare a GA drawing of the dosing pumps and 50mm uPVC dosing pipe work to reservoir.	sum	1		
21.3.3.2		Supply, store and deliver on site the dosing pumps.	No	2		
21.3.3.3		Supply, manufacture, store and deliver on site the dosing pipe work.	sum	1		
21.3.3.4		Install the dosing pumps with pipe work.	sum	1		
21.3.3.5		Commission and up-hold the dosing pumps for 12 months retention period.	sum	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 21 MECHANICAL_PUMPS

SECTION: 21 PUMPS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
21.4	PSA 8.10	BROUGHT FORWARD				
		CHLORINE SAMPLING PUMPS FOR RESERVOIR				
		Supply and install pumps complete including all connecting pipework				
21.4.1		<u>Equipment Specification</u>				
		TYPE: Submersible pump (DAB or similar Employers Agent Approved)				
		QUANTITY: 2				
		MAX FLOW: 500l/h				
		VALVE TYPE: 25mm Flow control valve to supply constant 33l/hour to the chlorine sampling equipment				
		FLOW METER: E&H Picomag or similar				
		Foot valve and rotameters to be included in the installation				
21.4.2		<u>Operation</u>				
		These pumps supply a continuous flow of 33 l/h from the clear water reservoir to a chlorine analyser in the filter gallery building. The flow will be regulated by a flow control valve and excess water returned to the clear water reservoir.				
21.4.3		<u>PRICING</u>				
21.4.3.1		Prepare a GA drawing of the sample pumps, including pipework from the reservoir to filter gallery, 25mm diaphragm control valve, in line flow meter (glass tube type) and 25mm foot valve	sum	1		
21.4.3.2		Supply, store and deliver on site the sample pumps.	No	2		
21.4.3.3		Supply, manufacture, store and deliver on site the sample pipe work, 25mm flow control valve, in line flow meter and 25mm foot valve	sum	1		
21.4.3.4		Install the sample pumps with pipe work.	sum	1		
21.4.3.5		Commission and up-hold the sample pumps for 12 months retention period.	sum	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 21 MECHANICAL_PUMPS

SECTION: 21 PUMPS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
21.5	PSA 8.10	BROUGHT FORWARD				
		HIGH LIFT PUMPS FOR PUMP STATION				
		Supply and install pumps complete including all connecting pipework				
21.5.1		<u>Equipment Specification</u>				
		TYPE: Horizontal, long-coupled, single-stage volute casing pump set (KSB ETANORM 125-100-315/2P or similar Employers Agent Approved)				
		QUANTITY: 2				
		PUMP DUTY PER PUMP: 70,1l/s				
		TOTAL HEAD REQUIRED: 115.5m				
		NPSH REQUIRED: TBA				
		MATERIAL PUMPED: Treated Water				
		PUMP SET: Pump, base plate, motor and coupling complete				
		SUCTION PIPE WORK: Pipe work, complete with an isolation valve. (As per drawings)				
		DELIVERY PIPE WORK: Pipe work, complete with isolation valve. (As per drawings)				
		PIPE WORK: All pipe work flanged with puddles, fasteners, gaskets and pipe supports.				
		COMPOSITION & MATERIAL:				
		- Pump set: KSB ETANORM 125-100-315/2P or similar				
		- Pipe work, valves and ancillary equipment: GMS with FBE coating				
		CIVIL LAYOUT: As per drawing No. J35030/139A				
21.5.2		<u>Operation</u>				
		These pumps pump treated water from the clear water reservoir to the town's command				
21.5.3		<u>PRICING</u>				
21.5.3.1		Prepare a GA drawing of the high lift pumps and pipe work including isolation valves, pump control valves, surge anticipating valves and a magnetic flow meter.	sum	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 21 MECHANICAL_PUMPS

SECTION: 21 PUMPS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
21.5.3.2		Supply, store and deliver on site the high lift pumps.	No	2		
21.5.3.3		Supply, manufacture, store and deliver on site the pipe work.	sum	1		
21.5.3.4		Install the high lift pumps with pipe work including isolation valves, pump control valves, surge anticipating valves and a magnetic flow meter	sum	1		
21.5.3.5		Commission and up-hold the high lift pumps for 12 months retention period.	sum	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 21 MECHANICAL_PUMPS

SECTION: 21 PUMPS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
21.6	PSA 8.10	BROUGHT FORWARD				
21.6.1		SUPER NATANT RETURN PUMPS FOR SLUDGE LAGOONS Supply and install pumps complete including all connecting pipework <u>Equipment Specification</u> TYPE: Submersible wastewater pump with adaptive impeller, self cleaning function and double mechanical seal (Flygt NP 3102 SH 3~ Adaptive 256 or similar Employers Agent Approved) QUANTITY: 2 PUMP DUTY PER PUMP: 17.5l/s TOTAL HEAD REQUIRED: 8.7m NPSH REQUIRED: TBA MATERIAL PUMPED: Supernatant draw-off from sludge ponds PUMP SET: Pump, base plate, motor and coupling complete SUCTION PIPE WORK: N/A DELIVERY PIPE WORK: Pipe work, complete with 2No isolation and 2No check valves. (As per drawings) PIPE WORK: All pipe work flanged with puddles, fasteners, gaskets and pipe supports. COMPOSITION & MATERIAL: - Pump set: Flygt NP 3102 SH 3~ Adaptive 256 or similar - Pipe work, valves and ancillary equipment: GMS with FBE coating CIVIL LAYOUT: As per drawing No. 135030/111 <u>Operation</u> These pumps pump supernatant draw-off from the sludge lagoons to the inlet works				
21.6.2						
21.6.3		<u>PRICING</u>				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 21 MECHANICAL_PUMPS

SECTION: 21 PUMPS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
21.6.3.1		Prepare a GA drawing of the super natant return pumps and pipe work including isolation and check valves.	sum	1		
21.6.3.2		Supply, store and deliver on site a E+H FMI21 or similar approved sump level pump control probe.	No	1		
21.6.3.3		Supply, store and deliver on site the super natant return pumps.	No	2		
21.6.3.4		Supply, manufacture, store and deliver on site the pipe work including isolation and check valves.	sum	1		
21.6.3.5		Install the super natant return pumps with pipe work including isolation and check valves.	sum	1		
21.6.3.6		Commission and up-hold the super natant return pumps for 12 months retention period.	sum	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 21 MECHANICAL_PUMPS

SECTION: 21 PUMPS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
21.7	PSA 8.10	BROUGHT FORWARD				
21.7.1		WTW DEDICATED SUPPLY PUMPS FOR PUMP STATION (EXISTING 500kL TANK SUPPLY) Supply and install pumps complete including all connecting pipework <u>Equipment Specification</u> TYPE: Self priming centrifugal pump (DAB jetcom 102M or similar Employers Agent Approved) QUANTITY: 2 PUMP DUTY PER PUMP: 1.5l/s TOTAL HEAD REQUIRED: 53m NPSH REQUIRED: TBA MATERIAL PUMPED: Potable water PUMP SET: Pump, base plate, motor and coupling complete SUCTION PIPE WORK: N/A DELIVERY PIPE WORK: Pipe work, complete with 2No isolation and 2No check valves. (As per drawings) PIPE WORK: All pipe work flanged with puddles, fasteners, gaskets and pipe supports. COMPOSITION & MATERIAL: - Pipe work, valves and ancillary equipment: GMS with FBE coating CIVIL LAYOUT: As per drawing No. 135030/130 <u>Operation</u> These pumps pump treated water from the clearwater reservoir to an existing 500kL storage tank.				
21.7.2		<u>PRICING</u>				
21.7.3						
21.7.3.1		Prepare a GA drawing of the WTW dedicated supply pumps and pipe work including isolation and check valves.	sum	1		
21.7.3.2		Supply, store and deliver on site the WTW dedicated supply pumps.	No	2		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 21 MECHANICAL_PUMPS

SECTION: 21 PUMPS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
21.7.3.3		Supply, manufacture, store and deliver on site the pipe work including isolation and check valves.	sum	1		
21.7.3.4		Install the WTW dedicated supply pumps with pipe work including isolation and check valves.	sum	1		
21.7.3.5		Commission and up-hold the WTW dedicated supply pumps for 12 months retention period.	sum	1		
TOTAL FOR SECTION 21 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 22 MECHANICAL_FLOW CONTROL

SECTION: 22 FLOW CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
22.1	PSA 8.10	ULTRASONIC LEVEL SENSORS FOR INLET WORKS AND RESERVOIRS				
22.1.1		<u>Equipment Specification</u> TYPE: Ultrasonic open channel level sensor and transmitter (EH Prosonic FDU90 & FMU90 or similar Employers Agent Approved) QUANTITY: 4				
22.1.2		<u>Operation</u> These level sensors will be installed: at the inlet works to regulate the flow control valve, at the clearwater reservoir to control pumps and at two other reservoirs to provide telemetry output.				
22.1.3		<u>PRICING</u>				
22.1.3.1		Supply, store and deliver on site the ultrasonic level sensor and transmitter set inclusive of all requirements under Item 22.1.1	No	4		
22.1.3.2		Install the ultrasonic level sensor and transmitter set	sum	4		
22.1.3.3		Commission and up-hold the ultrasonic level sensor and transmitter set for 12 months retention period.	sum	4		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002 BILL OF QUANTITIES
 CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 22 MECHANICAL_FLOW CONTROL
 SECTION: 22 FLOW CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
22.2	PSA 8.10	BROUGHT FORWARD				
22.2.1		SUMP LEVEL PUMP CONTROL SENSORS FOR SUPER-NATANT RETURN PUMP STATION				
		<u>Equipment Specification</u>				
		TYPE: Capacitive level sensor (EH Liquicap T FMI21 or similar Employers Agent Approved)				
		QUANTITY: 2				
22.2.2		CIVIL LAYOUT: As per drawing No. 135030/1111 <u>Operation</u>				
		These level sensors will be installed in the super natant return pump station (High level & Low level) to control the pumps				
22.2.3		<u>PRICING</u>				
22.2.3.1		Supply, store and deliver on site the capacitive level sensor inclusive of all requirements under Item 22.2.1	No	2		
22.2.3.2		Install the capacitive level sensor	sum	2		
22.2.3.3		Commission and up-hold the capacitive level sensor for 12 months retention period.	sum	2		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 22 MECHANICAL_FLOW CONTROL

SECTION: 22 FLOW CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
22.3	PSA 8.10	BROUGHT FORWARD				
22.3.1		FLOW CONTROL VALVE FOR INLET WORKS <u>Equipment Specification</u> TYPE: 250mm Combination level & rate of flow control valve set, PN16 rated, supplied complete with double chamber body with a remote sensing port for utilization with a higher pressure source as well as single rolling diaphragm for low flow conditions (SINGER #S106-PT-F-Type-5-2-RF or similar Employer Agent Approved) QUANTITY: 1 Kv VALUE: 310 lt/sec CONTROL VALVE INCLUDES: - On/Off float control mechanism with an adjustment range of between 0 and 1.5meters (SINGER Model #43 or similar) - stilling well (SINGER Model #43STILL or similar) - rate of flow pilot control valve and 304stainless steel paddle style orifice plate, which can be installed directly downstream of the valve (between flanges) (SINGER Model #160-RF or similar) - opening and closing speed controls (SINGER Model #26 or similar) COMPOSITION & MATERIAL: - Type, SINGER #S106-PT-F-Type-5-2-RF or similar - Body and cover, ASTM65-25 ductile iron - Spindle and seat, 316 stainless steel - Cover fasteners, 18-8 stainless steel - Coating, fusion bonded epoxy coated internally and externally to a minimum of 250 microns - Flanges, double flanged and drilled to SANS 1123 Table 1600/3 - Auxiliary control, consisting of copper tubing and brass compression fitting				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002 BILL OF QUANTITIES
 CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 22 MECHANICAL_FLOW CONTROL
 SECTION: 22 FLOW CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
22.3.2		BROUGHT FORWARD				
		- Warranty, 3 years CIVIL LAYOUT: As per drawing No. J35030/133A <u>Operation</u> This combination control valve will control the rate of flow into the inlet works with a level control to close when the clear water reservoir has filled up				
CARRIED FORWARD						

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BILL: 22 MECHANICAL_FLOW CONTROL

SECTION: 22 FLOW CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
22.3.3		<u>PRICING</u>				
22.3.3.1		Supply, store and deliver on site the control valve inclusive of all requirements under Item 22.3.3.1	No	1		
22.3.3.2		Supply, store and deliver on site a E+H FMU90 or similar approved ultrasonic open channel flow transmitter with FDU91 sensor	No	1		
22.3.3.3		Commission and up-hold the control valve for 12 months retention period.	sum	1		
CARRIED FORWARD						

BILL: 22 MECHANICAL_FLOW CONTROL
SECTION: 22 FLOW CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
22.4	PSA 8.10	BROUGHT FORWARD				
22.4.1		BASKET STRAINER FOR CONTROL VALVE AT INLET WORKS <u>Equipment Specification</u> TYPE: 250mm In-Line basket strainer, PN16 rated(SINGER Model #STR or similar Employers Agent Approved) QUANTITY: 1 BASKET STRAINER INCLUDES: - fitted with 100mm dial glycerine pressure gauge - fitted with 25mm stainless steel ball valve - fitted with 25mm air valve connection - fitted with 40mm stainless steel drain ball valve COMPOSITION & MATERIAL: - Type, SINGER Model #STR In-Line basket strainer or similar - Body and cover, manufactured from mild steel to SANS 719 - Cover fasteners, 316 stainless steel bolts, nuts and washers - Coating, solvent free epoxy coated internally and externally to a minimum of 250microns - Flanges, double flanged and drilled to SANS 1123 Table 1600/3 - Basket, 304 stainless steel complete with handle for easy removal - manufactured from 1.5mm perforated plate CIVIL LAYOUT: As per drawing No. J35030/133A				
22.4.2		<u>Operation</u> This in-line basket strainer will be installed before the flow control valve in the inlet works according to manufacturers specifications				
22.4.3		<u>PRICING</u>				
CARRIED FORWARD						

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BILL: 22 MECHANICAL_FLOW CONTROL
 SECTION: 22 FLOW CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
22.4.3.1		Supply, store and deliver on site the in-line basket strainer inclusive of all requirements under Item 22.4.1	No	1		
22.4.3.2		Commission and up-hold the control valve for 12 months retention period.	sum	1		
CARRIED FORWARD						

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SECTION: 22 FLOW CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
22.5	PSA 8.10	BROUGHT FORWARD				
22.5.1		PUMP CONTROL VALVE HIGH LIFT PUMPS <u>Equipment Specification</u> TYPE: 200mm Combination booster pump control valve complete with pressure sustaining feature, PN16 rated, Full port, valve supplied complete with single rolling diaphragm for low flow conditions (SINGER #S106-PG-BPC-R or similar Emolovers Agent Approved) QUANTITY: 2 Kv VALUE: 190 lt/sec CONTROL VALVE INCLUDES: - solenoid control pilot (SINGER Model #SC 24 V DC or similar) - Single limit switch assembly 160-RF rate of flow pilot (SINGER Model #X129 or similar) - pressure sustaining feature with an upstream adjustment range of between 1.3bar and 13.8bar (SINGER Model #81-RP or similar) - opening and closing speed controls (SINGER Model #26 or similar) COMPOSITION & MATERIAL: - Type, SINGER #S106-PG-BPC-R or similar - Body and cover, ASTM65-25 ductile iron - Spindle and seat, 316 stainless steel - Cover fasteners, 18-8 stainless steel - Coating, fusion bonded epoxy coated internally and externally to a minimum of 250 - Flanges, double flanged and drilled to SANS 1123 Table 1600/3 - Auxiliary control, consisting of copper tubing and brass compression fitting - Warranty, 3 years CIVIL LAYOUT: As per drawing No. J35030/139A				
22.5.2		<u>Operation</u>				
CARRIED FORWARD						

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BILL: 22 MECHANICAL_FLOW CONTROL
 SECTION: 22 FLOW CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
		This combination booster pump control valve will control the rate of flow delivered by the high lift pumps				
22.5.3		<u>PRICING</u>				
22.5.3.1		Supply, store and deliver on site the control vale inclusive of all requirements under Item 22.5.3	No	2		
22.5.3.2		Commission and up-hold the pump control valve for 12 months retention period.	sum	1		
22.5.3.3		Commission and up-hold the pump control valve for 12 months retention period.	sum	1		
CARRIED FORWARD						

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SECTION: 22 FLOW CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
22.6	PSA 8.10	BROUGHT FORWARD				
22.6.1		SURGE ANTICIPATING VALVE TO HIGH LIFT PUMPS <u>Equipment Specification</u> TYPE: 80mm surge anticipating relief valve, PN16 rated, valve supplied complete with single rolling diaphragm for low flow conditions (SINGER #S106-RPS-L&H or similar Employers Agent Approved) QUANTITY: 1 Kv VALUE: 26 lt/sec CONTROL VALVE INCLUDES: - Low pressure surge pilot with an adjustment range of between 1.3bar and 13.8bar (SINGER Model #82-PR or similar) - High pressure surge pilot with an adjustment range of between 1.3bar and 13.8bar (SINGER Model #81-RP or similar) COMPOSITION & MATERIAL: - Type, SINGER #S106-RPS-L&H or similar - Body and cover, ASTM65-25 ductile iron - Spindle and seat, 316 stainless steel - Cover fasteners, 18-8 stainless steel - Coating, fusion bonded epoxy coated internally and externally to a minimum of 250 microns - Flanges, double flanged and drilled to SANS 1123 Table 1600/3 - Auxiliary control, consisting of copper tubing and brass compression fitting - Warranty, 3 years CIVIL LAYOUT: As per drawing No. J35030/139A				
22.6.2		<u>Operation</u> This surge anticipating relief valve will be installed on a T downstream of the high lift pump control valves				
CARRIED FORWARD						

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BILL: 22 MECHANICAL_FLOW CONTROL
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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
22.6.3		<u>PRICING</u>				
22.6.3.1		Supply, store and deliver on site the surge anticipating relief valve inclusive of all requirements under Item 22.6.1	No	1		
22.6.3.2		Commission and up-hold the surge anticipating relief valve for 12 months retention period.	sum	1		
CARRIED FORWARD						

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BILL: 22 MECHANICAL_FLOW CONTROL

SECTION: 22 FLOW CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
22.7	PSA 8.10	BROUGHT FORWARD				
22.7.1		FLOW CONTROL VALVE FOR INLET TO COMMAND AND OLD TOWN RESERVOIRS <u>Equipment Specification</u> TYPE: 250mm Combination level & rate of flow control valve set, PN16 rated, supplied complete with double chamber body with a remote sensing port for utilization with a higher pressure source as well as single rolling diaphragm for low flow conditions (SINGER #S106-PT-F-Type-5-2-RF or similar) (Employment Asset Approved) QUANTITY: 1 Kv VALUE: 310 lt/sec CONTROL VALVE INCLUDES: - On/Off float control mechanism with an adjustment range of between 0 and 1.5meters (SINGER Model #43 or similar) - stilling well (SINGER Model #43STILL or similar) - rate of flow pilot control valve and 304stainless steel paddle style orifice plate, which can be installed directly downstream of the valve (between flanges) (SINGER Model #160-RF or similar) - opening and closing speed controls (SINGER Model #26 or similar) COMPOSITION & MATERIAL: - Type, SINGER #S106-PT-F-Type-5-2-RF or similar - Body and cover, ASTM65-25 ductile iron - Spindle and seat, 316 stainless steel - Cover fasteners, 18-8 stainless steel - Coating, fusion bonded epoxy coated internally and externally to a minimum of 250 . - Flanges, double flanged and drilled to SANS 1123 Table 1600/3 - Auxiliary control, consisting of copper tubing and brass compression fitting				
CARRIED FORWARD						

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BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 22 MECHANICAL_FLOW CONTROL

SECTION: 22 FLOW CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
22.7.2		BROUGHT FORWARD				
		- Warranty, 3 years CIVIL LAYOUT: As per drawing No. J35030/115B <u>Operation</u> This combination control valve will control the rate of flow into the inlet works with a level control to close when the clear water reservoir has filled up				
CARRIED FORWARD						

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BILL: 22 MECHANICAL_FLOW CONTROL

SECTION: 22 FLOW CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
22.7.3		<u>PRICING</u>				
22.7.3.1		Supply, store and deliver on site the control valve inclusive of all requirements under Item 22.7.3.1	No	2		
22.7.3.2		Supply, store and deliver on site a E+H FMU90 or similar approved ultrasonic open channel flow transmitter with FDU91 sensor	No	2		
22.7.3.3		Commission and up-hold the control valve for 12 months retention period.	sum	1		
TOTAL FOR SECTION 22 CARRIED FORWARD TO SUMMARY						

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BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 23 MECHANICAL_FLOW METERING

SECTION: 23 FLOW METERING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		MAGNETIC FLOWMETER SPECIFICATION Battery Powered Magnetic Flow Meter - Flow Sensor Flanged (EN 1092-1). 3 electrode system. Full bore, circular, uniform internal diameter equal to pipe diameter, without flow restrictions. No active components in the flow sensor. Magnetic coils to be epoxy potted for greater long term reliability. Supplied complete with calibration certification to ISO 17025 Battery Powered Magnetic Flow Meter - Flow Electronics Programmable graphic display screen with two displays at any time e.g. flow rate and volume. Totalization display to have a least 9 digits. Forward, reverse and net flow totals and pressure displays. Built-in keypad for configuration without using a laptop. Port for PC Communication. Accuracy: $\pm 0.5\%$. Smart sampling of measurements to extend battery life without reducing accuracy. Low flow calibration functionality without affecting high flow calibration. Input functionality for 1 pressure/level sensor. Compact enclosure mounted on to the flow meter. Includes factory integrated flow electronics, GSM modem, data Regularly check key operating parameters of the flow meter which can be internally Produce a data file of these measurements and meter details and e-mail this at user selected intervals, for verification report. This to include a Scada license for 36 months. Battery Powered Magnetic Flow Meter - Data Logging Functionality Capacity for up to 10 years 'data at 15 minute sampling intervals. Each data record to be 'date and time stamped' and contain engineering unit and engineering value for each measurement. Data logger to be integral with Flow Electronics. Battery Powered Magnetic Flow Meter - Battery Power Functionality				
CARRIED FORWARD						

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CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 23 MECHANICAL_FLOW METERING

SECTION: 23 FLOW METERING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD Battery powered together with universal external power input. 3 Separate battery packs. 1 Battery pack for GSM modem. 2 battery packs for flow metering and logging, with auto switch-over when the first battery pack runs out of power. In addition to the battery packs, universal external supply facility of 12 - 60VDC and 100 - 240VAC which automatically switches in or out depending on supply availability (battery back-up). Battery life must Battery Powered Magnetic Flow Meter - Data Transmission Functionality Logged data sent by GSM modem integral with Flow Electronics, via GPRS as an electronic and compatible (csv) file attached to an e-mail. Fully compatible 'plug & play' with the Scada. Battery Powered Magnetic Flow Meter - Calibration & Certification Qualifying certification: Flow meter shall be calibrated with water in a flow laboratory independently accredited to ISO17025. Production facility certified in accordance with ISO 9001 and OHSAS 18001. Manufacturer must be MID and/or OIMLR49 certified. Calibration laboratory shall be recognized by ILAC (International Laboratory Accreditation Cooperation) through the relevant national accreditation body. 97/23/CE PED Certificate Directive.				
CARRIED FORWARD						

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CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 23 MECHANICAL_FLOW METERING

SECTION: 23 FLOW METERING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
23.1	PSA 8.10	BROUGHT FORWARD				
23.1.1		MAGFLOW TYPE FLOWMETER FOR INLET WORKS <u>Equipment Specification</u> TYPE: Magnetic flow measurement system (ISOIL MS2500-E250-A1A2A with ML255-B6A7D7F3 converter or similar Employers Agent Approved) QUANTITY: 1 PIPELINE DIAMETER: 250mm PROCESS CONNECTION: Flanged UNI EN 1091-1 PN16 COMPOSITION & MATERIAL: - Carbon steel - Ebonite Liner - 316 st. steel electrode - IP 67 rating OPERATING TEMPERATURE: -5 to 80°C FLOW RANGE: 0 to 70.8 m³/h min. 1770 m³/h max DISPLAY: LCD OPERATIONAL LANGUAGE DISPLAY: English POWER SUPPLY: 1, 2 & 3 Lithium battery packs or Universal Power supply ACCURACY: 0.4% PROGRAMMING: 3 on-board push-buttons or via P.C ADDITIOANL MODULE: GPRS with antenna on separate antenna and 3 meter cable CIVIL LAYOUT: As per drawing No. J35030/133A <u>Operation</u> This magnetic type flow meter will be installed upstream off, the flow control valve and will measure the flow at the inlet works.				
23.1.2						
CARRIED FORWARD						

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BILL: 23 MECHANICAL_FLOW METERING

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
23.1.3		<u>PRICING</u>				
23.1.3.1		Prepare a GA drawing of the inlet pipe work including a resilient seal valve, magnetic flow meter, basket strainer and flow control valve.	sum	1		
23.1.3.2		Supply, store and deliver on site the magnetic type flow meter inclusive of all requirements under Item 23.1.1	No	1		
23.1.3.3		Install the inlet pipework work with a resilient seal valve, magnetic flow meter, basket strainer, flow control valve and all electronic and hydraulic controls	sum	1		
23.1.3.4		Commission and up-hold the magnetic flow meter for 12 months retention period.	sum	1		
CARRIED FORWARD						

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
23.2	PSA 8.10	BROUGHT FORWARD				
23.2.1		MAGFLOW TYPE FLOWMETER FOR PUMP STATION <u>Equipment Specification</u> TYPE: Magnetic flow measurement system (ISOIL MS2500-E250-A1A2A with ML255-B6A7D7F3 converter or similar Employers Agent Approved) QUANTITY: 1 PIPELINE DIAMETER: 250mm PROCESS CONNECTION: Flanged UNI EN 1091-1 PN16 COMPOSITION & MATERIAL: - Carbon steel - Ebonite Liner - 316 st. steel electrode - IP 67 rating OPERATING TEMPERATURE: -5 to 80°C FLOW RANGE: 0 to 70.8 m³/h min. 1770 m³/h max DISPLAY: LCD OPERATIONAL LANGUAGE DISPLAY: English POWER SUPPLY: 1, 2 & 3 Lithium battery packs or Universal Power supply ACCURACY: 0.4% PROGRAMMING: 3 on-board push-buttons or via P.C ADDITIOANL MODULE: GPRS with antenna on separate antenna and 3 meter cable CIVIL LAYOUT: As per drawing No. J35030/133A				
23.2.2		<u>Operation</u> This magnetic type flow meter will be installed downstream off, the pump control valves and will measure the flow in the rising main.				
CARRIED FORWARD						

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BILL: 23 MECHANICAL_FLOW METERING
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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
23.2.3		<u>PRICING</u>				
23.2.3.1		Supply, store and deliver on site the magnetic type flow meter inclusive of all requirements under Item 23.2.1	No	1		
23.2.3.2		Commission and up-hold the magnetic flow meter for 12 months retention period.	sum	1		
CARRIED FORWARD						

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SECTION: 23 FLOW METERING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
23.3	PSA 8.10	BROUGHT FORWARD				
23.3.1		MAGFLOW TYPE FLOWMETER FOR COMMAND AND OLD TOWN RESERVOIR OUTLETS <u>Equipment Specification</u> TYPE: Magnetic flow measurement system (ISOIL MS2500-E250-A1A2A with ML255- B6A7D7F3 converter or similar Employers Agent Approved) QUANTITY: 1 PIPELINE DIAMETER: 250mm PROCESS CONNECTION: Flanged UNI EN 1091-1 PN16 COMPOSITION & MATERIAL: - Carbon steel - Ebonite Liner - 316 st. steel electrode - IP 67 rating OPERATING TEMPERATURE: -5 to 80°C FLOW RANGE: 0 to 70.8 m³/h min. 1770 m³/h max DISPLAY: LCD OPERATIONAL LANGUAGE DISPLAY: English POWER SUPPLY: 1, 2 & 3 Lithium battery packs or Universal Power supply ACCURACY: 0.4% SPECIAL CALABRATION: 20 and 50 m3/h PROGRAMMING: 3 on-board push-buttons or via P.C ADDITIOANL MODULE: GPRS with antenna on separate antenna and 3 meter cable CIVIL LAYOUT: As per drawing No. J35030/133A				
23.3.2		<u>Operation</u>				
CARRIED FORWARD						

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BILL: 23 MECHANICAL_FLOW METERING

SECTION: 23 FLOW METERING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
23.3.3		This magnetic type flow meter will be installed downstream off, the pump control valves and will measure the flow in the rising main.				
		<u>PRICING</u>				
23.3.3.1		Supply, store and deliver on site the magnetic type flow meter inclusive of all requirements under Item 23.3.1	No	2		
23.3.3.2		Install the magnetic type flow meter	No	2		
23.3.3.3		Commission and up-hold the magnetic flow meters for 12 months retention period. Commissioning to include special calibration for low flow	sum	1		
CARRIED FORWARD						

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
23.4	PSA 8.10	MECHANICAL TYPE FLOWMETER FOR POTABLE WATER SUPPLY TO PLANT				
23.4.1		<u>Equipment Specification</u> TYPE: Mechanical flow measurement system (HUILE LXLC(R) or similar Employers Agent Approved) QUANTITY: 1 PIPELINE DIAMETER: 50mm PROCESS CONNECTION: Flanged UNI EN 1091-1 PN16 OPERATING TEMPERATURE: up to 50°C				
23.4.2		<u>Operation</u> This mechanical type flow meter will be installed in the WTW Pump Station and will measure the flow to the 500kL Storage tank				
23.4.3		<u>PRICING</u>				
23.4.3.1		Supply, store and deliver on site the magnetic type flow meter inclusive of all requirements under Item 23.4.1	No	1		
23.4.3.2		Install the mechanical type flow meter	No	1		
23.4.3.3		Commission and up-hold the mechanical flow meter for 12 months retention period.	sum	1		
23.5	PSA 8.10	MECHANICAL TYPE FLOWMETER FOR 500kL PRESSED STEEL TANK OUTLET				
23.5.1		<u>Equipment Specification</u> TYPE: Mechanical flow measurement system (HUILE LXLC(R) or similar Employers Agent Approved) QUANTITY: 1 PIPELINE DIAMETER: 80mm PROCESS CONNECTION: Flanged UNI EN 1091-1 PN16 OPERATING TEMPERATURE: up to 50°C				
23.5.2		<u>Operation</u>				
CARRIED FORWARD						

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
		This mechanical type flow meter will be installed on the 500kL storage tank outlet				
23.5.3		<u>PRICING</u>				
23.5.3.1		Supply, store and deliver on site the magnetic type flow meter inclusive of all requirements under Item 23.5.1	No	1		
23.5.3.2		Install the mechanical type flow meter	No	1		
23.5.3.3		Commission and up-hold the mechanical flow meter for 12 months retention period.	sum	1		
CARRIED FORWARD						

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
23.6	PSA 8.10	BROUGHT FORWARD				
23.6.1		SMART GPRS FLOWLOGGER TO MECHANICAL FLOWMETERS <u>Equipment Specification</u> TYPE: Flow logger (FLOW-G-3-68 or similar Employers Agent Approved) QUANTITY: 2 Two pulse inputs: - Selectable relay debounce function - Maximum pulse frequency: 30Hz without debounce or 10Hz with debounce; - Detects whether the pulse source is active (provides voltage) or passive logger provides voltage) and that it performs as required Logged data sent by built-in GSM modem via GPRS as a .csv file attached to an email. Integrated with the SCADA. Each data record to be 'time stamped' and to contain both engineering unit and engineering value for each measurement. Approximate GPRS coordinates of logger location. Logged date that can be downloaded to pc via onboard mini USB port. Logger memory capacity: more than 36 months Operating temperature: -10 to 60°C Configured by Software on pc, via standard mini cable Housing: IP68 Flow to totalized and logged at 15 minute intervals (i.e. flow quantity, not number of pulses). Logger memory capacity: 5 years Data Transmission Interval: 12 hours. Battery power: Lithium non-rechargeable battery. Battery life: minimum 3 years. External power supply: 12 - 24 V DC, auto changeover to battery backup.				
23.6.2		<u>Operation</u>				
CARRIED FORWARD						

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CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 23 MECHANICAL_FLOW METERING

SECTION: 23 FLOW METERING

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
		Flow loggers to be installed on the mechanical flow meters				
23.6.3		<u>PRICING</u>				
23.6.3.1		Supply, store and deliver on site the flow logger inclusive of all requirements under Item 23.6.1	No	2		
23.6.3.2		Install flow logger	No	2		
23.6.3.3		Commission and up-hold the flow loggers for 12 months retention period.	sum	1		
TOTAL FOR SECTION 23 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 24 MECHANICAL_CHLORINATION

SECTION: 24 CHLORINATION SYSTEM

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
24.1 24.1.1	PSA 8.10	HYPOCHLORITE GENERATION SYSTEM <u>Equipment Specification</u> TYPE: Electrolytic hypochlorite generation system (OSEC B-Pak 65 or similar Employers Agent Approved) CAPACITY: 1.25kg/h QUANTITY: 2 EACH CONSISTING OF: - Water Softener - Brine Feed Pump - Electrolyzer Assemblies - System Control Panel - Engineered Frame System - Dilution Water Controls INCLUDING ACCESSORIES: - 2 x Transformer / Rectifiers - 1x Mobile Acid Cleaning System - 2 x Water Heaters - 1 x Brine Saturator Tank (1000l) with Level Instrumentation - 2 x Sodium Hypochlorite Tanks(5000l) with Level Instrumentation - 2 x Hydrogen Blowers - 2 x Hydrogen Leak Detectors - 1 x Titration kit COMPOSITION & MATERIAL: POWER CONSUMPTION: Equal or less than 4.2 kWh/kg Cl ₂ PRODUCT CONCENTRATION: 8 g/l ± 0.5 (0.8%) CONTROL CABINET IP RATING: 54 RECTIFIER IP RATING: 21				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 24 MECHANICAL_CHLORINATION

SECTION: 24 CHLORINATION SYSTEM

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
24.1.2		OPERATING TEMPERATURE (WATER): 2.7 – 26.7 °C CIVIL LAYOUT: As per drawing No. 135030/130 <u>Operation</u> The hypochlorite generation system will be supplying chlorine for disinfection of the treated water				
24.1.3		<u>PRICING</u>				
24.1.3.1		Prepare a GA drawing of the hypochlorite generation system including all required pipework and controls.	sum	1		
24.1.3.2		Supply, store and deliver on site the hypochlorite generation system inclusive of all requirements under Item 24.1.1	No	2		
24.1.3.3		Supply, store and deliver on site W3T158815 SFC or similar approved for the continuous measurement of Chlorine residual, for wall mounting, prepared for the reception of 1 Sensor W3T162670 Pressure less DEPOLOX® 5 flow-through cell with integrated, open sensor for free Chlorine measurement Sample water flow: controlled to 33 l/h with max 4 bar pressure, flow monitor included and compatible	No	1		
24.1.3.4		Install all connecting pipework and controls complete	sum	1		
24.1.3.5		Commission and up-hold the hypochlorite generation system for 12 months retention period.	sum	1		
TOTAL FOR SECTION 24 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 25 MECHANICAL RAPID-GRAVITY SANDFILTERS

SECTION: 25 RAPID-GRAVITY SAND FILTERS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
25.1		Manufacture / procure and install the following by specialist. FILTER FLOOR Filter floor to be designed a. 3 x Filters in operation, filtration rate = 4m per hour @ 6 MLD b. 2 x Filters in operation, filtration rate = 7m per hour @ 6 MLD The contractor must design, manufacture install and commission all necessary pipework, inter connecting the air supply from the blowers to all 3 filter inlets. The pipework shall be sized according to the contractors filter floor design and performance. All pipework shall be mild steel (standard wall thickness pipes, hot dip galvanized)				
25.1.1		110 Diameter Filter floor lateral system complete with filter nozzles, end caps and floor clamps as per manufacture specifications.	m ²	55		
25.1.2		110 Machined sockets for filter later system to be cast into backwash overflow weir.	No	68		
25.1.3		Stainless steel filter inlet frame and water deflector mounted to filter inlet.	No	3		
25.1.4		Stainless Steel manual inlet sluice gate.	No	3		
25.1.5		Provide filtrate outlet pipework as per pipework schedule, Drawing 136 D	Sum	1		
25.1.6		Orifice filtrate outflow control as per the specified filtration rate.	No	3		
25.1.7		Delivery, installation and Commissioning of 25.1.1 to 25.1.6	No	3		
25.2		FILTER SAND/MEDIA				
25.2.1		High quality silica sand with a nominal size and a uniformity coefficient as specified by	m ³	55		
25.3		BACKWASH BLOWERS				
25.3.1		<u>Equipment Specification</u> Pipe positive displacement roots blower or similar employers agent approved.				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 25 MECHANICAL RAPID-GRAVITY SANDFILTERS

SECTION: 25 RAPID-GRAVITY SAND FILTERS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
		MUST INCLUDE: V- belt drive and Base Set, Inlet silencer and filter, "T" joint, Safety valve, Pressure gauge, Non-return valve, Discharge silencer, Inlet differential pressure gauge, Rubber Bellows, Acoustic enclosure, Discharge Temperature Switch QUANTITY: 2 PERFORMANCE & MATERIAL: Flow at Discharge: 730m³/hr at 6 bar. Flow at Inlet: To be confirmed by supplier Intake Operating Pressure: Atmospheric Design Ambient Temperature: 35°C Discharge Temperature: To be confirmed by supplier Discharge Diameter: To be confirmed by supplier Pressure Rise (gauge): 50kPa Blower Speed: To be confirmed by supplier Power absorption at duty point to be confirmed by supplier Installed motor power to be confirmed by supplier Motor Speed: 1460rpm Drive Arrangement: V-belt Site Altitude (assumed): 1300masl Noise Level without Acoustic Hood: 88-94dBA Noise Level with Acoustic Hood:<80dBA CIVIL LAYOUT: As per drawing No. 135030/136 <u>Operation</u> These blower will be supplying air required for the backwashing of the Rapid-Gravity Sand Filters. <u>PRICING</u>				
25.3.2						
25.3.3						
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 25 MECHANICAL RAPID-GRAVITY SANDFILTERS

SECTION: 25 RAPID-GRAVITY SAND FILTERS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
25.3.3.1		Prepare a GA drawing of the blower installation including all required pipework.	sum	1		
25.3.3.2		Supply, store and deliver on site the backwash blowers inclusive of all requirements under Item 25.3.1	No	2		
25.3.3.3		Install the supply pipework connecting to filter beds	sum	1		
25.3.3.4		Commission and up-hold the blowers for 12 months retention period.	sum	1		
25.4		FILTER CONTROL				
25.4.1		Automatic Filter Control Desk in 3CR12 Enclosure mounted on S/S 304 pedestal. Unit to include touch screen HMI, PLC and relevant switch gear for automatic filter backwash	No	3		
25.5		FILTER INSTRUMENTS AND CONTROL				
25.5.1		MCC wall mounted enclosure and associated equipment for the control of the Blowers and backwash pumps	No	2		
25.5.2		Testing rapid gravity sand filter's equipment, materials, effluent quality and operation.	Sum	1		
25.6		BACKWASH PUMPS				
		PUMP, MOTOR & BASEPLATE etc.				
		Supply, deliver and install the following pumps and fittings. Pumps to operate in 1 duty and 1 standby configuration				
25.6.1		Backwash pumps - supply, deliver and install to backwash pumps, complete with pump and coupling to deliver 550 m ³ @ 5m head (to be confirmed by supplier). Pumps to be controlled by VSD	No	2		
25.6.2		Electrical Motor: 4 Pole Electrical motor 'WEG Premium Efficiency Plus' or similar approved IE2 400V/3/50Hz, IP66, TEFC Squirrel Cage Motor at 1455 RPM. (kW Rating to be sized by Water Works specialist to achieve pump duty) Complete datasheet.	No	2		
25.6.3		Procure, Manufacture a standard galv. steel frame baseplate.	No	2		
25.6.4		Commission and up-hold the pumps for 12 months retention period.	Sum	1		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 25 MECHANICAL RAPID-GRAVITY SANDFILTERS

SECTION: 25 RAPID-GRAVITY SAND FILTERS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
25.6.5		Design, manufacture, supply, install and commission all interconnecting pipework from the suction end via the backwash pump to each of the 3 filter inlet sizes, according to the suppliers filter floor design	Sum	1		
25.6.6		Provisional sum allowed for modification to existing design, civil structures to allow for interfacing with mechanical design changes.	Prov.Sum	1	500 000.00	500 000.00
TOTAL FOR SECTION 25 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 26 ELECTRICAL_LOW VOLTAGE (LV) DISTRIBUTION AND MOTOR CONTROL

SECTION: 26 LOW VOLTAGE (LV) DISTRIBUTION AND MOTOR CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
26.1	PSA 8.10	Combined MDB & MCC Provide workshop drawings, manufacture and install combined free standing board (Form 4a construction), deliver on site, connect, test, commission and maintain for 12 months	Sum	1		
26.2		Supply	Sum	1		
	PSA 8.10	Distribution Boards Provide workshop drawings, manufacture and install electrical distribution boards, deliver on site, connect, test, commission and maintain for 12 months.				
		DB-I (At Inlet Works)				
26.3		Supply	No	1		
26.4		Install	No	1		
		DB-L (At Laboratory)				
26.5		Supply	No	1		
26.6		Install	No	1		
		DB-G (At Gate House)				
26.7		Supply	No	1		
26.8		Install	No	1		
		DB-A1, A2 or A3 (At Accommodation)				
26.9		Supply	No	3		
26.10		Install	No	3		
	PSA 8.10	Distribution Kiosk Provide workshop drawings, manufacture and install electrical distribution boards, deliver on site, connect, test, commission and maintain for 12months Distribution Kiosk-K1 complete with plinth.				
26.11		Supply	No	1		
26.12		Install	No	1		
	PSA 8.10	Trench Excavation, Ducts and Draw Chambers Cable Trenches				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 26 ELECTRICAL_LOW VOLTAGE (LV) DISTRIBUTION AND MOTOR CONTROL

SECTION: 26 LOW VOLTAGE (LV) DISTRIBUTION AND MOTOR CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
26.13		Excavate 300 mm wide x 875 mm deep cable trench in Class C material (earth).				
		Install	m	311		
26.14		SABS approved PVC Cable Warning Tape installed above cable or ducts in trench.				
		Supply	m	311		
26.15		Install	m	311		
26.16		Sand bedding				
26.17		Import suitable material and install sand bedding to a depth of 75 mm plus sand cover over cables or ducts to a depth of 75 mm.				
26.18		Supply	m	311		
26.19		Install	m	311		
		Backfilling				
		Backfill with local material and compact in accordance with the specification.				
26.20		Install	m	311		
		Hard material				
26.21		Extra over for excavation in Class B material (hard). Note that this amount is provisional and shall be expended only if agreed by the Engineer.	m ³	5		
26.22		Extra over for excavation in Class A material (rock). Note that this amount is provisional and shall be expended only if agreed by the Engineer.	m ³	2		
	PSA 8.10	Ducts				
		Supply and install underground PVC ducts in trench				
		160 mm diameter				
26.23		Supply	m	56		
26.24		Install	m	56		
		Allow extra over for the installation of slow bends in the above				
26.25		Supply	No	5		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 26 ELECTRICAL_LOW VOLTAGE (LV) DISTRIBUTION AND MOTOR CONTROL

SECTION: 26 LOW VOLTAGE (LV) DISTRIBUTION AND MOTOR CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
26.26		Install 110 mm diameter	No	5		
26.27		Supply	m	18		
26.28		Install Allow extra over for the installation of slow bends in the above	m	18		
26.29		Supply	No	5		
26.30		Install	No	5		
	PSA 8.10	Power Cables Supply and install in cable trench or underground ducts armoured 600V/1000V PVC insulated copper cored cables. 10 mm ² 3 core				
26.31		Supply	m	45		
26.32		Install 16 mm ² 3 core	m	45		
26.33		Supply	m	67		
26.34		Install 4 mm ² 4 core	m	67		
26.35		Supply	m	170		
26.36		Install 35 mm ² 4 core	m	170		
26.37		Supply	m	70		
26.38		Install 50 mm ² 4 core	m	70		
26.39		Supply	m	55		
26.40		Install 70 mm ² 4 core	m	55		
26.41		Supply	m	60		
26.42		Install	m	60		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 26 ELECTRICAL_LOW VOLTAGE (LV) DISTRIBUTION AND MOTOR CONTROL

SECTION: 26 LOW VOLTAGE (LV) DISTRIBUTION AND MOTOR CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
		150 mm ² 4 core				
26.43		Supply	m	50		
26.44		Install	m	50		
		Supply and install on cable tray or cable ladder armoured 600V/1000V PVC insulated copper cored cables.				
		1.5 mm ² 4 core				
26.45		Supply	m	219		
26.46		Install	m	219		
		4 mm ² 4 core				
26.47		Supply	m	123		
26.48		Install	m	123		
		10 mm ² 4 core				
26.49		Supply	m	131		
26.50		Install	m	131		
		120 mm ² 4 core				
26.51		Supply	m	60		
26.52		Install	m	60		
		150 mm ² 4 core				
26.53		Supply	m	63		
26.54		Install	m	63		
		Supply gland, shroud and lugs and terminate un- armoured screened 600V/1000V stranded PVC insulated copper cored cables				
		10 mm ² 3 core				
26.55		Supply	No	2		
26.56		Install	No	2		
		16 mm ² 3 core				
26.57		Supply	No	6		
26.58		Install	No	6		
		1.5 mm ² 4 core				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 26 ELECTRICAL_LOW VOLTAGE (LV) DISTRIBUTION AND MOTOR CONTROL

SECTION: 26 LOW VOLTAGE (LV) DISTRIBUTION AND MOTOR CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
26.59		Supply	No	16		
26.60		Install	No	16		
		4 mm ² 4 core				
26.61		Supply	No	16		
26.62		Install	No	16		
		10 mm ² 4 core				
26.63		Supply	No	16		
26.64		Install	No	16		
		35mm ² 4 core				
26.65		Supply	No	2		
26.66		Install	No	2		
		50mm ² 4 core				
26.67		Supply	No	2		
26.68		Install	No	2		
		70 mm ² 4 core				
26.69		Supply	No	2		
26.70		Install	No	2		
		120 mm ² 4 core				
26.71		Supply	No	4		
26.72		Install	No	4		
		150 mm ² 4 core				
26.73		Supply	No	12		
26.74		Install	No	12		
		Supply and install in underground sleeves or trench bare stranded copper earth conductor 25 mm ²				
26.75		Supply	m	70		
26.76		Install	m	70		
		35 mm ²				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 26 ELECTRICAL_LOW VOLTAGE (LV) DISTRIBUTION AND MOTOR CONTROL

SECTION: 26 LOW VOLTAGE (LV) DISTRIBUTION AND MOTOR CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
26.77		Supply	m	60		
26.78		Install	m	60		
		120 mm ²				
26.79		Supply	m	30		
26.80		Install	m	30		
		150 mm ²				
26.81		Supply	m	25		
26.82		Install	m	25		
		Supply lugs and terminate copper earth conductors				
		25 mm ²				
26.83		Supply	No	2		
26.84		Install	No	2		
		35 mm ²				
26.85		Supply	No	2		
26.86		Install	No	2		
		120 mm ²				
26.87		Supply	No	4		
26.88		Install	No	4		
		150 mm ²				
26.89		Supply	No	2		
26.90		Install	No	2		
	PSA 8.10	Local isolators				
		Supply and install surface mounted local isolators padlockable in the OFF position, weatherproof to IP 65.				
		20 A triple pole				
26.91		Supply	No	4		
26.92		Install	No	4		
		32 A triple pole				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 26 ELECTRICAL_LOW VOLTAGE (LV) DISTRIBUTION AND MOTOR CONTROL

SECTION: 26 LOW VOLTAGE (LV) DISTRIBUTION AND MOTOR CONTROL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
26.93		Supply	No	2		
26.94		Install	No	2		
		45 A triple pole				
26.95		Supply	No	2		
26.96		Install	No	2		
		240 A triple pole				
26.97		Supply	No	2		
26.98		Install	No	2		
26.99	PSA 8.10	Emergency Stop Pushbutton				
26.100		Supply and install surface mounted Emergency Stop Pushbutton complete with IP65 enclosure: SCHNEIDER XALK174 or approved equivalent.				
26.101		Supply	No	8		
26.102		Install	No	8		
	PSA 8.10	Cable Ladder				
		Supply and fix galvanised steel cable ladder complete with hangers and fixings. O-Line PS 75 or approved equivalent.				
		100 mm wide				
26.103		Supply	m	3		
26.104		Install	m	3		
		300 mm wide				
26.105		Supply	m	95		
26.106		Install	m	95		
		Extra over for right angle bends in 300 mm wide cable ladder				
26.107		Supply	No	8		
26.108		Install	No	8		
TOTAL FOR SECTION 26 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 27 ELECTRICAL INSTALLATION TO BUILDINGS

SECTION: 27 INSTALLATION TO BUILDINGS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		LIGHTING INSTALLATION				
	PSA 8.10	Conduit and Accessories				
		Supply and install 20mm diameter PVC conduit on surface in ceiling space				
27.1		Supply	m	428		
27.2		Install	m	428		
		Supply and install 20mm diameter PVC conduit chased into wall				
27.3		Supply	m	179		
27.4		Install	m	179		
		Supply and install galvanised steel conduit boxes.				
		Round steel conduit box installed flush in wall				
27.5		Supply	No	17		
27.6		Install	No	17		
		Round box installed flush in ceiling or on surface as a draw box				
27.7		Supply	No	74		
27.8		Install	No	74		
		100mm x 50mm conduit box recessed in wall				
27.9		Supply	No	52		
27.10		Install	No	52		
		Conduit terminations				
		Supply lock nuts and bushes and terminate 20 mm PVC conduit on trunking, floor boxes or conduit boxes.				
27.11		Supply	No	276		
27.12		Install	No	276		
	PSA 8.10	Conductors				
		Supply and install copper PVC insulated conductors in wireways				
		1.5 mm ²				
27.13		Supply	m	1346		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 27 ELECTRICAL INSTALLATION TO BUILDINGS

SECTION: 27 INSTALLATION TO BUILDINGS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
27.14		Install	m	1346		
		Supply and install bare copper earth conductors in wireways 1.5 mm ²				
27.15		Supply	m	637		
27.16		Install	m	637		
	PSA 8.10	Switches				
		Supply and install light switches complete with screwed metal cover plates in conduit boxes. 1-lever 1-way				
27.17		Supply	No	47		
27.18		Install	No	47		
		1-lever 2-way				
27.19		Supply	No	2		
27.20		Install	No	2		
		Photocell in weatherproof bulkhead case				
27.21		Supply	No	2		
27.22		Install	No	2		
	PSA 8.10	Light Fittings				
		Supply, deliver, install, test and commission SABS approved light fittings complete with lamps and maintain for 12 months Type A. Circular bulkhead fitting with die cast aluminium body and acrylic diffuser weatherproof to IP 65 and fitted with a 15 watt LED array. Province Lighting PBH 8.15W LED or approved equivalent.				
27.23		Supply	No	26		
27.24		Install	No	26		
		Type A/E. As for Type A above but with emergency power pack to provide 20% light output for one hour in the event of a power failure.				
27.25		Supply	No	6		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 27 ELECTRICAL INSTALLATION TO BUILDINGS

SECTION: 27 INSTALLATION TO BUILDINGS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
27.26		Install	No	6		
		Type M. Vapour proof light fitting with polycarbonate body weatherproof to IP65 complete with high frequency electronic control gear, three meter length of cabtyre cable and 5A three pin plugtop and two T5 type 28 watt lamps: Province Lighting Venus PPF3-228 or approved equivalent				
27.27		Supply	No	27		
27.28		Install	No	27		
		200 mm diameter lass bowl type fitting complete with 14 watt compact fluorescent lamp with integral control gear. EUROLUX CO 160 bowl with EUROLUX CO156 gallery or approved equivalent				
27.29		Supply	No	22		
27.30		Install	No	22		
		Type G1: 1500 mm long surface mounted open channel fitting with 2 x 24 watt LED lamps. FLOLITE or approved equivalent.				
27.31		Supply	No	3		
27.32		Install	No	3		
		SMALL POWER INSTALLATION				
	PSA 8.10	Conduit and Conduit Accessories				
		Supply and install 20mm diameter PVC conduit				
		Installed on surface				
27.33		Supply	m	45		
27.34		Install	m	45		
		Chased into brick wall				
27.35		Supply	m	81		
27.36		Install	m	81		
		Cast in floor slab				
27.37		Supply	m	144		
27.38		Install	m	144		
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 27 ELECTRICAL INSTALLATION TO BUILDINGS

SECTION: 27 INSTALLATION TO BUILDINGS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
		Conduit terminations				
		Supply lock nuts and bushes and terminate 20 mm PVC conduit on trunking, floor boxes or conduit boxes.				
27.39		Supply	No	86		
27.40		Install	No	86		
		Supply and install 20mm diameter steel conduit				
		Installed on surface				
27.41		Supply	m	36		
27.42		Install	m	36		
		Conduit terminations				
		Supply lock nuts and bushes and terminate 20 mm steel conduit on trunking, floor boxes or conduit boxes.				
27.43		Supply	No	4		
27.44		Install	No	4		
		Supply and install galvanised steel conduit boxes.				
		100mm x 100mm conduit box recessed in wall				
27.45		Supply	No	55		
27.46		Install	No	55		
		100mm x 100mm conduit box installed on surface				
27.47		Supply	No	3		
27.48		Install	No	3		
	PSA 8.10	Conductors				
		Supply and install copper PVC insulated conductors in wireways				
		2.5 mm ²				
27.49		Supply	m	644		
27.50		Install	m	644		
		Supply and install bare copper earth conductors in wireways				
CARRIED FORWARD						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 27 ELECTRICAL INSTALLATION TO BUILDINGS

SECTION: 27 INSTALLATION TO BUILDINGS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
		2.5 mm ²				
27.51		Supply	m	322		
27.52	PSA 8.10	Install	m	322		
		Outlets				
		Supply, deliver, accept, fix, connect and commission the following equipment complete with metal covers and metal screws and maintain for 12 months				
		20A double pole isolator in conduit box				
27.53		Supply	No	4		
27.54		Install	No	4		
		Duo 16A 3pin single switch socket outlet in conduit box				
27.55		Supply	No	50		
27.56		Install	No	50		
TOTAL FOR SECTION 27 CARRIED FORWARD TO SUMMARY						

CONTRACT: JGDM - 2026/27-002

BILL OF QUANTITIES

CONTRACT TITLE: NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

BILL: 28 ELECTRICAL_STANDBY GENERATOR

SECTION: 28 STANDBY GENERATOR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
28.1	PSA 8.10	Supply, deliver, test in factory, offload, test on site and commission 360 kVA standby generator including local automatic mains failure change-over system, sound attenuating louvers and integral fuel tank all as detailed in the specification and maintain for 12 months. Supply	No	1		
28.2		Install	No	1		
		Supply and install sound attenuating enclosure				
28.3		Supply	No	1		
28.4		Install	No	1		
		Supply as-built drawings and operating and maintenance manuals				
28.5		Supply	Sum	1		
		Provide one year's maintenance and guarantee				
28.6		Sum	Sum	1		
		Bulk diesel tank				
		Budgetary allowance for bulk diesel tank, circulating pump, fuel lines and filter				
28.7		Sum	PSum	1	35 000.00	35 000.00
28.8		Allow for profit and attendance on the above Exhaust System	%	35 000.00		
		Budgetary allowance for extension of exhaust system to comply with health and safety requirements				
28.9		Sum	PSum	1	35 000.00	35 000.00
28.10		Allow for profit and attendance on the above First filling of diesel	%	35 000.00		
28.11		Sum	PSum	1	10 000.00	10 000.00
28.12		Allow for profit and attendance on the above	%	10 000.00		
TOTAL FOR SECTION 28 CARRIED FORWARD TO SUMMARY						

Summary of Bill of Quantities

BILL OF QUANTITIES

TOTAL FOR SECTION NO. :

AMOUNT

1. PRELIMINARY AND GENERAL	R
2. SITE CLEARANCE AND EARTHWORKS	R
3. ROADWORKS	R
4. INLET/ DOSING BUILDING	R
5. FLOCCULATION CHANNELS	R
6. SEDIMENTATION TANK	R
7. FILTER BUILDING	R
8. 1M ³ CLEARWATER RESERVOIR	R
9. PUMP STATION	R
10. SLUDGE LAGOONS	R
11. OFFICE/ LABORATORY AND GATE HOUSE BUILDINGS	R
12. SUPERVISOR'S & OPERATOR'S LIVING QUARTERS	R
13. AUCAMP DAM OUTLET STRUCTURE AND PIPELINE	R
14. DISTRIBUTION PIPELINES	R
15. 3M ³ COMMAND RESERVOIR	R
16. 500k ³ OLD TOWN RESERVOIR	R
17. SEWERS	R
18. STORMWATER	R
19. GABIONS AND FENCING	R
20. INTERLOCKING PAVING AND RETAINING WALLS	R
21. MECHANICAL - PUMPS	R
22. MECHANICAL - FLOW CONTROL	R
23. MECHANICAL - FLOW METERING	R
24. MECHANICAL - CHLORINATION	R
25. MECHANICAL - RAPID-GRAVITY SAND FILTERS	R
26. ELECTRICAL - LV DISTRIBUTION & MOTOR CONTROL	R
27. ELECTRICAL - INSTALLATION TO BUILDINGS	R
28. ELECTRICAL - STANDBY GENERATOR	R

NET TOTAL OF TENDER:

R

ADD CONTINGENCIES (10% OF NET TOTAL):

R

Allow the sum of 10% (ten percent) of the above Sub-total for Contingencies to be spent as the Employer's Agent may direct and to be deducted in whole or in part if not required.

SUBTOTAL INCLUDING CONTINGENCIES

R

ADD CPA (10% OF SUBTOTAL INCLUDING CONTINGENCIES)

R

SUB TOTAL INCL CONTINGENCIES AND CPA

R

ALLOWANCE FOR VAT (15%)

R

TOTAL CONTRACT SUM

R

SIGNED BY/ON BEHALF OF TENDERER :



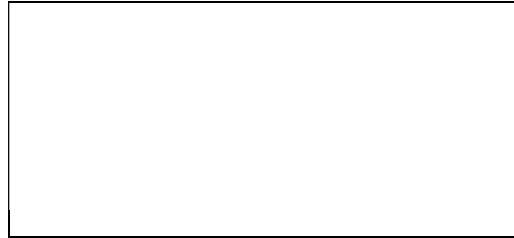
NAME



SIGNATURE



DATE



COMPANY STAMP

Declaration

(In respect of completeness of tender)

Tenderer's name and address:

I/we, the undersigned, do hereby declare that these are the properly priced Bill of Quantities forming Part C2.2 of this Contract Document.

This returnable document comprises 465 pages, including the Bills of Quantities comprising 156 pages in consecutive order, upon which my/our Tender for:

CONTRACT NO.: JGDM2026/27-002:

NQANQARHU WATER TREATMENT AND DISTRIBUTION UPGRADE: WATER TREATMENT WORKS

has been based.

SIGNED BY/ON BEHALF OF TENDERER :

NAME

SIGNATURE

DATE

COMPANY STAMP

Part C3: Scope of Work

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C3.3 Procurement	272
C3.4 Construction	274
C3.5 Management	357
C3.6 Electrical Installation	362
C3.7 Annexures	411

C3.1. Description of the Works

C3.1.1 Employer's Objectives

JGDM main objective is to provide and / or improve existing bulk water infrastructure in the town of Nqanqarhu (Maclear) and its surrounding townships.

JGDM's other objective is to create work opportunities for local residents during the implementation of the proposed works.

C3.1.2 Overview of the Works

The Works comprises out of the construction of a new conventional Water Treatment Works with a capacity of 6 Mℓ per day.

In addition to the water treatment works, the scope will also include the construction of a dam outlet, a new 370 m x 355 mm Ø oPVC gravity main supplying the new WTW, a new 1700 m x 355 mm Ø oPVC rising main from the new WTW, one 3 Mℓ command reservoir and one 500 kℓ concrete reservoir, remedial work on an existing 315 mm Ø uPVC gravity main and a concrete access road.

C3.1.3 Extent and Scope of the Works

The Works comprise the construction of a new conventional Water Treatment Works with a treatment capacity of 6 Mℓ/day.

The Works consists of:

1. Construction of a new Water Treatment Works comprising of the following:
 - a. Inlet/Dosing building
 - b. Flocculation channel
 - c. Sedimentation tank
 - d. Filter building
 - e. 1Mℓ Clear water reservoir
 - f. Pump station building incorporating standby generator and chlorination rooms
 - g. Sludge lagoons with offtake chamber and supernatant return pump station
 - h. Office/Laboratory
 - i. Gate house
 - j. Operator and Supervisor's living quarters
 - k. Internal potable water reticulation and pipework
 - l. Bulk earthworks
 - m. Internal roadworks – concrete surfacing
 - n. Storm water drainage
 - o. Gabions and retaining walls
 - p. Fencing
2. Construction of a dam outlet chamber in the Aucamp Dam with a 370 m x 355 mm Ø oPVC gravity main connecting to the WTW.
3. Construction of a new 1700 m x 315 mm Ø oPVC rising main from the new WTW.
4. Construction of one 3 Mℓ and one 500 kℓ in-situ cast concrete reservoirs.
5. Remedial works on an existing 315 mm Ø uPVC gravity main from the Maclear Dam and the connection thereof to the new WTW.
6. Construction of a 150 m long concrete access road.

C3.1.4 Nature of Ground and Subsoil Conditions

The geotechnical information will be provided to the successful Tenderer.

C3.1.5 Details of the Contract

The Contract comprises the full Scope of Works including both the Civil and Mechanical and Electrical components.

C3.1.6 Site Facilities Required

The Contractor shall provide, operate, maintain, service and upon completion, remove the Site facilities detailed in Portion 2: PSAB Engineer's Office

C3.1.7 Location of the Works

Nqanqarhu Town is located 205 km North East of Komani via Cala and Khowa (Elliot), and 105 km North West of Mthatha via N2 and R396. Refer to the Locality Plan attached under section T1.1.1.

The site is located to the west of the Nqanqarhu Town on the R396 and adjacent to the Maclear Golf Course.

C3.1.8 Temporary Works

The Contractor shall design, provide, construct, maintain and remove all Temporary Works necessary for the proper execution and completion of the Works.

The Temporary Works may include, but shall not be limited to:

- a. Site establishment and construction camp facilities;
- b. Temporary access roads and working platforms;
- c. Temporary traffic accommodation and pedestrian access arrangements;
- d. Temporary drainage and dewatering works;
- e. Temporary water, electricity and telecommunications services;
- f. Temporary supports, formwork, falsework and scaffolding;
- g. Temporary erosion and sediment control measures;
- h. Temporary protection of existing services, structures and facilities;
- i. Temporary fencing, barricading, signage and security measures; and
- j. Any other Temporary Works necessary for the execution of the Works.

An existing overhead TELKOM telecommunications line crosses the Site. The Contractor shall make due allowance for accommodating and protecting the service during construction and for coordinating any relocation that may be required with the relevant service authority.

The existing 315 mm diameter uPVC gravity main from Maclear Dam crosses the Site and shall remain fully operational for the duration of the construction period. The Contractor shall make due allowance for the protection of the pipeline and any temporary measures necessary to maintain uninterrupted operation until the connection to the new Water Treatment Works has been completed.

Before commencing any excavation, the Contractor shall investigate the Site and take all reasonable measures to identify and verify the position of existing services. The Contractor shall be responsible for exercising due care when working in the vicinity of existing services and shall immediately notify the Employer's Agent should any unidentified service be encountered.

Upon completion of the Works, the Contractor shall remove all Temporary Works not required for the permanent operation of the Works and reinstate all affected areas to the satisfaction of the Employer's Agent.

C3.2. Engineering

C3.2.1 Design Services and Activity Matrix

Responsibilities in terms of design and related documentation are as follows:

Activity	Responsibility
Obtain the necessary approvals from relevant authorities and submit documents to relevant authorities	Employer
Provide concept information including the detailed brief, scope, scale and form that sets out the integrated concept for the project	Employer
Provide design development information which develops in detail the required concept to finalise the design and definition criteria and sets out the integrated develop design	Employer
Develop production information which provides the detailing, performance definition, specification, sizing and positioning of all systems and components enabling either construction or the production of further information for construction	Contractor
Design Temporary Works	Contractor
Produce record information	Contractor

C3.2.2 Design Requirements

Where the Contractor is responsible for the design of the temporary works and any part of the mechanical and electrical installations, including shop drawings, Piping and Instrumentation Diagrams (P&IDs), fabrication drawings and installation drawings, the Contractor shall submit all drawings, calculations and supporting information necessary to demonstrate that the design:

- Complies with the Contract, applicable legislation, the process design, drawings, specifications and operational requirements;
- Allows adequate access for the operation, inspection, maintenance and replacement of equipment;
- Is suitable for the intended duty and operating environment; and
- Meets the required performance criteria specified in the Contract.

Acceptance of any design submission by the Employer's Agent shall not relieve the Contractor of responsibility for the adequacy, correctness or performance of the design.

C3.2.3 Drawings

The Employer's Agent shall provide the tender drawings and construction drawings for the permanent works.

The Contractor shall prepare and submit all drawings required for the execution of the Works, including temporary works drawings (if required), shop drawings, fabrication drawings, installation drawings, Piping and Instrumentation Diagrams (P&IDs) and any other drawings required in terms of the Contract.

The Contractor shall provide all information required for the preparation of record and as-built drawings.

All Contractor-prepared drawings shall be submitted to the Employer's Agent for review prior to construction, fabrication or installation, as applicable.

C3.2.4 Design Procedures

Where the Contractor is responsible for the design of any part of the Works, the Contractor shall:

- Verify all interfaces with existing and new structures, services, plant and equipment;
- Coordinate and integrate all design submissions with the Permanent Works design and construction programme;

- Obtain any approvals required in respect of the Contractor's design responsibilities in terms of the Contract;
- Comply with all applicable environmental, health and safety and statutory requirements;
- Maintain a register of drawings and design submissions and ensure that only the latest revisions are used for construction; and
- Submit revised drawings and supporting documentation whenever changes to the design are made.

C3.2.5 Record Information

The Contractor shall prepare and submit all record information required in terms of the Contract, including Operation and Maintenance Manuals, commissioning documentation, test records, test certificates, warranties and guarantees.

The Contractor shall provide all information necessary for the preparation of record and as-built drawings, including details of all deviations from the construction drawings and modifications made during construction.

All Operation and Maintenance Manuals, commissioning documentation, test records, warranties, guarantees and other record information shall be submitted in a format acceptable to the Employer's Agent.

Any warranties, guarantees or other obligations extending beyond the Defects Liability Period shall be clearly identified and included in the record information submitted by the Contractor.

C3.3. Procurement

C3.3.1 Procurement Procedures

C3.3.1.1 Requirements

Local Labour

The Contractor shall, where reasonably practicable and subject to the availability of suitably skilled personnel, maximise the use of locally sourced labour from communities in the vicinity of the Works.

The Contractor shall recruit such labour in consultation with the Employer's Agent, Community Liaison Officer (CLO), Project Steering Committee (PSC) and recognised community structures established for the project.

The Contractor shall remain responsible for ensuring that all personnel employed on the Contract are suitably trained, supervised and competent to perform the duties assigned to them.

Nothing in this clause shall relieve the Contractor of its obligations to complete the Works within the Time for Completion or to provide suitably qualified, skilled and experienced personnel where required for the proper execution of the Works.

The Contractor shall remain entitled to utilise its own key personnel and specialist personnel where the necessary skills, qualifications or experience are not available locally.

All employment and subcontracting arrangements shall comply with the applicable labour legislation and other statutory requirements.

Training

The Contractor shall provide all training necessary to ensure that its personnel and locally recruited labour are competent to safely and effectively perform the work assigned to them.

Where instructed by the Employer, the Contractor shall provide accredited training to locally recruited labour. Such training shall be undertaken by appropriately accredited training providers and in accordance with a training programme approved by the Employer's Agent.

The Contractor shall allow in its rates and prices for normal on-the-job training, induction training and health and safety training required for the execution of the Works.

Where accredited training is instructed by the Employer, the costs thereof shall be paid in accordance with the applicable provisions of the Contract.

C3.3.2 Participation of Target Groups

The Contractor shall, where reasonably practicable and subject to the availability of suitably qualified and experienced personnel, subcontractors and suppliers, promote the participation of Small, Medium and Micro Enterprises (SMMEs) from communities situated within the vicinity of the Works.

The Contractor shall submit an SMME participation plan to the Employer's Agent for review and acceptance. The plan shall identify the proposed work packages, estimated values and proposed SMMEs.

The Contractor shall review and update the SMME participation plan from time to time as necessary during the execution of the Works.

Nothing in this clause shall relieve the Contractor of its obligation to complete the Works within the Time for Completion or to ensure that all personnel, subcontractors and suppliers engaged on the Contract are suitably qualified, experienced and competent to perform the work assigned to them.

C3.3.3 Community Liaison Officer

The Contractor shall make allowance for the appointment of a Community Liaison Officer (CLO) for the duration of the construction period.

The CLO shall serve as a communication link between the Contractor, the Community, the Project Steering Committee (PSC), the Community Liaison structures established for the project and the Employer's Agent.

The CLO shall be appointed in consultation with the Employer facilitated by the Social Facilitator together with the PSC and relevant community structures and shall be a person of good standing within the local community.

The Contractor shall provide the CLO with the necessary office facilities, stationery and administrative support required to perform the duties associated with the position.

The CLO shall, inter alia:

- Assist with the recruitment and coordination of local labour;
- Facilitate communication between the Contractor and the local community;
- Assist in the resolution of labour and community-related matters;
- Maintain records relating to local labour participation and community liaison;
- Attend site meetings, PSC meetings and other meetings when required;
- Assist with the implementation of project communication and stakeholder engagement requirements; and
- Prepare regular reports on community liaison and local labour participation activities.

The detailed duties, remuneration and appointment procedures for the CLO shall be determined by the Employer.

C3.4. Construction

C3.4.1 Construction Specifications

C3.4.1.1 Applicable National and International Standards

The following SANS 1200 Standardised Specifications for Civil Engineering Construction are applicable:

South African National Standards (SANS) 1200	
SANS 1200 A	General
SANS 1200 AB	Engineer's Office
SANS 1200 AH	General (Structural)
SANS 1200 C	Site Clearance
SANS 1200 D	Earthworks
SANS 1200 DB	Earthworks (Pipe Trenches)
SANS 1200 DK	Gabions And Pitching
SANS 1200 DM	Earthworks (Roads, Subgrade)
SANS 1200 G	Concrete (Structural)
SANS 1200 GA	Concrete (Small Works)
SANS 1200 H	Structural Steelwork
SANS 1200 HA	Structural Steelwork (Sundry Items)
SANS 1200 HB	Cladding And Sheeting
SANS 1200 HC	Corrosion Protection Of Structural Steelwork
SANS 1200 L	Medium-Pressure Pipelines
SANS 1200 LB	Bedding (Pipes)
SANS 1200 LC	Cable Ducts
SANS 1200 LD	Sewers
SANS 1200 LE	Storm water Drainage
SANS 1200 M	Roads (General)
SANS 1200 ME	Subbase
SANS 1200 MF	Base
SANS 1200 MJ	Segmented Paving
SANS 1200 MK	Kerbing And Channelling
SANS 1200 MM	Ancillary Roadworks

The following additional SANS Specifications are applicable:

South African National Standards (SANS):	
SANS 207	The design and construction of reinforced soils and fills
SANS 462	Welded wire fabric gabions and gabion mattresses
SANS 558	Cast iron surface boxes and manhole and inspection covers and frames
SANS 675	Zinc-coated fencing wire
SANS 677	Concrete non-pressure pipes
SANS 927	Precast concrete kerbs, edgings and channels
SANS 966-1	Components of pressure pipe systems Part 1: Unplasticized poly(vinyl chloride) (PVC-U) pressure pipe systems
SANS 974-1	Rubber joint rings for use in water, sewer and drainage systems
SANS 1083	Aggregates from Natural Sources – Aggregates for concrete
SANS 1117	Plastic wrappings for the protection of steel pipelines

SANS 1123	Pipe Flanges
SANS 1294	Precast concrete manhole components
SANS 1372	Prefabricated concrete components for fences
SANS 1491	Precast concrete kerbs, channels and flags
SANS 1526	Thermoplastics Sheeting for use as a Geomembrane
SANS 1580	Hexagonal steel wire mesh gabions and revet mattresses
SANS 1601	Structural wall pipes and fittings of unplasticized poly(vinyl chloride) (PVC-U) or buried drainage and sewerage systems
SANS 1921-2	Accommodation of traffic on public roads occupied by the Contractor
SANS 1921-3	Structural steelwork
SANS 4427	Polyethylene (PE) pipes and fittings for water supply systems
SANS 10090	Community protection against fire
SANS 10102	The selection of pipes for buried pipelines
SANS 10142-1	Wiring of premises
SANS 10144	Detailing of steel reinforcement for concrete
SANS 10160	Basis of structural design and actions for buildings and industrial structures (Parts 1-8)
SANS 10162-1	Limit-state design of hot-rolled steelwork
SANS 10162-2	Cold-formed steel structures
SANS 10252-1	Water Supply Installations for Buildings
SANS 10252-2	Drainage Installations for Buildings
SANS 10400	The application of the National Building Regulations

C3.4.1.2 Project Specifications

The following variations to SANS 1200 are applicable:

South African National Standards (SANS) 1200	
PSA	General (SANS 1200 A)
PSAB	Engineer's Office (SANS 1200 AB)
PSC	Site Clearance (SANS 1200 C)
PSD	Earthworks (SANS 1200 D)
PSDB	Earthworks (Pipe Trenches) (SANS 1200 DB)
PSDK	Gabions And Pitching (SANS 1200 DK)
PSDM	Earthworks (Roads, Subgrade) (SANS 1200 D)
PSG	Concrete (Structural) (SANS 1200 G)
PSHA	Structural Steelwork (Sundry Items) (SANS 1200 HA)
PSHC	Corrosion Protection Of Structural Steelwork (SANS 1200 HC)
PSL	Medium-Pressure Pipelines (SANS 1200 L)
PSLB	Bedding (Pipes) (SANS 1200 LB)
PSLC	Cable Ducts (SANS 1200 LC)
PSLD	Sewers (SANS 1200 LD)
PSLE	Stormwater Drainage (SANS 1200 LE)
PSM	Roads (General) (SANS 1200 M)
PSMK	Kerbing and Channelling (SANS 1200 MK)
PSMM	Ancillary Roadworks (SANS 1200 MM)

C3.4.1.3 Particular Specifications

The following Particular Specifications are applicable:

Particular Specifications	
PSPG	High Security Fences and Gate Fencing
PSDQ	Concrete Retaining Block Wall
PSER	Revegetation
PES	Particular Environmental Specifications
POS	Particular Health and Safety Specifications

C3.4.2 Plant and Materials

C3.4.2.1 Plant and materials supplied by the Employer

No plant and materials will be supplied by the Employer.

C3.4.2.2 Material and samples

Contractor to provide the following:

- proof of compliance with materials specifications,
- samples of materials and finishes.

Unless otherwise instructed in writing by the Employer's Agent, all proprietary materials are to be used, mixed, applied, fixed, etc., strictly in accordance with the manufacturer's recommendations and the relevant specifications. The Work is to be executed with materials of the best quality, in the most suitable manner under the inspection of the Employer's Agent, and to his satisfaction. The terms "approved" and "directed" shall mean approved or directed by the Employer's Agent.

All materials, unless otherwise stated, must comply with the relevant SANS specifications.

C3.4.2.3 Material Delivery Programme

The Contractor must prepare a programme showing their planned material delivery dates. The Contractor must ensure that the orders of materials are placed timeously with suppliers, so that the delivery times on the programme are met. Any entitlement to an extension of time arising from the non-availability of materials shall be assessed in accordance with the Contract.

C3.4.3 Construction Equipment

C3.4.3.1 Requirement for equipment

All construction equipment shall be in good working order and of the type listed on Schedule A8 of T2.2 on page 47, failing such description, of a type suitable for the purpose for which it is intended.

C3.4.3.2 Equipment provided by the Employer

No equipment will be made available for use by the Contractor.

C3.4.3.3 Recording of Construction Equipment on Site

Information relating to construction equipment on Site shall be recorded in the Daily Site Diary. In addition, the Contractor shall deliver to the Employer's Agent, on a monthly basis, a detailed summary of construction equipment kept on the Site, full particulars given for each day of the month. Distinction shall be made between construction equipment in working order and construction equipment out-of-order. Such inventory shall be submitted by the first day of the month following the month to be reported.

C3.4.4 Existing Services

C3.4.4.1 Known services

The positions of existing services, insofar as they are known, are shown on the layout drawing. The existing services are bulk water and Telkom overhead lines and cabling.

Items have been allowed in the Bill of Quantities for dealing with and protecting services.

The Contractor shall exercise extreme care when working in these areas. Any repairs required to existing services damaged by the Contractor will be for his own account.

The Contractor shall maintain an accurate record of all existing services encountered during construction and provide such information to the Employer's Agent for incorporation into the record drawings.

C3.4.4.2 Treatment of Existing Services

Any existing services which are found to be in the path of the proposed Works shall be relocated on instructions by the Employer's Agent. Quotations shall be obtained from the relevant authority for the lowering or relocation of these services if deemed necessary by the Employer's Agent.

All connections to the existing services shall be undertaken in a manner and at times to be approved by the Employer's Agent.

C3.4.4.3 Use of Detection Equipment for the Location of Underground Services

The Contractor may use detection equipment to locate underground services before exposing services by hand.

C3.4.4.4 Reinstatement of Damaged Services and Structures

The Contractor shall be held responsible for the damage to services known and unknown.

The reinstatement of services and structure damaged will be as set out in SANS 1200A Clause 5.4.

C3.4.5 Site Establishment

C3.4.5.1 Facilities Provided by the Contractor

a) Location of Site Office and Depot

The establishment of all labour, construction equipment and materials on site and all arrangements in this respect is the responsibility of the Contractor. The Contractor shall inform the Employer's Agent with regard to the land to be used and arrangements made with the owner(s) of the property(ies).

The Contractor shall provide within his own on-site facilities, a suitably furnished office or other venue for meetings. The Contractor shall provide an office and carport for the use of the Employer's Agent. The Contractor shall maintain and service these facilities, as specified in SANS 1200 AB and PSAB.

Before the erection of his camp, offices, stores, plant and accommodation units or any facilities, the Contractor shall satisfy the Employer's Agent that he is familiar with and has taken due cognizance of any pertinent local by-laws, availability of services and statutory regulations. The Contractor's attention is specifically drawn to the regulations pertaining to the accommodation of labourers.

b) Source of Water Supply

The Contractor shall be responsible under the Contract for the supply and distribution at his cost of all water that he may require for purposes of constructing the Works. Accordingly, the Contractor shall pay all connection fees and consumption charges, and at his cost provide all connections, consumption meters, pipework, storage tanks, transport and other items associated with the supply of water for the Works

c) Source of Power Supply

The Contractor shall be responsible under the Contract for the supply and distribution at his cost of all electricity that he may require for purposes of constructing the Works. Accordingly, the Contractor shall pay all connection fees and consumption charges, and at his cost provide all connections, transformers, consumption meters,

cables, distribution boards and other items that are associated with the supply of electricity for construction of the Works. All of the above are to be preceded by the necessary application and approved by the local authority.

d) Housing

The Contractor shall be permitted to house only Key Personnel, within his camp site(s). At the commencement of the Contract, the Contractor shall inform the Employer's Agent of his intentions regarding the housing of Key Personnel on Site, and he shall thereafter ensure that all such accommodation is kept neat and tidy, hygienic and properly controlled at all times. Should at any stage of the Contract the Employer and/or the Employer's Agent be of the opinion that the housing of Key Personnel within the camp site(s) of the Contractor is causing disturbance or inconvenience to the landowner or to nearby residents, then the authority granted by this clause for the Contractor to house Key Personnel on Site may be withdrawn, either partially or entirely.

The Contractor shall at all times conform to all requirements contained in law or bylaws, as well as any other requirements set by the controlling local authority.

e) Sanitation

The Contractor shall be responsible under the Contract for all his sanitation requirements.

The Contractor shall ensure that the local requirements and regulations in respect of sanitation and site toilets are complied with at all times. Due to the extended nature of the area of works, the provision of portable chemical toilets that can be moved to the specific area of works must be provided.

f) Storage and Laboratory Facilities

Storage must be within the Contractor's designated, fenced off camp site.

g) Facilities, Vehicles and Equipment

The Contractor shall provide for the use of the Employer's Agent, maintain and service, the facilities as specified in SANS 1200 AB and PSAB.

h) Other Facilities and Services

Pipe materials may be placed adjacent to the trench position prior to installation at the Contractor's own risk.

i) Telephone, cell phone and computer facilities

Facilities must be provided, maintained and services as specified in PSAB 4.1.

C3.4.5.2 Advertising Rights

The Contractor may display his own advertising board equal in size and number to the project notice board. This advertising board may only be positioned adjacent to the notice board.

C3.4.5.3 Notice Boards

Two notice boards, design as per the specifications of the Employer's Agent, shall be supplied and erected by the Contractor in Nqanqarhu at positions as indicated by the Employer and/or the Employer's Agent. Notices, signs and barricades as well as advertisements may only be erected where approved by the Employer's Agent. The Contractor shall be responsible for their supply, erection, maintenance and ultimate removal and shall make provision for this in his tendered rates.

The Employer's Agent shall have the right (at no cost to the Employer) to have any sign, notice or advertisement moved to another location, or to have it removed from the Site of the Works, should it in any way prove to be unsatisfactory, inconvenient or dangerous to the general public.

Any damage to the notice boards shall be repaired within 14 days of a written instruction received from the Employer's Agent. For details of the boards refer to the Standard Drawings contained in this document.

The notice boards shall be manufactured from materials specified in Clause 3.1 of SANS 1200 AB but shall conform in the painting, decorating and detail with the recommendations for the Standard Board of the South African Association of Consulting Engineers (CESA).

All name boards shall be removed 14 days prior to the date of the Final Approval Certificate.

C3.4.5.4 Site Clearance

A clearing and earthworks plan shall be submitted to the Employer's Agent for approval prior to the commencement of such works. Building rubble from demolishing of structures, kerbs, paving, etc. shall be disposed of at registered dump sites. Charges for the use of such dump sites or any other costs involved with the disposal of material, including transport, will be deemed to be included in the rates for cleaning operations. Burning of any materials on site will not be allowed. Tree stumps shall be disposed of offsite at a registered dump site at no cost to the Employer.

The Contractor shall plan the work in such a way that wind-blown dust is kept to a minimum. Earthworks shall commence immediately after a section is cleared and approved. The Contractor will have a water-truck or other means on standby for spraying the cleared and excavated areas. Cost of water and spraying will be deemed to be included in clearing and excavation items in the Bills of Quantities.

C3.4.6 Site Usage

Unsafe excavations during the builder's holidays and any other non-working days shall be safeguarded at all times from danger to the public and workforce. Safe trench-crossings shall be provided at all crossings. The length of trench left open at any one time may be restricted by the Employer's Agent, should he consider such restriction to be in the interest of public safety.

C3.4.7 Permits and Wayleaves

Environmental Authorization is required under this Contract and has been obtained from the Department of Economic Development and Environmental Affairs.

In terms of the environmental authorization, the Contractor shall be required to:

- Submitted a written notice to the DEDEAT fourteen (14) days prior to the commencement of construction
- Compile an Operational EMPr prior to the commencement of construction
- Comply with the requirements of both the JGDM EMPr attached in annexure C3.7.3 as well as the approved EMPr that was submitted with the Final BAR in November of 2018 and attached in annexure C3.7.5.

A Water Use Licence is required under this Contract and has been applied for from the Department of Water Affairs.

Various wayleaves are also required under this Contract and have been obtained from ESKOM, TELKOM and SANRAL. The Contractor must work in close liaison with the Employer's Agent's Representative to ensure that all the terms and conditions of the various wayleaves are met and complied with.

C3.4.8 Inspection of Adjoining Properties

The Contractor shall record the condition and photograph of all adjoining structures before commencing with construction.

C3.4.9 Survey Control and Setting Out of the Works

For the setting out of the Works, refer to SANS 1200 A: Sub clause 5.1.1

Sufficient survey control beacons will be provided on Site to allow the Contractor to set out the Works. Although an accurate land survey of the Site was carried out during the design process, the Contractor shall verify all setting-out information, existing ground levels, coordinates and existing services prior to commencing construction.

The Contractor shall be responsible for the protection and preservation of all survey control points and beacons provided on Site. The cost of reinstating disturbed, damaged or destroyed survey control points shall be borne by the Contractor.

The following procedure shall be followed before construction commences:

- a) The proposed setting-out information shall be used to set out the Works.
- b) The Contractor shall locate and expose by hand all existing services that intersect or adjoin the proposed structures and pipelines.

- c) The Contractor shall determine and confirm the coordinates, levels, ground profile and positions of the existing services and submit such information to the Employer's Agent.
- d) Following inspection of the exposed services and submitted survey information, the Employer's Agent shall finalise and confirm the positions of the proposed structures and services.
- e) Setting-out shall be confirmed by the Employer's Agent before construction of the relevant section of the Works commences.

The Contractor shall appoint a registered Land Surveyor to verify all setting-out information before construction commences. The cost thereof shall be borne by the Contractor and paid under the relevant Preliminary and General item in the Bill of Quantities.

The Contractor shall maintain setting-out activities sufficiently in advance of construction to avoid delays to the Works. No extension of time or additional payment will be considered arising from the Contractor's failure to adequately plan and execute setting-out activities.

No separate payment shall be made for setting-out, permanent beacons, reference pegs, staking, detail surveys, cross-sections, benchmark verification or any other work described in this clause, except where specifically provided for in the Bill of Quantities.

C3.4.10 Dealing with water on the works

It is required that adequate preventative measures are taken, and maintained to ensure that the Works is protected from damage due to water from any source. In the event of these measures failing to protect the Works, action shall be taken immediately to protect the Works from further damage, the costs of which shall be carried by the Contractor. The damage caused by the water shall be made good as directed by the Employer's Agent.

The Contractor shall be responsible for any damages caused by floods, or failure of any part of the dewatering and flood protection structures at the Works. Thus the Contractor shall repair at his expense any damages to the foundations, structures or any part of the Works.

The cost of all dewatering measures shall be included in the relevant items in the Bill of Quantities and under Preliminary and General Item: Dealing with water on the site.

NOTE : Numbering in the Project Specifications correspond with the numbering of clauses in the Standard Specifications (SANS 1200). Additional clauses are preceded by an asterisk "**".

Tenderers must make provision for all the relevant Project Specifications to be included when calculating the prices of the various items in the Bill of Quantities.

In addition, the sum tendered shall cover all initial costs incurred in complying with the requirements of C1.2 Contract Specific Data

PSA GENERAL (SANS 1200 A)

PSA 2 INTERPRETATIONS

PSA 2.2 Applicable edition of standards

Add at the beginning of SANS 1200 A, sub-clause 2.2:

"Unless a specific edition is specified (see the List of Applicable Specifications)"

PSA 2.3 Definitions

Add at the beginning of SANS 1200 A, sub-clause 2.3:

"The terms "ESCOM", "ESC" and "Electricity Supply Commission" shall mean "Eskom"."

PSA 2.4 (b) Abbreviations

Add the following to SANS 1200 A, sub-clause 2.4(b):

"MAMDD: Modified AASHTO maximum dry density."

PSA 2.8.1 Principle

In the fourth line of SANS 1200 A, sub-clause 2.8.1, after the word "specification", add: "or in the measurement and payment clause of the standard specification, particular specification or project specification".

Add the following to SANS 1200 A, sub-clause 2.8.1:

"Items which are designated as provisional quantities or provisional in the Bill of Quantities are intended to provide for works, the need or extent of which cannot be forecast. Work scheduled as such shall only be undertaken on the written instruction of the Employer's Agent and, where applicable, shall be paid for at the tendered rate or in the absence of rates shall be valued in accordance with Clause 6.4 of the General Conditions of Contract.

The Bill of Quantities shall not be used for ordering purposes and no liability or responsibility shall be admitted by the Employer's Agent in respect of materials ordered or procured by the Contractor on the basis of the Bill of Quantities."

PSA 2.8.2 Preliminary and general section

Add the following to SANS 1200 A, sub-clause 2.8.2:

"In addition, the sum tendered shall cover all initial costs incurred in complying with the requirements of:

- Contract Specific Data _C1.2
- Scope of Work _C3.1 to C3.7
- Site Information _C4

Facilities for the Contractor shall include all the costs of providing water for construction other than the water required for watertightness testing of water retaining structures. Water for such tests will be measured according to PSG 7.2.5 Watertightness test.

The Contractor is to make his own arrangements with the JOE GQABI DISTRICT MUNICIPALITY for water and sanitation connections.

No separate payment will be made for the cost of constructing and maintaining the temporary access roads, the removal of the roads and the reinstatement of the areas, on completion. The sums tendered for in the Bill of Quantities shall include all such costs."

Add the following new sub-clause to SANS 1200 A, sub-clause 2.8:

***PSA 2.8.3 Time-related items**

"The Contractor shall tender a lump sum in the Bill of Quantities to cover his time-related establishment costs. The amount tendered and paid shall be full compensation to the Contractor for:

- i) The maintenance of his whole organization as established for this Contract.
- ii) The maintenance of all insurances, indemnities and guarantees required in terms of the Conditions of Contract or Tender, where applicable.
- iii) Compliance with all general conditions and requirements which are not specifically measured elsewhere for payment in these Contract Documents.

The Contractor shall tender a lump sum for the above mentioned items.

Payment of the lump sum shall be made monthly in compliance with the method laid down in Sub-clause 8.2.2 of SANS 1200:A. Provided that the total of the monthly amounts, so paid for the item, is not out of proportion to the value of the progress of the works as a whole.

The Contractor will not be paid Time-Related Preliminary and General Charges for any Special Non-Working Days, which shall be deemed to have been allowed for in his rates.

The payment to the Contractor for Time-Related Items shall be adjusted in accordance with the following formula in the event of the Contract being extended by means of a variation order:

$$1 \times \frac{2}{3}$$

Sum of Tendered amounts for Time Related Items (1) x Extension of Time authorised by variation order (2)
Tender contract period (3)

*For the purposes of applying this formula "Extension of Time" will exclude the Contractor's December/January close-down period, if applicable.

The abovementioned adjustment of the payment for Time-Related Items shall be made in the Completion Payment Certificate and shall be the only payment for additional Time-Related costs, irrespective of the actual period required to complete the Contract including its authorised extensions.

In the case of fixed price contracts, the amount by which the Time-Related Items is adjusted shall not be subject to the Contract Price Adjustment formula.

In the case of contracts subject to Contract Price Adjustment the amount by which the time-related items are adjusted shall be subject to the Contract Price Adjustment formula.

Where extension of time is approved, payment for time-related items shall only be applicable to working days as defined in the Contract."

PSA 3 MATERIALS

PSA 3.1 Quality

Add the following to SANS 1200 A, sub-clause 3.1:

"Where material to be used in this Contract is specified to comply with the requirements of an SABS Standard Specification, and such material is available with the official SABS mark, the material used must bear the official mark as proof of quality.

The Contractor shall submit in good time, before any construction commences, to the Employer's Agent on site samples of all materials intended to be incorporated into the Works. The samples shall be accompanied by results

of tests undertaken by an approved independent laboratory on the samples in question on behalf of the Contractor and at his cost, before consideration by the Employer's Agent.

The Employer's Agent, during construction, will take independent samples from stockpiles of proposed construction materials on site and from the completed works. Approval will not be granted for samples delivered by the Contractor directly to the Employer's Agent's office. The Contractor shall be responsible for the cost of all failures on test samples and control testing.

All pipes, fittings and materials used in the Works, must bear the official standardisation mark of The South African Bureau of Standards, where applicable. The mark and the class of a pipe shall be visible from above after the pipe is laid.

Rubber articles, including pipe insertion or joint rings shall be stored in a suitable shed and kept away from sunlight, oil or grease.

Large items not normally stored in a building (or storage shed) shall be neatly stacked or laid out above ground on suitable cleared areas on the Site. Grass or vegetation shall be kept short (or completely removed) in the storage areas and the material shall be kept free of dust, mud and be protected from stormwater and ponding water. Pipes shall be handled and stacked in accordance with the manufacturer's recommendations. Special care must be taken to avoid placing pipes over hard objects and stacking pipes to heights above those recommended by the manufacturer. uPVC pipes shall be protected from direct sunlight with suitable covers. Reinforcing will also be staked above ground with no grass cover beneath it. All reinforcing must be cleaned with steel brush before utilised in any structures construction.

Every precaution shall be taken to keep cement dry and prevent access of moisture to it from the time it leaves the place of manufacture until it is required for use on the Site. Cement is to be used on a first in/first out basis. Bags of cement which show any degree of hydration and setting shall be removed from the site of the Works and replaced at the Contractor's own expense. Any cement older than six weeks is to be removed from site.

Materials shall be handled with proper care at all times. Under no circumstances may materials be dropped from vehicles. Large pipes or large plant shall be lifted or lowered only by means of suitable hoisting equipment.

Proprietary materials are specified to indicate the quality, or type of materials, or specific articles, required for the specific installation or construction purpose. The terms "or other approved" or "or approved equivalent" are used in connection with proprietary materials or articles. The Contractor is to supply with their tender the name of the manufacturer and supporting documentation which shows that the materials or articles comply with the relevant specifications. It is understood that the approval shall be at the sole discretion of the Employer and the Employer's Agent."

PSA 4 PLANT

PSA 4.2 Contractor's offices, stores and services

Add the following to SANS 1200 A, sub-clause 4.2:

"The suitable first aid services required in terms of sub-clause 4.2 of SANS 1200 A shall include, inter alia, a First Aid cabinet fully equipped and maintained with at least the minimum contents as listed in Regulation 3 of the General Safety Regulations of the Occupational Health and Safety Act, 1993 (Act 85 of 1993), to deal with accidents and ailments which are likely to occur during the construction period."

PSA 5 CONSTRUCTION

PSA 5.1.1 Setting out of the works

Add the following to SANS 1200 A, sub-clause 5.1.1:

"The Contractor shall be fully responsible for the setting out of the Works, and where labour intensive work is specified, for the setting out of the daily tasks.

The Contractor must, within two (2) weeks after the site has been handed over, ascertain the correctness of all the setting out pegs and bench marks. Any discrepancy shall immediately be reported in writing to the Employer's Agent. Any costs or subsequent costs arising from discrepancies which had not been reported to the Employer's Agent, within the aforementioned period, shall be the sole responsibility of the Contractor.

Before commencement of work, the Contractor is to liaise with the Employer's Agent to establish exactly the status of all boundary pegs adjacent to the Works. The position of all erf pegs found must be recorded on a layout print. If any pegs are missing, he shall immediately inform the Employer's Agent in writing.

On completion of the Contract the pegs that have been unavoidably disturbed will be replaced by the Employer. Pegs which have, in the opinion of the Employer's Agent, been disturbed due to the negligence of the Contractor will be replaced by a registered Land Surveyor at the Contractor's cost."

PSA 5.2 Watching, barricading, lighting

Add the following to SANS 1200 A, sub-clause 5.2:

"The Contractor shall employ competent watchmen to guard the Works both by day and night.

From the time any portion of the Works commences, until the Completion of the Works and the issue of the Certificate of Completion of the Works, the Contractor shall be responsible for protecting the property of the Employer. The Contractor shall also be responsible for all persons having business on the Site from anything dangerous, or likely to cause damage or injury. The Contractor shall take all practical precautions to avoid nuisance or inconvenience to the owners / occupiers of properties near to the Site, as well as the public generally, whilst carrying out the Works. The Contractor shall at all times keep the Site clean and in a safety and satisfactory condition.

Temporary traffic signs shall be erected when work is being done within and adjacent to roadways. The number and layout of the traffic signs shall comply with the Site Manual entitled "Safety at Roadworks in Urban Areas", as published by the Department of Transport. Traffic signs shall have a yellow background with either a red or black border."

PSA 5.4 Protection of overhead and underground services

Add the following to SANS 1200 A, sub-clause 5.4:

"Temporary and permanent alterations made to existing services by the Contractor will be measured and paid under the relevant scheduled items. The length of a service that is re-laid will be measured in its final position.

The sums or rates (as indicated in the Bill of Quantities) shall cover the cost of excavation and backfilling, lifting, recovery of the existing service, laying of the service in the new position, any other related work and materials such as new rubber ring seals, packing, etc., required to complete the alteration.

New material can be used to make up shortfalls resulting from a longer route, existing material damaged during recovery (beyond the control of the Contractor), and other additional work carried out by the Contractor in making permanent alterations. These new materials, for which no scheduled items apply for, will be measured and paid under "SCHEDULE OF DAYWORK RATES".

All additional work to locate and expose the existing service if the existing service is situated further than 2,0 m from the position indicated, (i.e., excluding the initial work within 2,0 m from the indicated position) will be measured and paid under "SCHEDULE OF DAYWORK".

The tendered rates shall further cover the cost of backfilling the excavation with selected material compacted to 90% AASHTO density, keeping the excavation safe and taking care that the services are not damaged in any way. No direct payment will be made for the protection of such services."

PSA 5.5 Dealing with water on works

Add the following to SANS 1200 A, sub-clause 5.4:

"The Contractor shall take all precautions to keep stormwater away from the excavations. He shall deal with all water inclusive of seepage and groundwater, such that construction is not hampered and shall supply and operate all necessary plant.

The cost of supplying and operating the equipment for dewatering of excavations and the controlling of stormwater, shall be covered by the tendered sums in the Bill of Quantities."

Add the following new sub-clause to SANS 1200 A, sub-clause 5.6:

***PSA 5.6.1 Environment management**

"Compliance with the Environment Management Programme of the approved Environmental Impact Assessment Report in terms of the Department of Environmental Affairs and Tourism regulations is a prerequisite for the Contractor.

The Contractor is to price the lump sum provision provided in the Preliminary and General Section of the Bill of Quantities to cover the Contractor's cost for compliance with the requirements of the Environment Management Programme. The cost of producing the Environmental Management Programme as well as training and appointing the necessary personnel to ensure compliance with the required regulations and specifications, shall be included in this lump sum.

Additionally to the above, the Contractor shall incorporate provisions within their obligations to ensure appropriate support is extended to all subcontractors (civil, electrical, and control and instrumentation) to maintain compliance with these requirements.

A provision for a Time Related Item is made in the Preliminary and General Section of the Bill of Quantities. The amount submitted shall include full compensation for the provision of the training, plans, audits, assessments, administration, etc. and all other costs required for full compliance.

Fines issued for non-compliance will be deducted from these Provisional Sums, but are not limited to the value of the Provisional Sum stated."

PSA 5.7 Safety

Add the following to SANS 1200 A, sub-clause 5.7:

"Compliance with Occupational Health and Safety Act, 1993, the Construction Regulations, 2015 and the Employer's Health and Safety Specification, is another prerequisite for the Contractor.

The Contractor is to price the lump sum provision provided in the Preliminary and General Section of the Bill of Quantities, to cover the Contractor's cost for compliance with the requirements mentioned above. The cost of producing the Contractors Safety Management Plan and Risk Assessment as well as training and appointing the necessary personnel to ensure compliance with the required regulations and specifications, shall be included in this lump sum.

Additionally to the above, the Contractor shall incorporate provisions within their obligations to ensure appropriate support is extended to all subcontractors (civil, electrical, and control and instrumentation) to maintain compliance with these requirements.

A provision for a Time Related Item is made in the Preliminary and General Section of the Bill of Quantities. The amount submitted shall include full compensation for the provision of the training, PPE's, plans, audits, assessments, administration, etc. and all other costs required for full compliance. Fines issued for non-compliance will be deducted from the above Provisional Sums, but are not limited to the value of the Provisional Sum stated.

No separate item shall be allowed for in the Bill of Quantities for the accommodation of traffic. The Contractor's movement of construction activities is mainly between the site camp and the construction site which does not cross any municipal roads. In the event that the Contractor need to cross any municipal roads, he will ensure that he takes all necessary precautions for safety which will be deemed included in his rates."

Add the following new sub-clauses to SANS 1200 A, clause 5:

***PSA 5.9 Record drawing information**

"As the Works progress, the Contractor shall mark on a special set of drawings, all as-built details and submit the information to the Employer's Agent's Representative for approval on a monthly basis. No extra payment shall be made for preparation of these as-built plans and recording as built information.

The Certificate of Completion shall only be issued once all the as-built information has been received and verified by the Employer's Agent."

***PSA 5.10 Clearance of site on completion**

"The Contractor shall obtain a certificate, signed by each property owner listed in the Project Specification as being affected by the Works, which indicates that the property owners are satisfied with the standard of reinstatement of any fences, boundary walls and structures.

The Contractor should also obtain a similar certificate of satisfaction for any compensation paid for loss or damage to stock, crops or property, material spoiled on their properties or any other condition affecting their properties as a result of the operations of the Contractor. All such certificates must be lodged with the Employer's Agent before the Certificate of Completion will be issued."

***PSA 5.11 Community Liaison Officer and Project Steering Committee**

"Provisional sums have been allocated to allow for the initial obligations in respect of the employment and monthly salary of a person working full time as the Community Liaison Officer, for the duration of this Contract's construction period. The Contractor shall ensure that the salary is paid timeously and accurately recorded, based on the percentage of the provisional sum stipulated.

A provisional sum has been allocated to cover the monthly expenses for six (6) members of the Project Steering Committee (PSC) to attend the monthly PSC Meetings for the duration of the construction period under this Contract. The Contractor shall ensure that these stipends are paid on the day of each PSC Meeting and properly recorded.

Proof of expenditure, including petty cash slips, invoices, payslips, or receipts, must be submitted as evidence of payment.

***PSA 5.12 Connection into existing sewers**

"A provisional sum has been included to cover the cost of connecting into the existing sewer. The sum includes all labour, plant, specials, and materials required to complete the work, and deal with the existing flaws. Payment for all the work will be based on existing rates and/or Daywork rates where applicable."

***PSA 5.13 Relocation of existing services**

"A provisional sum has been included to cover the cost of re-locating existing services. The sum includes all labour, plant, specials, and materials required to complete the work. Payment for all the work will be based on existing rates and/or Daywork rates where applicable."

***PSA 5.14 ESKOM connection fee**

"A provisional sum has been included to cover the cost of connecting to existing ESKOM services. The sum includes all labour, plant, specials, and materials required to complete the work. Payment for all the work will be based on existing rates and/or Daywork rates where applicable."

PSA 6 TOLERANCES

PSA 6.2 Degrees of Accuracy

Add the following to SANS 1200 A, sub-clause 6.2:

"The degree of accuracy shall be Degree II except for:

- a) Smooth formwork which shall be Degree I."

PSA 7 TESTING

PSA 7.1 Testing principles

Add the following to SANS 1200 A, sub-clause 7.1:

"Every completed layer or section of the Works shall be subject to check testing by the Contractor. Whenever possible the check testing should be done in the presence of the Employer's Agent. Once the Contractor is satisfied with the standard of the Works, the Employer's Agent will be requested to perform acceptance testing for the particular section. When giving notice, the Contractor shall provide the Employer's Agent with the results

of the check testing, thus indicating that the Work is to specification. The Employer's Agent shall be given 48 (forty-eight) hours' notice of when testing or inspections are required.

The Employer's Agent may from time to time carry out his own check tests on the work performed by the Contractor. Should these test result differ significantly from the data provided by the Contractor, the quality of the Contractor's control testing can be called into question. Upon such a discovery the Employer's Agent may order further check tests to be carried out on work already completed. All costs associated with such check tests shall be for the Contractor's account, and so shall the costs of any other check tests whose results do not comply with the specification.

Failure by the Contractor to notify the Employer's Agent or to provide the required information or, where specified, to perform the required test, will be grounds to exempt the Employer from payment for the associated work. This exemption is applicable to all subsequent work, which would be affected by the failure of the specific portion not tested.

The Employer's Agent will be under no obligation to the Contractor to perform acceptance tests. If the Employer's Agent elects not to perform a particular test after notification by the Contractor and is satisfied with results of the Contractor's check tests, the Contractor will be issued with a written instruction to proceed with the relevant works without the acceptance test being performed.

Nothing contained in this clause will relieve the Contractor of any responsibilities under the specifications or in any way limit the tests, which the Employer's Agent may call for or perform in terms of the specification.

The Employer reserves the right to recover cost from the Contractor in instances where the Employer's Agent is called to witness certain control tests, such as the pressure testing of a pipeline, and the results of such tests do not comply with the specifications."

PSA 7.2 Approved laboratories

Replace SANS 1200 A, sub-clause 7.2 with the following:

"Acceptance testing shall be done by a laboratory selected by the Employer's Agent. The Employer's Agent requires 24 (twenty-four) hours' notice from the Contractor in order to perform the relevant acceptance test.

All acceptance testing by the Employer's Agent shall be paid by the Contractor. The cost of such tests which meet the specification requirements will be reimbursed to the Contractor in the monthly payment certificate. This payment amount shall consist of a billed amount plus the tendered mark-up.

A Provisional Sum for the sole use of the Employer's Agent has been provided in the Bill of Quantities to allow for the cost of such testing.

The Contractor shall make due allowance for testing procedures in the construction programme."

SANS 1200 A SECTION 8 MEASUREMENT AND PAYMENT

PSA 8.2.2 Time related items

Replace the contents of this clause with the following:

Payment for time-related items will be effected as follows only after payment for the relevant fixed-charge item has been made : Subject to the provision of 8.2.3 and 8.2.4 payment will be made monthly in equal amounts, calculated by dividing the sum tendered for the item by the tendered contract period in months, multiplied by the months completed, provided always that the total of the monthly amounts so paid for the item is not out of proportion to the value of the progress of the works as a whole.

PSA 8.3 Scheduled fixed-charge and value-related items

SANS 1200 A, sub-clause 8.3 to include payment for:

PSA 2.2	Interpretations
PSA 2.8.1	Principle
PSA 2.8.2	Preliminary and general
PSA 3.1	Quality
PSA 5.1.1	Setting out of the works
PSA 5.2	Watching, barricading, lighting
PSA 5.4	Protection of overhead and underground services.

PSA 6.2 Degrees of accuracy

PSA 8.3.2.2 (a) Offices and storage sheds

SANS 1200 A, sub-clause 8.3.2.2 (a) to include payment for:

PSA 4.2 Contractor's offices, stores and services

PSA 8.3.2.2 (h) Dealing with water

SANS 1200 A, sub-clause 8.3.2.2 (h) to include payment for:

PSA 5.5 Dealing with water on works

PSA 8.3.3 Other fixed charge obligations

SANS 1200 A, sub-clause 8.3.3 to include payment for:

*PSA 5.6.1	Environmental Management
PSA 5.7	Safety
*PSA 5.11	Community liaison officer and Project Steering Committee
*PSA 5.12	Connection into existing sewers
*PSA 5.13	Relocation of existing sewers

PSA 8.3.4 Removal of site establishment

SANS 1200 A, sub-clause 8.3.4 to include payment for:

*PSA 5.10 Clearance of site on completion

PSA 8.4 Scheduled time-related items

SANS 1200 A, sub-clause 8.4 to include payment for:

*PSA 2.8.3 Time related items

PSA 8.4.2.2 (a) Offices and storage sheds

SANS 1200 A, sub-clause 8.4.2.2 (a) to include payment for:

PSA 4.2 Contractor's offices, stores and services

PSA 8.4.2.2(h) Dealing with water

SANS 1200 A, sub-clause 8.4.2.2 (h) to include payment for:

PSA 5.5 Dealing with water on works

PSA 8.4.3 Supervision for duration of construction

SANS 1200 A, sub-clause 8.4.3 to include payment for:

*PSA 5.9	Record drawing information
PSA 6.2	Degrees of accuracy
PSA 7.1	Testing principals
PSA 3.1	Quality
PSA 5.1.1	Setting out of the works
PSA 5.2	Watching, barricading, lighting
PSA 5.4	Protection of overhead and underground services

PSA 8.4.5 Other time-rated obligations

SANS 1200 A, sub-clause 8.4.5 to include payment for:

*PSA 5.6.1 Environmental management

PSA 5.7 Safety
*PSA 5.11 Community liaison officer and Project Steering Committee

PSA 8.5 (b) Sums stated provisionally by Employer's Agent

SANS 1200 A, sub-clause 8.5 (b) to include payment for:

PSA 7.2 Approved laboratories

Add the following new sub-clause to SANS 1200 A, clause 8:

***PSA 8.10 Miscellaneous Items**

An item which, in the payment clause column of the BOQ, refers to this clause will be measured in the unit scheduled.

The sum or rate for such item shall cover the cost of all materials, labour and plant required to execute and complete the work as specified, described in the BOQ or shown on the drawings.

PSAB ENGINEER'S OFFICE (SANS 1200 AB)

PSAB 3 MATERIALS

PSAB 3.1 Nameboards

Adjust the first sentence of the first paragraph of SANS 1200 AB, sub-clause 3.1 to read as follows:

Delete: "The standard board of the South African Institution of Civil Employer's Agents" **and replace by:** "the standard nameboard of the JOE GQABI DISTRICT MUNICIPALITY's Employer's Agent's Department, all in accordance with standard drawing issued by the Employer's Agent contained in this document under Annexure C3.6.2."

Add the following the following to SANS 1200 AB, sub-clause 3.1:

"Two Employer's nameboards shall be erected within one month of the commencement of construction and shall be placed where ordered by the Employer's Agent. Any damage to this board shall be repaired within 14 days of a written instruction received from the Employer's Agent. The cost of the repair will be for the contractors account.

Erection of two Contractor's nameboards of maximum size 2.5 x 3 m will be allowed in the area of the Works, at positions approved by the Employer's Agent, who may at any time order their removal if any objections are received.

Sub-contractor's boards may be erected if sanctioned by the Employer's Agent. All nameboards shall be removed 14 days prior to the date of the Final Approval Certificate."

PSAB 3.2 Office building

Adjust the first sentence of the first paragraph of SANS 1200 AB, sub-clause 3.2 to read as follows:

"The Contractor shall supply, erect, maintain and service one office with adequate lighting for the sole use of the Employer's Agent's Representative and the Employer."

The furniture stated in SANS 1200 AB, sub-clause 3.2, (a.... j) shall be replaced by the following items to be provided in the site office:

- a) One desk(1.5m x 0.9m) with at least one lockable drawer and 3 office chairs
- b) One plans table (2 m long x 1 m wide x 0.9 m high) suitable for working with AO drawings plus one high stool.
- c) One A0 plan rack and hangers to accommodate 30 drawings hanging vertically.
- d) One lockable upright steel cabinet with three shelves or a lockable steel filing cabinet with four drawers
- e) At least four metres of file/book shelving.
- f) One noticeboard/pin-board of 2 m² size
- g) One whiteboard of 2 m² size with 3 coloured markers and duster
- h) Two independent power points, each supplied with a four plug extension cord
- i) One suitable electrical heater/air conditioner
- j) Adequate equipment and provisions for making tea or coffee.
- k) One small electric refrigerator.
- l) One small microwave oven.
- m) An acceptable blind on each window.
- n) A wash-hand basin inclusive of all necessary plumbing, soap and paper towels.
- o) Acceptable lighting

Add the following to SANS 1200 AB, sub-clause 3.2:

"The Contractor shall also supply and maintain two corrugated iron covered carports with closed sides and gravelled floor for the sole use of the Employer's Agent's Representative and the Employer.

The Contractor shall also supply, maintain and service a boardroom for 20 m² minimum floor area able to seat 10 people for joint use by him, the Employer's Agent's Representative and the Employer. This room shall be equipped with adequate lighting, chairs, tables, a 2 m² noticeboard, a 2 m² whiteboard with stationary and air-conditioning."

PSAB 4 PLANT

PSAB 4.1 Telephone

Replace SANS 1200 AB, sub-clause 4.1 with the following:

"Mobile phone

The contractor will be required to supply the Employer's Agent's Representative with a new mobile phone inclusive of sim card as soon as the contract has commenced and pay for all calls made from this phone up to a maximum amount of R1500.00 per month

Telephone, Fax and Mobile Network

The contractor shall supply a site telephone, fax, photocopier and a reliable ADSL facility for use by the Employer's Agents Representative for the duration of contract. The Contractor shall be responsible for the cost of all calls, installation, rental, supplies, maintenance, etc.

The ADSL facility may require a separate installation with modem from 8-ta, Space Stream or V-Sat.

Add the following new sub-clauses to SANS 1200 AB, clause 4:

***PSAB 4.2 Computer**

"A sum is to be allowed for the purchase of a computer, printer, scanner and copier, with required software for full functionality of all hardware, for the exclusive use of the Employer's Agent's Representative for the duration of the contract."

***PSAB 4.3 Survey equipment**

"The Contractor shall upon request provide the following survey equipment on the Site from commencement to the completion of the Works.

- (a) 1 Employer's Agents level and levelling staff.
- (b) 1 steel tape of 100 m length and measuring wheel.
- (c) Wooden and steel pegs and hammers as required.

The equipment shall be provided for the exclusive use of the Employer's Agent's Representative. The Contractor shall keep the equipment continuously insured against any loss, damage or breakage, and he shall indemnify the Employer's Agent and the Employer against any claims in this regard. The Contractor shall also maintain the equipment in good working order throughout the Contract period.

The following additional equipment/service may be required from time to time by the Employer's Agent's Representative and shall be supplied by the Contractor when required. The equipment/service may be shared with the Employer's Agent's Representative.

- (d) Two chainmen to assist with levelling and surveying;
- (e) Theodolite and prism;
- (f) Spray paint (selected colour)

Upon completion of the whole of the Works, ownership of the above equipment shall revert to the Contractor."

***PSAB 4.4 Site instruction books and daily site diary**

"The Employer's Agent shall supply a site instruction book for specific use on the Site. All instructions given by the Employer's Agent's Representative must be confirmed and countersigned by the Employer's Agent.

The Contractor shall supply a triplicate book for site correspondence and inspection requests to the Employer's Agent's Representative. Reasonable notice time shall be allowed prior to inspections. All inspections requests and approval/disapproval thereof shall be recorded by the Site staff in writing.

The Contractor in conjunction with the Employer's Agent must ensure that a suitable site quality record system is put in place to record that each section complies with the relative works specification.

The Contractor and the Employer's Agent shall keep a daily diary recording all the pertinent information and sign acceptance of each other's record on a daily basis. The daily record is to include weather conditions, any other factor that may affect the progress, labour on site, activity in progress, materials delivered, delays including reasons, site instructions received, plant on site and remarks pertaining to any other event on site."

SANS 1200 AB SECTION 8

MEASUREMENT AND PAYMENT

PSAB 8.2 Payment

SANS 1200 AB, sub-clause 8.2 to include payment for:

PSAB 3.1	Nameboards
PSAB 3.2	Office building
PSAB 4.1	Telephone
PSAB 4.2	Computer
PSAB 4.3	Survey equipment
PSAB 4.4	Site instruction book and daily site diary

PSAB 8.3 Electronic equipment for the Engineer

The Contractor will provide various items of electronic equipment for the exclusive use by the Employer's Agent and his site staff, to assist in the administration of the Contract, for the duration of construction. The equipment may include a digital camera(s), computer(s), software, printer(s), GPS, cellphones and related consumables.

The equipment shall remain the property of the Employer's Agent during the execution of the project, where after ownership will revert to the Employer. The Contractor shall have no obligation other than the payment in terms of PSAB8.2.

PSAB 8.4 Accommodation for the Employer's Agent's staff

The Employer's Agent will locate suitable accommodation for the Employer's Agent's staff which shall be leased in the name of the Contractor. The period of the lease shall extend until the end of the month in which the Completion Certificate is issued.

PSC SITE CLEARANCE (SANS 1200 C)

PSC 3 MATERIALS

PSC 3.1 Disposal of materials

Add the following to SANS 1200 C, sub-clause 3.1:

"Unless otherwise ordered by the Employer's Agent, the Contractor shall dispose of material resulting from clearing and demolition operations at a site to be determined by the Contractor. Such a site shall have the approval of the Employer's Agent, the Local Authority and the Environmental Officer. No additional payment will be made for the transportation of such material."

PSC 5 CONSTRUCTION

PSC 5.1 Areas to be cleared and grubbed

Add the following to SANS 1200 C, sub-clause 5.1:

"All areas to be constructed on inclusive of a two metre strip round the perimeter of each structure shall be cleared and grubbed. A strip up to 1.5m wide on either side of the centreline of the pipes shall be cleared and grubbed. This work will be paid under the relative item in the Bill of Quantities.

For the access and site roads the width of clearing shall only be sufficient for the construction of the road i.e. for the cut and fill operations and allowing for side slopes. The cost of this work will be for the contractor's account.

The platform constructed shall be cleared and grubbed to the toe of the outside slope including the concrete block retaining wall. Clearance for workspace shall be included in the rate.

No trees with a trunk girth of more than 1 m shall be removed without the written permission of the Employer's Agent."

PSC 5.6 Conservation of topsoil

Add the following to SANS 1200 C, sub-clause 5.6:

"The topsoil up to a depth of 150 mm, if available and approved by the Employer's Agent, shall be removed from the above specified cleared areas and stockpiled not higher than 2m on approved sites for later reuse. Until required for spreading, the stockpiles of topsoil material shall be stabilized by watering or other approved means to limit dust pollution.

When in the opinion of the Employer's Agent, there is an insufficient quantity of topsoil available as a result of the Contractor's failure to comply with the above, the Contractor shall import topsoil at his own cost."

SANS 1200 C SECTION 8 MEASUREMENT AND PAYMENT

PSC 8.2.1 Clear and grub

Add the following to SANS 1200 C, sub-clause 8.2.1:

"The rate tendered for clearing and grubbing shall cover the cost of disposal of the material off the Site by approved means. Debris should be dealt with as per PSC 3.1, as amended.

The area to be cleared and grubbed will be measured by area and will include trees up to 1.0m girth.

The rate tendered for will include payment for PSC 5.1, as amended."

PSC 8.2.10 Remove topsoil to nominal depth of 150mm and stockpile

Add the following to SANS 1200 C, sub-clause 8.2.10:

"The rate tendered for the removal of in-situ topsoil shall also cover the cost of stabilizing and protecting the stockpiles of topsoil and include payment for PSC 5.6, as amended."

PSD EARTHWORKS (SANS 1200 D)

PSD 2 DEFINITIONS

PSD 2.3 Restricted excavation

Add the following to SANS 1200 D, sub-clause 2.3 under Restricted excavation:

"Irrespective of the method of excavation, all excavations for platforms, concrete water retaining structures above the level of the underside of the particular floor slab's blinding layer shall be considered to be "bulk excavation". All excavations below this level will be considered as "restricted excavations"."

PSD EARTHWORKS (SANS 1200D)

PSD 3 MATERIALS

PSD 3.1.2 Classes of Excavation

Replace Sub-clauses 3.1.2 (a), (b) and (c) with the following:

All material encountered in any excavations for any purpose including restricted excavations will be classified as follows:

1. Excavation in all materials, excluding hard rock. This category of excavation includes excavation in all sandy and disturbed material; in clay; in undisturbed and weathered Shale (clay); Sandstone; Mudstone and in all rip-able rock.
2. Excavation in hard rock will require blasting or rock splitting. Areas where rock splitting is required will be indicated on site by the Employer's Agent.

Other earthworks

Non-plastic sandy material from excavations shall be used in the following order:

1. As selected granular material for pipe bedding.
2. As blanket and backfill to pipe trenches.
3. As backfill to structures.
4. As spoil stockpiled in selected areas indicated by the Employer's Agent.

The Contractor shall employ selective methods of excavation to obtain topsoil, and material suitable for backfill, embankments, pipe bedding and selected granular material.

PSD 5 CONSTRUCTION

PSD 5.1.1.2 Safeguarding of excavations

Replace SANS 1200 D, sub-clause 5.1.1.2 by the following:

"Excavation rates are to include all the Contractor's costs required for full compliance of the Occupational, Health and Safety Act 2014.

This can include the provision of a shoring system, designed by the Contractor and signed off by a suitably qualified Professional Engineer, OR

The reduction of the slope of excavations to the safe angle as determined by a suitably qualified Professional Geotechnical Engineer employed by the Contractor."

PSD 5.1.3 Groundwater

Add the following to SANS 1200 D, sub-clause 5.1.3:

"The Contractor shall provide, operate and maintain sufficient pumping equipment, pipes and other equipment on site as may be necessary for the proper execution of the Works."

PSD 5.1.4.1 Dust nuisance

Add the following to SANS 1200 D, sub-clause 5.1.4.1:

"The Contractor is responsible for dust control and is liable for all claims, that may result from the dust nuisance on all parts of the site and at all times, from the date of handing over of the Site, to the completion date of the Contract.

The Contractor shall plan the Works accordingly and shall use sufficient water or other methods to keep the level of dust to a minimum. This shall be done in consultation with the Employer's Agent and to the Employer's Agent's approval.

The Contractor must make allowance for the above in the rates tendered for excavation."

PSD 5.1.4.3 Disposal of surplus material

Add the following to SANS 1200 D, sub-clause 5.1.4.3:

"All surplus material and unsuitable material not required for backfilling shall be disposed of at disused borrow pits or other suitable sites to be located by the Contractor. All such sites shall require the approval of the Employer's Agent and the local Authority and community. No additional payment will be made for the transportation of such material

Dumping shall proceed in an orderly manner with coarse material placed at the bottom and covered with finer material, where possible. Upon completion of dumping the material shall be shaped to provide free draining surfaces and slopes and finished off to the satisfaction of the Employer's Agent.

All movement of cut to fill material shall be regarded as free-haul. In addition, all movement of topsoil, overburden soil or any other material within the boundary of the site and less than 5 km from the site boundary shall be regarded as free-haul."

PSD 5.2.2.1 (c) Excavation for general earthworks and for structures

Add the following to SANS 1200 D, sub-clause 5.2.2.1(c):

"The Contractor shall excavate to the net outlines of the structures plus an allowance for working space. Vertical concrete walls shall not be cast against excavated surfaces, except in the case of bases, concrete encasement to pipes and footings for brick walls."

PSD 5.2.2.1 (e) Excavation for general earthworks and for structures

Add the following to SANS 1200 D, sub-clause 5.2.2.1(e):

"The Contractor shall inform the Employer's Agent, in writing, at least 14 days before commencing any work which will result in a change of the topography of the site, whether such work is for the permanent works, or for temporary works which the Contractor intends to execute for his own convenience. After clearing the area to be worked on of all vegetation and before commencing the work, the Contractor shall in presence of the Employer's Agent take cross-sections of the original ground profiles or any other approved method to determine the ground profiles of the entire area to be worked. In addition all rock and/or foundation levels shall be recorded as the work proceeds.

The information so obtained shall be permanently recorded on a drawing or drawings by the Contractor each of which shall be signed off by both the Contractor and the Employer's Agent. The Contractor shall then provide the Employer's Agent with a copy of each drawing to serve as a permanent record. The Contractor is to provide the Employer's Agent with an electronic copy of the relevant information for the purpose of determining the quantities of excavation and earthworks carried out in the construction of the permanent works and the extent to which temporary works shall be removed or temporary excavations shall be filled upon completion of the Works.

Where the Contractor excavates to depths in excess of those shown on the drawings or ordered by the Employer's Agent or if the material in the bottom of an excavation is loosened before concrete has been cast, or if there is any over-excavation, or any loose or disturbed soil it shall be removed and the over-excavation shall be replaced by mass concrete of prescribed mix Grade 15/19 mm. Backfilling over-excavation with concrete will not be measured for payment unless the over-excavation is ordered by the Employer's Agent in order to remove unsuitable material, in which case the additional excavation will be measured and paid as excavation in all materials and the concrete will be measured by volume, all to the additional dimensions ordered by the Employer's Agent.

Where structural concrete is to be cast or where precast elements are to be placed on surfaces established by restricted excavation, the Contractor shall, in the case of rock surfaces, over excavate to 100 mm below the bottom of the structure and use mass concrete Grade 15/19 mm for bringing the level to the bottom of the blinding or mass concrete.

Excavations to final level, ready to receive a blinding layer or concrete footing, shall be completed less than 24 hours before such layer or footing is cast.

The Contractor shall arrange for the inspection by the Employer's Agent or his/her Representative of all surfaces to receive concrete immediately before casting concrete."

PSD 5.2.3.1 Construction of platform and embankments

Add the following to SANS 1200 D Sub-clause 5.2.3.1:

"The areas over which earth fills are to be constructed shall, after site clearance and removal of 150mm topsoil, be ripped to a depth of 150 mm and compacted to 90% of Mod AASHTO Density. Should the topsoil layer be in excess of 150mm the Contractor is to notify the Employer's Agent in writing and request a directive as to how to proceed.

The Contractor shall plan his operations and particularly his cut and fill operations in such a manner that all cut material may be used to the best advantage of the Employer. This would mean that no material shall be unnecessarily spoiled. The Contractor shall therefore not spoil any materials without the Employer's Agent's approval and without satisfying the Employer's Agent that this is necessary and the most economical method of constructing the works.

Where the earthworks pattern is such that the selected materials cannot be placed directly in their appropriate positions the Employer's Agent may authorise their removal to temporary stockpiles.

Wherever practical, fill shall be placed in successive layers parallel to the final level of the platform.

The material to be used for the platform construction will be G7 minimum quality material.

Fill in other applications shall be compacted to the densities specified in SANS 1200 D, sub-clause 5.2.3.1 and SANS 1200 DM, sub-clause 5.2.4.2 (100% for sand). Material shall be placed in such a way that adjacent layers at any stage of the operation do not differ in height by more than 600 mm.

The construction of benches shall be measured as "cut to fill" or cut to spoil as the case may be."

PSD 5.2.3.2 (a) General backfilling

Add the following to SANS 1200 D, sub-clause 5.2.3.2 (a):

"Backfill measured under the various items in the Bill of Quantities shall be compacted to a density as stipulated in the scheduled item.

Material for backfilling around structures must be selected so that no clay, boulders or rock is used for backfilling within 300 mm of the structure."

PSD 5.2.4.2 Topsoiling

Add the following to SANS 1200 D, sub-clause 5.2.4.2:

"Topsoil shall not be stockpiled higher than 2 m. Care shall be exercised to prevent the compaction of topsoil in any way especially by vehicles travelling over such material.

Topsoil shall be placed as directed in SANS 1200 D, sub-clause 5.2.4.2 on the faces of cut slopes and embankments and other flatter areas, as shown on the drawings or ordered by the Employer's Agent."

Amend the last sentence of SANS 1200 D, sub-clause 5.2.4.2 to read:

"The final thickness of topsoil after light compaction shall be at least 100mm."

PSD 7 TESTING

PSD 7.2 Taking and testing of samples

Add the following to SANS 1200 D, sub-clause 7.2:

"The Contractor shall carry out sufficient process control checks (one test per 7.5 cubic metres of backfill) on the compaction of all backfill layers before calling the Employer's Agent to inspect the work completed. The frequency of testing shall be such that at least 9 tests shall be carried out for every lift of backfill material across a 225 m² grid block. The costs of testing shall be deemed to be included in the rates for backfilling of the platform."

SANS 1200 D SECTION 8 MEASUREMENT AND PAYMENT

PSD 8.3 Scheduled items

SANS 1200 D, sub-clause 8.3 to include payment for:

PSD 5.1.1.2	Safeguarding of excavations
PSD 5.1.3	Groundwater
PSD 5.1.4.1	Dust nuisance
PSD 5.1.4.3	Disposal of surplus material
PSD 5.2.2.1(c) PSD 5.2.2.1(e)	Excavation for general earthworks and for structures
PSD 5.2.3.1	Construction of platform and embankments
PSD 5.2.3.2(a)	General backfilling
PSD 7.2	Testing and testing samples.

PSD 8.3.2 Bulk excavation

SANS 1200 D, sub-clause 8.3.2 to include the following:

No extra over payment will be made for excavation in material classified in terms of Sub clause 3.1.2 as intermediate excavation and boulder excavation Class A and B. The tendered rate for excavation in all materials shall include for the cost of such excavation. Rock quantities are to be measured and agreed with the Employers Agent prior to backfilling. In the event that backfilling has taken place before rock quantities have been agreed with the Employers Agent then no rock payment will be made.

PSD 8.3.3 Restricted excavation

SANS 1200 D, sub-clause 8.3.3 to include payment for:

PSD 2.3	Restricted excavation
PSD 3.1.2	Classes of excavation

PSD 8.3.5 Extra excavation in all materials to provide working space around structures

Add the following to SANS 1200 D, sub-clause 8.3.5:

"Excavation for workspace will be measured to the net vertical area of the structure below ground level, except in the case of footings for brick walls where no payment will be made."

PSD 8.3.6 Overhaul

Replace SANS 1200 D, sub-clause 8.3.6 with the following:

All movement of cut to fill material shall be regarded as freehaul. In addition, all movement of topsoil, overburden soil or any other material within the boundary of the site and less than 5 km from the site boundary shall be regarded as freehaul.

Overhaul will only be paid in disposal of topsoil, overburden, spoil or any other material where the transportation is beyond 5 km of the boundary of the site.

PSD 8.3.10 Topsoiling

SANS 1200 D, sub-clause 8.3.10 to include payment for:

PSD 5.2.4.2	Topsoiling

Add the following to SANS 1200 D, sub-clause 8.3.10:

"The topsoiling will be measured by surface area covered.

The rate for topsoiling shall cover the cost of loading, hauling, spreading, compacting and making suitable provision to avoid the topsoil slipping down the slopes of embankments and cut-slopes, all to the approval of the Employer's Agent."

PSDB EARTHWORKS (PIPE TRENCHES) (SANS 1200 DB)

PSDB 3 MATERIALS

PSDB 3.6.1 Subbase and base

Replace SANS 1200 DB, sub-clause 3.6.1 with the following:

"Where trenches cross existing surfaced roads the following will apply:

- a) The service (pipe, cable etc.) shall be laid on a bedding cradle, and covered with a fill blanket, as specified in SANS 1200 LB Bedding (Pipes) or in the Project Specification.

The rate for placing and compacting bedding and blanket material shall be included in the rate for excavation and backfilling. No additional payment will be made for placing and compacting bedding and blanket using material selected from trench excavations. Where material excavated from trenches is unsuitable for backfill bedding or blanket material and suitable material cannot be reasonably selected from adjacent trench excavations or stockpiles within free haul distance on the site, then the Employer's Agent will order the use of material from commercial sources.

- b) The remaining portion of the trench, from the top of the fill blanket to the underside of the road wearing layer, shall be filled with soilcrete (G6 gravel mixed with 3% cement) compacted mechanically in 150mm layers to 98% of MOD. ASSHTO."

PSDB 3.7 Selection

Add the following to SANS 1200 DB, sub-clause 3.7:

"Notwithstanding SANS 1200 DB, sub-clause 3.7, in terms of which the Contractor has a choice regarding methods of selection, the Contractor is required to use selective methods of excavation. The Contractor shall selectively remove and keep separate the sandy material from unsuitable material and place it adjacent to the trench for reuse as backfill, selected fill, selected granular material or for other use as ordered by the Employer's Agent.

Material which, in terms of SANS 1200 D, sub-clause 6.2 or SANS 1200 LB, sub-clause 6.1, is too wet for immediate use in the trench (but which is otherwise suitable) will not be regarded as "unsuitable" material and, if so ordered by the Employer's Agent, the Contractor shall spread such material in a suitable area until it has dried sufficiently for later use. Should the material which is replaced in the trench become too wet again, due to the fact that the Contractor made insufficient provision for the handling and removal of groundwater in accordance with SANS 1200 A, sub-clause 5.5, the Contractor shall replace the material at his own cost with material which is, in the opinion of the Employer's Agent, suitable.

When preparing his programme and construction methods, the Contractor shall make allowance for selective excavation and the handling and drying out of material which is too wet for immediate use.

Unless otherwise ordered by the Employer's Agent, all excavated material shall be kept within the pipe servitude. The toe of the bank of excavated material shall be trimmed well back from the edge of the trench so as to leave a minimum 0.6 m clearance between the toe of the bank and the edge of the trench. The Contractor shall keep this strip clear of excavated material at all times.

The Contractor shall take steps to avoid burying or contaminating topsoil which shall be set aside for replacing, as far as practical, on the surface from which it was excavated."

PSDB 5 CONSTRUCTION

PSDB 5.1.2 Stormwater, seepage and dewatering of excavations

PSDB 5.1.2.1 Throughout the works

Add the following to SANS 1200 DB, sub-clause 5.1.2.1:

"In addition to the Contractor's responsibilities for dealing with water, the Employer's Agent may order the Contractor to place a crushed stone bedding layer (minimum thickness 150 mm) on the trench bottom. Should the trench bottom conditions remain unstable due to the nature of the soil and the degree of saturation, the

Employer's Agent may order the Contractor to install a filter fabric on the trench bottom prior to the provision of the stone layer.

Should the material in the trench bottom or the bedding material be of such a nature that it can penetrate the stone layer, the Employer's Agent may instruct the Contractor to enclose the stone layer completely within a geotextile filter blanket which shall comply with the requirements below, and shall have overlaps of at least 300 mm.

The Contractor will only be paid by providing and laying the stone bedding layer and filter fabric after receipt of a written order to do so from the Employer's Agent.

Stone bedding in water-logged conditions:

Where the use of a layer of crushed stone in the trench bottom has been authorized by the Employer's Agent, it will be measured by volume calculated according to length multiplied by the minimum base width and specified thickness. The tendered rate shall cover the cost of preparation of the trench bottom to accommodate the layer of stone, the supply and placing of the layer of stone over at least the specified width and all related activities in order to produce a stable platform.

Geotextile filter fabric:

Where the Employer's Agent has authorised the use of geotextile filter fabric, this shall be measured by area as: width x nett length, where the width shall be the full or half-width supplied by the manufacturer which conforms closest to the specified minimum base width + 2 x height of bedding. The tendered rate shall include the cost of supply, placing and losses as a result of overlaps and over excavated trench widths.

The synthetic fibres of a geo-textile blanket shall consist of at least 85% by mass of polypropylene, polyethylene, a polyester, a polyamide, or a copolymer of vinyl chloride and vinylidene-chloride, or any combination of these polymers, and shall contain such additives as are necessary to render the filaments resistant to the effects of ultra-violet radiation and heat. The amount of water absorbed by the geo-textile after 24 hours soaking in water at 20°C shall be less than 1% by mass.

In addition to the requirements of Sub-clause 3.1.3 of SANS 1200 DK the geo-textile shall comply with the following:

Mass	:	150 g/m ² (minimum)
Strength in all directions	:	6 kN/m (minimum)
Equivalent opening size (EOS)	:	105 micrometres (maximum)"

PSDB 5.4 Excavation

Add the following to SANS 1200 DB, sub-clause 5.4:

"The maximum allowable length of open pipe trench, at any given time during the execution of this Contract, shall not exceed:

- a) 250 meters per section of the pipeline under construction and/or,
- b) 500 meters in aggregate, for all sections of pipeline
- c) At any time during the contract the aggregate length of completed sewer, without successful testing, will be restricted to 250 metres

Please note that any portion of the pipeline being laid and backfilled, which has not been fully backfilled, is deemed to be an open pipe trench. Open trenches are to be regularly (at least once a day) checked in compliance with the OHS Act requirements by the Contractor's appointed construction Safety Officer."

PSDB 5.5 Trench bottom

Add the following to SANS 1200 DB, sub-clause 5.5:

"Where the Contractor's method of working results in quagmire conditions in the trench bottom, the Contractor shall excavate and stabilize the trench at their own cost to the approval of the Employer's Agent."

PSDB 5.6.3 Disposal of soft excavation material

Replace SANS 1200 DB, sub-clause 5.6.3 with the following:

"All surplus material and unsuitable material not required for backfilling shall be disposed of at disused borrow pits or other suitable sites to be located by the Contractor. All such sites shall require the approval of the Employer's Agent and the local Authority and community. No additional payment will be made for the transportation of such material.

Dumping shall proceed in an orderly manner with coarse material placed at the bottom and covered with finer material, where possible. Upon completion of dumping the material shall be shaped to provide free-draining surfaces and slopes and finished off to the satisfaction of the Employer's Agent."

PSDB 5.6.6 Completion of backfilling

Replace SANS 1200 DB, sub-clause 5.6.6 with the following:

"The contractor shall bring on to the site sufficient resources for pipe laying so that trenches do not remain open for longer than one week ahead or behind the pipe laying team."

PSDB 5.6.8 Transport for earthworks

Add the following to SANS 1200 DB, sub-clause 5.6.8:

"Notwithstanding the contents of clause 5.6.8, the transport of all earthworks, whether for imported or excavated material from site, shall be included in the tendered rates for the scheduled items, and no payment will be made for overhaul."

PSDB 5.7.2 Areas subject to traffic loads

Add the following to SANS 1200 DB, sub-clause 5.7.2:

"All trenches within the sewage works site will be considered to be subject to traffic loads and the backfill material and compaction in these trenches shall comply with the requirements of SANS 1200 DB, sub-clauses 3.5 (b) and 5.7.2."

PSDB 7 TESTING

PSDB 7.1 Testing

Add the following to SANS 1200 DB, sub-clause 7.1:

"The Contractor is to allow in his rates a minimum of one compaction test per 50 meters for every completed layer of blanket and backfill."

SANS 1200 DB SECTION 8 MEASUREMENT AND PAYMENT

PSDB 8.3.2 Excavation

SANS 1200 DB, sub-clause 8.3.2 to include the following:

No extra over payment will be made for excavation in material classified in terms of Sub clause 3.1.2 as intermediate excavation and boulder excavation Class A and B. The tendered rate for excavation in all materials shall include for the cost of such excavation. Rock quantities are to be measured and agreed with the Employers Agent prior to backfilling. In the event that backfilling has taken place before rock quantities have been agreed with the Employers Agent then no rock payment will be made.

PSDB 3.7	Selection
PSDB 5.4	Excavation
PSDB 5.5	Trench Bottom
PSDB 5.6.3	Disposal of soft excavation material
PSDB 5.6.6	Completion of backfilling
PSDB 5.6.8	Transport for earthworks
PSDB 7.1	Testing

PSDB 8.3.6.1 Reinstate road surfaces

SANS 1200 DB, sub-clause 8.3.6.1 to include payment for:

PSDB 3.6.1	Subbase and base

PSDB 5.7.2

Areas subject to traffic loads

PSDB 8.3 Schedules items

Add the following new payment items to SANS 1200 DB, sub-clause 8.3:

***PSDB 8.3.8 Crushed stone bedding layer Unit: m³**

“The rate shall include payment for PSDB 5.1.2.1.”

***PSDB 8.3.9 Geofabric blanket Unit: m²**

“The rate shall include payment for PSDB 5.1.2.1.”

PSDK GABIONS AND PITCHING (SANS 1200DK)

PSDK 3 MATERIALS

PSDK 3.1.2 Gabion basket/cage

Replace SANS 1200 DK, sub-clause 3.1.2 with the following:

"Gabion boxes shall consist of double twisted, hexagonal wire mesh with nominal opening of 80 mm, with 4,4 mm o/d wire frame and 2,7 mm o/d mesh wire. Complete with partitions/diaphragms (see SANS 1200 DK, sub-clause 2.3.2) at 1 m centres. All wire to be mild steel to SANS 1580 – 2010, zinc coated by hot-dip galvanizing to SANS 675 – 2011.

Mattresses shall consist of double twisted, hexagonal wire mesh with nominal opening of 80 mm, with 4.0 mm o/d wire frame and 2.5 mm o/d mesh wire. Complete with partitions/diaphragms (see SANS 1200 DK, sub-clause 2.3.2) at 1 m centres. All wire to be mild steel to SANS 1580 – 2010, zinc coated by hot dip galvanizing to SANS 675 – 2011."

PSDK 3.1.3 Geotextile material

Add the following to SANS 1200 DK, sub-clause 3.1.3:

"Filter fabric for groundwater drains shall be a non-woven continuous filament, needle punched, spun-bounded polyester geotextile having the following physical characteristics:

Mass per unit surface.....	150 g/m ² (min)
Porosity under 0,5 KPa	93%
Porosity under 200 KPa	82%
Normal permeability under 2 KPa	3 x 10 ⁻³ m/s
Normal permeability under 200 KPa	7 x 10 ⁻⁴ m/s
Normal through flow under constant head of 400mm	270 ℓ /m ² /s

Alternatively - for woven filter fabrics the following characteristics shall apply:

Mass per unit area	270 g/m ²
Water percolation	160 ℓ/m ² /s
Composition	polypropylene tape and polyethylene monofil

The material shall be placed as directed and shall not be exposed to direct sunlight for prolonged period."

PSDK 5 CONSTRUCTION

PSDK 5.2.1 Preparations of the foundations and surface for bedding

Add the following to SANS 1200 DK, sub-clause 5.2.1:

"Where poor in-situ material is encountered below the concrete base, rock fill or 19 mm stone or a crusher-run or material complying with the requirements of sub-clause 3.3.3 of SANS 1200 MF, shall be used as bedding material. Where concrete bases are not required for low height revetment, the bed for the gabion cages shall be constructed using similar quality crusher-run material, or on suitable in-situ material as directed by the Employer's Agent."

PSDK 7 TESTING

Add the following new sub-clause to SANS 1200 DK, clause 7:

***PSDK 7.6 Concrete testing**

"The requirements of SANS 1200 GA shall apply to the testing of concrete used in the footings where applicable."

SANS 1200 DK SECTION 8 MEASUREMENT AND PAYMENT

PSDK 8.2.1 Surface preparation for bedding of gabions

SANS 1200 DK, sub-clause 8.2.1 to include payment for:

PSDK 5.2.1	Preparation of the foundations and surface for bedding
*PSDK 7.6	Concrete testing

PSDK 8.2.2 Gabions

SANS 1200 DK, sub-clause 8.2.2 to include payment for:

PSDK 3.1.2	Gabion basket/cage

PSDK 8.2.4 Geotextile

SANS 1200 DK, sub-clause 8.2.4 to include payment for:

PSDK 3.1.3	Geotextile material

PSDM EARTHWORKS (ROADS, SUBGRADE) SANS 1200 D

PSDM 3 MATERIALS

PSDM 3.1 Classification for excavation purposes

Replace SANS 1200 DM, sub-clause 3.1 with the following:

"The Contractor may use any method he chooses to excavate any class of material but the chosen method of excavation shall not determine the classification of the excavation. The Employer's Agent will decide on the classification of the materials. In the first instance the classification will be based on inspection of the material to be excavated and on the criteria given in PSD 3.1.2, as amended."

PSDM 3.2.3 Selected layer

Add the following to SANS 1200 DM, sub-clause 3.2.3:

"The Contractor shall obtain selected sub-grade material from a source of his own choice. The unit rate tendered shall include all procurement related costs, including haulage. The selected layer shall be constructed of material and compacted as specified."

PSDM 5 CONSTRUCTION

PSDM 5.2.3.3 Treatment of roadbed

Substitute the first paragraph of SANS 1200 DM, sub-clause 5.2.3.3 (a) with the following:

"The roadbed shall be scarified to a depth of 150 mm, watered, shaped and compacted to 93% mad. AASHTO density (100% for sand), except where otherwise ordered by the Employer's Agent."

Where the existing subgrade material does not conform to the G7 specification as per the TRH 20, the Contractor is to notify the Employer's Agent and request approval for inclusion of a selected subgrade layer."

PSDM 5.2.8.1 Freehaul

Replace SANS 1200 DM, sub-clause 5.2.8.1 with the following:

"All movement of cut to fill and cut and spoil material on site shall be regarded as freehaul. In addition, all movement of topsoil, overburden soil or any other material within the boundary of the site shall be regarded as freehaul."

PSDM 7 TESTING

PSDM 7.3 Routine inspection and testing

Add the following to SANS 1200 DM, sub-clause 7.3.2:

"No single test result which is below the specified density will be accepted."

The cost of all routine testing done by the Employer's Agent, and of which the results do not comply with the specified minimum requirement for the material, shall be borne by the Contractor and will be subtracted for the monthly payment certificates"

SANS 1200 DM SECTION 8

MEASUREMENT AND PAYMENT

PSDM 8.3.3 Treatment of roadbed

SANS 1200 DM, sub-clause 8.3.3 to include payment for:

PSDM 7.3	Routine inspection and testing
PSDM 5.2.3.3	Treatment of roadbed

PSDM 8.3.4 Cut to fill, borrow to fill

SANS 1200 DM, sub-clause 8.3.4 to include payment for:

PSDM 5.2.8.1 Freehaul

No extra over payment will be made for excavation in material classified in terms of SANS 1200 D Sub clause 3.1.2 as intermediate excavation and boulder excavation Class A and B. The tendered rate for excavation in all materials shall include for the cost of such excavation. Rock quantities are to be measured and agreed with the Employers Agent prior to backfilling. In the event that backfilling has taken place before rock quantities have been agreed with the Employers Agent then no rock payment will be made.

PSDM 8.3.5 Selected layer

SANS 1200 DM, sub-clause 8.3.5 to include payment for:

PSDM 3.2.3 Selected layer

PSDM 8.3.6 Extra-over Items 8.3.4 and 8.3.5 for excavating and breaking down material in

Delete Item a) of SANS 1200 DM, sub-clause 8.3.6 and add the following:

No payment shall be made for intermediate excavation. Excavation normally classified as Intermediate excavation shall be paid as per the rate for normal excavation (8.3.4 or 8.3.5 as appropriate).

PSDM 8.3.7 Cut to spoil or stockpile from:

Delete item b) of SANS 1200 DM, sub-clause 8.3.7.

No payment shall be made for intermediate excavation. Excavation normally classified as Intermediate excavation shall be paid as per the rate for soft excavation (8.3.7.a).

PSDM 8.3.12 Overhaul

SANS 1200 DM, sub-clause 8.3.12 to include payment for:

PSDM 5.2.8.1 Freehaul

PSG CONCRETE (STRUCTURAL) (SANS 1200 G)

PSG 3 MATERIALS

PSG 3.2 Cement

PSG 3.2.1 Applicable specifications

Add the following to SANS 1200 G, sub-clause 3.2.1:

"Portland Cement (OPC or RH) shall be in accordance with SANS 50197 CEMI 42.5 except for non-structural concrete where CEMI 32.5 is acceptable.

Pulverised fly ash (PFA) shall conform to the requirements of SANS 1491-2."

PSG 3.2.3 Storage of cement

Add the following to SANS 1200 G, sub-clause 3.2.3:

"Cement shall be used in the order in which it is received (first in, first out basis)

Cement kept in storage for longer than 6 weeks shall be removed from site and not used in the Works.

Any cement that shows signs of hydration, such as the formation of lumps, may not be used and is to be immediately removed from site."

PSG 3.3 Water

Replace SANS 1200 G, sub-clause 3.3 with the following:

"Only potable quality water from an approved source may be used for mixing concrete. Water from a river or stream may only be used for curing."

PSG 3.4 Aggregates

PSG 3.4.1 Applicable specification

Add the following to SANS 1200 G, sub-clause 3.4.1:

"The maximum aggregate size shall be 19 mm.

Notwithstanding the provisions of SANS 1200 G, sub-clause 3.4 the aggregates shall be obtained from approved commercial source.

Aggregates with a high potential for influencing the alkali silica reaction (ASR) shall not be used. The alkali content in aggregate shall be less than 1.8 kg of active Na₂O_e per m³. Aggregate tests shall be performed by the Contractor and results submitted to the Employer's Agent in time before implementing work. Payment shall be for concrete with low potential for ASR, either by using the above aggregate, or by adding admixtures, as per SANS 10100-2.

The fineness modulus of the sand delivered to the mixer shall lie between 1,7 and 2,8 and the standard deviation of fineness moduli of samples of sand that is delivered to the mixer during one shift shall be not more than 0,10.

At least one month before commencement of concrete work the Contractor shall supply at his own cost representative samples to the Employer's Agent of the aggregates he intends using, together with certificates from an approved laboratory indicating that the aggregates comply with the specifications. Approximately 50 kg of each sample of aggregate shall be supplied.

After approval these samples shall be taken as standard for the agreed aggregates to be used in the Works. If at any time during the course of the Contract the Employer's Agent considers that there has been any deviation from the approved standard the Contractor shall submit further tested samples of material to the Employer's Agent for approval."

PSG 3.4.2 Use of plums

Replace SANS 1200 G sub-clause 3.4.2 with the following:

“The use of plums will not be permitted.”

PSG 3.5 Admixtures

PSG 3.5.1 Approval of admixtures requirements

Add the following to SANS 1200 G, sub-clause 3.5.1:

“The use of admixtures will be subject to the approval of the Employer’s Agent. The information listed in SANS 1200 G, sub-clause 3.5.1 shall be provided.

In addition all water retaining structures will include the following admixture: Crystalline Waterproofing Additive (Zypex Admix C- 500 NF) added at the rate of 5kg per 1m³ of concrete during mixing, all to manufacturer’s specification.

If two or more admixtures are to be used, the Contractor shall submit all necessary and available data for assessing the interaction and compatibility of the admixtures.”

Add the following new sub-clauses to SANS 1200 G, sub-clause 3.5:

***PSG 3.5.3 Pulverized fly ash (PFA)**

***PSG 3.5.3.1 General**

“Concrete containing a percentage of FA shall be termed FA concrete. Pulverized fly ash (PFA) shall conform to the requirement of SANS 1491-2.

All concrete used shall consist of FA in the concrete unless otherwise shown on the drawings or ordered by the Employer’s Agent.

FA concrete shall conform to the requirements of SANS 1200 G for concrete and the additional requirements specified below.”

***PSG 3.5.3.2 Source and quality**

“Fly Ash shall be procured from an approved source and shall be of a consistent quality conforming to SANS 1491-2. In particular it shall be tested for and shall conform to the following:

- a) the loss on ignition shall not exceed 5%
- b) the percentage by mass retained on 45 micron screen shall not exceed 12.5%”

***PSG 3.5.3.3 Cementitious material**

“The cementitious material used for FA concrete shall consist of a mixture of between 75% and 80% by mass of ordinary Portland cement and of between 25% and 20% by mass of FA.

If instructed by the Employer’s Agent, all concrete used for construction of water retaining structures shall contain a post surface treatment that waterproofs by crystallization (Xypex or similar approved) at a rate and application in accordance with manufacturer’s recommendation. Reference made to PSG 5.5.8, Curing and protection.”

***PSG 3.5.4 Crystalline Waterproofing Additive**

The Contractor shall be responsible for furnishing all labour, materials, services and equipment necessary for the supply and installation of crystalline waterproofing additive to concrete structures as indicated on the drawings, and as specified herein. The crystalline waterproofing material shall be added to concrete during the mixing cycle, and shall be used in above and below grade walls and slabs including liquid retaining structures where enhanced chemical resistance is required.

The concrete waterproofing system shall be of the crystalline type that chemically controls and permanently fixes a non-soluble crystalline structure throughout the capillary voids of the set concrete. The system shall cause the

set concrete to become sealed against the penetration of liquids from any direction, and shall protect the concrete from deterioration due to harsh environmental conditions.

Prior to installation of waterproofing, the Contractor shall conduct a meeting with the Employer's Agent's representative, concrete supplier, concrete placer and waterproofing manufacturer's representative to verify and review the project requirements for waterproofing as well as the manufacturer's product data including application instructions.

After this meeting, the Contractor shall obtain approval to install the crystalline waterproofing additive in writing from the product manufacturer, which written approval shall be given to the Employer's Agent's representative. This requirement shall not absolve the Contractor of his/her obligations in accordance with the contract and project requirements.

The admixture shall be added to the concrete mix at the time of batching. The Contractor shall obtain a completely homogeneous mixture by thoroughly blending the admixture with the concrete mix.

***PSG 3.9 Materials for movement joints**

***PSG 3.9.1 General**

"The various jointing materials, the manufacturers of the materials and the methods of application shall be as approved by the Employer's Agent. Materials shall be stored and protected to avoid damage, degradation, distortion or contamination.

The joint materials shall be resistant to ultraviolet light and to biological degradation."

***PSG 3.9.2 Waterstops**

"Waterstops shall be of approved manufacture and of the pattern and the material and widths scheduled and specified and shown on the drawings. They shall comply with the tolerances specified in clause 6.1. They shall conform to Specifications CKS 388 or 389, for natural rubber or PVC respectively, and have the appropriate physical properties as set out below:

	PVC	Rubber
Tensile strength (@ 25°C)	12,2 MPa	20,7 MPa
Elongation at break (@ 25°C)	250%	500%
Hardness BS degrees (IRHD @ 25°C)	-	60 to 65°
Softness (BS)	28 to 52°	-

All intersections between waterstops shall be prepared by mitring and welding/vulcanising intersection pieces in the factory in accordance with the manufacturer's instructions and to approval of the Employer's Agent. Only straight lengths of waterstop may be field welded using the appropriate jigs and tools.

Where required, waterstops shall have eyelets so that they may be tied securely to the adjacent reinforcement. "Rearguard"-type waterstops shall have flanges or cleats that grip effectively."

***PSG 3.9.3 Fillers**

"Closed cell expanded polyethylene fillers shall comply with the following:

Property	Unit	Value Test Method
Density	kg/m ³ 110	DIN 53420
Compression Stress at compression strains of	10% 25% 50%	kPa 175 kPa 210 kPa 340
Compression set after 24 hours recovery	% 14	DIN 53577 DIN 53577 DIN 53577
Tensile Strength	kPa 680	DIN 53571

Property	Unit	Value Test Method
Elongation at Break	% 49	DIN 53571
Max. water absorption after 24 hours by volume	% 0,1	ASTM C-177

Fillers shall be pre-cut to suit the application with a tear-out strip for forming the specified recess for the sealant. If so required the filler shall be glued into position with an approved epoxy glue."

***PSG 3.9.4 Bond breakers, primers and sealants**

"The bond breaker between the top of the blinding layer or dry packed mortar screed and the underside of the floor slab shall be either a double coat of a spray grade bitumen emulsion complying with SANS 309 applied at a rate of 1,0 ℓ/m² of net bitumen or a 250 micrometre polythene sheet complying with SANS 952, Type D.

Where bitumen-impregnated resilient fibreboard is specified, it shall comply with American Federal Specification HH-F-341a for Type 1, Class B.

The bond breaker (if specified) shall be self-adhesive PVC tape (or equal, approved material) with a width the same as the joint recess into which it is to be applied.

The primer, if required for the sealant, shall be fully compatible with the sealing compound that is to be used.

The elastomeric sealant shall be either a two-component polysulphide liquid polymer base complying with the requirements of SANS 110 or a polyethylene based polyurethane "pouring grade" for horizontal or near horizontal joints or "gun grade" for vertical/overhead joints and joints steeper than 1 in 10 to the horizontal. All elastomeric sealants shall comply with BS 4254 Type A1 and shall have a movement tolerance of 25%."

***PSG 3.10 Precast paving slabs**

"The paving slabs shall comply with the requirements of SANS 541, shall be as scheduled and with patterned surface, or equal approved. Samples of the types which the Contractor proposes to use shall be submitted for approval prior to construction.

The area to be paved shall be compacted to a minimum of 93% Mod AASSHTO density (100% for sand), trimmed and then treated with an approved weedkiller, with care being taken to avoid contaminating surrounding areas. The paving slabs shall be laid on a sand bed approximately 25 mm thick, which shall be graded to the required levels and slopes as approved by the Employer's Agent. The joints between the slabs shall be 2 mm to 6 mm wide and shall be grouted with cement mortar. Gaps in the pattern of slabs shall be filled with Grade 15MPa/19 concrete and given a wood floated finish."

PSG 4 PLANT

PSG 4.3 Mixing plant

PSG 4.3.1 General requirement for mixing plant

Add the following to SANS 1200 G, sub-clause 4.3.1:

"Stand-by mixers of adequate capacity and with an independent power unit shall be maintained on site for immediate use in the event of breakdown of the regular mixers failure of the power supply."

PSG 4.4 Vibrators

Add the following to SANS 1200 G, sub-clause 4.4:

"Stand-by vibrators of adequate capacity and with an independent power unit shall be maintained on site for immediate use in the event of breakdown of the regular vibrator failure of the power supply.

Vibrators for in-situ concrete shall be of the internal or immersion type."

PSG 4.5 Formwork

PSG 4.5.3 Ties

Add the following to SANS 1200 G, sub-clause 4.5.3:

"The use of sleeves for formwork ties through the walls of water retaining structures will not be permitted. Ties, when cast in, shall have some form of positive anchorage to prevent any rotation when loosening formwork and some form of water bar to restrict seepage along the tie.

A sample of the tie to be used must be submitted the Employer's Agent for approval prior to construction."

Add the following new sub-clause to SANS 1200 G, clause 4:

***PSG 4.6 Water-bath**

"A temperature-controlled water-bath with a capacity to cure two hundred cubes shall be provided on site. The water-bath shall be located under cover."

PSG 5 CONSTRUCTION

PSG 5.1 Reinforcing

PSG 5.1.2 Fixing

Add the following to SANS 1200 G, sub-clause 5.1.2:

"Fixing of reinforcing bars by welding and heating of bars will not be permitted.

Fixing blocks for the attachment of fixtures may be embedded in concrete provided that the strength or any other desirable feature (such as appearance of the member) is not, in the opinion of the Employer's Agent, impaired thereby.

Supports shall be of approved precast concrete blocks properly shaped to maintain position or proprietary supports of an approved type. Concrete blocks shall be adequately cured as specified. Wooden supports shall not be used nor shall bars be placed in succeeding layers of fresh concrete nor shall bars be adjusted during the placing of concrete. Tie-wire shall point away from the nearest formwork face.

Where clips, stools and other supports are not shown on the drawings and are structurally not required, the Contractor shall provide those supports he deems necessary to ensure the correct positioning of the reinforcement, to the satisfaction of the Employer's Agent. The cost of such steel, labour, and other fixing materials shall be inclusive in the rate for the scheduled reinforcement and no additional payment shall be made."

PSG 5.2 Formwork

PSG 5.2.1 Classification of finishes

Add the following to SANS 1200 G, sub-clause 5.2.1:

"Rough formwork may be used on the outside faces where the concrete is more than 500 mm below the final ground level. Smooth formwork will be used elsewhere.

All concrete surfaces that will be exposed above the final ground levels shall have a special smooth finish to a Degree of Accuracy I. The formwork used shall be high-grade, unblemished and regular in size. Formwork ties shall be placed in a regular pattern. The special smooth finish shall be an off-shutter finish to the concrete such that no after treatment is required other than at the positions of formwork ties.

All honeycombing shall be repaired by cutting back to sound concrete and patching with a suitable epoxy mix to the approval of the Employer's Agent.

Concrete for manholes shall be finished with a steel float or against a steel shutter which has been cleaned and oiled before use."

PSG 5.2.2 Preparation of formwork

Add the following to SANS 1200 G, sub-clause 5.2.2:

"All exposed external angles in concrete work shall have 20 mm x 20 mm chamfers unless otherwise specified or ordered, but the top edge of a slab that is to receive an applied finish shall not be chamfered."

PSG 5.5 Concrete

PSG 5.5.1.1 General

Add the following to SANS 1200 G, sub-clause 5.5.1.1:

"Supervision:

The Contractor shall be responsible for ensuring that the erection of the concrete work is carried out under the supervision of a person with adequate knowledge of the mixing, transporting, placing and curing of concrete.

Programme and Plant:

Prior to carrying out any concrete work, the Contractor shall obtain the approval of the Employer's Agent in respect of:

- a) Structural programme,
- b) Concrete plant details,
- c) Materials to be used in concrete,
- d) Details of concrete,
- e) Construction joints"

PSG 5.5.1.4 Chloride content

Add the following to SANS 1200 G, sub-clause 5.5.1.4:

"With reference to Table 4, Efflorescence will not be acceptable on any exposed concrete surface."

PSG 5.5.1.5 Durability

Add the following to SANS 1200 G, sub-clause 5.5.1.5:

"The water/cement ratio shall be as specified in Table 5, but shall not exceed 0,5."

PSG 5.5.1.6 Prescribed mix concrete

Add the following to SANS 1200 G, sub-clause 5.5.1.6:

"Notwithstanding the requirements of SANS 1200 G, sub-clause 5.5.1.6, samples of aggregates will not be made available by the Employer's Agent. The Contractor shall supply aggregates from commercial sources located by him, complying with the requirements of PSG 3.4.1, as amended, for the production of prescribed mix concrete."

PSG 5.5.1.7 Strength concrete

Add the following to SANS 1200 G, sub-clause 5.5.1.7:

"With the exception of mixes weaker than 15 MPa, all concrete for the Works shall be considered to be strength concrete.

Unless otherwise specified on the drawings or in the Bill of Quantities, all structural concrete shall be Grade 35 MPa/19. Where blinding layers are specified, the concrete shall be grade 15 MPa/19 placed and finished off to the final level.

The concrete mix design for strength concrete must be prepared in an approved laboratory and the results of actual test mixes must be submitted for approval together with 7-day and 28-day strength test results. Special attention is drawn to the fact that the concrete mix must provide a very dense and impervious concrete.

The Contractor shall submit details of the proposed concrete aggregates, design mix and casting procedures to the Employer's Agent for approval prior to casting, after which he shall be required to make a trial mix and obtain cube test results to validate the proposed mix. Only after receipt of satisfactory cube test results shall the Contractor be permitted to use the mix in the construction of water retaining structures. The cost of designing and proving the proposed concrete mix shall be deemed to be included in the tendered rates.

The Employer's Agent may call for revised mix designs at any stage during the Contract.

Any mix for use in the wall or floor of a water-retaining structure shall have a water/cement ratio not exceeding 0,5, shall contain a cement content not less than 325 kg/m³ and not more than 400 kg/m³ and the proportions of the various aggregates shall be such as to produce a density of at least 2 400 kg/m³. For concrete containing PFA the maximum cement content shall be 450 kg/m³.

In order to facilitate or increase the workability of concrete in the fresh/plastic state, to ensure watertightness without increasing the water/cement ratio, the Employer's Agent may approve the use of an additive.

The workability of concrete shall be assessed by means of the slump test.

"No-fines" concrete:

A nominal aggregate size of 19 mm shall be used in the manufacture of "no-fines" concrete.

No-fines concrete shall be laid under where specified and shall consist of coarse aggregate, cement and water only. No fine aggregate shall be used. Sandwiching or layering of pours will not be permitted. The Contractor shall cast to the profile depth in one pour.

The mixing of the cement and water paste shall have the consistency of paint capable of coating each coarse aggregate particle uniformly and sufficiently to form a small fillet at all the contact points of each stone in the aggregate.

Between 24 and 48 hours after the no-fines layer has been laid it shall be covered with 1:4 cement and mortar layer 20 mm thick. The mix shall be comparatively dry to ensure that it does not penetrate and block the cavities in the no-fines concrete. The surface shall be steel floated to form a plane surface.

The mortar skim shall be cured in the same manner as concrete for a period of not less than 2 days.

PSG 5.5.2 Batching

Add the following to SANS 1200 G, sub-clause 5.5.2:

"Batching of all strength concrete shall be by mass. Prescribed concrete may be batched by volume. Batching shall not be done by wheelbarrow.

All concrete shall be mechanically mixed.

Stand-by mixers of adequate capacity and with an independent power unit shall be maintained on site for immediate use in the event of breakdown of the regular mixers failure of the power supply."

PSG 5.5.3.2 Ready-mixed concrete

Replace SANS 1200 G, sub-clause 5.5.3.2 with the following:

"Concrete from a central concrete production facility other than on the construction site will be permitted if the facility is within a 40 km radius of the site and, apart from test results in terms of SANS 1200 G, sub-clauses 7.3.1, 7.3.2 and/or 7.3.3, test results obtained by such a production facility as part of its quality control system will be accepted for evaluation in terms of SANS 1200 G, sub-clause 7.3.4, provided the cubes are stored and cured on site. All tests to be done by an independent approved laboratory."

PSG 5.5.5 Placing

Add the following new sub-clause to SANS 1200 G, sub-clause 5.5.5:

***PSG 5.5.5.10 Casting of concrete in excavation**

"Structural concrete shall not be cast directly against the side of any excavation without the use of formwork unless prior approval has been obtained in writing from the Employer's Agent.

Concrete used in pipe trenches for encasement and for the thrust / anchor blocks may be cast directly against the side of the excavation.

After vibration, the concrete shall be spaded in corners, in angles and against forms to release air bubbles which may have been trapped in these positions."

PSG 5.5.7 Construction joints

PSG 5.5.7.1 General

Add the following to SANS 1200 G, sub-clause 5.5.7.1:

"The edge of joints, exposed to view in the finished structure, shall be formed with suitable beads to provide a straight edge true to line and level.

All joints, other than expansion, contraction and other movement joints shall be treated as follows:

As soon as practical, but not before 15 hours after placing, the construction joint surface shall be prepared to receive fresh concrete. This preparation, as specified in SANS 1200 G, sub-clauses 5.5.7.3 (a) to (d), shall be such as to remove all laitance or inert and strengthless material which may have formed and the specified chipping or sand blasting shall be such as to produce a roughened surface all over.

When concreting is interrupted concrete surfaces shall be protected from the sun as specified in SANS 1200 G, sub-clause 5.5.8 (d) or by means of hessian kept damp until concreting is resumed.

All constructional joints shall be dealt with as specified in PSG 5.5.7.3, as amended.

Unless construction joints between designated joints shown on the drawings are authorized by the Employer's Agent in writing, concrete in the floor and wall shall be cast continuously between the designated joints shown on the drawings."

PSG 5.5.7.2 Formed joints (generally vertical or near vertical)

Add the following to SANS 1200 G, sub-clause 5.5.7.2:

"Formed joints will be considered to be designated joints as defined in SANS 1200 G, sub-clause 2.4.3. The forming of a straight edge to a construction joint as specified in PSG 5.5.7.1, as amended, does not constitute a formed joint.

Each joint shall be formed as shown on the drawings, complete with shear key rebates, waffle formwork, V-feature, waterstops, "Flexcell" or equal, approved joint filler, dowel bars and their PVC tubes, etc. as indicated."

PSG 5.5.7.3 Non-designated joints

Add the following to SANS 1200 G, sub-clause 5.5.7.3:

"Any non-designated joints shall be identical to designated joints, as shown on the drawings, which would be used in similar positions and shall perform the same function."

Add the following new sub-clause to SANS 1200 G, sub-clause 5.5.7:

***PSG 5.5.7.4 Joints between footings or floors and walls or columns**

"Construction joints between foundations, footings or floors and walls, columns or piers connected to them, shall not be made flush with the supporting surface, but shall be made at a distance above the footing or floor shown as on the drawings or approved by the Employer's Agent. The "kicker" shall be cast as an integral part of the foundation, footing or floor."

***PSG 5.5.7.5 Construction Joints in Circular Reservoirs**

a) Construction Joints in Walls or Footings

Construction joints may only be placed where shown on the drawings or to the approval of the Employer's Agent. No vertical joints shall be permitted in the reinforced concrete reservoirs.

The entire contact surface along the joint in the concrete already cast shall be chipped or water jetted to expose the coarse aggregate to 5 mm beyond the surrounding matrix. Care shall be taken to ensure that the concrete structure is not damaged and that all loose material is removed. The surface must be thoroughly cleaned and wetted before casting against the joint.

All construction joints in the reservoir walls and footing shall be cast with water stops. No construction joints will be permitted in the floor.

b) Construction Joints In Roof Slabs

Construction joints in the roof slab are permitted. The position of these joints shall be approved by the Employer's Agent.

These joints shall be cast against a vertical shutter leaving a 15 mm deep by 20 mm wide recess which is sealed with a one part poly-sulphide sealer on completion. The sealer used and method of application shall be to the Employer's Agent's approval.

No additional payment shall be made for these joints.

c) Expansion and Contraction Joints

Expansion and contraction joints shall be constructed as detailed on drawings using water stops. Water stops extruded from recycled material shall not be permitted.

***PSG 5.5.7.6 Application of primers and adhesives**

"The concrete to which the primer or adhesive is to be applied shall be dry and shall be cleaned of all dust, grit, grease, surface laitance and foreign matter by compressed air and/or water, solvents, or other suitable approved means. The Contractor shall provide on Site an approved moisture meter to measure the degree of dryness of the joint. This meter shall be made available to the Employer's Agent for testing. The joint shall be approved for the application of the primer and adhesive if the moisture content of the concrete is less than or equal to 5%. It may be necessary to dry the concrete surfaces locally to reduce the moisture content to 5% or less."

***PSG 5.5.7.7 Contraction and expansion joints**

"Contraction and expansion joints shall be formed true to line in smooth formwork.

All surfaces shall be thoroughly cleaned of all accretions of concrete or other foreign matter by scraping or other approved means.

Particular care shall be taken to compact the concrete around waterstops, edges, etc.

Rebates for seals shall be formed to required dimensions and lines, or cut true to line and size after floating the surface and before the final set of the cement has taken place. All rebates, etc., shall be adequately protected against damage until the completion of the work; accidental damage which in the opinion of the Employer's Agent will impair the performance or appearance of the joint shall be made good by reconstructing the work as directed by the Employer's Agent. Rebates for seals shall be grit blasted or wire brushed on all faces to remove surface laitance and thoroughly cleaned with soft brushes and/or compressed air jets, and, if necessary, dried by blow-lamp or other approved means before priming."

***PSG 5.5.7.8 Installation of waterstops in joints**

"Waterstops shall be held in the formwork so as to prevent air pockets forming underneath them. Special precautions shall be taken, to the approval of the Employer's Agent, to ensure that all flexible waterstops are in perfect contact with well compacted void-free concrete."

***PSG 5.5.7.9 Installation of joint filler in expansion joints**

"Joints in the filler shall be neatly butted so as to exclude mortar from the joint. Edges of filler strip against waterstops, concrete, formwork, projections, etc., shall also be closely fitted to exclude mortar, so that there is no resistance (other than the compression of the filler) to the expansion movement for which the joint is designed.

Joint filler shall be fixed to the first cast of concrete with an approved adhesive and as directed by the Employer's Agent."

***PSG 5.5.7.10 Application of joint seals**

"Rebates shall be cleaned as required by PSG 5.5.7.5, Application of primers and adhesives, and shall be inspected and approved by the Employer's Agent's Representative before filling.

Joint sealants and primers shall be applied strictly in accordance with the manufacturer's instructions. Flow and non-slumping grades shall be used for horizontal and vertical joints respectively.

Immediately after the compound is applied the joint shall be protected against damage until completion of the Contract."

PSG 5.5.8 Curing and protection

Add the following new sub-clauses to SANS 1200 G, sub-clause 5.5.8:

***PSG 5.5.8.1 Post-Crystallization (Concentrate & Modified) slurry coat and curing**

"The Concrete surfaces to receive a concentrate slurry coat treatment shall have an open capillary system to provide 'tooth and suction', and shall be free from scale, excess form oil, laitance, curing compounds and foreign matter.

In order to improve the effectiveness of the crystallization treatment, the specified minimum time for the removal of the formwork shall be three days. All surfaces shall be pressure cleaned in accordance to the product manufacturer's requirement to remove all oil, laitance, curing compound and foreign matter.

Concrete surfaces must be thoroughly saturated with clean water prior to application in order to ensure the growth of the crystalline formation deep within the pores of the concrete. Wetting to be done must be at least 1hr before application. If concrete surface dries out before application, it must be re-wetted.

The concentrate slurry is applied at a coverage rate of 1kg/m² using a semi-stiff nylon bristle block brush – work slurry well into the surface, filling surface pores and hairline cracks. The coating must be uniformly applied at approximately 1.25 mm thickness. The second modified slurry coat with the same application rate must be applied within 48 hours of the first coat. Light pre-watering between coats may be required when drying out signs appear. Detail coating applications shall be confirmed by the manufacturing.

Cure by spray for minimum of 3 days must be established once the final coat has been applied. Protect from rainfall, puddling of water, wind & frost for at least 48 hours after application. When plastic sheeting is used as protection allowance must be made for the coating to breathe."

***PSG 5.5.8.2 Curing for normal concrete surfaces**

"The use of membrane curing compounds will be allowed on vertical faces or steeply inclined faces (i.e. steeper than 45° to the horizontal) of cast in situ members of the structures subject to the Contractor producing sufficient, satisfactory cube crushing strength test results where the crushing strength of cubes which have been cured with the proposed curing membrane and left exposed to the elements are compared with those of an equal number of water cured cubes. The crushing strength of cubes cured with the proposed membrane shall be at least 85% of the crushing strength of the water cured cubes.

Before any membrane curing compound is used, each batch shall be tested on a trial surface to ensure that it forms a satisfactory membrane, and any compound which is unsatisfactory in the opinion of the Employer's Agent, shall be rejected. Curing membranes will be disallowed if permanent discolouration of the concrete takes place. Surfaces where curing membranes are used shall be treated in such a manner that the final concrete texture and colour blends in with the rest of the concrete work. Furthermore, the Employer's Agent shall, at his discretion, require the Contractor immediately to adopt an effective alternative means of curing any area of the structure to which a membrane has been applied which, in the opinion of the Employer's Agent, is unsatisfactory. The curing compound used shall be to the approval of the Employer's Agent. Wax based curing compounds will not be permitted.

The curing compound shall be applied immediately as formwork is progressively stripped or, in the case of unformed surfaces, when the concrete has taken its initial set. It shall preferably be applied by spraying and the rate of application shall be strictly in accordance with the manufacturer's recommendations. A method of monitoring the area to which curing compound has been applied and the application rate shall be as approved by the Employer's Agent and rigidly applied by the Contractor.

Surfaces of joint rebates, where elastomeric sealant is to be applied, shall be protected from contamination by curing compound by the use of masking tape."

PSG 5.5.9 Adverse weather condition

Replace SANS 1200 G, sub-clause 5.5.9.2 with the following:

"No placing of concrete shall take place if the ambient temperature exceeds 32°C, or is likely to rise to above 32°C during the casting period or within eight hours after casting is completed.

If concrete is to be cast during times of high ambient temperature or hot drying winds, the Contractor shall be responsible for taking the necessary steps to keep the placement temperature as low as possible. Such steps include the spraying of the coarse aggregate with water, the painting of silos with a reflecting aluminium paint, the insulation of tanks and pipelines, and the protection of concrete ingredients against the direct rays of the sun. The area of the pour shall be shaded before and during concreting and the concrete shall be shaded from the time of mixing until eight hours after placing.

Windbreaks shall be erected if necessary."

PSG 5.5.10 Concrete surfaces

Replace SANS 1200 G, sub-clause 5.5.10 with the following:

PSG 5.5.10.1 Screeded finish

"After placing and compacting the concrete on a top (unformed) surface shall be struck off with a template to the designated grades and tamped with a tamping board to compact the surface thoroughly and to bring mortar to the surface, leaving the surface slightly ridged but generally at the required elevation. No mortar shall be added, and noticeable surface irregularities caused by the displacement of coarse aggregate shall be made good by re-screeding after the interfering aggregate has been removed or tamped."

PSG 5.5.10.2 Wood-floated finish

"Where wood-floating is ordered or scheduled, the surface shall first be given a finish as specified in PSG 5.5.10.1, Screeded finish, as amended, and, after the concrete has hardened sufficiently, it shall be wood-floated, either by hand or machine, only sufficiently to produce a uniform surface free from screeding marks."

PSG 5.5.10.3 Steel-floated finish

"Where steel-floating is specified or scheduled, the surface shall be treated as specified in PSG 5.5.10.1, Screeded finish, as amended, except that, when the moisture film has disappeared and the concrete has hardened sufficiently to prevent laitance from being worked to the surface, the screeded surface shall be steel-trowelled under firm pressure to produce a dense, smooth, uniform surface free from trowel marks."

PSG 5.5.10.4 Granolithic screeds

"Granolithic screed shall consist of:

Cement	1 part by mass
Sand	1,25 parts by mass
Coarse aggregate	2 parts by mass

The coarse aggregate shall consist of granite or other approved chips which shall pass a 10 mm sieve and be retained on a 5 mm sieve.

The cement/water ratio of the mix shall be at least 2,0.

Before placing any granolithic screeds the base concrete shall be chipped to expose the aggregate over 100% of the area to be screeded and soaked with water for at least 24 hours.

The base concrete shall be thoroughly cleaned by scrubbing and all standing water removed after soaking. A 1:2 cement/sand grout shall then be brushed into the prepared surface followed by the granolithic screed before the grout sets. The granolithic screed shall be of the driest feasible consistency with a slump not exceeding 50 mm and shall be formed true to profile and shape as required and shown on drawings. Before placing granolithic screed against an adjacent band of granolithic screed, the edge of the latter shall be prepared by chipping back to firm material, wire brushing and brushing with grout as for the base concrete.

Granolithic screed shall be compacted to remove all air and shall be screeded and finished with a steel trowel to Degree of Accuracy 1.

The trowelling shall be carried out in the following stages:

- a) First - as soon as the granolithic screed has been compacted and screeded.
- b) Second - after 2 hours to close the surface and remove laitance.
- c) Third - after a further 4 hours.

The time intervals are estimated as appropriate to normal temperature conditions and shall be varied by the Contractor to ensure a smooth dense finish.

Granolithic screed shall be cured as specified in PSG 5.5.8, as amended, but shall additionally be protected from direct sunlight and drying winds as it is being placed.

All screeding necessary to accommodate mechanical equipment shall be done under the equipment supplier's supervision and in strict accordance with his instructions. It shall be commenced as soon as the equipment supplier gives notice on completion of erection and shall be finished expeditiously."

PSG 5.5.11 Watertight concrete

Add the following to SANS 1200 G, sub-clause 5.5.11:

"The floors, walls and roofs of all water retaining structures shall be considered to be watertight concrete structures.

Concrete to manholes shall be watertight concrete."

PSG 5.5.14 Defects

Add the following to SANS 1200 G, sub-clause 5.5.14:

"All defects shall be repaired as soon as possible after the formwork has been removed and the Employer's Agent has inspected the concrete. A statement of the method to be used for each repair shall be submitted to the Employer's Agent for his approval before any work is carried out. The Employer's Agent may prohibit the further placing of concrete in the particular area concerned until he is satisfied that the repair has been satisfactorily executed."

Add the following new sub-clauses to SANS 1200 G, sub-clause 5.5:

***PSG 5.5.16 Items to be cast in or grouted into concrete**

***PSG 5.5.16.1 Casting pipes and specials in concrete**

"Where the pipe or special is supplied by others or where ordered by the Employer's Agent, the Contractor shall provide a box-out in the wall and cast the unit in at a later stage. When constructing such box-outs reinforcement shall not be cut but shall run through the opening. Reinforcement shall be cut and/or bent out at a later stage to suit the item being cast in. After installation of the item the remaining reinforcement shall be bent back in position.

Where entry holes for pipes/specials have been provided in the walls, the Contractor shall be responsible for the concreting in of such pipes/specials regardless of whether or not these have been supplied by himself.

Before commencing the positioning in holes of any pipes/specials the Contractor shall:

- a) remove all formwork and boxing remaining in the holes;
- b) make any alternations required to the position and shape of the holes and cut reinforcement to suit the item, as directed by the Employer's Agent; and
- c) thoroughly scabble the sides of the holes so as to obtain a satisfactory bond surface for the new concrete and treat the surface as specified.

Immediately prior to the placing of mortar and concrete around the pipes, the surface of the existing concrete shall be saturated with water. All surplus water shall be removed and the surface covered with a layer, approximately 12 mm thick, of mortar made of the same mix as the concrete in which the pipes/specials are to be placed.

The concrete ingredients shall be mixed and placed as dry as possible to obtain a dense, waterproof concrete. The concrete shall be carefully worked around the puddle flange, if any, and the pipe barrel or body of the special, and shall be vibrated in layers so as to obviate a falling away from pipe/special surfaces of the concrete already placed. The whole shall, when set, form a dense, homogeneous, and waterproof mass."

***PSG 5.5.16.2 Fixings for equipment supplied under separate contract**

- a) The Contractor will be responsible for the forming of pockets to the details shown on the drawings to accommodate holding down bolts for equipment supplied under a separate contract. Holding down bolts will be supplied by and positioned by others.
- b) After casting of the concrete all shuttering shall be removed and the sides of the bolt holes and surface on which the machine base is to be placed shall be scabbled to remove all defective concrete, laitance, dirt, oil, grease and loose material.
- c) Upon completion of the positioning and alignment of equipment and when instructed by the Employer's Agent the Contractor shall in collaboration with the mechanical contractor, grout up pockets and baseplates by filling pockets and voids under the baseplates with an approved non-shrink grout."

***PSG 5.5.16.3 Fixings for items supplied under this Contract**

"Holding down bolts or other fixings required for the installation of items supplied under this Contract shall be provided by the Contractor. These fixings shall be cast in or grouted into pockets or installed by other means as approved by the Employer's Agent.

Where anchor bolts are used which are installed into holes drilled into concrete or masonry these shall be of a type approved by the Employer's Agent. All such bolts used shall be manufactured from stainless steel or a metal with a resistance to corrosion equal to that of grade 304 stainless steel. The metal used for bolts shall be compatible with galvanized mild steel.

Anchor bolts shall have minimum pull-out forces and minimum ultimate lateral loads at least equal to those specified below:"

Specified Anchor Size	Minimum Pull-out Force (kN)	Minimum Ultimate Lateral Load (kN)
M6	10,35	7,60
M8	13,70	11,15
M10	19,44	15,95
M12	31,85	26,90
M16	50,45	45,80
M20	60,50	71,20

***PSG 5.5.16.4 Plastic puddle pipe items supplied under this Contract**

"Plastic puddle pipe cast-in fittings as indicated per drawing required for the installation of items supplied under this Contract shall be provided by the Contractor. These fittings shall be cast in or grouted into pockets or installed by other means as approved by the Employer's Agent.

All such fittings shall be manufactured from uPVC CLASS 16 according to the drawings in accordance with SANS 966. The welded puddle shall be governed in accordance with standards DVS 2207 and SANS 10268. All welded items shall be issued with an accredited quality certificate from an accredited manufacturer."

PSG 7 TESTS

PSG 7.1.2 Frequency of sampling

Add the following to SANS 1200 G, sub-clause 7.1.2.1:

"One sample shall consist of three concrete test cubes.

For each sample taken the position in the structure shall be recorded where the batch represented by that sample is placed as also the date sampled."

Replace SANS 1200 G, sub-clause 7.1.2.2 with the following:

"At least 2 samples shall be taken per day from every 0 m³ to 10 m³ of concrete of each grade placed. At least 4 samples shall be taken per day from every 10 m³ to 20 m³ of concrete of each grade placed. At least 6 samples shall be taken per day from concrete of each grade placed in excess of 20 m³."

PSG 7.2 Testing

Add the following new sub-clause to SANS 1200 G, sub-clause 7.2:

***PSG 7.2.5 Testing watertight concrete**

"The watertightness of the water retaining structures shall be tested as follows:

On completion of a water retaining structure it shall be cleaned and shall be filled with water at an approved rate. After allowing a period of absorption of 3 days, the depth of water shall be recorded and the water allowed to stand for a further 7 days during which the total permissible drop in water level after allowing for evaporation should not exceed 10 mm.

In the event of any leakage or dampness being evident at any stage of the filling or testing or in the event of the Employer's Agent considering the final degree of watertightness to be unsatisfactory, the Contractor, when ordered by the Employer's Agent, shall discontinue such filling or testing and shall, at his own expense, take approved steps immediately to rectify the leakage and to make the work thoroughly sound to the complete satisfaction of the Employer's Agent. All such work of rectification shall be continued assiduously until a satisfactory test is obtained, which shall prove to the Employer's Agent that watertightness has been obtained.

If required by the Employer's Agent, the structure shall be retested before the expiry of the Defects Liability Period.

The Works will not be certified complete until the structure has been proved by testing to be watertight to the satisfaction of the Employer's Agent."

PSG 7.3 Acceptance criteria for strength concrete

Add the following new sub-clause to SANS 1200 G, sub-clause 7.3:

***PSG 7.3.6 Grouting**

"The Contractor shall, where so ordered, carry out a site test for each grouting procedure. The tests shall be carried out on a dummy bedplate similar in configuration to that which is to be grouted, but not exceeding 1 m² in area unless otherwise ordered. When the dummy bedplate is dismantled, the underside shall show a minimum grout contact area of 80% with reasonably even distribution of the grout over the surface grouted except that, in the case of expanding grout, the minimum grout contact area shall be 95%. The test shall show evidence of good workmanship and materials and the results shall be to the satisfaction of the Employer's Agent.

The Contractor shall, when so ordered, make standard test cubes from various grout mixtures and also subject them to compression tests to determine whether the specified strength has been achieved. Test procedures shall comply with the relevant requirements of SANS 1200 G, sub-clauses 7.2.1 to 7.2.3."

SANS 1200 G SECTION 8

MEASUREMENT AND PAYMENT

PSG 8.1.1 Formwork

SANS 1200 G, sub-clause 8.1.1 to include payment for:

PSG 4.5.3	Ties
PSG 5.2.1	Classification of finishes
PSG 5.2.2	Preparation of formwork

Add the following new sub-clauses to SANS 1200 G, sub-clause 8.1.1:

***PSG 8.1.1.7 Edges of blinding layer**

"No separate payment will be made for formwork to the edge of the blinding layer. The rates tendered for concrete to the blinding layer shall cover the cost of such formwork."

***PSG 8.1.1.8 Chamfers and fillets**

"No additional payment will be made for chamfers and fillets up to 40 mm wide. Larger fillets and chamfers will be measured by length in accordance with SANS 1200 G, sub-clause 8.2.5."

PSG 8.1.2 Reinforcement

SANS 1200 G, sub-clause 8.1.2 to include payment for:

PSG 5.1.2	Fixing

Add the following to SANS 1200 G, sub-clauses 8.1.2.2 and 8.1.2.3:

"Notwithstanding the method of measuring and paying for reinforcement specified in SANS 1200 G, sub-clauses 8.1.2.2 and 8.1.2.3, reinforcement will be measured and paid for as scheduled."

PSG 8.1.3 Concrete

SANS 1200 G, sub-clause 8.1.3 to include payment for:

PSG 3.2.1	Cement: Applicable specifications
PSG 3.2.3	Storage of cement
PSG 3.3	Water
PSG 3.4.1	Aggregates: Applicable specification
PSG 3.4.2	Use of plums
PSG 3.5	Admixtures
PSG 4.3.1	General requirement for mixing plant
PSG 4.4	Vibrators
*PSG 4.6	Water-bath
PSG 5.5.1.1	Quality: General
PSG 5.5.1.4	Chloride content
PSG 5.5.1.5	Durability
PSG 5.5.1.6	Prescribed mix concrete
PSG 5.5.1.7	Strength concrete
PSG 5.5.2	Batching
PSG 5.5.3.2	Ready-mixed concrete
PSG 5.5.5.10	Casting of concrete in excavation
PSG 5.5.8.2	Curing for normal concrete surfaces
PSG 5.5.9	Adverse weather conditions
PSG 5.5.11	Watertight concrete
PSG 5.5.14	Defects
PSG 7.1.2	Frequency of sampling

PSG 8.2 Scheduled formwork items

Add the following new payment item to SANS 1200 G, sub-clause 8.2:

***PSG 8.2.7 Kickers Unit: m²**

"Formwork to the edges of kickers will be measured as plane (or circular) vertical (not as narrow widths)."

PSG 8.4 Scheduled concrete items

PSG 8.4.4 Unformed surface finishes

Add the following to SANS 1200 G, sub-clause 8.4.4:

"The rates for unformed surface finishes shall cover the cost of providing the respective surface finish as specified in PSG 5.5.10, as amended, Concrete Surfaces."

PSG 8.5 Joints

Add the following to SANS 1200 G, sub-clause 8.5:

"Only designated joints as shown on the drawings will be measured for payment according to the length of each type of joint constructed. The rate shall cover the cost of all materials, labour and plant required to construct each type of joint specified on the drawings, including the cost of all shuttering, treatment of the joint as specified in SANS 1200 G, sub-clause 5.5.7.3 and PSG 5.5.7.3, as amended, the provision of chamfers as specified where concrete is exposed, as well as testing and repairing where necessary.

Non-designated joints will not be measured for payment."

SANS 1200 G, sub-clause 8.5 to include payment for:

*PSG 3.9	Materials for movement joints
PSG 5.5.7	Construction joints

Add the following new payment items to SANS 1200 G, sub-clause 8.5:

***PSG 8.5.1 Formed joints Unit: m**

"Formed joints will be measured by the length of the joint.

The rates shall cover the cost of all operations and materials specified in PSG 5.5.7, as amended, and PSG 5.5.7.2, as amended, and detailed on the drawings such as joint filler, dowel bars and tubes, bitumen coats, waterstops or waterbars, etc."

PSG 8.7 Grouting

Add the following to SANS 1200 G, sub-clause 8.7:

"Grouting of base plates and equipment bases will be measured by the volume of grout used.

The rate shall cover the cost of the supply and floating in of grout under the plates to ensure solid and complete filling of the gap."

SANS 1200 G, sub-clause 8.7 to include payment for:

*PSG 5.5.16.2	Fixing of equipment supplied under separate contract
*PSG 5.5.16.3	Fixing for items supplied under this Contract
*PSG 7.3.6	Grouting

PSG 8.8 HD Bolts and miscellaneous Metal Work

Add the following to SANS 1200 G, sub-clause 8.8:

"Fixing of holding down bolts will be measured by number. The rate shall cover the cost of all things necessary to ensure that the bolts are effectively and rigidly held in position during casting, complete with sleeved pockets, all as detailed on the drawings."

Add the following new payment items to SANS 1200 G, clause 8:

***PSG 8.9 No-fines concrete Unit: m²**

"No-fines concrete will be measured by area.

The rate shall cover the cost of supplying materials, constructing and placing in position and compaction of the no-fines concrete as specified in PSG 5.5.1.7, Strength concrete, as amended, and shall include for the steel floated 20 mm mortar skim to the approval of the Employer's Agent."

***PSG 8.10 Items cast in concrete Unit: No.**

"Items cast in concrete will be measured by number separately for each type of item.

Notwithstanding SANS 1200 G, sub-clause 8.2.6, the rate shall cover the cost of fixing in position and casting in the item as construction proceeds, irrespective of whether the Contractor chooses to fix the item in the formwork and cast it in directly or to box out a hole and grout the item in subsequently. The rate is to include payment for

*PSG 5.5.16.1, Casting pipes and specials in concrete, and *PSG 5.5.16.4, Plastic puddle pipe items supplied under this Contract.

The rate for the puddle pipes shall cover the cost of all things necessary to ensure that the fitting are effectively and rigidly held in position during casting including the certification and all as detailed on the drawings. Repairs for leaking cast in items will not be paid for."

***PSG 8.11 Granolithic screeds.....Unit: m²**

"Special floor finish will be measured by area. The rate shall cover the cost of the supply and application of the specified material, complete as specified by the manufacturer and to the approval of the Employer's Agent. Repairs to unsatisfactory work will not be paid for.

Measurement of granolithic screeds will be by the surface area covered.

The unit rate or lump sum shall cover the cost of all materials, labour and equipment required to provide the screed as specified in PSG 5.5.10.4, Granolithic screeds. The rate shall include the steel float finish."

***PSG 8.12 Precast paving slabs.....Unit: m²**

"Precast paving slabs will be measured by the area paved.

The rate shall cover the cost of compacting the area, application of weed-killer, supplying, laying and bedding the slabs, grouting the joints and filling any gaps, all as specified in *PSG 3.10, Precast paving slabs."

***PSG 8.13 PFA concrete.....Unit: m³**

"Measurement and payment for PFA concrete shall be as specified in PSG 8.1.3, Concrete, as amended.

The tendered rate shall cover all costs in connection with the supply, storage, handling on site and mixing in of PFA."

***PSG 8.14 Watertightness test.....Unit: No.**

"The watertightness test will be paid by a lump sum separately for each structure.

The sum shall cover the cost of all labour, equipment and materials to carry out the tests, as specified in *PSG 7.2.5, Testing watertight concrete, to rectify faults and to achieve a test result to the satisfaction of the Employer's Agent."

***PSG 8.15 Slurry coat and curing Unit: m²**

"Supply & apply waterproof treatment with Xypex Concentrate and Xypex modified to all areas as specified.

The rate shall cover for the supply and surface treatment of specified concrete surfaces according to *PSG 5.5.8.1, Post-Crystallization (Concentrate & Modified) slurry coat and curing."

PSG 8.16 Bond Breaker.....Unit: m²

"Where a 250 micron black plastic continuous layer is to be laid over the no-fines concrete under floor slabs, the side and end laps shall not be less than 100mm. Just before casting the sheeting shall be perforated in a grid pattern at 1 m centres.

Care shall be taken not to rip or tear the sheeting. All repairs shall be at the Contractor's expense.

The rate shall include payment for *PSG 3.9.4, Bond breakers, primers and sealants."

PSHA STRUCTURAL STEELWORK (SUNDRY ITEMS) (SANS 1200 HA)

PSHA 3 MATERIALS

Add the following under SANS 1200 HA, clause 3:

"Where the words "Structural Steelwork" appear in the heading and in other relevant Clauses, amend to read "Aluminium, Stainless Steel and Structural Steel"."

PSHA 3.1 Structural steel

Add the following to SANS 1200 HA, sub-clause 3.1:

"All stainless steel items shall be Grade 304L material.

Structural steelwork shall comply with Grade 43 of BS 4360. All steel pipes and specials, irrespective of diameter, shall be fabricated from plain ended pipes. The use of screwed flanges and fittings shall not be permitted, except for use on air-valve assemblies. All fabrication shall take place in a suitable workshop prior to galvanizing, and no cutting or welding of pipes on site shall be permitted.

All aluminium items shall be grade M57S material anodized in accordance with SANS 999 Grade 25."

PSHA 3.3.1 Bolts and nuts

Add the following to SANS 1200 HA, sub-clause 3.3.1:

"All bolts, nuts and washers within water retaining structures or exposed to the rain, or with a diameter of 10 mm or less, all anchor bolts of any size in concrete or brickwork and all bolts of any size used in conjunction with stainless steel items, shall be manufactured from Grade 304L stainless steel.

All other bolts, nuts and washers with a diameter of 12 mm or greater shall be hot dip galvanized to SANS 10684. Nuts shall be tapped before galvanizing, taking into consideration the extra clearance necessary to allow for the thickness of galvanizing on the bolts. If, after installation, there is any indication that galvanising has been stripped from either the nut or the bolt, both nut and bolt shall be removed and replaced."

PSHA 5 CONSTRUCTION

PSHA 5.2.6 Handrails

Add the following to SANS 1200 HA, sub-clause 5.2.6:

"The handrails shall be manufactured by an approved manufacturer specializing in such work and shall be of galvanized steel tubing of nominal thickness 2,6mm and of normal outside diameter at least 34 mm.

Stanchions shall be manufactured preformed in one piece and shall be at least 42 mm nominal outside diameter. The bases of the stanchions shall be preformed to suit the situation in which they are to be installed, and the stanchions and spheres shall be preformed to suit right angled or other angled intersections as shown on the drawings.

Stanchions shall be spaced at intervals not exceeding 2,0m. All joints shall be welded, cold galvanised and painted after the erection of handrails."

PSHA 5.2.10 Protective treatment

Replace the last sentence of SANS 1200 HA, sub-clause 5.2.10 with the following:

"The open grid and chequer plate flooring panels and frames, handrails, ladders and similar items shall be hot-dip galvanized in accordance with the requirements of SANS 1200 HC, sub-clause 5.9.

In addition handrails shall be degreased, primed and painted yellow with two coats of recoatable polyurethane to a minimum total dry film thickness of 70 micrometers after installation."

Add the following new sub-clause to SANS 1200 HA, sub-clause 5.2:

***PSHA 5.2.11 Hand stops and stop logs**

“Stainless Steel 316 hand stops shall close drop tight and be manufactured to the dimensions shown on drawings.

Fabrication details of hand stops and stop logs shall be submitted to the Employer’s Agent for approval before manufacture commences. Hand stops with daylight openings exceeding 0,5 m² shall be supplied in equal 250mm stop logs with a neoprene interface seal.

The hand stops and stop logs shall be supplied with Stainless Steel 316 frames which are suitable for casting into concrete, and shall, where necessary, be provided with strengthening plates to withstand the pressure of the full water depth. The stop logs shall be provided with resilient water seals under each unit to provide a drop-tight seal.”

SANS 1200 HA SECTION 8

MEASUREMENT AND PAYMENT

PSHA 8.3.1 Structural steel

SANS 1200 HA, sub-clause 8.3.1 to include payment for:

PSHA 3.1	Structural steel
PSHA 3.3.1	Bolts and nuts

PSHA 8.3.2 Handrails

Add the following to SANS 1200 HA, sub-clause 8.3.2:

“Handrails will be measured according to SANS 1200 HA, sub-clause 8.3.2 (a) and the relevant drawing. The rate shall include for PSHA 5.2.6, Handrails, as amended.”

PSHA 8.3.6 Corrosion protection

“Notwithstanding the requirements of SANS 1200 HA, sub-clause 8.3.6, corrosion protection will not be measured separately, the rates tendered for the steel items being held to include for the cost of corrosion protection as specified in PSHA 5.2.10, Protective treatment, as amended.”

Add the following new payment item to SANS 1200 HA, sub-clause 8.3:

***PSHA 8.3.7 Hand stops.....Unit: No.**

“The tendered rate shall cover the cost of supply, delivery, corrosion protection and complete installation of gates and frames. The rate shall also make provision for *PSHA 5.2.11, Hand stops and stop logs.”

**PSHC CORROSION PROTECTION OF STRUCTURAL STEELWORK
(SANS 1200 HC)**

PSHC5 CONSTRUCTION (EXECUTION OF WORK)

PSHC 5.9 Application of metal coatings (hot-dip galvanizing, metal spraying)

Add the following to SANS 1200 HC, sub-clause 5.9:

“All structural steel members shall be hot-dip galvanized.”

SECTION PSL MEDIUM-PRESSURE PIPELINES (SANS 1200 L)

PSL 2 INTERPRETATIONS

PSL 2.4 ABBREVIATIONS

Add the following to SANS 1200 L, sub-clause 2.4:

GRP : Glass Reinforced Polyester

PSL 3 MATERIALS

PSL 3.1 General

Add the following to SANS 1200 L, sub-clause 3.1:

"The materials and construction of all pipes, fittings, valves and specials shall comply with the appropriate SANS, BS or other appropriate specification, whether stated or not, and shall be approved by the Employer's Agent. Only full-length pipes bearing the relevant standard's mark will be acceptable. Cut pipes shall only be used at pipe junctions to position valves and specials as shown on the drawings, and at connections to structures. When laying the pipes the markings shall be visible from above.

Pipelines shall be high density polyethylene (HDPE) Class 12, PVC-U pipes Classes 9, 12, 16 and 20 or PVC-O pipes Classes 12, 16 or 20 complying with SANS 966, as scheduled or shown on the drawings.

HDPE pipes shall be joined using of the "Plasson" compression type, or equivalent, approved couplings which have a polypropylene body, nut and compression ring with rubber O-ring.

The Contractor shall be responsible for the structural and hydraulic design of all bends and fittings where these are not standard off the shelf items designed and guaranteed by the manufacturer for the purpose intended. Acceptance of the Contractor's design will be subject to the Employer's Agent's approval.

The Employer's Agent shall at all reasonable times have free access to the place where the goods are manufactured for the purpose of examining and sampling the materials and goods, and if necessary for supervising the testing and marking of goods. The manufacturer shall supply free of charge every facility and all labour required for such examination, sampling, inspection, testing and marking before delivery and shall provide and maintain in good order suitable, convenient and accurate apparatus for testing goods.

Mild steel specials shall have a minimum wall thickness of 4,5 mm, and shall be hot dipped galvanised. The ends of plain ended specials which join onto FC or CI pipework shall be fitted with 150 mm wide collars and machined to the OD of PVC-U pipes of the diameter specified.

Steel pipes shall be groove ended galvanised carbon steel pipes with Klambon type cast galvanised SP couplings or similar approved and shall comply with the requirements of SANS 815.

Stainless steel pipework specials shall be manufactured from Grade 304L as scheduled. Grade 304L specials shall have a minimum wall thickness of 3 mm. All welds shall be pickled and passivated.

The ends of plain ended specials which join onto uPVC or CI pipework shall be fitted with 150 mm wide collars and machined to the OD of uPVC pipes of the diameter specified.

All pipes, specials and valves arriving on site shall be marked clearly with the item number appearing in the Bill of Quantities. Furthermore the nuts, bolts, washers and other ancillary equipment for each individual item shall be kept separate in a bag which shall also bear the respective reference number of that item. The cost of such marking will be held to have been included in the rates tendered for the items.

The Contractor shall satisfy the Employer's Agent that the manufacturers' recommendations for good practice for transporting, handling, stacking, storing and installing pipes, pipe fittings, sealing rubbers etc. are being diligently followed. The Employer's Agent shall be given the opportunity to inspect all materials immediately prior to installation and shall have the right to reject any materials which, in his opinion, have suffered damage which may impair the long term durability or strength of said items.

Pipes and specials shall be protected against damage during all stages of manufacture, delivery, storage and handling. The ends of all steel pipes and specials shall be protected against denting. Steel pipes shall be transported and stacked in such a manner that the pipe barrel is not deformed by more than 2% of its diameter.

Dents which cause a protrusion of more than 1 mm on the inside of the steel special, may result in the special being rejected."

PSL 3.4 Steel pipes, fittings and specials

PSL 3.4.1 General

Add the following to SANS 1200 L, sub-clause 3.4.1:

"All steel pipes and specials, irrespective of diameter, shall be fabricated from plain ended pipes. The use of screwed flanges and fittings shall not be permitted, except for use on air-valve assemblies. All fabrication shall take place in a suitable workshop prior to galvanising, and no cutting or welding of pipes on site shall be permitted.

The Contractor shall, when called upon to do so, make available to the Employer's Agent the manufacturer's certificates covering the chemical analysis and physical properties of the steel used in the manufacture of the pipes. The pipes shall be hydraulically tested before leaving the factory to the test pressure specified in sub-clause 7.3 of SANS 1200 L. The methods of sampling and testing of the manufactured pipes shall comply with Sections 6 and 7 of SANS 719. Tests shall be carried out at the place of manufacture and at the expense of the Contractor. On delivery of the goods concerned the Contractor shall supply a signed certificate giving results of the tests and certifying that the goods have been manufactured in accordance with the Specification."

PSL 3.4.3 Pipes of nominal bore over 150mm

Replace SANS 1200 L, sub-clause 3.4.3 with the following:

"Steel pipes of nominal bore over 150 mm shall comply with the applicable requirements of SANS 719 and shall be Grade B. The minimum wall thickness of steel pipes, fittings and specials up to 660mm external diameter shall be 6 mm, and above 660mm to 914mm external diameter shall be 8mm. The ends of pipes, fittings and specials used with uPVC pipes shall have suitable spigot ends.

Pipes shall be longitudinally and circumferentially butt-welded by the submerged arc welding process. Spirally welded pipes will also be accepted. The welding processes and materials used for the fabrication of the pipes shall conform to SANS 044. The Contractor shall, when called upon to do so, provide written confirmation that welding has been carried out by coded welders.

Plain ends shall be machined to suit the outside dimensions of connecting pipework.

The Contractor shall be responsible for the structural design of all steel bends, tees, fittings and specials, which design shall be carried out by a registered Professional Employer's Agent. Costs for design shall be included in the rates for design, supply and laying. The Contractor shall submit certification of the designs and manufacture to the Employer's Agent for approval prior to delivery to site.

All steel pipes and specials shall be hot-dip galvanised after manufacture.

Any damage to the coatings prior to or during laying/fixing of the pipes will be cause for the pipes to be rejected by the Employer's Agent unless the damage is repaired to the approval of the Employer's Agent."

PSL 3.7 Other types of pipes

Add the following new sub-clauses to SANS 1200 L, sub-clause 3.7:

***PSL 3.7.4 mPVC PIPES**

"mPVC pipes and fittings shall be fitted with spigot and socket rubber ring joints and shall comply with the requirements of SANS 966-1."

***PSL 3.7.5 GRP PIPES**

"Glass reinforced pipe and fittings shall conform to ASTM D3262, ASTM3754, AWWA C950 and SANS 1748 - 1 : 1998 Glass Fibre Reinforced Thermosetting Plastics (GRP) pipes Part 1 : Pipes for Water Supply , Sewerage or drainage. GRP pipe shall be stiffness SN 5000 jointed with Double Bell couplings. The pressure rating and diameter shall be as detailed in the Bill of Quantities and drawings."

PSL 3.8 Jointing material

PSL 3.8.2 Flexible couplings

Replace SANS 1200 L, sub-clause 3.8.2.1 with the following:

"Detachable couplings shall be of the "Viking-Johnson" or similar approved type without central register unless otherwise specified. Coupling flanges shall be designed to withstand the hydrostatic test pressures and all stresses due to tightening of the bolts, and the rubber rings shall generally comply with BS 2494 Class D. Detachable couplings shall suit the outside dimensions of pipe-work complying with either BS 2035 or the relevant SANS specification as the case may be.

Mild steel "Viking-Johnson " couplings shall be lined and coated with SIGMA EP 2300 or approved equivalent to the manufacturer's specification, and a minimum dry film thickness of 350 micron.

All cast iron pipes, specials and valves shall be given two coats of approved epoxy paint except where cast into concrete. The cost of this work shall be included in the rates tendered for supplying and fixing pipes, specials and valves."

PSL 3.8.3 Flanges and accessories

Add the following to SANS 1200 L, sub-clause 3.8.3

"All flanges shall be to BS 4504 (25 Bar) or SANS 1123 Table 1600/3 unless otherwise specified or shown on the drawings. The Contractor shall be responsible for ensuring that the flange drillings on all pipeline components including valves, fittings, specials and fixtures etc. are compatible.

Where used with mild steel pipes underground, the connections shall be bitumen mastic wrapped.

All gaskets for flanged joints shall be 3 mm thick, full face rubber insertion in accordance with the requirements of BS 3063.

Where services are relocated or connected to existing pipes, the dimensions of existing flanges and pipes shall be verified by the Contractor prior to ordering of materials.

Any item of pipework or special or valve of which the flanges are incorrectly drilled, will be rejected. The reaming of bolt-holes to oversized dimensions to enable a particular item to fit will not be allowed.

All flanges shall be provided complete with bolts, nuts, washers and rubber O-rings as appropriate. Rubber O-rings dimensioned in accordance with DIN 2514 specification shall be supplied to suit suitably machined flanges.

"All bolts, nuts and washers used in the jointing of mild steel pipes shall be hot-dip galvanised in accordance with SANS 121:2011. Under no circumstances shall electro-plating be accepted as an alternative means of corrosion protection."

All bolts, nuts and washers for jointing of stainless steel pipes shall also be stainless steel all in accordance with SANS 1700."

PSL 3.9 Corrosion protection

PSL 3.9.1 Cast iron pipes

Replace SANS 1200 L, sub-clause 3.9.1 with the following:

"All cast iron pipes, specials and valves shall be given two coats of approved epoxy paint except where cast into concrete. The cost of this work shall be included in the rates tendered for supplying and fixing pipes, specials and valves."

PSL 3.9.3 PROTECTION AGAINST ELECTROLYTIC CORROSION

Add the following new sub-clause to SANS 1200 L, sub-clause 3.9.3:

***PSL 3.9.3.1 CATHODIC PROTECTION**

"Soil resistivity tests and a stray current survey are to be carried out by the contractor.

The design of the Cathodic Protection System shall be carried out by an approved Specialist in this field appointed by the Contractor and submitted to the Employer's Agent, one calendar month before commencing construction, for acceptance.

A Provisional Sum has been allowed in the Tender Documents for the testing, design, supply and construction of a cathodic or other corrosion protection system. After acceptance by the Employer's Agent of the design of the system the Contractor shall within fourteen days prepare a detailed cost proposal, including schedules of quantities, for the supply and installation of the system for approval by the Employer's Agent. The proposal shall be supported by a full breakdown of costs with supporting documentation such as quotations from suppliers etc. Payment may be claimed after completion of the relevant item, at the approved rates, in the monthly Certificates in the normal manner. The contractor shall allow in his programme for completion of the design prior to commencement of laying of pipes. Any pipes which have to be removed subsequent to laying for implementation of a corrosion protection system shall be to the Contractor's cost."

PSL 3.9.5 Joints, bolts, nuts and washers

Replace SANS 1200 L, sub-clause 3.9.5 with the following:

"All bolts, nuts and washers shall be hot-dip galvanised in accordance with SANS 121:2011. Under no circumstances shall electro-plating be accepted as an alternative means of corrosion protection."

PSL 3.9.6 Corrosive soils

Replace SANS 1200 L, sub-clause 3.9.6 with the following:

"All underground screwed steel joints and saddles are to be treated with a compatible primer, packed with a bitumen or tar based mastic and wrapped with "Denso Tape". The cost of this work shall be included in the rates tendered for supplying and fixing pipes and specials."

PSL 3.10 Valves

Add the following to SANS 1200 L, sub-clause 3.10:

"All valves (other than those manufactured from non-corrodible material such as stainless steel or brass) shall be coated with fusion bonded epoxy.

Fusion bonded epoxy (FBE) coating shall comply with the provisions of SANS 12176 as for a Type 2 powder coating which shall apply mutatis mutandis to the coating of fittings.

Such coating may only be done in a shop with a known or proven proficiency in such type of work.

- The entire surface to be coated must be free of dust and moisture and must comply with the provisions of Sub-clause 4.1.1 of SANS 12176. The total dry film thickness shall be at least 400 micrometres ($\pm$ 50 micrometres).
- The sealing area of the flanges shall be treated to a dry film thickness of 150 micrometres ($\pm$ 25 micrometres) (i.e. masked off before the second coat is applied).
- The painting shall be such that all trimmings are covered by paint for a distance of at least 5 mm to discourage bi-metal corrosion.

No field repairs of damaged paint areas (if any) are allowed. Where parts may become distorted because of their large size when heated the Contractor shall provide full details of the alternative proposal to the Employer's Agent's approval."

Add the following new sub-clauses to SANS 1200 L, sub-clause 3.10:

***PSL 3.10.1 Gate valves**

"Unless otherwise scheduled, gate valves shall be double flanged with ductile iron bodies and stainless steel trim, and shall conform with all relevant sections of SANS 664 or BS 5163, specifications and subsequent amendments. Flanges shall be drilled to BS4504 or SANS 1123 for 25 bar or 16 bar working pressure as specified, and compatible with pipework flanges.

Gate valves shall be of the wedge gate type, VOSA or similar approved. Approval shall only be given for the specified or equivalent valves from well-established and well known manufacturers with a proven record of supply and service of equivalent products within the southern African region. Valves shall be Class 16 or 25 as specified or shown on the drawings, clockwise closing and shall have non-rising spindles of high quality high tensile manganese bronze. The direction of closing shall be cast into the handwheel (where specified) or valve casing

with the words "OPEN" and "CLOSE" respectively. The gate shall be guided within the body of the valve to fit accurately onto the seat and to avoid possible buckling. Where extended spindles are required, they shall be suitably supported to prevent swaying and buckling, and to guarantee the intended use of the valve. All gate valves shall be drop tight when tested in accordance with the requirements of BS 5163. All gate valves of 600mm and larger shall be fitted with an integral bypass valve.

All gate valves shall be capable of being operated manually with a maximum applied torque of 150Nm for valves with a nominal diameter of more than 450mm and 100Nm for valves with a nominal diameter less than 450mm.

Valves shall be grit blast cleaned to S15 standard and a solvent-free sintered epoxy powder applied in one coat by the use of arc-spray machines to provide a dry film thickness of not less than 450 micron.

Flanged valves shall be complete with galvanised or titanium coated bolts and nuts, gaskets and insertion rings."

***PSL 3.10.2 Air valves**

"Air release and vacuum break valves shall be double orifice with anti-shock orifice mechanism, of type "Vent-O-Mat Series RBX" or similar approved with flanged inlets and rated for a minimum of 16 or 25 bar working pressure as specified.

The valve shall have an integral surge alleviation mechanism which shall operate automatically to limit transient pressure rise or shock induced by closure due to high velocity air discharge or the subsequent rejoining of separated water columns. The limitation of pressure rise must be achieved by deceleration of approaching water prior to valve closure.

The intake/discharge orifice area shall be equal to the nominal size of the valve.

The inlet shall be fitted with an isolating valve with vertical spindle, key operated from above.

Air valves shall be able to withstand twice the maximum rated pressure and must provide a positive drop tight closure from a minimum pressure of 50 kPa up to the maximum rated pressure."

***PSL 3.10.3 Non-return valves**

"Non-return valves shall comply with the requirements of BS 5153 or the relevant SANS specification for working pressures as specified for each application. They shall be double flanged and of general construction details as specified for gate valves with anti-shock closing characteristics. Flanges shall be drilled to BS4504 or SANS 1123 for 25 bar or 16 bar working pressure as specified, and compatible with pipework flanges.

Check valves shall be RGR axial flow, Vent-O-Mat Maxiflow or similar approved. Valves shall be fast acting with short travel and designed to minimise slamming."

***PSL 3.10.4 Knife gate valves**

"Knife gate valves shall be AVK Stainless steel AISI 316 with Teflon gaskets, or equal approved."

***PSL 3.10.5 Isolating valves**

"Valves shall conform to all relevant sections of SANS 664 (2011) and SANS 665 (2011) specifications and subsequent amendments.

Valves shall be anti-clockwise closing and have non-rising spindles of high quality tensile manganese bronze fitted with caps suitable for use with a key in the vertical position. The direction of rotation shall be permanently marked on the cap top or wheel.

All isolating valves for air valves shall be supplied with a cast iron hand wheel. All other valves shall be provided with a cap top for use with a valve key."

Add the following new sub-clauses to SANS 1200 L, clause 3:

***PSL 3.12 METERS**

***PSL 3.12.1 FLOW METERS**

"Magnetic Flow Meters specified shall be IP68 rated Endress & Hauser or similar approved magnetic flow type meters suitable for measuring flows in the ranges specified and for installation in a pipelines of diameter specified. The unit shall be capable of link up to the existing telemetry system and shall have 2 x 4 to 20mA outputs and two relays.

Measurement accuracy shall be within 0.2%. Maximum head loss through the meter and taper sections (if any) shall not be greater than 0.3m.

The rate tendered shall include for selection, supply and fitting of the meter with all necessary fittings and specials to fit the meter in a nominal 600mm diameter pipe, linking up to power supply, link up to the existing telemetry system located within 50m, including all necessary fittings and sundries to provide a complete working installation, testing and commissioning.

Mechanical flow meters, where specified, shall be able to provide pulsed output for continuous flow rate monitoring suitable for telemetry link-up. Flanged in-line strainers shall be provided with all mechanical flow meters installed. The strainers shall have removable components to allow access for cleaning and maintenance without removing the flanged strainer body."

The rate tendered shall include for selection, supply and fitting of the mechanical meter with all necessary fittings, specials and sundries to provide a complete working installation, testing and commissioning.

***PSL 3.12.2 WATER METERS**

"The meters shall be of the semi-positive rotary piston volumetric type and be to Class C specification.

Bulk water meters shall be supplied and built into the meter chambers as detailed in the drawings. Fittings and the construction of the chambers will be measured elsewhere.

Water meters must comply with the SANS Specification No. 1529-1: 2006 and must be approved in terms of Section 18 of the Trade Metrology Act, Act No. 77 of 1973, as amended by the Trade Metrology Amendment Act, Act No. 42 of 1994.

All water meters offered must be tested and sealed by an authorised official in an SANS 17025 accredited laboratory, situated within the borders of the Republic of South Africa."

PSL 5 CONSTRUCTION

PSL 5.1 Laying

PSL 5.1.1 General

Add the following to SANS 1200 L, sub-clause 5.1.1:

"Pipes shall be handled and laid in accordance with the manufacturer's specifications.

Large changes in horizontal or vertical alignment of the pipeline will be accommodated by special bends as detailed on the drawings.

Small changes in horizontal or vertical alignment will be accommodated at the pipe joints. In no case shall the deflection exceed two thirds of the recommendations of the relevant SANS, BS or other relevant specification, or of the pipe manufacturer."

PSL 5.1.4 Depth and cover

Add the following to SANS 1200 L, sub-clause 5.1.4.1:

"During construction there shall be not less than 0.9 m of cover over the pipes where construction traffic is liable to cross the pipeline, Road crossings shall not be utilised until the construction of the road layers has reached the stage where 0.9 m cover over the pipe is available.

Where the actual clearance between pipe crossings or other services is less than the minimum clearance of 150 mm the main shall be laid beneath the service crossed at an invert level which allows for the minimum clearance. The main shall be laid horizontally at this level for a distance of at least 3.0 m on either side of the centreline of the service crossed and then gradually revert to the minimum cover as specified above.

No decrease in cover or clear space between the pipe barrels as specified will be permitted unless otherwise instructed by the Employer's Agent in writing.

A minimum cover of 900 mm from natural ground level and maximum of 1.2 m to top of pipe shall be maintained throughout, unless otherwise specified or shown on the drawings."

PSL 5.6 Valve and hydrant chambers

Add the following to SANS 1200 L, sub-clause 5.6:

“The Contractor shall provide the Employer’s Agent with all relevant dimensions of valves fittings and specials for the purposes of finally sizing chambers and the designing of the reinforcement at least 40 working days prior to such sizes and reinforcement schedules being required. No extensions of time for delays resulting from failure to supply this information on time will be entertained. Any redesign costs due to supply of incorrect information will be to the Contractor’s account.”

PSL 7 TESTING

PSL 7.1 General

Add the following to SANS 1200 L, sub-clause 7.1:

“The price for testing the pipeline must be included in the scheduled items for supply and installation.”

SANS 1200 L SECTION 8 MEASUREMENT AND PAYMENT

PSL 8.2.1 Supply, lay and bed pipes

SANS 1200 L, sub-clause 8.2.1 to include payment for:

PSL 3.1	General
PSL 3.4.1	General
PSL 3.4.3	Pipes of nominal bore over 150mm
*PSL 3.7.4	mPVC Pipes
*PSL 3.7.5	GRP Pipes
PSL 3.8.2	Flexible couplings
PSL 3.8.3	Flanges and accessories
PSL 3.9.1	Cast iron pipes
PSL 3.9.3.1	Cathodic protection
PSL 3.9.5	Joints, bolts, nuts and washers
PSL 3.9.6	Corrosive soils
PSL 5.1.1	General
PSL 5.1.4	Depth and cover
PSL 7.1	Testing: General

PSL 8.2.5 Supply and place pipes, valves and specials

SANS 1200 L, sub-clause 8.2.5 to include payment for:

*PSL 3.10.1	Gate valves
*PSL 3.10.2	Air valves
*PSL 3.10.3	Non-return valves
*PSL 3.10.4	Knife gate valves
*PSL 3.10.5	Isolating valves
*PSL 3.12.1	Flow meters
*PSL 3.12.2	Water meters

PSL 8.2.13 Valve and hydrant chambers

SANS 1200 L, sub-clause 8.2.13 to include payment for:

PSL 5.6	Valve and hydrant chambers

PSLB BEDDING (PIPES) (SANS 1200 LB)

PSLB 3 MATERIALS

PSLB 3.1 Selected granular material

Add the following to SANS 1200 LB, sub-clause 3.1:

"Wherever the words "Selected Granular Material" are used in the specification, these shall be replaced with "Selected Bedding Material". In the case of flexible pipes the selected granular material shall consist of sand.

Wherever practicable, the Contractor shall use suitable material selected from the excavations for selected bedding and selected fill material."

PSLB 3.2 Selected fill material

Replace SANS 1200 DM, sub-clause 3.2 with the following:

"Selected fill material shall be free from vegetation and from lumps and stones of diameter exceeding 30mm, and shall be obtained from the trench excavations or other necessary excavations on the site, all to the approval of the Employer's Agent."

PSLB 3.3 Bedding

Add the following to SANS 1200 LB, sub-clause 3.3:

"Selected bedding material shall comply with the following requirements:

- A maximum particle size of 30mm
- A minimum grading modulus of 0,5
- A minimum CBR of 15% at 93% of modified AASHTO maximum density
- A maximum plasticity index of 12

The Bedding shall be compacted to at least 93% of modified AASHTO maximum density (100% for sand).

The type of bedding to be used shall be in accordance with the details shown on the drawings."

PSLB 3.4.1 Selection from trench excavation

Add the following to SANS 1200 LB, sub-clause 3.4.1:

"Wherever practicable, the Contractor shall use suitable material selected from the excavations for selected bedding and selected fill material."

SANS 1200 LB SECTION 8 MEASUREMENT AND PAYMENT

PSLB 8.1.2 Sources of bedding material

Add the following to SANS 1200 LB, sub-clause 8.1.2:

"Payment for the provision of imported bedding materials will only be made where they cannot be selected from the excavation within 5km of the point where it is required, and where it is ordered in writing by the Employer's Agent."

PSLB 8.1.3 Volume of bedding material

Add the following to SANS 1200 LB, sub-clause 8.1.3:

"The volume of bedding material will be measured net, excluding the volume occupied by the pipe. The volume of bedding material will be computed from:

- the trench width specified or scheduled, and
- the depth of each bedding layer as shown on the drawings, and
- by deducting the volume occupied by the pipe."

PSLB 8.2.1 Provision of bedding from trench excavation

SANS 1200 LB, sub-clause 8.2.1 to include payment for:

PSLB 3.1	Selected granular material
PSLB 3.2	Selected fill material
PSLB 3.3	Bedding
PSLB 3.4.1	Selection from trench excavation

PSLC CABLE DUCTS (SANS 1200 LC)

PSLC 3 MATERIALS

PSLC 3.1 Ducts

Add the following to SANS 1200 LC, sub-clause 3.1:

"Class 6 uPVC pipes (dia 110 mm or 160 mm) shall be used as ducts for electric cables under streets. Ducts for Telkom shall be of pitch-impregnated fibre pipes."

Add the following new sub-clause to SANS 1200 LC, sub-clause 3.1:

***PSLC 3.1.1 Supply of ducts by Telkom**

"Notwithstanding any provisions of the contract in terms of which the Contractor is required to provide all materials necessary for the construction of the works, Telkom will supply the ducts for telephone cables. Consequently, the Contractor's obligations under the contract shall include taking delivery, the construction, completion and maintenance of the works and the provision of all labour, materials (other than those that are to be supplied by Telkom), plant, temporary works, and everything, whether of a temporary or permanent nature, required in and for such construction, completion and maintenance, so far as the necessity for providing the same is specified in or reasonably to be inferred from the contract.

To assist Telkom in arranging for the goods to be supplied to suit the Contractor's construction program, the Contractor shall submit to the Employer's Agent, at agreed intervals, lists of his requirements. These lists shall be submitted at least 6 weeks (or another approved period) in advance of the date by which the goods are required. The Employer's Agent will ascertain in advance the actual dates of delivery of consignments and will advise the Contractor who shall adjust his construction program as necessary to minimise any disruption of his work.

In the event of supply being effected, the Contractor shall, provided that appropriate due notice of dispatch has been given, be responsible for taking immediate delivery of such goods as they arrive at the site. He shall be responsible for checking the actual deliveries against delivery notes. From the time of taking delivery the Contractor shall be responsible for the handling, transportation and storage of the goods and he shall at the same time accept the risk of damage to or loss of the goods.

Should any goods reach the point(s) of delivery in a damaged or an apparently damaged condition, the Contractor shall report this fact to the Employer's Agent, and he shall, before removing the goods from the transport vehicle, to avoid demurrage or similar charges, afford the Employer's Agent reasonable opportunity to inspect such damaged goods.

On receipt of the goods, the Contractor shall issue a receipt to Telkom in an approved form. The Contractor shall accept full responsibility for checking deliveries and ensuring that the goods supplied to him are in sound condition.

The Contractor's receipt will be deemed to indicate that he has satisfied himself that the goods enumerated on it are in sound condition. Unless the Contractor at the time of receipt advises the Employer's Agent that goods have been short delivered or are defective and obtains the Employer's Agent's approval to take delivery (which approval will not be unreasonably withheld), no subsequent claim for short deliveries or replacement of damaged goods will be considered by the Employer's Agent."

PSLC 3.2 Bedding

Replace SANS 1200 LC, sub-clause 3.2 with the following:

"The provisions of SANS 1200 LB: Bedding (Pipes) and the relevant project specification shall apply mutatis mutandis and payment shall be made under the appropriate payment clauses of SANS 1200 LB."

PSLC 3.3 Backfill

Replace SANS 1200 LC, sub-clause 3.3 with the following:

"The provisions of SANS 1200 DB: Earthworks (Pipe Trenches) and the relevant project specification shall apply mutatis mutandis and payment shall be made under the appropriate payment clauses of SANS 1200 DB."

PSLC 3.4 Cable duct markers

Add the following to SANS 1200 LC, sub-clause 3.4:

"Cable duct markers shall be provided as specified in PSLC 5.10, Position to be marked, as amended."

PSLC 5 CONSTRUCTION

PSLC 5.1 Excavation of trenches

PSLC 5.1.1 Trench widths and depths

Add the following to SANS 1200 LC, sub-clause 5.1.1:

"Trench widths shall be in accordance with the provisions of SANS 1200 DB: Earthworks (Pipe Trenches).

The minimum depth of cover over ducts shall be 600 mm from the final road level."

Add the following new sub-clause to SANS 1200 LC, sub-clause 5.1:

***PSLC 5.1.3 Excavation of trenches at road crossings**

"The minimum depth of cover over ducts shall be 300 mm where construction traffic is liable to cross them. Road crossings shall therefore be constructed after the construction of the roadworks has reached the stage where the required cover is available."

PSLC 5.2 Bedding and compaction of bedding

Replace SANS 1200 LC, sub-clauses 5.2.1 and 5.2.2 with the following:

"All ducts shall be laid on a Class C bedding according to the provisions of SANS 1200 LB: Bedding (Pipes). Backfilling shall be according to the provisions of SANS 1200 DB: Earthworks (Pipe Trenches)."

PSLC 5.4 Backfilling and compaction

Add the following to SANS 1200 LC, sub-clause 5.4:

"Road crossings shall be backfilled with sand from designated borrow pits, the site or commercial sources, whichever is applicable, up to underneath the subbase, and compacted to a minimum of 100 % of MOD AASHTO density."

PSLC 5.8 Road crossings

Substitute "0,5 m" in the last sentence of SANS 1200 LC, sub-clause 5.8 with "1,0 m" and add the following:

"Ducts for road crossings shall be effectively sealed by means of end caps."

PSLC 5.10 Position to be marked

Add the following to SANS 1200 LC, sub-clause 5.10:

"The lettering height shall be at least 70 mm.

The positions of ducts shall be marked by means of incisions on top of the kerb. The dimensions of such incisions shall be at least 40 mm long, 3 mm wide and 5 mm deep and the spacing, where more than one incision is required, shall be 20 mm. Ducts for Telkom crossings and electrical crossings shall be marked with green and red painted incisions respectively.

The draw wire, as specified in SANS 1200 LC, sub-clause 5.3.3, shall be secured to a 150 x 150 x 150 mm grade 20 MPa/19 mm concrete marker, which shall be installed with a depth of cover of 50-100 mm below the top of kerb or sidewalk level."

Add the following new sub-clause to SANS 1200 LC, clause 5:

***PSLC 5.12 Draw and joint boxes for Telkom cables**

"Draw and joint boxes shall be constructed strictly in accordance with the positions and details given on the plans."

PSLC 7 TESTING

PSLC 7.2 Compaction tests

Replace SANS 1200 LC, sub-clause 7.2 with the following:

"The Contractor shall, for at least one out of every five road crossings, submit density tests to the Employer's Agent at his own expenses. The decision as to which road crossing densities shall be tested, rests with the Employer's Agent. The Contractor shall, if such densities fail to meet the minimum requirements, prove at his expense that all the other densities do comply with the specified minimum requirements."

SANS 1200 LC SECTION 8 MEASUREMENT AND PAYMENT

PSLC 8.2 Scheduled items

PSLC 8.2.5 Supply, lay, bed and prove duct Unit : m

Substitute "GPO" in SANS 1200 LC, sub-clause 8.2.5 (a) with "Telkom".

Add the following to SANS 1200 LC, sub-clause 8.2.5 (a):

"The rates for the installation of Telkom distribution ducts parallel to streets shall first be submitted by the Employer to Telkom for approval. The installation of these ducts will only form part of this contract if approved by Telkom."

PSLC 8.2.8 Cable markers Unit : No

Add the following to SANS 1200 LC, sub-clause 8.2.8:

"The rate shall also cover the cost of the end cap and the incisions, concrete marker and draw wire, as specified in PSLC 5.8, Road crossings, as amended and PSLC 5.10, Position to be marked, as amended."

PSLD SEWERS (SANS 1200 LD)

PSLD 3 MATERIALS

PSLD 3.1 Pipes, fittings and pipe joints

Replace SANS 1200 LD, sub-clauses 3.1.1, 3.1.2, 3.1.3 and 3.1.4 with the following:

"Pipes for Sewers shall be Class 34 (Heavy Duty), solid wall UPVC pipes as specified in SANS 1200 LD, sub-clause 3.1.5."

PSLD 3.5.2 Precast concrete sections

Add the following to SANS 1200 LD, sub-clause 3.5.2:

"Dolomitic aggregate and dolomitic sand shall be used for the manufacture of precast concrete sections and for precast concrete manholes."

PSLD 3.5.7 Step irons

Replace SANS 1200 LD, sub-clause 3.5.7 with the following:

"Step irons shall be installed in all manholes deeper than 1,2 m. Step irons shall consist of polypropylene coated 12 mm high tensile steel, such as Calcamite or similar. The installation of the step irons shall be in accordance with the specification of the manufacturer."

PSLD 3.5.8 Manhole covers and frames

Replace SANS 1200 LD, sub-clause 3.5.8 with the following:

"Manhole covers and lids are to be precast concrete lids. Lids shall be alternative concrete type with an integral galvanized mild steel surround, as detailed on the drawings. Where specified manhole covers and frames shall be Type 2A (SANS 558) regardless of whether or not the manholes are subject to traffic loads."

Locking mechanism will be manufactured, as per details on drawings, from mild steel which is galvanised and cast into position as shown."

PSLD 3.6 Marker posts

Add the following to SANS 1200 LD, sub-clause 3.6:

"Marker posts shall be manufactured from 150mm diameter x 1,5m FC pipe filled with concrete. The half-length of pipe protruding above the ground shall be painted using approved exterior white enamel paint."

PSLD 5 CONSTRUCTION

PSLD 5.6 Manholes, inspection chambers, etc.

PSLD 5.6.1 General

Add the following to SANS 1200 LD, sub-clause 5.6.1:

"Manholes shall generally be precast concrete rings with sealed joints as detailed on drawing and shall be installed according to the manufacturer's specifications. After the joints have been sealed with an approved sealant in accordance with sub-clause 3.5.2 the joints shall be covered on the outside by a double wrapping of polyethylene adhesive tape."

Manhole cover levels are to be 200mm above natural ground level, except in carriage ways where they are to be flush with the surfacing, unless otherwise specified or ordered."

The flexible connections to the manholes shall be constructed as shown on Drawing SANS 1200 LD-2 (c) for concrete pipes."

Benching shall be constructed at a slope of 1 (vertical):4 (horizontal) and finished off with a 20mm thick high alumina screed or two coats of water tightness sealant to protect benching from decaying (one coat Xypex concentrate, followed up with one coat Xypex Modified, or similar approved products). The inside surface of the walls and the underside of the top slab to be treated with two coats of bituminous coating to prevent decay due to methane gas build-up in manhole. Contractor must discuss alternatives with the Employer's Agent before any application. (ABE Ravenol or similar approved)."

PSLD 5.9 Connecting sewers

PSLD 5.9.1 Location and details

Add the following to SANS 1200 LD, sub-clause 5.9.1:

"Erf connections shall be installed on the exact positions as indicated on the drawings where it shall be blanked off with an end cap. Danger tape shall be used to locate the sewer end and extend from the pipe end to final ground level.

All house connecting sewers shall be laid at a gradient of 1:60, except where otherwise ordered by the Employer's Agent"

PSLD 5.9.2 Marker posts

Add the following to SANS 1200 LD, sub-clause 5.9.2:

"At the time of backfilling the marker posts shall be installed at each manhole vertically above the pipeline centreline and not more than 1,5m from the manhole. The post shall protrude 0,9m above ground level or as otherwise specified by the Employer's Agent."

Add the following new sub-clause to SANS 1200 LD, sub-clause 5.9:

***PSLD 5.9.4 As-built information**

"The Contractor shall after completion of a section of pipeline submit the following as-built information:

- Inlet and outlet invert levels at manholes.
- Cover levels at manholes.
- Distances between manholes.
- Y,X Co-ordinates of manholes

The Employer's Agent will issue a form for this purpose.

Non-compliance with this Clause will constitute grounds for the withholding of payment from any certificate, at the sole discretion of the Employer's Agent."

PSLD 7 TESTING

PSLD 7.2 Tests and acceptance / rejection criteria

PSLD 7.2.1 Air test

Add the following to SANS 1200 LD, sub-clause 7.2.1:

"Air tests on the sewers shall be carried out in the presence of the Employer's Agent, after the trench backfill has been completed up to natural ground level. For each test a copy of the form "STANDARD AIR TEST FOR SEWERS" as supplied by the Employer's Agents shall be completed and certified by the Contractor and the Employer's Agent, as a record of the test."

PSLD 7.2.6 Watertightness of manholes

Add the following to SANS 1200 LD, sub-clause 7.2.6:

"The following test is to be carried out on completed manholes after backfilling has been completed:

The manhole shall be completely filled with water and allowed to stand for 24 hours. At the end of this period enough water shall be added to refill the manhole and in the subsequent period of 24 hours the water level shall

not drop by more than 75 mm per meter of depth of the manhole measured from the channel invert to the underside of the concrete cover slab. Manholes to be tested will be indicated on site by the Employer's Agent. Rectification, if necessary, will be carried out at the Contractor's expense."

SANS 1200 LD SECTION 8

MEASUREMENT AND PAYMENT

PSLD 8.2.1 Supply, lay, joint, bed and test pipeline

SANS 1200 LD, sub-clause 8.2.1 to include payment for:

PSLD 3.1	Pipes fittings and pipe joints
PSLD 7.2.1	Air test

PSLD 8.2.3 Manholes

SANS 1200 LD, sub-clause 8.2.3 to include payment for:

PSLD 3.5.2	Precast concrete sections
PSLD 3.5.7	Step irons
PSLD 3.5.8	Manhole covers and frames
PSLD 5.6.1	Manholes, inspection chambers, etc: General
*PSLD 5.9.4	As-built information
PSLD 7.2.6	Water tightness of manholes

Add the following to SANS 1200 LD, sub-clause 8.2.3:

"For the purpose of measurement and payment, the depth of a manhole, inspection chamber, etc, is defined as the depth from the top of the cover to the invert level of the manhole, inspection chamber, etc.

The rate for manholes shall cover the supply and installation of the complete manhole castings, step irons, with required manhole covers and frames, locking mechanisms (as scheduled) and concrete footings for the prevention of filtration where applicable."

PSLD 8.2.6 Erf connections

SANS 1200 LD, sub-clause 8.2.6 to include payment for:

PSLD 5.9.1	Location and detail

PSLD 8.2.9 Marker posts

SANS 1200 LD, sub-clause 8.2.9 to include payment for:

PSLD 3.6	Marker Posts
PSLD 5.9.2	Marker Posts

PSLE STORMWATER DRAINAGE (SANS 1200 LE)

PSLE 3 MATERIALS

PSLE 3.4.1 Bricks

Replace the first sentence of SANS 1200 LE, sub-clauses 3.1.4 with the following:

“Bricks used in stormwater structures shall be burnt clay engineering bricks, having a nominal compressive strength of 28 MPa, and complying with the requirements of SANS 227.”

Add the following new sub-clause to SANS 1200 LE, clause 3:

***PSLE 3.6 Composite drainage system**

“The fin drain system shall consist of a geonet drainage core and geopipe enclosed within a geotextile filter jacket. The fin drain shall be supplied prefabricated with geopipe for assembly on site. The fin drain shall have a minimum flow capacity of 0,19 l/s per metre (hydraulic gradient of unity and a pressure of 10 KPa) and shall not decrease in thickness by more than 20% under confining pressure of 10 kPa.

(a) Geonet Drainage Core

The core shall be non-corroding, rot-proof and manufactured from low density polyethylene with minimum characteristics as follows:-

Mass	:	822 g/m ²
Thickness	:	5mm
Tensile Strength	:	2,4 kN/m
Discharge capacity gradient of unity	:	3,0 l/sec under 100 kPa at a hydraulic

(b) Drainage Pipe

The geopipe to be used in conjunction with the prefabricated fin drain shall be manufactured from high density polyethylene with not less than 60% of the surface perforated.”

PSLE 5 CONSTRUCTION

PSLE 5.2 Bedding and laying

PSLE 5.2.1 General

Add the following to SANS 1200 LD, sub-clause 5.2.1:

“Pipes with ogee joints, where they pass under roads and also on curved pipelines in verges, shall be wrapped with two layers of hessian soaked in cementitious grout. The wrapping shall be 400mm wide and placed centrally over each joint.

Unless otherwise scheduled or indicated on the drawing, pipes with ogee joints shall be used.

Butt-ended pipes will not be permitted.

Lifting holes should be visible at the top of the pipe after laying and suitably closed off to prevent the ingress of soil.

Pipes may protrude up to 300mm into a manhole / catchpit. This relaxation will only be permitted if the pipe does not have to be cut. The “dead space” formed at the end of the manhole is to be suitably benched off to prevent the collection of silt and rubbish.”

Add the following new sub-clause to SANS 1200 LE, clause 5:

***PSLE 5.8 Installation of composite drainage system**

“The geopipe shall be placed at the bottom of the geonet with the channel section of the geopipe as the invert of the drain.

The geotextile filter shall then be wrapped around the geopipe and stapled/joined at 300mm intervals. The complete system shall then be placed in the trench ensuring that during the fin remains vertical. The system shall discharge into a manhole, catchpit or headwalls."

SANS 1200 LE SECTION 8 MEASUREMENT AND PAYMENT

PSLE 8.2.1 Supply and lay concrete pipe culverts

SANS 1200 LE, sub-clause 8.2.1 to include payment for:

PSLE 5.2.1 General

PSLE 8.2.9 (a) Brickwork

SANS 1200 LE, sub-clause 8.2.9 (a) to include payment for:

PSLE 3.4.1 Bricks

Add the following new payment items to SANS 1200 LE, sub-clause 8.2:

***PSLE 8.2.14 Composite drainage system Unit : m**

"The composite drain will be measured linearly on slopes overall as laid. Separate items will be scheduled for different diameters of pipes, where relevant.

The rate shall cover the cost of providing the composite drain and the cost of excavation, laying, bedding, backfilling, jointing and making connections into manholes. The rate shall include payment for *PSLE 3.6, Composite drainage system, and *PSLE 5.8, Installation of composite drainage system"

PSM ROADS (GENERAL) (SANS 1200 M)

PSM 2 INTERPRETATIONS

PSM 2.2 Definitions

Add the following to SANS 1200 M, sub-clause 2.2:

"The road construction material codes that are used in this Project Specification and drawings refer to "TRH 14: 1985 - Guidelines for road construction materials"."

PSM 5 CONSTRUCTION

Add the following new sub-clause to SANS 1200 M, clause 5:

***PSM 5.1 Traffic control/safety measures**

"When roads to be constructed under this contract join onto existing surfaced trafficked roads, the Contractor shall take all the necessary precautions to ensure the safety of the traveling public. To this end, signs warning through traffic of vehicles encroaching into the travelled way shall be erected by the Contractor prior to such work being undertaken. In addition flagmen shall be installed along the through road. These control measures shall be checked and recorded on a daily basis.

Under no circumstances shall drums be permitted to be used as traffic demarcation devices.

All signs must comply with the latest edition of the South African Road Traffic Sign Manual."

PSM 6 TOLERANCES

Add the following new sub-clause to SANS 1200 M, clause 6:

***PSM 6.4 Level control of road layers**

"The Contractor shall submit to the Employer's Agent, at the time of requesting acceptance of a road layer, a record of the surface levels of that section, taken at metre intervals to coincide with the level pegs. A sample form will be obtainable from the Employer's Agent."

PSM 7 TESTING

PSM 7.1 General

Add the following to SANS 1200 M, sub-clause 7.1:

"The random sampling method of TMH 5, for the location of positions, for field density testing will not necessarily be applied by the Employer's Agent. Density testing shall be carried out where, in his opinion, the density of the compacted layer is suspect. The Contractor shall present the full width of the layer, between the stated linear stake values, for acceptance. Only in exceptional cases will partial widths of a layer be accepted for testing."

PSM 7.3 Routine inspection and testing

Add the following to SANS 1200 M, sub-clause 7.3.1:

"The request for acceptance of a layer shall be submitted in writing, specifying the exact location of the section and type of layer. On receipt of all these details the Employer's Agent will arrange for the necessary inspections and tests to satisfy himself that the road layer complies. Testing will be carried out as expeditiously as possible, and the results will be available within 24 hours of receipt of test request. The Contractor shall backfill the test holes left in the layer with a similar material to that of the layer tested and compact the material to a similar density. Concrete shall not be used."

Add the following to SANS 1200 M, sub-clause 7.3.2:

"Notwithstanding the requirements for minimum densities for single tests, as set out in the relevant standardized specification, no lot for which any single test result is below the specified density will be deemed to comply with the requirements for density.

The Contractor shall bear the cost of all tests carried out by the Employer's Agent at the request of the Contractor or as specified for process control."

PSM 7.4 Compaction control

Add the following to SANS 1200 M, sub-clause 7.4:

"Density test shall be carried out by the Contractor on each layer of the selected subgrade, subbase, base-course and shoulders/layers as soon as possible but not later than twenty-four hours (24) after compaction of that layer has been completed, and the results of the test shall be submitted to the Employer's Agent without delays and in any case not later than twelve hours (12 hours) after they become available.

The contractor shall locate and test any soft or wet areas evident in any layer and shall, if these tests fail, re-compact and retest such areas for density before requesting the Employer's Agent to carry out check tests.

The Contractor shall provide adequate equipment and facilities for carrying out the tests required to be performed by him. Should the Employer's Agent at any time consider that the equipment and facilities are inadequate for this purpose, he may instruct the Contractor to cease work on the completion of subgrade, sub-base and base course until such time as the Contractor has remedied the deficiency of equipment, labour and facilities. The results of the test carried out by the Employer's Agent shall be regarded as final."

Add the following new sub-clause to SANS 1200 M, clause 7:

***PSM 7.5 Employer's Agent's discretion**

"Notwithstanding the provision of SANS 1200 M, clause 7 and of PSM 7, testing of a section of completed work shall be at the sole discretion of the Employer's Agent who may refuse to check test and consequently not approve a section of work which contains obvious defects such as loose patches, over-wet material etc."

SANS 1200 M SECTION 8 MEASUREMENT AND PAYMENT

PSM 8 Measurement and payment

SANS 1200 M, clause 8 to include payment for:

PSM 2.2	Definitions
PSM 5.1	Traffic control/safety measures
PSM 6.4	Level control of road layer
PSM 7.1	General
PSM 7.3	Routine inspection and testing
PSM 7.4	Compaction control
PSM 7.5	Employer's Agent's discretion

Add the following new sub-clause to SANS 1200 M, clause 8:

***PSM 8.1 Inspection and testing of a road layer**

"The cost of refilling and compacting the density test holes shall be included in the rate tendered for the construction of that layer."

PSMK KERBING AND CHANNELLING (SANS 1200 MK)

PSMK 3 MATERIALS

PSMK 3.2 Precast kerbing and channelling

PSMK 3.2.1 General

Add the following to SANS 1200 MK, sub-clause 3.2.1:

“Precast units as indicated on the drawings shall be required in 1m lengths. Lengths of 300 mm shall be used in bellmouths and for radii less than 20 m. These kerbs shall be cast and not saw-cut.”

PSMK 3.9 Bedding material

Replace SANS 1200 MK, sub-clause 3.9 with the following:

“The material on which precast kerbs and channels are bedded shall consist of Grade 15/19 concrete to SANS 1200 GA and to the dimensions indicated on the drawings.”

PSMK 5 CONSTRUCTION

PSMK 5.2 Precast concrete kerbing and channelling

Replace the second paragraph of SANS 1200 MK, sub-clause 5.2 with the following:

“Provision shall be made for expansion joints of width 10 mm at intervals not exceeding 10 m for kerbing, channelling and edging. The joints shall be filled with a suitable silicone or polysulphide sealant.

Notwithstanding the fact that vertical curves have not been specified where changes to grade of up to 2% occur, the kerbs and channels shall be laid to levels based on a minimum vertical curve length of 20 m.

No change in grade shall be applied on kerbs in bellmouths unless specific levels are indicated.”

SANS 1200 MK SECTION 8

MEASUREMENT AND PAYMENT

PSMK 8.1 Basic principles

Add the following new sub-clause 8.1.4 to SANS 1200 MK, sub-clause 8.1:

“Measurement and payment for bedding as well as the backing of kerbs as specified in PSKM 5.2, as amended, shall be included in the separate items scheduled in terms of SANS 1200 MK, sub-clause 8.2.1 and 8.2.2. The rates shall cover the cost of supplying and installing the bedding as specified in PSKM 3.9, as amended. The rates shall include payment for PSKM 3.2.1, as amended.”

PSMM ANCILLARY ROADWORKS (SANS 1200 MM)

SANS 1200 MM SECTION 8 MEASUREMENT AND PAYMENT

PSMM 8.3.4 Excavation and backfilling and concreting (if any) for sign supports

Replace: "Excavation and backfilling and concreting (if any) for sign supports.....Unit: m³"
with the following:

"PSMM 8.3.4 Excavation and backfilling and concreting (if any) for sign supports.....Unit: No."

Add the following to SANS 1200 MM, sub-clause 8.3.4:

"The unit of measurement shall be the number of sign post foundations excavated, backfilled and concreted as specified. The rate shall include for all plant, labour and materials needed to cast concrete surrounds and backfilling with soil for each sign post base."

PSPG HIGH SECURITY FENCES AND GATE FENCING

PSG1 GENERAL

PSPG 1.1 Scope

This specification covers material requirements and installation of security fencing and gates.

PSPG 1.2 Work included

Furnish and install fence and gates, and accessories as required and shown.

PSPG 1.3 Submittals

The following must be submitted for approval by the Employer's Agent before the installation of the security fence commences.

- a) Certificate of compliance for materials and coatings.
- b) Shop drawing for gates.
- c) Quality control program shall be submitted to the Employer's Agent for review prior to commencement of any work.

PSPG 2 High security fences and gates

PSPG 2.1 General

- a) All steel materials shall be of good commercial quality, galvanized steel.
- b) All pipes shall be galvanized, one piece without joints. Furnish moisture proof caps for all posts.
- c) Zinc coating shall be smooth and essentially free from lumps, globs, or points.
- d) Miscellaneous material shall be galvanized.

PSPG 2.2 Description of fence system

PSPG 2.2.1 Post

The posts shall comply with the following specifications:

- a) Post shall be 2.7m long.
- b) Post width shall be 85mm tapering to 45mm with a depth of 85mm.
- c) Post shall include locking mechanism to secure panel edge.
- d) Post shall be sealed with a UV stabilized polymer cap.
- e) Post shall be galvanized.
- f) Post foundation shall be 600mm x 400mm² and minimum 15 MPa concrete (28-day compressive strength) concrete, 19mm aggregate; no air entrapment.

PSPG 2.2.2 Panel

The panel shall comply with the following specifications:

- a) Panel shall be 3.297m width and 2.1m high.
- b) Panel aperture size (centres) shall be 76.2mm x 12.7mm.
- c) The panel shall be reinforced with 4 x 50mm deep "V" formation horizontal recessed bands (rigidity).
- d) Panel shall have 2 x 70° flanges along sides (internal fixtures – all fixtures shall be on the inside of the fence line).
- e) Panel shall have 2 x 30° flanges along top and toe (integrated rigid angle).
- f) Panel post shall have a flush panel post finish with no climbing aid.
- g) Panel shall be affixed to post over 48 line wires using 8 x Double bolt comb clamps and 8 x Single bolt comb clamps using 24 x Anti vandal bolts.
- h) Panel and fixtures shall be galvanized.

PSPG 2.2.3 Topping

A 100mm high toughened steel spike shall be affixed to top panel edge, internally at 150mm intervals using Anti-vandal bolts. Spike finish shall be Hot Dipped Galvanized.

PSPG 2.2.4 Anti-burrow

The fence shall be equipped with the specified anti-burrow option.

PSPG 2.2.3 Gates**PSPG 2.2.3.1 Swing gates**

All connections and joints shall be welded to form rigid frames or assembled with corner fittings. Hinges shall not twist or turn under the action of the gate and shall be so arranged that a closed gate cannot be lifted off the hinges to obtain entry.

PSPG 2.2.3.2 Sliding gates

Gate frame fabrication and miscellaneous items shall be similar to Swing Gates. All fittings, brackets and rear wheel tracks shall be standard manufactured products for the intended application.

PSPG3 Execution**PSPG 3.1 Clearing the fence line**

The fence line shall be cleared over a width of at least 1 m on each side of the centre line of the fence and surface irregularities shall be graded so that the fence will follow the general contour of the ground. Clearing the line shall include the removal of all trees, scrub, stumps, isolated boulders or stones and other obstruction which will interfere with the construction of the fence. Stumps within the cleared space shall be grubbed as described in SANS 1200C. The bottom of the fence shall be located at a uniform distance above the ground line in accordance with the requirements shown on the drawings. All material removed shall be disposed of by the Contractor.

PSPG 3.2 General

Install all fencing and gates in accordance with the drawings, specifications, instructions, and as specified lines and grades indicated. Line posts shall be spaced at intervals not exceeding 3.3m. Terminal posts shall be set at abrupt changes in vertical and horizontal alignment.

PSPG 3.3 Posts

Post holes shall be cleared of loose material. Waste material shall be spread where directed by the Employer's Agent. The ground surface irregularities along the fence line shall be eliminated to the extent necessary.

Posts shall be set plumb, and follow the indicated alignment. All posts shall be set to the depth indicated on the design documents. Concrete shall be thoroughly consolidated around each post, free of voids, and finished with a domed shaped surface, with the base of dome at grade elevation. Concrete shall be allowed to cure prior to installing any additional components to the posts.

Concrete footings shall be carried down to at least the depth indicated on the design documents and shall not be smaller than the dimensions shown. Where a rock layer is encountered within the required depth to which the post is to be erected, a hole of a diameter slightly larger than the largest dimension of the post may be drilled into the rock and the post grouted in. Then the regular concrete footing shall be placed between the top of the rock and the top of the footing elevation as shown on the design documents. Posts shall be approximately centered in their footings. All concrete shall be placed promptly and consolidated by tamping or other approved methods. Where the ground is firm enough to permit excavation of the post hole to neat lines, the concrete may be placed without forms by completely filling the hole. Curing may be achieved by covering the concrete with not less than four inches of loose moist material immediately after placing concrete, or by using a curing compound. All excess material from footings, including loose material used for curing, shall be disposed of as directed by the Employer's Agent.

Where the ground cannot be satisfactorily excavated to neat lines, forms shall be used to place concrete for footings. Under these conditions the earth and forms coming in contact with the concrete shall be moistened and all ponded water shall be removed from the hole prior to placing concrete. When forms are removed, the footing shall be backfilled with moistened material, and thoroughly tamped. The top of the concrete shall then be covered

with not less than 100 mm of loose moistened material or use curing compound if the 7-days cure is not completed. All excess material from footings, including loose material used for curing, shall be disposed of as directed.

PSPG 3.4 Gates

Gates shall be installed at the locations shown. Hinged gates shall be mounted to swing as indicated. Latches, stops, and keepers shall be installed as required. Slide gates shall be installed as recommended by the manufacturer.

Gates shall be erected at the positions indicated on the drawings. Gates shall be hung on gate fittings as indicated on the drawings and shall be erected such that they swing in a horizontal plane at right angles to the gate posts, clear of the ground in all positions. For double leaf gates the gap between the individual gates shall not exceed 20 mm when closed and shall not be further than 40 mm from the gate post when closed.

PSPG 3.4.1 Adjusting

Adjust gate to operate smoothly, easily, and quietly, free from binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

PSPG SECTION 8

MEASUREMENT AND PAYMENT

PSPG 8.1 Fence clearance

Clearing the fence line, 2,0m wide strip Unit : km

The rate shall cover clearing the fence line as specified including the removal of trees of girth less than 1,0 m, stones and other obstructions, the disposal of all waste material resulting from the clearing operations including all haul.

The removal of trees and stumps with a girth exceeding 1,0 m shall be paid for separately.

Clearing of the fence line shall be measured linearly along each fence line cleared as directed by the Employer's Agent.

PSPG 8.2 Security fence

Supply, fabricate, deliver and install security fence complete as detailed on drawing.....Unit: km

The rate shall cover the supply of all materials and the full installation thereof to erect the security fence as per the drawing and the project specifications.

PSPG 8.3 Security Gate

Supply, fabricate, deliver and install security gate as detailed on drawing..... Unit : Sum

The rate shall cover the supply of all materials and the full installation thereof to erect the security gate as per drawing and the project specifications.

PSDQ CONCRETE RETAINING BLOCK WALL

PSDQ 1 SCOPE

This is a Particular Specification and covers the erection of gravity / composite / precast block retaining walls in terms of the latest amended edition of the SANS 508:2008. This specification covers the construction of a concrete retaining block system for the stabilization of the platform fill slopes and to provide protection of the platform during flooding conditions.

PSDQ 2 INTERPRETATION

PSDQ 2.1 Supporting specification

In addition the specifications and requirements of the supplier of the Loffelstein CRB or similar approved units shall be adhered to. The block shall comply with the minimum specifications as stated in the table below and in the SANS 508:2008, and shall also be erected in accordance with the dimensions shown on the design drawings.

21 day crushing strength of blocks:

• Under full platen contact	:	Avg 13MPa with a minimum of 11MPa
• Under simulated in-situ point loading	:	8 MPa (minimum)
• Coefficient of friction for interlocking sliding	:	0,54 (Value at 95%)
• Block dimensional variations	:	Approx 3mm (length, width and height)
• Block mass variation	:	Not less than 95% of specified mas.

Tests and associated results, as conducted by an approved authority / laboratory, shall be made available to the Employer or his Agent for approval, e.g.:

- 21 day crushing strength (As specified above)
- Determination of the coefficient of friction for interlocking and sliding between blocks
- Representative pullout resistance (Block and geogrid connection test / Determination of pullout resistance of various block types)

PSDQ 3 MATERIALS

PSDQ 3.1 Precast concrete units

Apart from the specification of concrete mentioned hereafter, all materials shall comply with SANS 508:2008 specifications. Concrete used for gravity retaining wall footings shall comply with the requirements of SANS 1200 G.

PSDQ 3.2 Concrete footing

Strip clearing for the retaining wall shall be carried out in accordance with SANS 1200 C. Concrete used for the foundation bases, where required, shall comply with SANS 1200 GA, as applicable, for strength concrete of Class 35/19.

PSDQ 3.3 Curing compound

The curing compound for the concrete foundations for Concrete Retaining Wall System shall be a white pigmented natural resin based liquid curing compound complying with ASTM C309-74.

PSDQ 3.4 Geotextile material

The applicable provisions specified in PSDQ 8.4 shall apply.

PSDQ 3.5 Bedding material

Where poor in-situ material is encountered below the concrete base, rock fill or 19 mm stone or a crusher-run or material complying with the requirements of sub-clause 3.3.3 of SANS 1200 MF, shall be used as bedding material. Where concrete bases are not required for low height revetment, bases shall be constructed using similar quality crusher-run material, or on suitable in-situ material as directed by the Employer's Agent.

PSDQ 3.6 Block filling material

An approved granular soil material suitable for supporting plant growth shall be used for filling the blocks.

PSDQ 5 CONSTRUCTION

PSDQ 5.1 Footing foundation

The footings shall either be cast in-situ concrete or constructed from an approved crusher-run material or in-situ material as directed by the Employer's Agent or as shown on the drawings.

PSDQ 5.2 Placing and backfilling

Backfilling behind the blocks is to be placed in layers not exceeding 200mm and compacted to 93% MOD AASHTO.

PSDQ 6 TOLERANCES

PSDQ 6.1 Permissible deviations

The permissible deviation on the surface of the concrete footings shall be 3 mm on the flatness of the plan surface.

The completed retaining wall shall be true to the setting out line and blocks shall be installed horizontally with the use of a line and spirit level (3 blocks will be levelled simultaneously in length and in depth), unless otherwise stated. The height of the lower block above the final ground level shall not vary by more than 100 mm from that shown on the approved detail drawings.

PSDQ 7 TESTING

PSDQ 7.1 Concrete

The requirements of SANS 1200 GA shall apply to the testing of concrete used in the footings where applicable. The requirements of SANS 508-2008 shall apply to the concrete retaining blocks.

PSDQ SECTION 8

MEASUREMENT AND PAYMENT

Various items shall be listed as given below. The tendered rates shall include full compensation for the necessary plant, labour and material to execute the works as listed, including the spoil of surplus material on site and control density testing.

PSDQ 8.1 CRB Loffelstein blocks

Sandstone CRB blocks Unit: sq.m

The rate shall cover the cost of supplying, loading, transporting and off-loading, together with the cost of any additional trimming of the cut batter slopes, of laying the precast units to specified heights, of backfilling, and for the provision of approved granular soil and filling of the units, and all plant, equipment and labour to complete the wall.

Items will be provided for height increments of 2 m measured vertically from the top to the footing, or in the case of a perched condition, from the near side finished road level. Excavation for required cut batters will be paid under SANS 1200 DM.

PSDQ 8.2 Bedding material

Crusher-run material for bedding below concrete footings /G7 Material Unit: cu.m
Crusher-run material for wall footings material Unit: cu.m

The rate shall cover the cost of acquiring, regardless of distance, the required material from commercial sources, delivering and placing the material, compacting and finishing to the required tolerances.

The volume of gravel bedding material will be computed from the dimensions of the footings as shown on the drawing or as directed by the Employer's Agent.

PSDQ 8.3 Supply concrete for footing

Concrete Class 35/19..... Unit: cu.m

The rate shall cover the cost of the design of the concrete mix, the provision of concrete, mixing, testing, placing, compacting, forming of stop-ends and unforeseen construction joints, striking off or levelling as applicable, and curing and repairing where necessary. It shall also include for all excavation for the concrete footing and excavation for crusher-run bedding beneath the footings, and for disposal of the excavated material. The rate shall also include the steel reinforcement mesh as specified per drawing.

PSDQ 8.4 Supply geotextile fabric (A2/U14)

Geotextile Fabric (A2/U14)..... Unit: sq.m

The rate shall cover the cost of supply, lay and bed into position as shown on the drawing.

PSDQ 8.5 Fill behind retaining wall

Use G7 material from stockpile and stabilize with 2% cement and place and compact in layers of 150mm to 93% MOD AASHTO density behind retaining wall blocks..... Unit: cu.m

The rate shall cover the cost of supply, lay and bed into position as shown on the drawing.

PSER REVEGETATION (SPEC ER)

PSER 1 Scope

This Specification covers the requirements for the planting and establishment of vegetation on Site.

PSER 3 Materials

PSER 3.1 Seed

Seed species used for hydroseeding shall be *Lolium multiflorum*, *Eragrostis teff* and *Cynodon dactylon*.

PSER 3.2 Mulch

Mulch shall be Aquasorb, Stoscosorb, Synpol H or equivalent product approved by the Employer's Agent.

PSER 3.3 Soil stabilization

Soil stabilization shall be carried out by the addition of a soil binder such as Wheat straw together with Flobond or equivalent product approved by the Employer's Agent.

PSER 3.4 Fertilizers

The Contractor shall use 2:3:2 and Super phosphate as fertilizers.

PSER 4 Plant

PSER 4.1 Hydroseeder

The hydroseeder shall be capable of pumping the specified seed mix, fertilizer and soil stabilizer (mixed in water) at the specified rates over the areas to be seeded. The slurry distribution lines shall be large enough to prevent stoppage, and the discharge line shall be equipped with a set of hydraulic spray nozzles suitable for the even distribution of the slurry on the various slopes to be seeded.

PSER 5 Construction

PSER 5.1 Preparation of areas to be hydroseeded

Prior to revegetation / rehabilitation of the stockpiles the Contractor shall remove all remnants of building materials and other foreign debris from the stockpiles. Embankments shall be shaped to the required slopes and levels.

PSER 5.2 Hydroseeding

The prepared area shall be hydroseeded using the following specification:

Seed mixture:

<i>Lolium multiflorum</i>	10 kg/ha
<i>Eragrostis teff</i>	10 kg/ha
<i>Cynodon dactylon</i> (Kweek)	20 kg/ha
Mulch (as directed by the Employer's Agent)	20kg/ha
Soil stabilization (as directed by the Employer's Agent)	12 kg/ha
Fertilizer : 2:3:2(30)	400 kg/ha
Super phosphate	200 kg/ha

Prior to spreading the seed mixture or laying the grass sods an approved fertilizer shall be applied evenly to the whole area to be grassed. The fertilizer shall be super phosphate applied at a rate of 200 kg per hectare plus 2:3:2 (30) mixture applied at a rate of 400 kg per hectare. The fertilizer shall be free flowing and suitable for application with approved equipment, delivered to site in bags or other convenient containers each fully labelled and bearing the name of the fertilizer and trade name of the producer.

Hydroseeding machines shall be thoroughly cleaned after each operation and the mixture shall be kept uniform during the seeding operation by means of a power-driven agitator.

PSER 5.3 Traffic on re-vegetated areas

No construction equipment, vehicles or unauthorised personnel shall be allowed onto areas that have been vegetated.

PSER 5.4 Establishment

Establishment shall consist of maintaining the surface to the required slopes and levels without erosion, watering, weeding, fertilizing, disease and insect pest control. As well as any other procedure consistent with good horticultural practice necessary to ensure normal, vigorous and healthy growth of the plant material on site. Establishment shall commence immediately after hydroseeding and shall continue until a satisfactory cover, as detailed in this Specification, has been achieved and the Certificate of Completion has been issued.

In the absence of adequate rainfall, all seeded areas shall be watered once weekly, during the first month, and once every two weeks during the second month. Rainfall of less than 60mm in the first month and less than 45mm in the second month is regarded as inadequate water supply. Watering should be carried out using a fine nozzle spray to avoid erosion and disturbance of the vegetation.

PSER 7 Testing

PSER 7.1 Acceptable cover

Acceptable cover shall have been achieved when not less than 60% of the area seeded is covered with acceptable plants and there are no bare patches greater than 800 mm in maximum dimension through the area.

PSER SECTION 8

MEASUREMENT AND PAYMENT

PSER 8.1 Commercial seed

Commercial seed Unit: kg

The unit rate for commercial seed shall cover the cost of the supply of seed to the place of application, of labelling and certification, of sampling and testing, of labour, equipment and transport and of any other thing necessary for the proper execution of the work to the satisfaction of the Employer's Agent.

PSER 8.2 Mulch

Mulch (type stated) Unit: kg

The unit rate for mulch shall cover the cost of supply and transport to the point of application, of all labour, tools, equipment, plant and of any other thing necessary for the proper execution of the work to the satisfaction of the Employer's Agent.

PSER 8.3 Soil stabilizer

Straw Unit: ha

Soil stabilizer (chemical) Unit: kg

The unit rate for soil stabilizers shall cover the cost of supply and transport to the point of application, of all labour, tools, equipment, plant and of any other thing necessary for the proper execution of the work to the satisfaction of the Employer's Agent.

PSER 8.4 Fertilizer

Fertilizer (type stated) Unit: kg

The unit rate for fertilizer shall cover the cost of supply and application of fertilizer whether by hand or mechanical means, of all labour, tools, equipment, plant and of any other thing necessary for the proper execution of the work to the satisfaction of the Employer's Agent.

PSER 8.5 Hydroseeding

Hydroseeding Unit: m²

The unit rate for hydroseeding shall cover the cost of mixing and agitating of all the materials including seed, fertilizer, and soil stabilizer required in the seed-cocktail, of applying the mixture, of watering, weeding and re-hydroseeding bare patches. As well as costs of all labour, tools, equipment, plant, transport and of any other thing, except mowing of grass, which may be necessary to establish acceptable cover. Also included is the maintenance of the grass during the establishment period to the satisfaction of the Employer's Agent.

PSER 8.6 Maintenance

Maintenance of planted area Unit: m²

The area which has been grassed shall be maintained by the Contractor for a period of eight weeks after grassing of the entire area has been completed to the satisfaction of the Employer's Agent. Any areas which fail to grow or any sparse patches shall be replaced with fresh sods to obtain a uniform healthy state of growth over the entire area.

The rate shall cover the cost of providing transport, equipment, labour and materials for watering, mowing, weeding, topdressing and maintaining the grassed area in a lush and healthy condition for a period of eight weeks as specified.

C3.5. Management

C3.5.1 Management of the Works

C3.5.1.1 Applicable Management Standards

The following SANS 1921 standards will apply:

South African National Standards (SANS):	
SANS 1921-1	General engineering and construction works
SANS 1921-4	Third-party management support in works contracts

C3.5.1.2 Construction Programme

The programme shall clearly show the order in which the Contractor proposes to carry out the Works, the critical path, the proposed rate of progress and a linked cash flow forecast.

The Contract period shall include all Saturdays, Sundays and non-working days, including public holidays and the annual year-end shutdown period. The programme shall be submitted to the Employer's Agent for review and acceptance.

The Contractor shall allow in the Programme for normal weather conditions reasonably expected for the locality and season. Claims arising from weather conditions shall be assessed on the basis of the actual impact on the critical path of the Accepted Programme and not solely on recorded rainfall.

C3.5.1.3 Operation Requirement

The existing water supply system shall remain operational during construction except where otherwise approved by the Employer's Agent. The Contractor shall plan and execute the Works to minimise disruption to the existing water supply infrastructure.

C3.5.1.4 Sequence of The Works

In order to complete the Works within the Time for Completion, it is anticipated that certain activities may need to be undertaken concurrently.

All areas of the Site required for the execution of the Works will be made available to the Contractor from the commencement of the Contract.

Construction activities shall be executed in accordance with the Accepted Programme and disruption to traffic, existing services and normal activities on the Site shall be kept to a minimum.

C3.5.1.5 Method Statement

The Contractor shall submit method statements for activities identified in the Contract, the Environmental Management Programme (EMPr), the Health and Safety Plan, or as instructed by the Employer's Agent.

Method statements relating to environmental matters shall be submitted to the Environmental Control Officer (ECO) for review and approval, with a copy provided to the Employer's Agent.

All other method statements shall be submitted to the Employer's Agent for review and acceptance.

C3.5.1.6 Quality Plans and Control

The Contractor shall submit a Quality Control Plan. The Quality Control Plan shall include Inspection and Test Plans (ITPs), procedures for the control of non-conforming work, calibration requirements for testing equipment and arrangements for maintaining quality records and test results. The Quality Control Plan shall be submitted to the Employer's Agent for review and acceptance.

The Contractor shall carry out all testing required in terms of the Contract and shall submit the results thereof to the Employer's Agent for review.

The onus to produce Works that conforms in quality and accuracy of detail to the requirements of the Specifications and Drawings rests with the Contractor.

The Contractor shall, at its own expense, institute and maintain a quality control system and provide experienced engineers, technicians, foremen, surveyors, materials technicians and other technical staff, together with all necessary transport, instruments and equipment, to ensure adequate supervision and control of the quality of the Works at all stages of the Contract.

The cost of the Contractor's supervision, quality control and process control testing shall be deemed to be included in the tendered rates and prices. The Contractor shall comply with the minimum testing frequencies specified in the Contract and shall increase such frequencies where necessary to ensure compliance with the Contract requirements.

Upon submission of any portion of the Works for inspection, the Contractor shall provide the Employer's Agent with all relevant test results, measurements, levels and records demonstrating compliance with the Contract. The Employer's Agent shall not be required to inspect any work submitted without such supporting information.

Any acceptance by the Employer's Agent of any material, Plant and its operation, construction procedure, or any section of the completed Works, shall not imply any relaxation of the requirements governing the quality of materials, workmanship or completed Works, nor relieve the Contractor of any obligations, responsibilities or liabilities under the Contract.

C3.5.1.7 Environmental

The Contractor shall comply with the Environmental Management Programme (EMPr), all conditions of the Environmental Authorisation and all applicable environmental legislation and requirements.

The Environmental Control Officer (ECO) shall liaise directly with the Contractor on general environmental matters. Environmental matters affecting the execution of the Works shall, however, be channelled through the Employer's Agent or the Employer's Agent's Representative.

C3.5.1.8 Accommodation of Traffic on Public Roads Occupied by the Contractor

The Contractor shall implement all measures necessary to ensure the safety of the public, road users and construction personnel where the Works affect public roads or areas adjacent thereto.

The Contractor shall maintain safe and convenient access at all times and shall minimise disruption to traffic and pedestrian movement.

Where roads are crossed, half-width construction and traffic accommodation shall be utilised unless otherwise approved by the Employer's Agent.

C3.5.1.9 Testing

Every completed layer or section of the Works shall be subject to check testing by the Contractor. Once the Contractor has satisfied itself that the Works comply with the requirements of the Contract, the Employer's Agent shall be requested to perform acceptance testing for the particular section. When giving notice, the Contractor shall provide the Employer's Agent with the results of its check testing demonstrating compliance with the Contract.

Failure by the Contractor to notify the Employer's Agent, provide the required information or perform any specified test may result in the Employer's Agent withholding certification of the relevant work until the required information and test results have been submitted.

The Employer's Agent shall be under no obligation to perform acceptance testing. Where the Employer's Agent elects not to perform a particular acceptance test after notification by the Contractor, the Employer's Agent may issue a written instruction permitting the Contractor to proceed with the relevant Works without the acceptance test being performed.

Nothing contained in this clause shall relieve the Contractor of its responsibilities under the Contract or limit the tests which the Employer's Agent may require or perform in terms of the Contract.

Acceptance testing shall be carried out by a laboratory selected by the Employer's Agent. The Employer's Agent requires twenty-four (24) hours' notice from the Contractor in order to perform the relevant acceptance testing.

C3.5.1.10 Completion

The Certificate of Completion shall be issued when the Contractor has completed all work and rectified all defects identified by the Employer's Agent for Completion in accordance with the Contract and such work has been accepted in writing by the Employer's Agent.

The Certificate of Completion shall only be issued once all record information required in terms of the Contract has been submitted, including as-built information, operation and maintenance manuals, commissioning documentation and operating instructions, where applicable.

C3.5.1.11 Commissioning and correction of defects

Commissioning of the Works shall only commence once all inspections, tests and checks required in terms of the Contract have been successfully completed.

The Contractor shall promptly rectify all defects and deficiencies identified during testing, commissioning and the Defects Liability Period and shall provide all labour, materials, plant and equipment necessary to demonstrate compliance with the Contract requirements..

C3.5.1.12 Key Personnel

The Contractor and the Employer's Agent shall each maintain an up-to-date schedule of their Key Personnel, including names, positions, telephone numbers and email addresses.

The schedule shall be made available to the Employer, Employer's Agent and Contractor and shall be updated whenever there is a change in personnel or contact details.

The Contractor shall immediately notify the Employer's Agent of any proposed changes to the Key Personnel.

C3.5.1.13 Management Meetings

The following formal project meetings shall be held on Site, at the office provided by the Contractor for meetings, between representatives of the Employer, Employer's Agent, Employer's Agent's Representative, Contractor and other relevant stakeholders:

- Technical meetings (every four weeks, alternating fortnightly with Site meeting); and
- Site meetings (every four weeks, alternating fortnightly with Technical meetings)

Representatives attending such meetings shall have the necessary delegated authority in respect of planning, change management, health and safety and other matters relevant to the execution of the Works.

The Contractor shall make allowance in the Programme for regular on-site project coordination meetings.

The Contracts Manager and Construction Manager shall attend all project meetings unless otherwise agreed by the Employer's Agent.

The cost of complying with the requirements of this clause shall be deemed to be included in the rates and prices for the Time-Related Items.

C3.5.1.14 Forms for Contract Administration

The Employer's Agent may make available standard forms and templates for contract administration purposes. The Contractor shall use such forms where instructed by the Employer's Agent.

C3.5.1.15 Daily Records

The Contractor and the Employer's Agent's Representative shall maintain daily records of resources utilised on the Site, including personnel, construction equipment, weather conditions, work performed, delays, instructions received and any significant events affecting the execution of the Works.

The Contractor shall provide a rain gauge and two maximum/minimum thermometers and shall install them in accordance with the requirements of the South African Weather Service or other approved standard.

The Contractor shall maintain daily records of rainfall and maximum/minimum temperatures and shall record such information in the Site Diary.

Accurate rain gauge readings shall be taken daily at 08:00, unless otherwise agreed by the Employer's Agent. The Contractor shall take all reasonable precautions to prevent interference with or damage to the rain gauge and associated recording equipment.

The Contractor shall provide a signed copy of the previous day's Site Diary and resource records to the Employer's Agent's Representative on a daily basis. Any differences between the records maintained by the parties shall be discussed and resolved as soon as reasonably practicable.

C3.5.1.16 Communication System

All communications relating to the Contract shall be in writing and shall be addressed to the Employer's Agent unless otherwise provided for in the Contract.

Any verbal instruction, direction or agreement affecting the Works shall be confirmed in writing as soon as reasonably practicable.

The Contractor shall use any standard forms and templates issued by the Employer's Agent for contract administration purposes where instructed to do so.

C3.5.1.17 Payment Certificates

The quantities measured for interim and final payment certificates shall be agreed with the Employer's Agent's Representative prior to submission of the Contractor's monthly payment certificate to the Employer's Agent for certification.

The payment certificate shall comprise, as a minimum:

- Cover letter;
- Tax invoice;
- Bill of Quantities;
- Summary page;
- Contract Price Adjustment (CPA) calculations, where applicable;
- Materials on Site (MOS) documentation, where applicable; and
- Any supporting documentation reasonably required by the Employer's Agent.

Where applicable, claims for Contract Price Adjustment (CPA) and Materials on Site (MOS) shall be submitted with the payment certificate together with all supporting documentation required in terms of the Contract.

Claims for Materials on Site (MOS) shall be supported by proof of ownership, proof of payment and evidence that the materials have been delivered to and stored on Site or at an approved extended Site.

Claims for Contract Price Adjustment (CPA) shall be supported by the calculations and information necessary to verify the adjustment in accordance with the Contract.

The Contractor shall submit all invoices, vouchers, receipts and other supporting documentation in respect of payments made for provisional sum and prime cost items when claiming payment for such items.

C3.5.1.18 Proof of Compliance with the Law

The Contractor shall comply with all applicable laws, regulations, by-laws, statutory requirements and collective agreements applicable to the execution of the Works.

The Contractor shall, upon request by the Employer's Agent, provide documentary proof of such compliance, including but not limited to:

- Wages, conditions of employment and labour legislation;
- Occupational Health and Safety legislation;
- Compensation for Occupational Injuries and Diseases Act, 1993 (Act No. 130 of 1993);
- Bargaining Council requirements, where applicable;
- Environmental legislation, environmental authorisations and Environmental Management Programme (EMPr) requirements; and
- Permits, licences, wayleaves and statutory approvals required in terms of the Contract.

C3.5.1.19 Permits

The Contractor shall be responsible for obtaining and maintaining all permits, licences, approvals, authorisations, security clearances, access permits and entrance permits required for the execution of the Works where such permits, licences, approvals or authorisations are the responsibility of the Contractor in terms of the Contract or applicable legislation.

This shall include, where applicable, permits for hazardous work, confined space entry, hot works, lifting operations, excavation works, road occupancy and any other permits required by law or by the Contractor's Health and Safety Plan.

The Contractor shall comply with all conditions attached to such permits, licences, approvals and authorisations, security clearances, access permits and entrance permits and shall make copies available to the Employer's Agent upon request.

The cost of obtaining and complying with the requirements of such permits, licences, approvals and authorisations, security clearances, access permits and entrance permits shall be deemed to be included in the tendered rates and prices.

C3.5.1.20 Reporting of Accidents

In addition to any statutory reporting obligations, the Contractor shall notify the Employer's Agent of any accident, incident or occurrence resulting in injury to persons, damage to the Works, property or equipment within 24 hours of its occurrence.

The Contractor shall submit such reports in the format prescribed by the Employer's Agent and shall provide copies of any statutory notifications, reports or investigation findings associated with the incident.

The Employer's Agent shall have the right to investigate the circumstances, causes and consequences of any such accident or incident, and the Contractor shall provide all reasonable assistance, information and access required for the purposes of such investigation.

C3.5.1.21 Community Liaison Officer

The Contractor shall in his dealings with the communities affected by the project, work with the Project Steering Committee (PSC), which has been elected by the ISD Consultant (Social Facilitator), appointed by the Employer.

The PSC acts as a communication structure between the project and the community. The process of appointing the Community Liaison Officer (CLO) is also facilitated by the Social Facilitator together with the PSC. The CLO acts as a link between the Contractor and the labourers and the PSC, and attends to all labour related issues. The CLO facilitates labour recruitment through the PSC. The CLO and the Executive structure of the PSC (Chairperson, Vice- Chairperson and the Secretary) attend monthly project progress report meetings (site), besides the PSC meetings attended by the full PSC. The Contractor must include in his rates the costs of a maximum of six (6) PSC members attending an average of one PSC meeting each month.

The CLO is appointed for the period of physical construction, plus a period of 14 days prior to this period. The Contractor will provide office and stationery for the CLO to be able to perform his or her duties. The ISD Consultant shall prepare and facilitate the signing of the contract between the CLO and the Contractor. A CLO who fails in the responsibilities / duties he / she is given will be replaced following the procedures as stipulated in his or her contract with the Contractor.

The Terms of reference for the CLO shall be provided by the ISD Consultant.

C3.6. Electrical Installation

DRAWING SCHEDULE

The drawings as listed below form part of the complete tender specification issue and are to be read in conjunction with the technical sections, i.e. from Part C3.7 onwards.

J35030/150E	Wastewater Treatment Works Layout: Electrical Distribution
J35030/151E	Pump Station: Electrical Layout
J35030/152E	Pump Station: Small Power And Lighting Installation
J35030/153E	Inlet Works and Dosing: Electrical Installation
J35030/154E	Laboratory/Office: Electrical Installation
J35030/155E	Gate House: Electrical Installation
J35030/156E	Sludge Lagoon Pump Station: Electrical Installation
J35030/157E	Single Line Diagrams and Process & Instrumentation Diagrams
J35030/158E	Supervisor's Living Quarters: Electrical Installation
J35030/159E	Operator's Living Quarters: Electrical Installation

C3.6.1 Extent of Work: Electrical Installation

C3.6.1.1 General

The extent of work described herein shall be read in conjunction with the other parts of the specification, technical schedules and accompanying drawings.

C3.6.1.2 Project Description

The Employer is the Joe Gqabi District Municipality.

The project comprises the construction of a new conventional Water Treatment Works.

C3.6.1.3 Electrical Installation

The Electrical Installer shall be responsible for the supply, installation, testing, commissioning and free maintenance during the three year guarantee period of the installation, detailed in this Specification, the Bill of Quantities and on the accompanying drawings.

The electrical work to be carried out comprises the following:

- Installation of standby generator (Supply of Generator by Employer)
- Installation of low voltage switchgear and motor control centre
- Installation of low voltage cables, local isolators for supply to motors and other field equipment
- Electrical installation to various buildings

The works shall be carried out strictly in accordance with the following:

- This Specification
- The Departmental Norms and Standards
- The Occupational Health and Safety Act No. 85 of 1993 and the relevant Regulations as amended.
- The Code of Practice for the Wiring of Premises - SANS 10142-1 of 2021 as amended.
- National Building Regulations
- The relevant local bye-laws and regulations of the Supply Authority.
- The Standard Specifications included with this specification

The Electrical Installer shall take note of his responsibilities in respect of:

- As-Built Drawings

In terms of Government Notice No 17548, it is the Electrical Installer's responsibility to ensure that all electrical fittings installed comply with the relevant SANS safety standards, applicable to the particular class of fitting. In the event of fittings specified by the Engineer/Architect which do not comply with the SANS safety standards, it shall be the Electrical Installer's responsibility to notify the Employer's Agent immediately in writing, so that alternative fittings which do comply with the SANS safety standards may be timeously selected.

The Electrical Installer shall not install any fitting or equipment under any circumstance which does not comply with the SANS safety standards unless specifically instructed in writing by the Employer's Agent on an item for item basis.

Where a product is claimed to comply with the SANS safety standard by compliance to an alternative foreign safety standard recognised and accepted by the SANS, the Installer shall obtain and submit proof of such acceptance. Where the SANS grants a permit for the use of equipment which does not carry the SANS/SABS mark, the Electrical Installer shall submit copies of the permits and test reports to the Employer's Agent at the time of tender.

All equipment tendered shall comply with the SANS safety standard as required by the above legislation. The Electrical Installer shall provide copies of SANS certificates of compliance for electrical fittings upon request by

the Employer's Agent. No claim will be considered on the basis that equipment tendered did not comply with the relevant SANS standard.

C3.6.1.4 Scope of Works Included

The Electrical Installer's work shall be the complete electrical installation including commissioning of the following:

- LV Distribution Cabling and Switchgear
- Earthing
- Surge Protection
- Distribution Boards
- Interior Lighting
- Socket Outlets, Switches, Isolators, Cover Plates and Other Accessories
- Conduits, Cable Trays, Powerskirting, Trunking and other Wireways
- Wiring and Connections
- Electrical Signs Notices and Labelling
- Cutting of Chases and Rough Filling
- Painting of Electrical Equipment
- Workshop Drawings and Samples
- Chasing of Conduits
- Managing Sub-Installers and Suppliers to the Electrical Contract
- Provision of own Hoisting and Lifting
- Provision of own Scaffolding
- Removal of own Waste
- Standby generator set

Production of as-built drawings (Copies of the Construction drawings may be modified by the Installer such that they become the master as-built originals).

C3.6.1.5 Programme

The Electrical Installer will be required to comply with the General Installer's programme for the Works. The Electrical Installer shall ensure that he has adequate staff available to complete the contract concurrent with the General Installer. A copy of the anticipated programme will be prepared by and made available by the General Installer.

The costs of overtime, additional labour and plant for the completion of the Works in accordance with the General Installer's programme shall be included in the Electrical Installer's price for the project.

The costs of any work outside the Scope of Works and general requirements of the programme or necessary under exceptional circumstances shall be for the Employer's account only under a Variation Order if agreed to in writing before the work takes place.

Installation of new work and connections to existing work shall be planned to ensure minimal interference with the regular operation of existing facilities. Necessary temporary shutdowns of existing services must be approved in writing by the Employer's Agent.

Milestone Dates : To be advised.

Practical Completion and Handover : Per the General Installer's programme.

C3.6.1.6 Definitions

Supply : To purchase or procure and deliver complete with all necessary and additional specified accessories.

Erect : To place or mount and fix in position.

Install	:	To erect, connect up and commission, complete with related accessories.
Indicated, Shown, Noted	:	As indicated or shown on drawings.
Approved Alternative	:	Approved in writing by the Employer's Agent
Similar, Equal	:	Equal or better in efficiency of performance, construction and compatibility with installation.
Tenderer	:	After contract award, Tenderer shall also mean Installer where applicable.

C3.6.1.7 Workshop Drawings, Samples and Inspections

The Electrical Installer shall timeously provide workshop drawings, catalogues and/or samples of the following items for the Employer's Agent's review:

- Distribution Boards/Motor Control Centres (MCCs)
- Light Fittings
- Powerskirting
- Socket Outlets, Switches and Accessories

Manufacture and/or delivery of these items shall not proceed without the Employer's Agent's written instruction to proceed.

The Electrical Installer shall timeously advise the Employer's Agent that these items may be inspected at the manufacturer's premises to enable the Employer's Agent to inspect the items at the manufacturer's premises prior to delivery.

C3.6.1.8 Electricity Connection

The Contractor shall liaise with the Supply Authority to arrange for the new mains supply and to agree the take-off point.

C3.6.1.9 Earthing

Earthing shall generally be provided in accordance with SANS 10142.

At the MDB (Main Distribution Board) the earthing installation shall include an accessible and common consumer earth terminal, to which all incoming services using metallic conduits, pipes etc. shall be bonded, including water and Telkom.

C3.6.1.10 Moving of Equipment

The Electrical Installer shall investigate each space through which equipment must be moved. Where necessary, equipment shall be shipped in sections of size suitable for moving through spaces available.

C3.6.1.11 Operating Instructions, Parts Lists and Maintenance Manuals and As-Built Drawings

The Installer shall supply, after approval by the Employer's Agent, three bound sets of operating instructions, parts lists, maintenance manuals and as-built drawings including the following details and information:

- Installer's and Supplier's details (name, address, email address, telephone and facsimile numbers)
- Installer's emergency (after hours) contact details
- A General Description of the Reticulation and Key Control Features

- Schedule of Luminaires and Lamps indicating Manufacturer, Supplier, Brand Name and Type Number
- Cable Layouts, including Feeder and Control Cable Marking Numbers and Details
- Distribution Boards and MCC
- Sub-Installers/Suppliers Documents
- Test Certificates
- Certificates of Compliance per distribution board
- Guarantees and Warranties

The Installer shall mark up one full set of the Construction drawings with relevant as-built changes and information, and submit to the Employer's Agent for his scrutiny 30 days before practical completion.

The contract will not be accepted as complete until these have been supplied, complete and to the satisfaction of the Employer's Agent.

C3.6.1.12 Testing and Commissioning

The Electrical Installer shall test the electrical installations prior to commissioning in accordance with the requirements of SANS 10142 and the equipment manufacturer's/supplier's recommendations.

The Electrical Installer shall notify the Employer's Agent timeously, prior to testing and commissioning, in order that the Employer's Agent may witness such tests as he chooses.

C3.6.1.13 Training

The Electrical Installer shall provide training to the Employer's operating personnel at practical completion.

Training shall be provided in respect of the standard/routine operation and maintenance for all electrical installations provided under this Subcontract.

C3.6.1.14 Guarantee and Free Maintenance

The Installer shall provide a three-year guarantee to replace or repair, free of charge, any part of the installation in which defects may develop as a result of manufacturing defects or poor workmanship.

C3.6.2 Standard Technical Specifications

The following specifications apply to this project, but are not included in this document. These specifications may be obtained or viewed at SA National Standards (SANS)

The latest published issue of each standard at tender closing date shall apply.

INDEX

SANS 156	Moulded-case circuit-breakers
SANS 164-1 to 7	Plug and socket-outlet systems for household and similar purposes for use in South Africa
SANS 556-1	Low-voltage switchgear
SANS 767-1	Earth leakage protection units
SANS 950	Unplasticized polyvinyl chloride rigid conduit and fittings for use in electrical installations
SANS 1085	Wall outlet boxes for the enclosure of electrical accessories
SANS 1213	Mechanical cable glands
SANS 1239	Plugs, socket-outlets and couplers for industrial purposes
SANS 1473-1	Low-voltage, switchgear and controlgear assemblies – Part 1: Type-tested, partially type-tested and specially tested assemblies with a rated short-circuit withstand strength above 10 kA
SANS 1574	Electric cables – Flexible cords and flexible cables
SANS 1765	Low-voltage switchgear and controlgear assemblies (distribution boards) with a rated short-circuit withstand strength up to and including 10 kA
SANS 10114	Interior lighting
SANS 10142 -	Part 1 The wiring of premises; low voltage insulations
SANS 10198	The selection, handling and installation of electric power cables of rating not exceeding 33 kV
SANS 10400	National Building Regulations
SANS 60269/IEC 60269	Low-voltage fuses
SANS 60309/IEC 60309	Plugs, socket-outlets and couplers for industrial purposes
SANS 60439-4/IEC 60439-1	Low-voltage, switchgear and controlgear assemblies – Part 1: Type-tested and partially type-tested assemblies
SANS 60439-5/IEC 60439-5	Low-voltage switchgear and controlgear assemblies - Part 5:
SANS 60598-1/IEC 60598-1	Luminaires: General requirements and tests
SANS 60529/IEC 60529	Degrees of protection provided by enclosures (IP Code)
SANS 60669/IEC 60669	Switches for household and similar fixed-electrical installations
SANS 61000-4-5/IEC 61000-4-5	Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test
SANS 61084/IEC 61084	Cable trunking and ducting systems for electrical installation
SANS 61386/IEC 61386	Conduit systems for electrical installations
SANS 62305	Lighting protection
IEC 60730-2-7	Automatic electrical controls for household and similar use Part 2-7: Particular requirements for timers and time switches
IEC 61643-1	Surge protective devices connected to low voltage distribution systems

In addition the following GIBB Standard Specifications shall apply and are included with this enquiry:

Section AA	Low Voltage Switchboards
Section BB	Armoured LV Cables
Section BE	Cable Trunking
Section CA	Earthing
Section CC	Earth Electrodes
Section CI	Conduit and Conduit Accessories
Section DA	Interior Luminaires
Section DB	Installation of Interior Luminaires
Section DC	Fluorescent Luminaires for Interior Use
Section EB	Photo Electric Cells
Section RD	Motor Control Gear Up to 1000 V
Section RE	Connections to Motors
Section UH	Pillar Boxes - Distribution
Section WA	Civil Engineering Works Associated with the Installation of Underground Cables

SECTION AA LOW VOLTAGE SWITCHBOARDS

INDEX

1	General
2	Construction
3	Busbars
4	Switches, Circuit Breakers
5	Earth
6	Cable entries/terminations
7	Wiring
8	Labels and Diagrams
9	Balancing of Load
10	Notices
11	Guarantee

1 GENERAL

- 1.1 The switchboard(s) shall comply with BS 61439, IEC 61439, the Occupational Health and Safety Act of 1993, and local authority's requirements. Switchboards shall be either of wall mounting type with front access or free standing with front and/or rear access, as specified.
- 1.2 The switchboard(s) shall be dustproof, vermin proof and adequately ventilated to prevent overheating of the equipment.
- 1.3 Drawings of the switchboard(s) shall be submitted to the Employer's Agent for approval prior to manufacture.
- 1.4 Surface mounted cartridge type fuses for instrument protection, as specified, shall be mounted on the busbars.
- 1.5 Current transformers (ratio and burden as specified) shall be of the pedestal type or as noted, and shall be securely mounted in the switchboard.
- 1.6 The completed switchboard(s) may be inspected by the Employer's Agent at the manufacturer's works prior to despatch. The Electrical Contractor shall inform the Employer's Agent timeously in writing when the switchboard(s) is ready for inspection.

2 CONSTRUCTION

- 2.1 The switchboard(s) shall be of robust construction consisting, in general, of a channel, box or angle iron frame covered with sheet steel panel(s) of 1,6 mm minimum thickness. The panel(s) shall be reinforced to prevent distortion and to ensure rigidity.
- 2.2 The electrical equipment shall be flush mounted on a chassis within the switchboard. The panel shall be suitably slotted or drilled to allow the operating handles of the switchgear to protrude.
- 2.3 Removable panels shall be provided for access to the wiring, busbars and equipment. The panels shall be held in position by chromium plated coin slot, square key or knurled captive thumb screws. Switchboards shall have lockable doors where specified.
- 2.4 Space for 50% spare ways, unless otherwise noted, shall be allowed on the switchboard for future equipment. Each spare outgoing way shall include sufficient space for future switchgear and associated instrumentation, similar to the equipped outgoing ways.
- 2.5 All drilling, cutting or any other metalworking operations shall be completed prior to any paint process being undertaken.

Prior to painting, all metal parts shall be prepared to SANS 10064 clause 6.2.2 for high quality - finished commodities, medium weight phosphating may be employed.

In the period 24 - 96 hours after phosphating, a high quality zinc-chromate primer to SABS 679, Type 1, shall be applied, followed by two coats of high quality alkyd based enamel to SABS 630. Care shall be taken to cover all edges properly.

The paint to be used shall have an impact resistance of 9 kg on a 9 mm mild steel plate and a scratch resistance of 1000 grams.

After baking, the minimum film thickness of the paint shall not be less than 0,06 mm.

The switchboards shall be finished in the colour specified on the outside and white on the inside.

3 BUSBARS

3.1 Busbar details shall be shown on the drawings submitted in accordance with paragraph 1.3.

3.2 The busbars shall comply with SANS 1195 and shall be braced for the fault currents specified.

3.3 Busbars shall be of rectangular section manufactured from copper or aluminium.

3.4 Aluminium and copper busbars shall have joints of adequate contact area for the current rating and to prevent joint relaxation by cold flow of the metal. Spring washers shall be used when bolting joints.

3.5 All joints in the busbars shall be firmly bolted together with suitable high tensile steel bolts and nuts. Spring washers shall be used.

3.6 Bolted joints shall be designed to maintain contact pressure permitting rated current at rated temperature and thermal expansion without buckling of busbars. Joints shall not loosen under vibration. Joints on aluminium busbars shall be suitably prepared.

3.7 The manufacturer shall specify the tightening torque to be applied to bolted joints in busbars.

3.8 All busbars shall be carried on insulated supports placed at intervals not exceeding 600 mm for main busbars, or 300 mm for busbars droppers. They shall be adequately identified in phase colours. Connections to busbars shall be made by means of bolted take-offs.

3.9 Busbar insulator material shall be Tufnol of suitable grade, or equivalent, shaped and spaced to provide protection against tracking, flashover or distortion of busbars.

3.10 The insulators shall be tested in accordance with SABS 161.

3.11 The moisture absorption resistance shall be in accordance with SABS 161.

3.12 Incoming and outgoing busbar stubs, where required, shall be suitably insulated where they pass through the top panels of the switch board and shall be suitably and firmly supported within the board.

3.13 Incoming and outgoing collector bars for cables in parallel shall be so arranged that the multiple cable ends can be connected to the collector bars with reasonably short tails to eliminate crossing of conductors.

3.14 Busbar droppers to and from circuit breakers shall not be supported only by the circuit breaker terminals (or the circuit breaker cradle terminals) and the main bus bars, but shall also have a suitable intermediate insulated support. Heavy out going cables shall be supported so that there is no undue strain on circuit breaker or circuit breaker cradle terminals.

3.15 Where stub bars are used to accommodate large cable ends at the circuit breaker terminals, the Electrical Contractor shall ensure that the clearance between phases is adequate.

4 SWITCHGEAR - GENERAL

4.1 All switchgear shall be flush mounted behind removable panels with operating handles only projecting through suitable machine punched slots or holes. Equipment of normally surface-mounted types such as energy meters, time switches and relays, shall be mounted on suitable chassis behind hinged front panels. In the case of supply authority meters the removable front panels shall have glass inserts to facilitate reading the meter.

5 EARTHBAR

5.1 Each board shall be equipped with a copper earth bar of sufficient length to allow for the termination of all the incoming and outgoing earth conductors. The size of the earth bar to be as noted on the drawings. The earth bar shall be complete with adequate brass bolts and nuts.

6 CABLE ENTRIES/TERMINATIONS

-
- 6.1 Cable gland plates shall be galvanised and of at least 3 mm thickness. The gland plate shall be bonded to the main earth bar with a copper earth strap having a cross-sectional area equivalent to that of the earth bar. When cables enter the top of the board a similar cable gland plate shall be incorporated in the top of the switchboard and shall be connected to the main earth bar in a similar manner. Spare entry holes in the top gland plates shall be provided with galvanised blank seals.
- 6.2 Gland plates and cable end support bars must be placed at suitable heights having regard to the bending radii of the cables concerned and convenience in making off. The support bars should preferably be of a section similar to "Unistrut" and be fitted with sliding clamping bolts.
- 6.3 The entire board shall be vermin proof and at the gland plate the vermin-proofing shall consist of expanded metal of a suitable gauge secured to the gland plate and the framework of the board.
- 7 WIRING
- 7.1 All internal wiring shall be laced or run in wiring channels and shall be clearly marked with numbered ferrules and colour coded.
- 7.2 Stranded wire shall be used having a minimum area of cross-section of 2,5 mm² and shall comply with SANS 1507.
- 7.3 Where circuit breaker terminals are designed to take stranded conductors, PVC insulated stranded conductors shall be used. The jumpers to each breaker shall be separately run and the individual conductors in each set separated from each other by a spreader secured to the conductor to prevent movement during fault conditions and to maintain conductor spacing.
- 8 LABELS AND DIAGRAMS
- 8.1 All equipment shall be clearly labelled as specified. The labels shall be of ivory or plastic secured by screws or rivets.
- 8.2 All switchboards shall be labelled as specified. Glass- or clear perspex- covered, framed legends shall be fixed to the boards or adjacent thereto.
- 8.3 All fuse-switches, circuit breakers and other apparatus on switchboards shall be labelled to indicate their function.
- 8.4 The incoming isolating switch or circuit breaker on each board shall be labelled "Main Switch".
- 8.5 10 mm high letters shall be provided on each switchboard indicating voltage present.
- 8.6 All labels shall be in the language(s) specified.
- 8.7 All masking tape and other temporary markings are to be removed on completion of the installation work.
- 8.8 The Electrical Contractor shall provide separate diagrammatic charts showing essential features of the as-installed electrical system, including single line and riser diagrams on which equipment designation shall correspond with labels.
- 9 BALANCING OF LOAD
- 9.1 The Electrical Contractor will be required to balance the load as equally as possible over the multi-phase supplies.
- 10 NOTICES
- 10.1 The following notices in compliance with the Occupational Health and Safety Act of 1993, in the languages specified, shall be supplied and installed by the Electrical Contractor.
- a notice prohibiting unauthorised persons from entering the switchroom or substation.
 - b notice prohibiting unauthorised persons from handling or interfering with electrical apparatus.
 - c notice containing directions as to procedure in case of fire.
 - d notice containing directions as to restoration of persons suffering from the effects of electric shock.
 - e danger notices (skull and crossbones).
- 10.2 The notices defined under (a) and (e) above shall be mounted on the outside of the switchroom/substation door(s).
- All other notices shall be mounted in a conspicuous position inside the switchroom/substation.
-

The notices shall comprise black embossed letters, at least 15 mm high, on a yellow backplate.

11 GUARANTEE

- 11.1 The tenderer shall give a 12 months guarantee to replace free of charge any parts of the low voltage switchboard in which manufacturing defects may develop during this period. Such period shall commence from the date on which the switchboard is taken over by the Employer.

SECTION AA

LOW VOLTAGE SWITCHBOARDS

CHECK LIST

Select technical parts according to the project and then state the following:

- 1 Any special requirements such as compliance with CPA, PWD or GPO specifications.
- 2 Rated Voltage.
- 3 Rated current of busbars
- 4 Size of Earth Bar
- 5 Whether Class 1, 2 or 3 switchboard as defined in BS 61439
- 6 Busbar fault current
- 7 Rating of fuses to be mounted on busbars
- 8 Type and ratio of current transformers
- 9 Whether switchboard is to have front or rear access
- 10 Whether doors are to be lockable
- 11 Spare space on switchboard according to employer's anticipated requirements
- 12 Finished colour of switchboard exterior.
- 13 Language(s) for labels
- 14 Precise details of labels. Draw up table showing designation of label, size of lettering, type of lettering (eg white on black background). Refer to attached sample

SAMPLE SWITCHBOARD LABELS

CIRCUIT NO	CIRCUIT BREAKER	INSTRUMENTS LABEL	CIRCUIT	CIRCUIT DESIGNATION	SIZE OF LETTERS mm
1	5 kA SP	1 Ammeter	Lighting	Lights 1	20
2	5 kA SP	1 Ammeter	Lighting	Lights 2	20
3	5 kA SP	1 Ammeter	Lighting	Lights 3	20
4	5 kA SP	1 Ammeter	Sump Pump	Motor 1	20
-	15 kA TP	1 Ammeter 3 CT's	Main Switch Selector	Main Switch SW	30
Spare	5 kA SP	1 Ammeter	Spare	N/A	

SECTION BB

ARMOURED LV CABLES

INDEX

1	General
2	Construction
3	Installation
4	Laying Cables in Prepared Trenches (Where Applicable)
5	Cable Warning Tiles (Where Applicable)
6	Plastic Cable Warning Sheeting (Where Applicable)
7	Tests
8	Guarantee

- 1.1 600/1 000 Volt PVC SWA and PVC sheathed cable shall comply with SANS 1507 with particular reference to tables L,Q,R and S.
- 1.2 The conductors shall be of high conductivity copper or aluminium as specified insulated with one layer of PVC.
- 2 CONSTRUCTION
- 2.1 The cores shall be twisted together, bedded, sheathed with PVC (preferably black) armoured with a layer of galvanised steel wire, sheathed with PVC (preferably black).
- 2.2 All insulation shall be for general service 600/1 000 volt grade.
- 3 INSTALLATION
- 3.1 Glands shall be suitable for PVC SWA and PVC sheathed general purpose 600/1 000 volt cable.
- 3.2 The non-watertight glands shall be easily converted to watertight glands by means of sealing rings and waterproofing shroud.
- 3.3 The glands shall be Pratley, Captive Cone or other approved type. The gland shall be fitted with an earth terminal.
- 3.4 On the cable entry side of the barrel, a groove shall be provided, to accommodate a rim of the waterproof shroud.
- 3.5 The shrouds shall be made of non-deteriorating neoprene or synthetic rubber, and shall be resistant to water, oil and sunlight. The shrouds shall fit tightly around the glands and cable.
- 3.6 Epoxy-resin jointing materials shall be "Scotch-Cast" Splicing Kits or approved alternative and shall be used strictly in accordance with the supplier's recommendations.
- 3.7 Copper cables shall be terminated either by crimped or soldered lugs. Termination of aluminium cables are to be made by a method approved by the Employer's Agent.
- 3.8 The earth terminal shall be connected to the earth bar by a suitable bonding strip.
- 4 LAYING CABLES IN PREPARED TRENCHES (WHERE APPLICABLE)
- 4.1 Before the cables are laid, the bottom of the trench shall be covered with a 75 mm layer of earth which shall have been passed through a sieve with a maximum mesh of 12 mm.
- 4.2 The cables shall be laid on the prepared bed carefully to avoid cuts and damage. Dragging along the ground shall be avoided wherever practicable. Cable rollers shall be used.
- 4.3 Where more than one cable is laid in a trench, the cables shall be spaced apart at a nominal 75 mm centres, and in straight run trenches, cable crossing will not be permitted except where cables may have to branch from the main run. At every draw-in point or joint box, the cables shall be snaked.
- 4.4 The trench shall be back-filled as soon as possible after cable has been laid. To prevent theft and possible damage, long lengths of cable shall not be left exposed in an open trench overnight.

- 4.5 Water shall not be allowed to accumulate at any part of the works. The Electrical Contractor shall ensure that no cable laying is carried out until the trenches are free from water.
- 4.6 All side channels, sumps or temporary excavations for dewatering purposes shall be filled in after use.
- 4.7 Cables shall be covered with a layer of minimum thickness 75 mm of earth which shall have been passed through a sieve with maximum mesh of 12 mm.
- 5 CABLE WARNING TILES (WHERE APPLICABLE)
- 5.1 Where noted, cables shall be covered with concrete tiles 600 mm long x 225 mm wide x 50 mm thick of approved design.
- 5.2 The routes of all underground cables and duct ends shall be marked by means of approved concrete markers having cast insert the words "Electric Cables" positioned at every change of direction, and every point of crossing another cable, or service, and not less than one per 30 metres of straight run.
- 6 PLASTIC CABLE WARNING SHEETING (WHERE APPLICABLE)
- 6.1 Unless otherwise noted, all cables shall be covered with a light yellow plastic warning sheet of approved design with the skull and cross bones insignia together with the words "DANGER, GEVAAR, INGOZI" printed in black at regular intervals. The warning shall be placed 300 mm above the top of the cable.
- 7 TESTS
- 7.1 During manufacture and before despatch the cables may be inspected by the Employer's Agent at the manufacturer's works or when installed and subjected to such tests as may be deemed necessary.
- 8 GUARANTEE
- 8.1 Tenderers shall give a 12 months guarantee to replace free of charge any cable in which manufacturing defects may develop during this period. Such period shall commence from the date on which the cable is taken over by the employer.

SECTION BB

ARMOURED LV CABLES

CHECK LIST

Select technical parts according to the project and then state the following:

- 1 Copper or aluminium conductor
- 2 Are cable warning tiles and markers required?
- 3 Is plastic cable warning sheeting required?

SECTION BE

CABLE TRUNKING

INDEX

1	General
2	Construction
3	Installation
4	Guarantee

1 GENERAL

- 1.1 The cable trunking shall comply with BS 4678.

2 CONSTRUCTION

- 2.1 Cable trunking shall consist of butting sections constructed from high grade sheet steel having a minimum thickness of 1,6 mm.
- 2.2 It shall be rustproofed by an approved metallising process, finished with one coat of rust resisting paint and one coat of high grade stove enamel.
- 2.3 The lids of the trunking shall be made from the same material, shall be removable over the whole length of the trunking and secured at centres not greater than 450 mm by cadmium plated mushroom headed screws. These screws shall be located into threaded bosses, pressed into the trunking.
- 2.4 Adjoining lengths of trunking shall be correctly aligned and the two sides at right angles to the cover shall each be jointed to the corresponding sides of the adjacent trunking by means of internal fishplate connectors.
- 2.5 The connectors shall be constructed from sheet steel not less than 2,6 mm thick, and attached by means of not less than eight cadmium plated steel mushroom headed 6 mm screws passing through clearance holes complete with shakeproof washers and nuts. Two pairs of screws on either side of the joint shall be connected by tinned copper braids with split soldered washers under the nuts to provide electrical continuity across the joints.

3 INSTALLATION

- 3.1 Trunking shall be supported on both horizontal and vertical runs at the following centres:

Trunking Size	Maximum spacing of hangers and fixings
Up to 76 x 76 mm	600 mm centres
Up to 150 x 76 mm	1 000 mm centres
Up to 380 x 200 mm	1 200 mm centres

- 3.2 The trunking shall be mechanically continuous throughout. At each joint in the trunking continuity shall be maintained by the installation of copper or brass links secured by brass nuts, locking washers or bolts.
- 3.3 All tees, reducers, angles and other accessories for trunking shall have folded and welded corners.
- 3.4 All trunking bends shall be of easy sweep design with fillet corners, and where branch or cross-over connections are made the edges of the apparatus shall be rendered smooth with approved edging strips.
- 3.5 Where trunking is not directly fixed to surfaces it shall be hung from straps or rod hangers arranged to support the trunking rigidly in both directions.
- 3.6 Where inverted trunking is used the cables shall be retained in their individual compartments by clips at not less than 30 mm intervals. Groups of cable shall not be secured within the trunking with plastic tape.

- 3.7 The Electrical Contractor shall arrange his layout of trunking in conjunction with other trades and no work shall commence until the Electrical Contractor has verified that his trunking will not clash with the services of other trades by means of co-ordination drawings to the Employer's Agent's approval.
- 3.8 All trunking shall be properly lined up and particular attention shall be paid to butting of sections and lids. Surfaces receiving trunking shall be prepared in a manner that will ensure proper alignment before the trunking is erected.
- 3.9 Adequate allowance shall be made for expansion and contraction on all runs and where the trunking passes over expansion joints in the building structure, expansion couplers shall be provided.
- 3.10 Care shall be taken to ensure that water, concrete and other foreign matter are not allowed to enter trunking particularly where trunking is cast into or through structural concrete or floor screeds.
- 3.11 When installing trunking the Contractor shall ensure that:
- (a) When cut, filed or drilled, the connections shall be given one coat of approved anti-corrosive paint subsequent to the removal of all burrs.
 - (b) Where conduits enter trunking, the connection shall be made with two locknuts and a female brass bush.
 - (c) All swarf caused by drilling or machines shall be removed prior to the installation of cables and the fixing of lids.
- 4 GUARANTEE
- 4.1 Tenderers shall give a 12 month guarantee to replace free of charge any sections of cable trunking in which manufacturing defects may develop during this period. Such period shall commence from the date on which the cable trunking is taken over by the Employer.

SECTION CA

EARTHING

INDEX

1	Earthing of a General Electrical Installation
2	Earthing of Substations
3	Guarantee

This section covers the earthing of electrical installations in buildings or other structures. The total earthing system of any electrical installation shall be in complete accordance with SABS 0142 and of the AMEU Code of Practice for the Application of Protective Multiple Earthing to Low Voltage Distribution System.

1 EARTHING OF A GENERAL ELECTRICAL INSTALLATION

1.1 General

All earth conductors shall be stranded copper with or without green PVC insulation. The conductors shall comply with SABS 150. All earth conductor sizes shall be determined in accordance with SABS 0142, paragraph 4.6 where the earth does not form an integral part of the cable.

1.2 Mechanical Damage

Where earth conductors may be subject to mechanical damage they shall be suitably protected to a height of 2,0 m above floor or ground level unless otherwise specified. This requirement shall not apply to restricted access switch rooms or substations.

1.3 Ring Mains

Common earth conductors may be used in accordance with SABS 0142. In such instances the sizes of earth conductors shall be specifically approved by the Employer's Agent. Earth conductors for individual circuits branching from the ring main shall be connected to the common earth conductor with an exothermic weld, T-ferrules or soldered. The common earth shall not be broken.

1.4 Connections

Under no circumstances shall any connection points, bolts, screws, etc used for earthing be utilized for any other purpose.

The securing of earth conductors by means of self-threading screws will not be permitted.

It will be the responsibility of the Electrical Contractor to supply and fit earth terminals or clamps on equipment and materials that must be earthed where these are not provided. Unless earth conductors are connected to proper terminals, the ends shall be tinned and lugged. Lugs may be crimped provided that the system used complies with the requirements of BS 4579, Part 1, "Compression Joints in Copper".

1.5 Water Pipes

Unless otherwise specified metal cold water mains shall be bonded by solid 12 x 1,6 mm copper strapping to the earth busbar in the Main Switchboard. All other hot and cold water pipes shall be connected with 12 x 0,8 mm perforated or solid copper strapping to the nearest switchboard. The strapping shall be fixed to the pipework with brass nuts and bolts and against walls with brass screws at 300 mm centres. In all cases where metal water pipes, down pipes, flues, etc are positioned within 1,6 m of switchboards an earth connection consisting of copper strapping shall be installed between the pipework and the board. In vertical building ducts accommodating both metal water pipes and electrical cables, all the pipes shall be earthed at each distribution board.

1.6 Roofs

Where service connections consist of overhead conductors, all metal parts of roofs, gutters and down pipes shall be earthed. One bare 10 mm² copper conductor shall be installed over the full length of the ceiling void, fixed to the top purlin and connected to the main earth conductor of each switchboard. The roof and gutters shall be connected at 15 m intervals to this conductor by means of 12 x 0,8 mm copper strapping (not conductors) and

- galvanised bolts and nuts. Self-tapping screws are not acceptable. Where service connections consist of underground supplies, the above requirements are not applicable.
- 1.7 External Advertising Signs
- External advertising signs shall be earthed by means of a separate earth conductor.
- 1.8 Computer Earth
- An isolated earth bar located in the computer room shall be connected through an insulated earth conductor to an earth electrode. The maximum permissible earth loop impedance is one ohm on the earth bar. Under no circumstances is the computer earth to be interconnected to the lightning protection system at any point.
- 2 EARTHING TO SUBSTATIONS
- All substations shall be earthed in accordance with the requirements of the Supply Authority. If no earthing method is specified and no specific requirements of the Supply Authority exist, the following method shall be adopted:
- 2.1 Main Earth Bar
- A main earthing bar (minimum cross-sectional area 50 mm x 4 mm) shall be provided and fixed to the transformer room wall facing the LV side of the transformer and with a suitable space provided between the earth bar and the wall.
- All earth wires shall be secured to the earthing bar by means of 10 mm diameter brass bolts. Locknuts shall be provided for all terminals. The point of origin of each earth conductor must be clearly indicated by means of a metal strip tag attached to the conductor in such a way that the conductors can be easily identified.
- 2.2 Earth Rods
- Two 1,8 m x 16 mm earth electrodes shall be driven into the ground in the immediate vicinity of the substation at least 3 m apart with their tops not less than 600 mm below ground level. The electrodes shall be interconnected with a 70 square mm bare copper conductor buried at a depth of not less than 750 mm. A 70 square mm earth conductor shall be taken from each of the two earth electrodes, one to the neutral terminal of the transformer and the other to the main earthing bar in the transformer room.
- 2.3 Earthing and Bonding Wire
- The HV switchboard, transformer earthing terminal and cable supports shall be bonded to the main earthing bar by means of 70 mm² earth conductors. The neutral busbar and earth bar in the main LV switchboard shall be bonded to the main earth bar with an earth conductor (or conductors in parallel) having a cross-sectional area of not less than half the size of the LV phase conductor (or conductors in parallel) between the transformer and the main LV switchboard.
- In addition, a 70 mm² copper earth conductor shall be laid in the cable trenches along with all incoming and outgoing HV cables for a distance of 40 m and the conductors shall be connected to the main earth bar.
- 2.4 Earth Resistance Measurements
- The Electrical Contractor shall carry out earth resistance measurements on completion of the installation of the earthing system and the results must be submitted to the Employer's Agent for approval. Should the earth resistance exceed the value given by the formula:
- Protective device system three phase voltage
- Protective device maximum rated current x 2 x 1,732
- the Employer's Agent may request the Electrical Contractor to install additional earth electrodes or trench earths and/or separation of the neutral and/or an earth leakage device for which a variation order will be issued.
- 2.5 Miniature Substation Earthing
- The earthing of mini-substations is similar to the earthing requirements of substations described above except that a main earth bar is not required. The earthing bar in the LV compartment shall become the main earth bar. The HV switch, transformer earth terminal and neutral busbar shall be bonded to the earthing bar in the LV compartment as described for substations.

2.6 Switch Rooms

The earthing of switch rooms utilising earth electrodes is similar to the earthing requirements of substations described above. A main earth bar is required to which the earthing electrodes and the HV switchboard shall be bonded by means of 70 mm² earth wires.

2.7 Outdoor Equipment

In cases where substations contain transformers or switchgear installed outdoors, the fence shall be earthed as follows if no other method is specified:

- (a) A 70 mm² earth wire shall be installed 400 mm below ground level and 500 mm from the fence on the outside of the substation along the entire length of the fence. This earth wire shall be earthed at each corner by means of a 1,8 m x 16 mm earth electrode and the electrode and earth wire bonded to the fence. The earth wire shall also be bonded, at least at two points, to the main earthing system.
- (b) A 70 mm² earth wire shall also be buried at a depth of 400 mm around each transformer and switch and bonded to the main earthing system.

3 GUARANTEE

- 3.1 Tenderers shall give a 12 months guarantee to replace and install, or make good free of charge any portion of the earthing system which develops defects within this period. Such period shall commence from the date on which an acceptance certificate is issued by the Employer's Agent.

SECTION CI

CONDUIT AND CONDUIT ACCESSORIES

GENERAL

This section covers the requirements for conduit and conduit accessories for general installations under normal environmental conditions.

1. SCREWED CONDUIT

Conduits shall comply with SABS 162 and shall bear the SABS mark.

All conduit shall be heavy gauge, welded or solid drawn, hot-dip galvanised or black enamelled, screwed tube.

Galvanised conduit shall be hot-dipped inside and outside in accordance with SABS 763.

All conduit ends shall be reamed and threaded on both sides and delivered with a coupling at one end and a plastic cap on the other end.

2. METAL CONDUIT ACCESSORIES

All metal conduit accessories shall be of malleable cast iron or pressed steel with brass bushes in accordance with SABS 162. Alloy or pressure cast metal accessories or zinc base alloy fittings are not acceptable. All fittings whether galvanised or black enamelled, shall be fitted with brass screws.

3. CIRCULAR TYPE BOXES

The boxes shall be of the long spout pattern, manufactured of malleable cast iron or pressed steel and stove enamelled jet black or galvanised as required. The two cover fixing holes shall be diametrically opposite each other, drilled and tapped at 50 mm centres.

Junction, draw-in and inspection boxes shall be of adequate size and shall be supplied with heavy gauge metal cover plates.

Boxes shall comply with SABS 162.

4. SWITCH BOXES AND SOCKET-OUTLET BOXES

All switch boxes and socket-outlet boxes shall be manufactured of pressed galvanised steel of at least 1 mm thickness. All boxes shall be fitted with the necessary lugs to suit standard flush mounted switches and socket-outlets manufactured in accordance with SABS 518 and SABS 1085.

Light switch boxes shall be 100 x 50 x 50 mm with two 20 mm knock-outs on the sides, one 20 mm knock-out on the top, bottom, side and back.

Socket-outlet boxes shall be 100 x 100 x 50 mm with two 20 mm knock-outs each on the top, bottom, sides and back.

Switch and socket-outlet cover plates shall comply with SABS 1084.

5. FLEXIBLE CONDUIT

Flexible steel conduit and adaptors shall comply with BS 731, Part 1 where applicable. Flexible conduit shall be of galvanised steel construction and in damp areas of plastic sheathed galvanised steel type. Flexible conduit shall only be used as specified and shall then be installed in accordance with par. 5.4.4 of SABS 0142.

6. PLAIN-END METALLIC CONDUIT

As an alternative to the threaded conduit, plain-end (unthreaded) metallic conduit with accessories may be used under the conditions stated in the Department's standard specification for "INSTALLATION AND TERMINATION OF CONDUITS AND CONDUIT ACCESSORIES", par. 3 of Section B1.

Unthreaded conduit shall be manufactured of mild steel with a minimum thickness of 0,9 mm and shall comply with SABS 1007.

Bending and setting of conduit shall be done with the correct apparatus recommended by the manufacturer of the conduit.

The Contractor or Supplier shall be responsible for obtaining the approval of local authorities for the use of this system.

All conduit and accessories used in areas within 50 km of the coast shall be hot-dip galvanised to SABS 763. In inland areas electro-galvanised or cadmium-plated accessories will be accepted.

7. NON-METALLIC CONDUIT

Non-metallic conduit shall comply fully with SABS 950 and shall be installed in accordance with Appendix C of the same specification as well as the Department's standard specification for "INSTALLATION AND TERMINATION OF CONDUITS AND CONDUIT ACCESSORIES", par. 4 of Section B1.

8. EARTH CLAMPS

Earth clamps shall consist of copper strips at least 1,2 mm thick and not less than 12 mm wide secured with a brass bolt, nut and washer and shall be so constructed that the clamp will fit firmly to the conduit without any additional packing.

SECTION DA

INTERIOR LUMINAIRES

INDEX

1	General
2	Painting
3	Nylon or Powder Coating
4	Light Diffusers and Louvres
5	Particulars to be Supplied
6	Bulkhead Luminaires
7	Watertight Luminaires
8	Guarantee

1 GENERAL

- 1.1 The complete installation of luminaires, luminaire components and lamps shall comply with SABS 56, 165 and 1278 where applicable, the Standard Regulations and Municipal Requirements.
- 1.2 The types of luminaires shall be as shown on the drawings and as specified.
- 1.3 Reference shall be made to the constructional details of ceilings, luminaires and components shall be supplied to suit. Luminaire descriptions may not necessarily denote specific mounting accessories for the particular type of ceilings on or in which they will be installed.
- 1.4 The location of luminaires on electrical drawings is diagrammatic only.
- 1.5 The final positions and spacing of luminaires shall be checked with the architectural ceiling plans before the luminaires are installed.
- 1.6 When luminaires require circuits more involved than simple wiring, the electrical contractor shall submit wiring diagrams to the Employer's Agent for approval at least 4 weeks prior to installation.
- 1.7 Drawings shall be provided showing the relative positions of luminaires and adjacent structures such as walls, columns, ducts, openings, etc.
- 1.8 The installation of luminaires shall be co-ordinated with other trades.
- 1.9 Where possible all lighting fittings shall be fixed directly to BS conduit boxes.
- 1.10 Luminaires exposed to the weather shall be anodised or suitably finished aluminium. Indoor luminaires shall be baked enamel or anodised except as otherwise individually specified.
- 1.11 No luminaire shall have rough edges anywhere which may be liable to cause damage or injury. All edges shall be finished and painted as specified below.
- 1.12 Every corner of whatever material on each luminaire shall be cut to a radius.
- 1.13 Adequate numbers of knock-outs are to be provided for wiring and installation.

2 PAINTING

- 2.1 The treatment and finish of all sheet steel surfaces of all luminaires shall comply with the requirements specified.
- 2.2 Before painting the metalwork of luminaires shall be thoroughly degreased and derusted. Thereafter the metal is to be treated with a hot phosphating solution in accordance with Section 2.4 of the SABS 064 - 1060 "Code of Practice" for the preparation of steel surfaces for painting.
- 2.3 One or more coats of white baking enamel shall be applied as necessary to all surfaces including edges.
- 2.4 Requirement of the finish.
 - 2.4.1 The dry film thickness of the enamel shall not be less than 0,0396 mm.

- 2.4.2 The finish shall be smooth, glossy and free from grit or any other surface imperfections.
- 2.4.3 The finish on the luminaire, or on test specimens cut from the luminaire where necessary shall comply with the requirements in SABS 663 "Primer and Enamel Paint for Hospital Furniture" in respect of:
- (a) Scratch resistance (Type 1 enamel)
 - (b) Impact resistance (enamel)
 - (c) Daylight 45 degree, 0 degree luminous directional reflectance of white enamel
 - (d) Yellowness,
 - (e) Specular gloss at 60 degrees.
- 2.4.4 The finish shall show no blistering, wrinkling or loss of adhesion, and not more than 1,5 mm rust or blister creep from an X-mark cut through the film, when degreased test specimens cut from the fitting and exposed in a salt spray cabinet, complying with and operated in accordance with SABS Method 155, for a period of 200 hours.
- 2.4.5 After stripping the paint, the underlying metal shall show no sign of corrosion, except along the X-mark where rust spots extending up to the limit specified above are permitted.
- 3 Nylon or powder coating of metal surfaces will be considered as an alternative provided that full information on the process and it's effect on the finished item is supplied at the time of tendering.
- 4 LIGHT DIFFUSERS AND LOUVRES
- Diffusers shall be manufactured from colour stabilised plastic which is certified 100% virgin acrylic. No plastic will be accepted unless it is stabilised polystyrene or polycarbonate. The degree of stabilisation against discolouration shall be guaranteed in writing by the manufacturer.
- 4.1 Light diffusers and louvres are intended to advantageously control light leaving the luminaire; none will be accepted which, due to use of inferior quality materials or bad design, introduces glare or has poor utilisation.
- 4.2 Diffuser panels may be single piece injection moulded but must be positively located in position to prevent any movement or vibration.
- 4.3 Diffuser panels and louver grids shall be easily removable to facilitate relamping or ballast replacement using approved clip arrangements and safety chains or other acceptable method to prevent the panel from falling during maintenance.
- 5 PARTICULARS TO BE SUPPLIED
- 5.1 Tenderers shall submit with their tenders the following information:
- (i) Utilisation tables
 - (ii) Photometric charts
- for all types of luminaires included in the tender.
- 6 BULKHEAD LUMINAIRES
- 6.1 Bulkhead fittings shall be manufactured to take lamps up to 150 W. The base of the fitting shall be of die cast or heavy gauge pressed aluminium. The base shall be treated against corrosion and shall have a black matt finish.
- 6.2 Threaded conduit entries to take 20 mm dia conduit must be provided on at least two sides and one for back entry. At least two of the conduit entries must be fitted with brass or neoprene stoppers.
- 6.3 The lens shall be injection moulded, prismatic, clear UV stabilised polycarbonate. The lens shall be held in position by two stainless steel screws via reinforced holes in the lens and the screws must be provided with gaskets to prevent the ingress of moisture. The fitting shall be provided with either a neoprene or a silicone gasket fitted between the lens and the base.

- 6.4 The internal finish of the fitting shall be of high grade heat resistant white enamel and the fitting shall be provided with a lampholder mounted on a removable metal lampholder platform. The fitting shall also be provided with a reflector between the lamp and the base, and wiring leads to the lampholder shall be high heat resisting and preferably covered with silicone.
- 7 WATERTIGHT LUMINAIRES
- 7.1 The watertight fitting is to consist of a cast iron base with reflector of approximately 225 mm diameter and fitted with a screw neck type well glass, rubber washer and porcelain bayonet cap lampholder.
- 7.2 A hole drilled and tapped 20 mm ISO thread shall be provided in the back of the cast metal base for the conduit entry and the finish of the base shall be matt black on the outside and white enamel on the inside.
- 8 GUARANTEE
- 8.1 Tenderers shall give a 12 months guarantee to replace free of charge any portion of the luminaires and ancillary equipment in which any manufacturing defects may develop within that period. Such period will commence from the date on which the luminaires are handed over to the Employer.

SECTION DA

INTERIOR LUMINAIRES

CHECK LIST

Select technical parts according to the project and then state the following:

- 1 Rated voltage.
- 2 Wattage and type of lamp.
- 3 Colour of luminaire finish.
- 4 Fixing arrangement for the luminaires.
- 5 Specify type of lampholder.

**SECTION EB
PHOTO ELECTRIC CELLS**

INDEX

- 1 General
- 2 Construction
- 3 Guarantee

1 GENERAL

Each unit shall be self-contained and enclosed in a weatherproof housing suitable for mounting either on the top of a pole or by means of a bracket attached to a wall.

The levels of daylight shall be monitored by a hermetically sealed photo conductive cell.

2 CONSTRUCTION

The photo-electric switch shall:

- have a minimum contact capacity of 5 A at 230 V

- operate at a nominal voltage of 230 V with +- 10% variation.

- operate at a frequency of 50 HZ

- withstand weather conditions, pole vibrations, hail, corrosion from atmospheric conditions dust and UV radiation

- operate satisfactorily within the temperature range of -10 degrees celcius to +55 degrees celcius.

Switching shall be positive between either "ON" or "OFF" states.

"ON" switching shall occur at 12-18 lux and "OFF" switching at 50-60 lux.

(NB - Illumination is expected in terms of lux measured in the horizontal plane one meter above finished ground level).

The photo-electric switch shall have a time delay of one to two minutes to avoid unnecessary switching.

The photo-electric switch shall be capable of making a minimum of 5000 satisfactory switching operations.

3 GUARANTEE

Tenderers shall give a 12 months guarantee to replace free of charge any photo electric cells in which manufacturing defects may develop within that period. Such period will commence from the date on which the photo electric cells are taken over by the Employer.

C3.6.3 Specification for Standby Generator Set

SECTION 1: GENERAL

The extent of work described herein shall be read in conjunction with the other parts of the specification, technical schedules and accompanying drawings.

SECTION 2: PROJECT DESCRIPTION

The Employer is the Joe Gqabi District Municipality.

The project is for the supply, delivery, offloading, testing and commissioning of a 360 kVA standby diesel generator set complete with sound attenuating enclosure louvers and integral fuel tank.

The set shall be installed at the Nqanqarhu Water Treatment Works.

SECTION 3: INSTALLER'S RESPONSIBILITY

The Installer shall be responsible for the supply, installation, testing, commissioning and free maintenance during the guarantee period (three years) of the Standby Generating Set

The Installer shall provide all materials, equipment, labour and services necessary for the complete, safe and efficient operation of the electrical installation in accordance with the intent of this Specification and Drawings.

The works shall be carried out strictly in accordance with the following:

- The Occupational Health and Safety Act No. 85 of 1993 and the relevant Regulations as amended.
- National Building Regulations
- The relevant local bye-laws and regulations of the Supply Authority.
- SANS 8528-1:2008 Reciprocating internal combustion engine driven alternating current Generating Sets: Part 1: Application, ratings and performance.
- SANS 8528-2:2008 Reciprocating internal combustion engine driven alternating current Generating Sets: Part 2: Engines.
- SANS 8528-3:2008 Reciprocating internal combustion engine driven alternating current Generating Sets: Part 3: Alternating current generators for generating sets.
- SANS 8528-4:2008 Reciprocating internal combustion engine driven alternating Current Generating Sets: Part 4: Controlgear and switchgear.
- SANS 8528-5:2008 Reciprocating internal combustion engine driven alternating current Generating Sets: Part 5: Generating sets.
- SANS 8528-6:2008 Reciprocating internal combustion engine driven alternating Current Generating Sets: Part 6: Test methods.
- SANS 8528-7:2008 Reciprocating internal combustion engine driven alternating current Generating Sets: Part 7: Technical declarations for specification and design.
- SANS 8528-9:2008 Reciprocating internal combustion engine driven alternating current Generating Sets: Part 9: Measurement and evaluation of mechanical vibrations.
- NRS 010-2 Stationary lead acid batteries
- NRS 024-Part 1 Diesel alternator sets for fixed installations
- NRS 026 Battery chargers, industrial type
- SANS 013 The determination of performance (at net power) of internal combustion engine
- SANS 529 Heat-resisting wiring cables
- SANS 556-1 Low-voltage switchgear
- SANS 1411-1 Materials of insulated electric cables and flexible cords – Part 1: Conductors
- SANS 1433 Electrical terminals and connectors
- SANS 1473-1 Low-voltage, switchgear and controlgear assemblies – Part 1: Type-tested, partially type-tested and specially tested assemblies with a rated short-circuit withstand strength above 10 kA
- SANS 1507 Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1 900/3 300 V)
- SANS 1765 Low-voltage switchgear and controlgear assemblies (distribution boards) with a rated short-circuit withstand strength up to and including 10 kA

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• SANS 10103	The measurement and rating of environmental noise with respect to annoyance and speech communications
• SANS 10131	The storage and handling of liquid fuel
• SANS 10140	Identification for colour parking (Part 2)
• SANS 10142 - Part 1	The wiring of premises; low voltage installations
• SANS 10400	National building regulations
• SANS/IEC 6034	Rotating electrical machines
• SANS 60529/IEC 60529	Degrees of protection provided by enclosures (IP Code)
• SANS 60947/IEC 60947	Low-voltage switchgear and controlgear
• BS 500	Machines for miscellaneous application
• BS 2757	Classification of insulating material for electrical machinery
• BS 4999	
• BS 5000	
• BS 5514	Specification for reciprocating internal combustion engines performance
• IEC 61643	Surge protective devices connected to low voltage distribution systems

In terms of Government Notice No 17548, it is the Installer's responsibility to ensure that all electrical fittings installed comply with the relevant SANS safety standards, applicable to the particular class of fitting. In the event of fittings specified by the Engineer/Architect which do not comply with the SANS safety standards, it shall be the Installer's responsibility to notify the Employer's Agent immediately in writing, so that alternative fittings which do comply with the SANS safety standards may be timeously selected.

The Installer shall not install any fitting under any circumstance which does not comply with the SANS safety standards unless specifically instructed in writing by the Employer's Agent on an item for item basis.

Where a product is claimed to comply with the SANS safety standard by compliance to an alternative foreign safety standard recognised and accepted by the SANS, the Installer shall obtain and submit proof of such acceptance. Where the SANS grants a permit for the use of equipment which does not carry the SANS/SABS mark, the Installer shall submit copies of the permits and test reports to the Employer's Agent at the time of tender.

All equipment tendered shall comply with the SANS safety standard as required by the above legislation. The Electrical Installer shall provide copies of SANS certificates of compliance for electrical fittings upon request by the Employer's Agent. No claim will be considered on the basis that equipment tendered did not comply with the relevant SANS standard.

SECTION 4: SCOPE OF WORKS INCLUDED

The Generator Installer's work shall be the complete diesel standby generator installation including commissioning of the following:

- Standby Generator Plant: 360 KVA minimum output at 400V/50 Hz at 0.85 Power Factor. This is an emergency standby power rating as defined in Clause 13.3.4 of SANS 8528-1.
- Automatic Mains/Standby Changeover Switchgear
- Sound attenuating louvers
- Mains Failure Sensing
- Control Panel
- Exhaust and Silencer Systems
- Batteries and Battery Charger
- Cooling System
- Louvers
- Water jacket heater(s)
- Signs, Notices and Labelling
- Painting of Equipment
- Workshop Drawings and Samples
- Provision of own Hoisting and Lifting
- 3 years Free Maintenance and Services commencing at date of commissioning
- 3 years Guarantee commencing at date of commissioning
- Removal of own Waste

SECTION 5: WORKSHOP DRAWINGS, SAMPLES AND INSPECTIONS

The Installer shall timeously provide workshop drawings and/or catalogues and/or of the following items for the Employer's Agent's review:

- General and Connection Diagrams
- Control Panels
- Standby Generator Plant
- Exhaust System/s
- Proposed Physical Layouts of Plant and Equipment
- Details of Builder's Work Required
- Changeover Panels Where Supplied

Manufacture and delivery of these items shall not proceed without the Employer's Agent's written instruction to proceed.

The Installer shall timeously advise the Employer's Agent that these items may be inspected at the manufacturer's premises to enable the Employer's Agent to inspect the items at the manufacturer's premises prior to delivery.

SECTION 6: TESTING AND COMMISSIONING

6.1 Pre-delivery Works Tests

A works test and/or inspection are required by the Employer's Agent of the complete diesel-alternator set and changeover panel before delivery to site. The Employer's Agent shall be given the opportunity to witness the above tests. The Installer shall give the Employer's Agent timeous notice when he is ready to undertake the test. The Installer shall nevertheless undertake his own test as prescribed in the relevant Standards.

During the execution of the test the Installer shall record both steady state and transient load, voltage, frequency, oil pressure and engine temperature at regular intervals and shall provide the Employer's Agent with an authenticated test report for his records.

The works test shall include full load tests and step load tests with an adjustable load bank provided by the Installer.

6.2 Acceptance Inspection Test

Acceptance testing of the installation shall take place at a time prior to the contract practical completion date. The Installer shall give the Employer's Agent timeous notice of being ready for such tests.

The Installer shall provide all necessary test equipment, materials and tools and competent staff for the performance of the acceptance tests of the complete installation on site.

The test shall be carried out on site with all details of the plant and its environs complete so that a full rated load test can be performed. A load bank is not required for site acceptance tests.

If any portion of the works fails to pass the tests, tests of the said portion after replacement or rectification of the fault at the Installer's expense shall be repeated within a reasonable time upon the same terms and conditions. All reasonable expenses incurred by the Employer/Employer's Agent by such repetition of the tests shall be paid to the Employer's Agent by the Installer and shall not be added to the contract sum. Final payments in respect of the generator contract works will not be certified before all payments due to the Employer/Employer's Agent in this respect have been made. Should the works fail to pass the test and inspection, the time required to remedy faults shall form part of the contract period. The Installer is advised to perform the test as timeously as possible to allow time to rectify faults within the contract period. The guarantee period on the contract will commence from the date of issue of the Agent's certificate of practical completion.

6.3 Type Tests

Type test certificates for the current design of the alternator shall be submitted with the tender. Machines for which type test certificates are not available are not acceptable. Routine test certificates shall be submitted to the Employer's Agent prior to the final works test.

6.4 Maintenance Tests

Notwithstanding the successful testing of the equipment and test results the tenderer shall remain responsible for the satisfactory operation of the system as a whole for a period of not less than one year from practical completion.

6.5 Noise

The Generator Installer shall arrange tests and measurements to prove compliance with SANS 10103 regarding generator plant noise at the boundary of the premises. The location of the generator may be regarded as a Rural District in terms of Table 2 of SANS 10103.

SECTION 7: SPARES

The Tenderer shall submit with his tender a detailed itemised list of spares recommended to cover the probable requirements for one year's maintenance of the plant. The list shall include individual catalogued parts numbers and descriptions.

SECTION 8: TOOLS

The Tenderer shall provide a list of the tools and test equipment he recommends for the maintenance of the plant, and shall submit an optional extra price for these, as per the Price Schedule.

A tool for opening the control panel (square panel key or similar as applicable) shall in any event be supplied.

SECTION 9: OPERATING INSTRUCTIONS, PARTS LISTS AND MAINTENANCE MANUALS

The Installer shall supply, after approval by the Employer's Agent, one bound set of comprehensive operating instructions, parts lists, maintenance manuals and as-built drawings including the following details and information:

- Installer's and Supplier's details (name, address, email address, telephone and facsimile numbers)
- Installer's emergency (after hours) contact details
- Cable Layouts, including Feeder and Control Cable Marking Numbers and Details
- Control Panel/s
- Changeover Panel/s
- Spare Parts List
- Tools List
- Standby Generator Operating and Maintenance Manual
- Test Certificates
- Certificates of Compliance
- Guarantees and Warranties

The contract will not be accepted as complete until these have been supplied, complete and to the satisfaction of the Employer's Agent.

SECTION 10: PARTICULAR REQUIREMENTS FOR THIS PROJECT

10.1 Standby Generator Set

A 360 kVA 400 V 50 Hz standby generator set shall be supplied and installed complete with the necessary control and changeover panels, wiring and interconnecting wiring.

All changeover switchgear shall be electrically and mechanically interlocked, fully automatic and contain all the necessary coils, main contacts, auxiliary contacts, relays and adjustable timers for correct operation. The timers, relays and auxiliary contacts shall be connected to prevent the simultaneous energising of both the main and standby generator supply switchgear.

10.2 Site Conditions

The site is located as described in the tender document

Service Conditions:

Altitude:	30 m above sea level
Maximum Daily Temperature:	35°C
Minimum Daily Temperature:	1°C
Relative Humidity;	55%

Atmosphere	Temperate
Pollution Level:	Light
Mains Voltage:	400/230 Volt (nominal)
Mains Frequency:	50 Hz (nominal)

10.3 Operation

The diesel alternator set shall start up automatically after an adjustable period of 0-10 seconds (as determined by the Employer's Agent) after detection of failure of mains power. The machine shall take load on attaining rated speed and voltage.

The machine and control shall be so designed and set so that the time from mains failure to load acceptance shall not exceed 15 seconds.

The transfer of load will be by means of motorised isolators. These are to be installed in a position remote to the generator. This position is still to be determined and an enclosure for housing the isolators will be constructed by others. The Generator Installer shall liaise with the Employer's Agent and shall supply and install the motorised isolators in this enclosure.

An Electrical Installer will terminate the electrical power cables and pilot cable linking between the generator and the change-over isolators and between the changeover isolators and the MDB.

On sensing the return of the mains the machine shall continue to run on load for a period adjustable from 0 - 300 seconds after which time the transfer of power from emergency back to mains shall take place.

The machine shall run on at no load to cool the engine for a period determined by the manufacturer whereafter it shall automatically shut down ready for the next mains failure.

A plant selector switch shall be provided with off, manual, automatic and test positions which may be incorporated into a purpose designed controller.

In the automatic mode the machine shall operate as described above.

In the manual mode the machine shall be started by an accompanying start button after which it should take load as for automatic operation but shall be stopped by a stop button. The stop button shall cause the machine to shed its load and run on for its cool down period.

In the off mode the machine shall not operate.

In the test mode the machine shall start and run in response to operation of the start/stop buttons, but shall not take load. In the event of the mains failing during the test procedure the machine shall, however, take load automatically.

An emergency stop button shall be provided to shut the machine down instantly in any operating mode.

10.4 Engines

The engine shall be multi-cylinder vertical or inclined compression ignition two or four stroke naturally aspirated or exhaust gas turbo charged cold starting direct diesel injection water cooled type.

The engine shall be rated for standby power matched to drive the alternator and its imposed load at a speed of 1 500 rpm in accordance with SANS 8528 at site.

The engine shall be rated for 10% overload for a period of 1 hour without deviation from rated speed and without undue heating or mechanical stress.

10.4.1 Engine accessories

The engines shall be complete with the following accessories in addition to those elsewhere specified:

- Oil pressure gauge in kPa
- Water temperature gauge
- Non resettable running (hour meter) in the control panel
- Fuel shut off solenoid valve preferably continuously rated energised for engine to run
- Removable drip tray

- Dynamically and statically balanced fly wheel to limit cyclic irregularity to SANS 8528 requirements independently to the alternator inertia.

10.4.2 Engine protection

The engine shall be provided with the necessary transducers with accompanying relays to indicate separately the following conditions:

- High oil temperature
- Low oil pressure
- Over and under speed exceeding 5% above or below rated speed
- Start failure after 3 attempts

The engine shall shut down under the above conditions an alarm shall be provided in the control panel to indicate the event.

The above protection shall be interlocked with control circuits to prevent false indication during run up and run down periods.

10.4.3 Governor

An electronic governor capable of accurate speed regulation within SANS 8528 class G2 suitable for the imposed load shall be provided.

10.4.4 Starting

Battery starting shall be provided by means of an axial type starter. The starting circuits shall ensure that cranking stops as soon as the engine fires and that the starter does not re-engage until the engine is at rest.

The engine shall be provided with water jacket heaters to ensure easy starting and load acceptance as soon as rated speed and voltage are attained. Should the Installer deem it necessary to ensure this condition he shall include for an electric oil circulating pump.

10.5 Step Loading

The plant shall be capable of accepting a step load from 0 – 65% of the nominal rated load with a voltage deviation not exceeding 15% of rated voltage and a frequency variation not exceeding 6% of rated speed. Voltage and frequency recovery shall be within 2 – 4 seconds and frequency in 2 seconds during motor starting while on load frequency and voltage variation shall not exceed the above limit and recovery time.

10.6 Cooling

The engines shall be water cooled by means of a set mounted radiator. The cooling system shall be commissioned with a rust inhibitor in the water.

10.7 Lubrication

The lubrication system shall be pressure fed with a reliable disposable element oil filter fitted between the pump and engine oil circuit. The filter shall have a bypass valve to maintain lubrication when the filter is choked.

10.8 Air Filters

The engine shall be fitted with a suitable air intake filter. Dry types shall be provided with a service indicator.

10.9 Exhaust Systems

The engine shall be supplied complete with an exhaust system and locally mounted exhaust silencer.

The maximum noise level from the exhaust shall not exceed the SANS 10103 recommended residual sound levels for a rural area as listed in Table 2.

Flexible couplings and mounting shall be provided between parts of the exhaust system fixed to the structure and the engine.

Where necessary both absorptive and resonator silencers shall be fitted to reduce noise below the above level.

The exhaust system shall be 3CR12.

The exhaust cladding shall be galvanised mild steel/stainless steel.

10.10 Fuel Systems

The set shall be fitted with an integral fuel tank to provide at least eight hours' running time at 65% of rated load.

10.11 Alternators

The alternator shall comply with SANS 8528 C3.7. Protection shall be IP 22 or better and winding insulation shall be class H or better.

The alternator shall be the self excited, self regulated screen protected, drip-proof brushless type.

The voltage regulation expressed as a percentage rise in terminal voltage on the instant reduction of full rated load at 0,8 power factor to no-load shall not exceed 5%.

The alternator shall be of the two bearing type of the ball and/or roller type.

The electrical characteristics shall be as follows:

Voltage	:	400V three phase 230V single phase.
Frequency	:	50 Hz at rated speed of 1500 rpm.
Radio and TV interference suppression shall be fitted in accordance with SATRA/Telkom requirements.		

The load imposed on the alternator will be as follows:

Lighting and Small power	50 kVA
Pump Motors	310 kVA

The minimum capacity for this plant shall be 360 kVA at 0.8 power factor.

Notwithstanding the specified nominal load capacity of the diesel standby generator, the complete set shall be capable of supplying both the transient and quiescent power, requirements imposed by the equipment above within the voltage and frequency limits specified.

This load excludes engine auxiliaries. The Installer shall add the kVA loading of engine auxiliary equipment to the minimum power required when sizing the alternator.

10.12 Mounting

The engine and alternator shall be mounted on a common base and direct coupled with a flexible coupling. The engine and alternator shall be mounted on the base with anti-vibration mountings. Provision shall be made for bolting the base to the floor.

10.13 Battery and Battery Charger

The batteries shall be of the lead-acid stationary low maintenance type.

The batteries shall be of sufficient capacity to provide six starts in a one hour period.

The battery charger shall be mounted in the alternator control panel and shall automatically boost or trickle charge the batteries as determined by the battery voltage. The boost charge current shall not exceed 20% of the rated battery capacity. A constant trickle charge facility is not acceptable.

The method of charging the battery and charging equipment supplied shall have the prior approval of the battery manufacturer of the batteries the Generator Installer intends installing.

10.14 Control Panel

The alternator set control panel shall be set mounted. The panel shall contain all the engine protection relays, timers, circuit breakers, battery charger, voltage regulator, mains sensing relays, motorised circuit breakers and wiring necessary for the complete safe and reliable operation of the diesel standby generator.

All terminals and equipment shall be labelled clearly with approved markers and legends. Each control wire shall be marked at each end. Markings shall correspond exactly with those on the switchboard circuit diagrams.

The Electrical Installer on the project will supply install and connect/terminate where indicated by the Generator Installer the following cables:

- Power In;
- Power Output:

The control panel shall contain inter alia:

- Alternator protection circuit breaker
- Battery charger
- Voltage regulator
- Plant selector switch
- Emergency stop button
- Start/stop button
- Demand indication ammeters
- Voltmeters
- Battery volt- and ammeter
- Running hour meter
- Reset buttons
- Engine protection relays and indication
- Frequency meter
- Fuses
- Terminals
- Start delay, potential and stop delay timers
- Run on timer
- Three phase adjustable phase failure and rotation sensing relay

As much of the above as possible can be combined into a controller (except the emergency stop button).

Four coloured indicator lights shall be mounted in the panel, with clear labelling, to indicate the following:

- Mains live
- Mains on load
- Standby live
- Standby on load

Only circuit breaker toggles, push buttons and indication equipment shall be accessible. The balance of equipment shall be behind hinged doors. Perforated plastic trunking shall be provided wherever necessary to neatly house all control wiring.

10.15 Painting

Painting of equipment shall be in accordance with SANS 0140 part 2 specification LEE-P4A-1.

10.16 Noise and Attenuation

The completed installation shall generally comply with the requirements of SANS 10103 in relation to noise at the property boundary. Tenderers shall advise the Employer's Agent at tender stage if additional special treatment of the generator plant and enclosure will be necessary to meet this requirement.

The Installer shall arrange testing and measurement to prove compliance.

The engine and alternator shall be mounted on the frame using anti-vibration mounts to prevent transmission of vibration to the structure. Where necessary the exhaust system shall be suspended on spring mounts to prevent transmission of vibration to the structure.

10.17 Remote Indication and Control Facilities

The Installer shall provide a remote indication panel as indicated on the plans to show the following conditions:

- Low fuel (30% capacity)
- Common failure alarm
- Generator running

The Generator Installer shall additionally provide potential free contacts for signalling these conditions to a Building Management System (BMS).

10.18 Labels

All labels shall be English. All labels shall be of ivory or plastic and securely fixed by screws or rivets. Lettering shall be block capitals, minimum size 4 mm.

All feeder and control cables shall be identified with approved marked brass or fibre identifying discs at terminations, every 10 m (if practical) horizontally and at every floor level vertically. The Installer shall provide diagrammatic charts showing the identity, type and size of each cable.

10.19 Danger Notices

The Generator Installer shall supply and install all danger and statutory notices in terms of the relevant regulations.

10.20 Corrosion

The Generator shall take adequate measures to protect the installations against corrosion, according to the site conditions.

SECTION 11: TRAINING

The Installer shall provide training to the Employer operating personnel at practical completion.

Training shall be provided in the routine operation and maintenance of the standby generator and related plant included in this subcontract.

SECTION 12: GUARANTEE AND MAINTENANCE AND SERVICING

The Installer shall provide a three year guarantee (from date of commissioning) to replace or repair, free of charge, any part of the installation in which defects may develop as a result of manufacturing defects or poor workmanship.

The Installer shall provide maintenance and services during the three year guarantee period, included in the tendered contract sum.

Where products supplied normally carry a guarantee exceeding three years, the full normal guarantee for the product shall apply.

SECTION 13: SCHEDULES OF INFORMATION TO BE COMPLETED BY THE TENDERER

1. TECHNICAL DECLARATIONS FOR SPECIFICATION AND DESIGN (Extract from SANS 8528 Part 7)

Tenderers shall fill in under Column M for all items unless N/A has been inserted by the Employer's Agent.

No	Term	Item	Reference	C	M
4.1	Basic data	Power demand		360 kVA	
		Power factor		From 0.8 to 0.96	N/A
		Rated frequency		50 Hz	
		Rated voltage		400 V	
		Type of system earthing	SANS 10142	TNS	
		Profile of the connected electrical load	9.1 of SANS 8528-5	Refer Part 4 Clause 18.12	N/A
		Required steady-state frequency and voltage behaviour	16 of SANS 8525-5	Class G2	
		Required transient frequency behaviour	16 of SANS 8525-5	Class G2	
		Type of fuel available	12 of SANS 8528-2	Refer South African Suppliers	
		Starting	15.1 of SANS 8528-5 and C.3.11 of SANS 8525-7	Electrical	
		Cooling and room ventilation	15.6 of SANS 8525-5		
4.2	Engine	Speed	6.2 of SANS 8525-2		
		Fuel specification	12 of SANS 8525-2	Diesel: Refer South African Suppliers	
		Nature and type of speed governor	6.3 of SANS 8525-2		
		Nature of engine cooling		Water cooled	
		Required operating time without refuelling	15.3 of SANS 8525-2	To be discussed	
		Required engine instrumentation	7.4 of SANS 8525-4	a,b,c,d,e,h	
		Required protection system	7.3 of SANS 8525-4	Over current, underspeed, control circuit protection	
		Fuel consumption	14.5 of SANS 8525-1		
		Starting system and ability	11 of SANS 8528-2	Refer Part 4 Clause 18.14 above.	
		Heat balance	9 of SANS 8525-2		
		Air consumption			

No	Term	Item	Reference	C	M
4.3	Generator	Nature and type of excitation and voltage regulation	14.7.2 of SANS 8528-1 a and 12 of SANS 8525-3nd 8	Class G2	
		Required mechanical protection	IEC 34-5	IP 22	
		Required electrical protection	7.3 of SANS 8525-4	Over current, underspeed, control circuit protection	
		Nature of generator cooling	IEC 34-5	Air	
		Heat balance	9 of SANS 8525-3		
		Unsymmetrical load (unbalanced load current)	10.2 of SANS 8525-3	As given in Clause 10.2	
		Construction and mounting arrangement	IEC 34-7	Refer Clause 18.13 of Part 4 above.	
		Grade of telephone and radio interference suppression	10.5 and 10.6 of SANS 8528-3	As given in Clauses 10.5 & 10.6.	
4.4	Mode of operation	Continuous	6.1 of SANS 8525-1	No	N/A
		Limited time operation (emergency generating set, peak load generating set)		As 6.1.5	N/A
		Expected operating hours per year		150	N/A
4.5	Power rating classification	Continuous power	13.3 of SANS 8525-1		
		Prime power			
		Limited-time running power			
4.6	Site criteria	Land use	6.2.1 of SANS 8525-1	Yes	N/A
		Marine use	6.2.2 and 11.5 of SANS 8525-1	No	N/A
4.7	Performance class		7 of SANS 8525-1	G2	
4.8	Single and parallel operation	Parallel operation with other generating sets	6.3 of SANS 8525-1	No	N/A
		Parallel operation with mains		No	N/A
		Type and execution of synchronising		N/A	N/A

No	Term	Item	Reference	C	M
4.9	Mode of start-up and control	Manual	6.4 of SANS 8525-1 and 6 of SANS 8525-4	No	N/A
		Automatic		Refer Clause 18.4 of Part 4 above.	N/A
		Semi-automatic		No	N/A
		Additional control device proposed by the generating set manufacturer			
4.10	Start-up time	Generator set with no specified start-up time	6.5 of SANS 8525-1	No	
		Long-break set		Yes. Refer Clause 18.4 of Part 4 above.	
		Short-break set		No	
		No-break set		No	
4.11	Installation features	Installation configuration	8.2 of SANS 8525-1	Fixed	
		Set configuration	8.3 of SANS 8525-1	Base frame Type C	
		Type of mounting	8.4 of SANS 8525-1	Rigid	
		Weather effects	8.6 of SANS 8525-1	Inside	
4.12	Site conditions	Ambient temperature	11 of SANS 8528-1	31°C	
		Altitude		30 m above sea level	
		Humidity		55%	
		Sand and dust		No	
		Marine		No	
		Shock and vibration		N/A	
		Chemical pollution		No	
		Type of radiation		No	
4.13	Emissions	Noise limitation	9 of SANS 8528-1		
		Exhaust gas limitations			
		Vibrations			
		National legislation		RSA	

No	Term	Item	Reference	C	M
4.14	Test methods	Standard	4 of SANS 8528-6	Yes	
		Special requirements		No	
4.15	Maintenance intervals	Routine (e.g. oil changes)		3 monthly	
		Mechanical (e.g. filters)			
		Electrical (e.g. controls)			
		Service life to major overhaul			
4.16	Auxiliaries	Power consumption of the auxiliary devices (e.g. fan, compressor)			
		Pre-heating			
		Pre-lubricating			
		Auxiliary and starting battery			
4.17	Controlgear and switchgear	Rated current capacity	4.5 of SANS 8528-4	800 A	
		Neutral earth scheme	7.3.7 of SANS 8528-4	N/A	
		Fault-current rating	5.3 of SANS 8528-4	15 kA at changeover	
		Nature of protection device	7.3 of SANS 8528-4	Circuit breaker	
		Nominal operating voltage for control circuit.	4.6 of SANS 8528-4	48 V	
4.18	Factors affecting generating set's performance	With respect to power	9.2 of SANS 8528-5 and 14.2 of SANS 8528-1	Automatic starting of motors	
		With respect to frequency and voltage	9.2 of SANS 8528-5 and 14.2 of SANS 8528-1	Automatic starting of motors	
4.18	Other regulations and requirements		3 of SANS 8528-7	N/A	

2. GENERATING SET DATA

Tenderers shall complete the table below.

No	Description	
1	DIESEL ENGINE	
1.1	General	
1.1.1	Manufacturer	
1.1.2	Model number	
1.1.3	Type	
1.1.4	Two stroke or four stroke	
1.1.5	Revolutions at 100% load	r/min
1.1.6	Number and arrangement of cylinders	
1.1.7	Total mass of set on base	kg
1.1.10	Starting period to full load	s
1.1.11	Engine run-down time	s
1.1.12	Fuel consumption under site conditions	
	a) Full load	ℓ/kWh
	b) ¾ load	ℓ/kWh
	c) ½ load	ℓ/kWh
1.1.13	Guaranteed power output under site conditions	kW
1.2	Mode of Operation (Standby/Continuous)	
1.3	Cooling	
1.3.1	Cooling medium	
1.3.2	Recommended coolant for closed circuit of engine	
1.3.3	Method of cooling, if one method preferred	
1.4	Aspiration and Cooling Air Intake(s)	
1.4.1	Type of air filter	
1.5	Starting System	
1.5.1	Method of starting	
2	INSTRUMENTATION	
2.1	Engine-driven tachometer	r/min Yes/No
2.2	Engine temperature gauge	°C Yes/No
2.3	Fuel oil pressure gauge	kPa Yes/No
2.4	Lubricating oil pressure gauge	kPa Yes/No
2.5	Oil temperature gauge	°C Yes/No
2.6	Starter battery voltage	V Yes/No
2.7	Running hour meter	h Yes/No

No	Description	
2.8	Dirty filter indicator (if applicable)	Yes/No
2.9	Other instrumentation recommended	
3	ENGINE CONTROLS	
3.1	Manual start key/switch	
3.2	Shutdown in case of fire	
4	ENGINE LABELLING	
4.1	Grade of oil	
4.2	Danger label	
4.3	Information labels	
4.4	Rating plates	
5	ALTERNATOR	
5.1	General	
5.1.1	Manufacturer	
5.1.2	Model number	
5.1.3	Rated output	kVA
5.1.4	Maximum short-circuit current	kA
5.1.5	Guaranteed net continuous site rating	kVA
5.1.6	Power factor at net continuous site rating	
5.1.7	Time intervals for applying loads	
5.1.8	Number of phases	
5.1.9	Phase-to-phase/phase-to-neutral voltage	/..... V
5.1.10	Range of adjustment of terminal voltage	±.....%
5.1.11	Frequency	Hz
5.1.12	Nominal speed	r/min
5.1.13	Efficiency at unity/0.8 lag power factor	
	a) Full load	%
	b) ¾ load	%
	c) ½ load	%
	d) ¼ load	%
5.1.14	Excitation method	
	a) Excitation voltage range	V
	b) Maximum field control current	A
5.1.15	Parallel operation (if required)	Yes/No
5.1.16	Neutral earthing method	
5.2	Alternator Protection	
5.2.1	Overcurrent and earth fault protection	

Item	Description	
5.2.2	Other protection	
5.3	Alternator labelling (adjacent to alternator)	
	a) Danger label	
	b) Terminal label and colours	
	c) Information labels	
	d) Rating plates	
5.4	Transient output variations	
5.4.1	Maximum voltage drop during a load step of 150 kVA	%
	Maximum frequency deviation during a load step of 150 kVA	%
5.6	Alternator construction	
5.6.1	Number of bearings	
5.6.2	Are there special bearing and lubrication requirements?	
	a) If Yes, details of requirements	
	b) If No, details of bearings offered	
5.6.3	Alternator cooling	
6	MECHANICAL BUILD	
6.1	Base frames	
	a) Length	mm
	b) Width	mm
6.2	Equipment mounted on the base frame or separately	
6.2.1	Control cubicle	
6.2.2	Day fuel tank	
6.2.3	Battery for starter motor	
6.2.4	Battery for control circuits	
6.2.5	Other accessories	
6.3	Overall mass of set (for lifting purposes)	
6.3.1	Cable entry positions	
6.4	Coupling method	
6.5	Vibration damping mounting details	

Item	Description	
6.6	Enclosure (if applicable)	
6.6.1	Sound-reducing	
6.6.2	Weather protection	
6.6.3	Material used for soundproofing	
6.6.4	Corrosion-protected material used for the enclosure	
6.6.5	Internal illumination details	
6.6.6	Overall dimensions and mass	mm
	a) Length	mm
	b) Width	mm
	c) Height	mm
	d) Mass	kg
	e) Layout of proposed construction supplied	

Item	Description	
7	EXHAUST SYSTEM	
7.1	General	
7.1.1	Maximum flow resistance of exhaust system	kPa
7.1.2	Exhaust line diameter	mm
7.1.3	Maximum outlet noise level	dBA
	At	m
7.1.4	Silencer details	
	a) Manufacturer	
	b) Type/model number	
	c) Diameter	mm
	d) Length	mm
	e) Mass	kg
8	Materials	
	Exhaust line material	
	Details of expansion bellows	
	Lagging	
	Type of lagging offered	
	Thermal capabilities of lagging offered	
9	SWITCHGEAR	
9.1	Switchgear equipment	
	Equipment to be supplied	
9.1.1	Voltmeter	
9.1.2	Frequency meter	
9.1.3	Maximum demand ammeters	
9.1.4	kW meter	
9.1.5	Battery voltmeter	
9.1.6	Battery ammeter	
9.1.7	Mains isolator	
9.1.8	Alternator circuit breaker, details	
9.1.9	Changeover circuit breaker or contactor	
9.1.10	Cable termination terminals	
9.1.11	Neutral and earth bar	
9.1.12	Other equipment deemed necessary or recommended	
10	CONTROL PANEL AND SYSTEM	
10.1	Mechanical construction	
10.1.1	Panel height	mm

Item	Description	
10.2	Protection alarms and indications	
10.2.1	Alarm system, general requirements	
	a) Type of display offered	
	b) Remote control and indication alarm system	
10.2.2	Engine alarms	
	a) Low oil pressure	
	b) High engine temperature	
	c) High bearing temperature	
	d) Low coolant/water level	
	e) Engine overspeed	
	f) Engine start failure	
	h) Engine running	
	i) Day fuel tank low	
	j) Engine management system	
	k) Other alarm (including low battery voltage)	
10.2.3	Alternator alarms	
	a) Overload	
	b) High winding temperature	
	c) High output voltage	
	d) Low output voltage	
	e) Phase unbalance	
	f) High/low frequency	
	g) Earth fault	
	h) High bearing temperature	
	i) Unbalanced load	
	j) Reverse power	
10.2.4	General	
	a) Battery charger failure	
	b) DC fail	
	c) Mains fail	
	d) Fire valve(s) operated	
	e) Protection trip	
	f) Protection off/normal	
	g) Alarm system failure	
10.2.5	Engine alarms, indications and controls: recommendations	

Item	Description	
10.2.6	Alternator alarms, indications and controls: recommendations	
11	CONTROL AND TIMERS FOR STANDBY SETS	
11.1	Mains fail	
11.2	Changeover delay timer range	 to s
11.3	Off-load run timer range	s
11.4	On-load run timer range	s
12	CONTROL EQUIPMENT	
12.1	Type of control system offered	
12.2	If system is PLC based	
12.2.1	Software documentation provided	
12.2.2	Writer of software	
12.2.3	Flow chart to be submitted	
12.2.4	Hard wired manual override facility	Yes/No
13	BATTERIES AND BATTERY CHARGER	
13.1	Batteries	
13.1.1	Starter battery	
	a) Type	
	b) Manufacturer	
	c) Voltage	
	d) Capacity	V
	e) Location	Ah
13.1.2	Control and alarm batteries	
	a) Type	
	b) Manufacturer	
	c) Voltage	
	d) Capacity	V
	e) Location	Ah
13.1.3	Other battery (if required)	
	a) Type	
	b) Manufacturer	V
	c) Voltage	Ah
	d) Capacity	
	e) Location	
	f) Purpose	
13.1.4	Battery charger	

Item	Description	
14	EARTHING	
14.1	Alternator neutral earthing	Yes/No
14.2	Battery earthing	
14.2.1	Is negative pole earthed to frame?	
14.3	Is bypass earthing of bearings recommended and provided?	
15	CORROSION PROTECTION AND FINISH	
15.1	Final colour of finishes	
15.1.1	Engine	
15.1.2	Alternator	
15.1.3	Frame	
15.1.4	Enclosure (if applicable)	
15.1.5	LV switchgear	
15.1.6	Control panels	
15.1.7	Other	
16	SPARES AND SPECIAL TOOLS	
16.1	Confirmation that all spares will be available for ten years from equipment delivery	
17	MARKING/LABELLING/DOCUMENTATION	
17.1	Labelling	
17.1.1	Are labels language or pictorial type?	
17.2	Documentation	
17.2.1	Number of copies of O&M Manual	
17.2.2	Number of copies of works test certificates	

3 SCHEDULE OF RECOMMENDED PARTS AND SPARES

ITEM	DESCRIPTION	CATALOGUE PART NO
1	ENGINE PARTS:	
2	ALTERNATOR PARTS:	
3	AUXILIARIES:	
4	OTHER:	

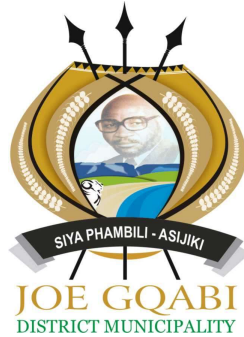
4 SCHEDULE OF RECOMMENDED TOOLS

ITEM	DESCRIPTION	CATALOGUE PART NO
1	ENGINE:	
2	ALTERNATOR:	
3	AUXILIARIES:	
4	OTHER:	

C3.7. Annexures

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C3.7.1 Employer's Occupation Health and Safety Agreement



OCCUPATIONAL HEALTH AND SAFETY ACT, 1993

AND

Construction Regulations 2014

AGREEMENT WITH MANDATARY

In terms of Section 37 (1) and (2) of the OHSACT

WRITTEN AGREEMENT ENTERED INTO AND BETWEEN

(Employer)

AND

(Principal Contractor)

REQUIREMENTS:

1. The Principal Contractor/Contractor's attention is drawn to "General Duties of Employers to their Employees" as required by Section 8 of the Act.
2. The Principal Contractor/Contractor is required to:
 - 2.1 Sign a written "Agreement with Mandatary" as Required by Sec 37(1)(2) of the Act before commencing any work on site.
 - 2.2 Ensure that all your employees receive the necessary Induction Training and have proof thereof in their records.
-Note: You must ensure that all employees under your control are informed, instructed and trained by a competent person regarding any hazard and the related work procedures before any work commences.
 - 2.3 Ensure the provision of Welfare Facilities for your employees as per Construction Regulation 30.
 - 2.4 Provide the Employer/Principal Contractor with your SHE Plan and Specifications
 - 2.5 Ensure that Method Statements, Risk Assessments and Safe Work Procedures are done and available.
 - 2.6 Provide the Employer/Principal Contractor with written appointment of the person who is going to manage the Construction Work per Construction Regulation 8(1).

- 2.7 Provide the Employer/Principal Contractor with written designation of your nominated Health and Safety Representative as per Section 17 (1).
- 2.8 -Note: Your Health and Safety Representative will be expected to attend the Employer/Principal Contractor safety meetings.
- 2.9 If you employ more than five(5) persons, you are required to provide your own First Aid Box (GSR 3(2)).
- 2.10 Where more than ten(10) persons are employed, the Principal Contractor/ Contractor are required to provide your own qualified First Aider as per GSR 3(4).
-Note: Where the Principal Contractor/Contractor have difficulty in complying with items 2.7 and 2.8 above, you may arrange / come to an agreement with the Employer/Principal Contractor to make use of his First Aid facilities in case of injury. You will be expected to communicate such an agreement to your employees.
- 2.11 When working with Hazardous Chemical Substances, comply with HCS Reg.3.
- 2.12 Note: Asbestos and Lead Regulations are separate.
- 2.13 When using a Materials Hoist, comply with the requirements of Construction Regulation 19.
- 2.14 When using Lifting Machines and Lifting Tackle, comply with DMR 19.
- 2.15 Note: You may be required to appoint a Banksman to control Lifting/Slinging operations.
- 2.16 When erecting/using Scaffolding comply with the requirements of SANS 10085 "Access Scaffolding".
- 2.17 When erecting/using Suspended Scaffolding comply with the requirements of Construction Regulation 17.
- 2.18 When doing Demolition Work, comply with Construction Regulation 14.
- 2.19 When doing Blasting to comply with Explosives Regulations Chapter 10.
- 2.20 When doing Excavation Work, comply with Construction Regulations 13.
- 2.21 When doing Electrical Installations, comply with the requirements of Construction Regulation 24.
- 2.22 Note: Electrician to provide a copy of registration as per Electrical Installations Regulations 9(3).
- 2.23 When using Construction Vehicles, comply with Construction Regulation 23.
- 2.24 When using/erecting Temporary Works, comply with Construction Regulation 12.
- 2.25 When working over or in close proximity to Water, comply with Construction Regulation 26.
- 2.26 Ensure that good Housekeeping, Stacking and Storage principles are applied on this project as per Construction Regulations 27 and 28.
- 2.27 Ensure that appropriate measures are taken to avoid the risk of Fire/Explosion and comply with requirements of Construction Regulation 29.
- 2.28 If you are going to work at heights a Fall Protection Plan must be submitted (roof work included) as per the requirements of Construction Regulation 10.
- 2.29 When using explosive actuated fastening devices, comply with Construction Regulation 21
- 2.30 When Welding, Flame Cutting/Soldering, comply with GSR 9.
- 2.31 When working in Confined Spaces, comply with GSR 5.
3. The Principal Contractor/Contractor is responsible for providing their own legal safety documents and registers to comply with the Act's requirements. A copy of the OHS Act of 1993 and the Construction Regulations 2014 will be available for perusal in the Principal Contractor's site office.
4. The Principal Contractor/Contractor is required to comply with General Safety Regulations 2 (1) to (7) and provide your employees with:
5. Report of Incidents of Occupational Diseases shall be done as per General Admin. Regulation 8 (Also see Sect 24 of the Act).
6. Personal protective equipment which will allow them to carry out their work in a safe manner, e.g. hard hats, safety harnesses, gloves, safe footwear, eye protection, ear protection, waterproof clothing etc.

7. Reporting of Incidents of Occupational Injuries and Diseases Act (No.130 of 1993).
8. You are required to provide the Employer/Principal Contractor with proof of registration with the Compensation Commissioner/Federated Employer(s) Mutual when signing this agreement. If you are not registered, the Employer/Principal Contractor may deduct the necessary amounts from your progress payment and pay it over to the Commissioner to ensure that you are insured. See Section 80 and 89 of the COID Act.
9. Public safety (safety of school children, visitors, general public is of paramount importance).

Signature:_____	Signature:_____
(Employer)	(Principal Contractor)
Date_____	Date_____

OCCUPATIONAL HEALTH & SAFETY, 1993

Regulation 5 of the Construction Regulations, 2014

APPOINTMENT OF PRINCIPAL CONTRACTOR

1. (1) a EMPLOYER MUST-

(k) appoint every principal contractor in writing for the project or part thereof on the construction site;

I/We, _____

(Employer's name)

Hereby

Appoint: _____

(name of principal contractor)

As the principal contractor for the construction work/project to be carried out at:

(exact physical address of the construction work and site office)

The appointed principal contractor accepts the appointment and confirms that he/she is conversant with all relevant statutory provisions and regulations of the Occupational Health and Safety Act, 1993, with regard to carrying out construction work.

Signature: _____ Date _____

Of Employer

Signature: _____ Date _____

Of Principal Contractor

C3.7.2 Employer's Health and Safety Specifications

JOE GQABI DISTRICT MUNICIPALITY



**HEALTH AND SAFETY SPECIFICATION IN ACCORDANCE TO CONSTRUCTION
REGULATIONS 5(1)(b) OF OCCUPATIONAL HEALTH AND SAFETY ACT 85 OF 1993**

Private Bag X102

EKHEPHINI

9786

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1. PURPOSE AND SCOPE

This Health and Safety Specification is to assist in achieving compliance with the provisions of Occupational Health and Safety Act 83.1993 and its Regulations. The document describes the requirements of compliance to which the Principal Contractor and all Sub-Contractors must comply in relation to the scope of works. This document defines the minimum management requirement that is to be implemented by the Principal Contractor and Sub-Contractors for the management of Health and Safety on the project.

This specification covers the requirements for eliminating and mitigating incidents and injuries on the particular project. The scope also addresses legal compliance, hazards identification and risk assessment, risk control and promoting a health and safety culture amongst those working on the project. The specification also makes provision for protection of those persons other than employees.

2. REFERENCE DOCUMENTS

- Occupational Health and Safety Act, (Act No. 85 of 1993)
- Compensation for Occupational Injury and Diseases Act, (Act No. 130 of 1993)
- Construction Regulations 2014
- JGDM Health and Safety Specification and
- All other applicable pieces of legislations (SANS Codes)

3. DEFINITIONS

The following definitions will apply to the Safety Management Plan, acronyms given hereunder shall apply:

“Agent”

Means a competent person who acts as a representative for a client

“The Act”

Means, unless the context indicates otherwise, the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and Regulations promulgated there under.

“Contractor”

Means an employer who performs construction work.

“Construction work”

Means any work in connection with –

- a) The construction, erection, alteration, renovation, repair, demolition or dismantling of or an addition to a building or any similar structure;
- b) The construction, erection, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system or moving of earth, clearing of land, the making of excavation, piling or any similar civil engineering structure;

“Designer”

Means a competent person who –

- Prepares a design.
- Checks and approves a design.
- Arranges for a person at work under his or her control to prepare a design, including an employee of that person where he or she is the employer.
- An architect or engineer contributing to or having overall responsibility for a design.

- A building services engineer designing details for fixed plant.
- A surveyor specifying articles or drawing up specifications.
- A contractor carrying out design work as part of a design and building project.
- An interior designer, shop-fitter or landscape architect.

“Hazard”

Means a source of or exposure to danger (source which may cause injury or damage to persons, or property)

“Hazardous Chemical Substance (HCS)”

Means any toxic, harmful, corrosive, and irritant or asphyxiate substance, or a mixture or substances for which an occupational exposure limit is prescribed, or an occupational exposure limit is not prescribed, but which creates a hazard to health.

“Hazard Identification”

Means the identification and documentation of existing or expected hazards to the health and safety of persons, which are normally associated with the type of construction work being executed or to be executed.

“Health and Safety File”

Means a file, or other record containing the information in writing required by Construction Regulations.

“JGDM”

Joe Gqabi District Municipality

“Risk”

Means the probability that injury or damage will occur.

“ Construction site”

Means an work place where construction work is being performed.

4. RESPONSIBILITIES

4.1. Notification of Intention to Commence Construction Work

It is essential for the Contractor to notify the Provincial Director of the Department of Labour, immediately upon receipt of the Letter of Acceptance of project commencement and within seven (7) days before work is carried out, if the intended construction work will:

- Include the excavation work
- Include working at a height where there is risk of falling
- Include demolition of structure
- Include the use of explosives to perform construction work

A copy of the notification letter from the Provincial Director must be forwarded to JGDM for record purpose and the Principal Contractor’s safety file.

4.2. Assignment of Contractor’s Responsible Persons to supervise H&S on Site

The Contractor shall submit supervisory appointments as well as any relevant appointments in writing (as stipulated by the Occupational Health and Safety Act and Construction Regulations) prior to commencement of work

4.3. Competency for Contractor's Appointed Competent Person

Contractor's competent person for the various risk management portfolios shall fulfil the criteria as stipulated under the definition of a competent person in accordance with the Construction Regulations. Proof of competence for various appointments must be attached.

4.4. Risk Assessment Competent Person

The Contractor shall appoint a competent person in writing at commencement of the project to control the risk assessment process on site.

4.5. Health and safety file

The Principal Contractor must, in terms of Construction Regulation 7(1)(b), keep a Health & Safety File on site at all times that must include all documentation required in terms of the Act and Regulations and must also include a list of all Contractors on site that are accountable to the Principal Contractor and the agreements between the parties and details of work being done. A more detailed list of documents and other legal requirements that must be kept in the Health and Safety File are attached as an addendum to this document. Upon completion of the construction work, the Contractor has to hand over a consolidated health and safety file to JGDM

4.6. Health and Safety Organogram

The Principal Contractor and all Sub-Contractors shall submit an organogram, outlining the Health and Safety Site Management Structure including the relevant appointments/competent persons. 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 Management Structure.

4.7. Occupational Health and Safety Policy

The Principal Contractor and all Sub-Contractors shall submit a Health and Safety Policy signed by their Chief Executive Officer. The Policy must outline objectives and how they will be achieved and implemented by the Company / Contractor.

4.8. Health and Safety Plan

The Contractor shall provide and demonstrate to JGDM, a suitable, sufficiently documented and coherent site specific Health and Safety Plan in accordance with this Specification. The Health and Safety Plan shall be submitted for approval to JGDM before work commences on the project.

4.9. Health and Safety Representatives

The Principal Contractor and the Sub-Contractors shall ensure at least one (1) Health and Safety Representative be nominated, elected and trained to carry out his / her functions in his / her area of responsibility. The Principal Contractor and the Sub-Contractors shall ensure employees elected shall be designated in writing for a specific area and period of time. The Principal Contractor and all Sub-Contractors shall ensure that Health and Safety Representative(s) are trained to carry out their functions.

The designated persons shall be required to conduct monthly inspections within their area of responsibility, the records must be kept for JGDM auditing purposes and that deviations recorded are reported to the responsible supervisor so that appropriate action can be taken. The designated person/s shall be permitted to participate in the Health and Safety Committee Meetings.

4.10. Compensation for Occupational Injury and Diseases Act 130.1993 (COIDA)

The Contractor shall submit a letter of good standing with its Compensation Insurer to JGDM as proof of registration. The Sub-Contractors shall submit proof of registration to the Principal Contractor before they commence work on site.

4.11. Hazard Identification Risk Assessment (HIRA)

The Contractor shall 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 construction phase health and safety plan submitted for approval to JGDM. The risk assessment must include;

- a) A list of hazards identified as well as potentially hazardous tasks;
- b) A documented risk assessment based on the list of hazards and tasks;
- c) A set of safe working procedures to eliminate, reduce and/or control the risks assessed;
- d) A monitoring and review procedure of the risks assessment as the risks change.

The Principal Contractor shall ensure that all Sub-Contractors are informed, instructed and trained by a competent person regarding any hazards, risks and related safe work procedures before any work commences and thereafter at regular intervals as the risks change and as new risks develop. Proof of this must be kept for inspection by JGDM. The Principal Contractor shall be responsible for ensuring that all persons who could be negatively affected by its operations are informed and trained according to the hazards and risks and are conversant with the safe work procedures, control measures and other related rules (tool box talk strategy to be implemented).

4.12. Health and Safety Committees

The Principal Contractor shall ensure that project health and safety meetings are held monthly and minutes are kept on record. Meetings must be organised and chaired by the Principal Contractor's Responsible Person. All Contractors' Responsible Persons and Health & Safety Representatives shall attend the monthly health & safety meetings. Sub-Contractors shall also have their own internal health & safety committees in accordance with the OHS Act 85.1993 and minutes of their meetings shall be forwarded to the Principal Contractor on a monthly basis.

4.13. Medical Certificate of Fitness

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 Medicine Practitioner or Occupational Health Nurse Practitioner.

4.14. Health and Safety Training

Training of personnel is a legal requirement and a necessity and is required of the Principal Contractor to provide to JGDM a training Matrix which must be included in the Health and Safety Plan to be submitted prior work commencing on site.

Training should include the following but is not limited to:

4.14.1. Induction Training

The Principal Contractor shall ensure that all site personnel group undergo a risk specific health and safety induction training session before starting work. A record of attendance shall be kept in the health and safety file.

4.14.2. Awareness Training

The Principal Contractor shall ensure, on site, periodic toolbox talk take place at least once a week. These talks should deal risk relevant to the construction work at hand. A record of attendance shall be kept in a health and safety file. All Contractors have to comply with the minimum requirements. At least one of the tool box talks shall be on any environmental related issues.

4.14.3. Competency

Training identified through the HIRA Process and conducted through this process shall be kept on file as proof of competency and training which must be made available to JGDM upon request. (This shall include operator competency training and assessments)

4.14.4. First Aid and Health & Safety Representative Training

Principal Contractor shall provide proof of competency of all Health and Safety Representatives elected and designated, including first aiders to JGDM, which must be available on site for auditing purposes.

4.15. General Record Keeping

The Principal Contractor and Sub-Contractors must ensure that all the Health and Safety records, required by both the Occupational Health and Safety Act, 85 of 1993 and Regulations are kept for reference purposes and auditing by JGDM.

Further to the requirements set out above, the Principal Contractor and the Sub-Contractors must also maintain records that may be defined through the risk assessment process, for auditing purposes. In accordance with the requirements set out in the Construction Regulations 2014 and the requirement set out in the JGDM Health and Safety Specification, the Principal Contractor and the Sub-Contractors must ensure a copy of all Health and Safety records generated during the course of construction, are handed over to JGDM upon completion of construction.

4.16. Statistics

The Principal Contractor and the Sub-Contractors must ensure injury and incident records (First Aid, Non-disabling, Disabling and fatality), training etc. referred to above are kept on site and submitted monthly to JGDM. All documents shall be made available to JGDM for inspection including the Department of Labour's Inspectors as required by the Occupational Health and Safety Act, 85 of 1993.

4.17. Health and Safety Audits

Health and Safety audits shall be conducted once per month by JGDM OHS Officer or an Agent. The results shall be tabled and discussed at Health and Safety Committee meetings and at project meetings.

The Contractor must also conduct its own internal audits, the results of which must be submitted to JGDM monthly.

4.18. Penalties

Non-compliance with JGDM safety specifications will result in work stoppages and possible expulsion from site until the problem has been rectified. Costs will be borne by the Contractor.

4.19. Emergency Procedures

The Principal Contractor shall submit a detailed Emergency Procedure for approval by JGDM prior to commencement on site. The procedure shall detail the response plan including the following key elements:

- a) List of key competent personnel;
- b) Details of emergency services;
- c) Actions or steps to be taken in the event of the specific types of emergencies;
- d) Information on hazardous material/situations.

Emergency procedure(s) shall include, but shall not be limited to, fire, spills, accidents to employees, use of hazardous substances, bomb threats, major incidents/accidents, etc. The Principal Contractor shall advise the JGDM in writing forthwith, of any emergencies, together with a record of action taken. A contact list of all service providers (Fire Department, Ambulance, Police, Medical and Hospital, etc.) must be maintained and available to site personnel.

4.20. First Aid Box and Contents

The Principal Contractor and all Sub-Contractors shall appoint in writing First Aider(s). The appointed First Aider(s) are to be sent for accredited first aid training. Valid certificates are to be

kept on site. The Principal Contractor shall provide an on-site First Aid Station with first aid facilities, including first aid boxes adequately stocked at all times.

4.21. Accident and Incident Reporting and Investigation

Should an accident occur, the Principal Contractor shall conduct an investigation into the incident. The Principal Contractor must ensure that a competent person be appointed in writing to conduct the said investigation. The procedure to be followed must be in accordance with the General Administrative Regulations 9, Annexure 1 form. (Recording and Investigation of Incident form).

The Principal Contractor shall ensure that the results of all investigations are communicated to the employees engaged through incident recall and prescribed meetings. The Principal Contractor must ensure that the investigations are kept for record purposes in accordance with the prescribed requirements set out in the OHSA.

Should there be an incident; JGDM must be notified within 24-hours, of the occurrence. JGDM reserves the right to participate in all investigations into accidents or incidents.

4.22. Hazards and Potentially Hazardous Situations

The Principal Contractor shall immediately notify other Sub-Contractors as well as the Client of any hazardous or potentially hazardous situations that may arise during performance of construction activities

4.23. Personal Protective Equipment and Clothing

The Contractor shall ensure that all workers are issued and wear the required personal protective equipment which will be determined through the HIRA process for each activity (Reference to General Safety Regulations 2). The Contractor shall ensure that employees are not allowed on site without proper personal protective equipment. However, the Contractor and all Sub-Contractors shall issue personal protective equipment to their employees free of charge. It is recommended for

hygienic reasons that the Contractor should provide two sets of overalls for each employee. The Contractor shall clearly outline procedures to be taken when personal protective equipment or clothing is:

- a) Lost or stolen;
- b) Worn out or damaged.

The above procedure applies to Principal Contractor and Sub-contractor, as they are all employers in their own right. The Principal Contractor must ensure adequate training in the use of personal protective equipment provided to all employees, and proof of training shall be kept at the office for auditing purposes.

4.24. Safety Signage

The Contractor shall provide adequate on-site OHS signage. Including but not limited to „no unauthorised entry, report to site office “ Beware of overhead work, “hard hat area”. Signage shall be posted up at all entrances to site as well as on strategic locations e.g. access routes, stairways, entrances to structures and buildings, scaffolding, and other potential risk areas/operations.

4.25. Permits

The Principal Contractor must establish site access rules and implement and maintain these throughout the construction period. Access control must include the rule that non-employees shall at all times be provided with fulltime supervision while on site.

4.26. Public and Site Visitor Health & Safety

The Principal Contractor shall ensure that every person working on or visiting the site, as well as the public in general, shall be made aware of the dangers likely to arise from site activities, including the precautions to be taken to avoid or minimise those dangers. Appropriate health and safety notices and signs shall be posted up, but shall not be the only measure taken.

Both JGDM and the Principal Contractor have a duty in terms of the OHS Act 85/1993 to do all that is reasonably practicable to prevent members of the public and site visitors from being affected by the construction activities.

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. A record of these inductions must be kept on site in accordance with the Construction Regulations

4.27. Contractors and their Sub-Contractors

The Principal Contractor shall enter into an Agreement with JGDM in terms of Section 37(2) of the Occupational Health and Safety Act, 85.1993, and all other Sub-Contractors shall be appointed by the Principal Contractor.

The Principal Contractor shall also be required to appoint its Sub-Contractors in accordance with Construction Regulation 7(1)(c)(v).

The Principal Contractor shall assist and ensure that all Sub-Contractors comply with all of these requirements and adhere to the requirements set out in the OHSA.

4.28. Construction Health and Safety Officer

A contractor must, after consultation with the client and having considered the size of the project and the hazards or dangers that can be expected, the contractor shall appoint in writing a full-time or part-time Construction Health and Safety Officer. The appointed Health and Safety Officer shall be registered with a Statutory Body (SACPCMP) and will attend to all health and safety related matters of the project.

5. HEALTH AND SAFETY PRACTICE

5.1. Excavations

The Principal Contractor and the Sub-Contractors shall ensure that all activities involving excavations, shoring, dewatering or drainage, a safe working procedure is submitted to the project engineer for approval prior to work commencing. Since this project is within the town, it is recommended that the way leaves be requested from Eskom and Telkom, prior to excavation. Excavation work exceeding the specified depth as stipulated in the OHSA regulations, must comply with the following requirements:

- a) The excavations are inspected before the shift starts, after heavy rain (inclement weather) and after any major condition which may affect the excavations stability and the findings are to be recorded and kept;
- b) All excavations regardless of the depth shall be adequately barricaded to prevent persons falling into the excavation;
- c) the safe working procedure shall be communicated to all employees who may be effected by the work; and
- d) the safe working procedures shall be enforced and maintained by the appointed excavation supervisor at all times.
- e) for high-risk activities, all personnel working in the excavation shall be attached by means of a lifeline.
- f) Material excavated shall be removed from the point of excavation.
- g) Ensure stability of adjoining structures.

The Principal Contractor and the Sub-Contractors must ensure that a competent person is appointed in writing to control all excavating activities during construction.

5.2. Demolition

The Principal Contractor and the Sub-Contractors must appoint a competent person in writing to supervise and control all demolition work on site.

Prior to any demolition work being carried out, the Principal Contractor shall submit a safe working procedure and a detailed engineering survey for approval by JGDM. Acceptance will then be issued to the Principal Contractor to proceed with the demolition work. The Principal Contractor shall ensure that demolition work complies with the Construction Regulations 14.

During the demolition, the competent person shall check the structural integrity of the structure at regular intervals determined in the method statement in order to avoid any premature collapses.

5.3. Explosives and Blasting

The Principal Contractor shall ensure where blasting is required with the use of explosives, that compliance with the Explosives Regulations.

The Principal Contractor must ensure that all work carried out in under the supervision of a competent person as defined in the Explosives Regulations which requires the competent person to have sufficient training and experience in, and knowledge of, the health and safety aspects of explosives deemed appropriate by the National Explosives Council or any other organization approved by the chief inspector of occupational health and safety.

The Principal Contractor must ensure a detailed blasting plan; emergency plan and site layout plan is submitted for approval to JGDM.

5.4. Stacking of Materials and Housekeeping

The Principal Contractor and the Sub-Contractors must ensure that all stacking will be supervised by a person competent and appointed in writing to supervise over the activities, and that clearly defined and allocated storage areas are provided for and identified, and that materials being stored

within this area are stacked in accordance with sound stacking principles of sort-by-sort, access to be maintained, level surface, and the height will not exceed three times the base width.

Housekeeping must also be maintained at all times as this will be inspected and evaluated by JGDM during monthly audits.

5.5. Hazardous Chemical Substances

The Principal Contractor and Sub-Contractors must ensure the necessary training and information regarding the use and storage of HCS is provided to all personnel, and that the use and storage of HCS is carried out as prescribed by the HCS Regulations.

Furthermore, the Principal Contractor and the Sub-Contractors must ensure that all chemicals brought to site have a Material Safety Data Sheet (MSDS) and the users are made aware of the Occupational hazards and precautions that need to be taken when using the chemical.

The First Aiders must also be made aware of the MSDS and how to treat HCS incidents appropriately.

Access to all HCS records shall be kept in a safety file at all times.

5.6. Fuel

Bulk storage areas must be demarcated, secured and sign posted with the relevant warning pictograms. Bulk storage areas must be adequately bounded to ensure containment of 100% of the stored product. Re-fuelling must be conducted in designated re-fuelling areas only. Spill-kits must be available at all times in these designated areas. The surface of the bounded areas and walls must be of impermeable material. The bounded area must be sloped towards a collection pit.

5.7. Plant and Machinery:

5.7.1. Construction Plant

“Construction Plant” includes all types of plant including but not limited to, cranes, piling rigs, excavators, road vehicles, and all lifting equipment.

The Principal Contractor shall ensure that all such plant complies with the requirements of the OHS Act 85/1993 and Construction Regulations (2014). The Principal Contractor and all relevant Sub-Contractors shall inspect and keep records of inspections of the construction plant used on site. Only authorised/competent persons are to use machinery under proper supervision. Appropriate PPE and clothing must be provided and maintained in good condition at all times. Proofs of medical test as required by the Construction regulations must be available at all times for inspection by JGDM.

Vehicles shall not enter site with:

- Defective exhaust systems
- Serious oil or fuel leaks
- Unsafe bodywork or loads
- Non-standard equipment fitted.
- Improperly seated passengers
- Any obvious mechanical defects.

All earth moving equipment 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. All earth moving equipment shall be equipped with a reverse siren

5.7.2. Transport of Personnel

The Principal Contractor and other Sub-Contractors shall not:

- Transport persons together with goods or tools unless there is an appropriate area or section to store them;
- Transport persons in a non-enclosed vehicle, e.g. truck; there must be a proper canopy (properly covering the back and top) with suitable sitting area. Workers shall not be permitted to stand or sit at the edge of the transporting vehicle

5.7.3. Pressure Equipment or Gas Bottles

The Principal Contractor and all relevant 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;
- Providing appropriate firefighting equipment (Fire Extinguishers) on hand

5.7.4. Fire Equipment

The Principal Contractor and relevant Sub-Contractors shall provide adequate, regularly serviced firefighting equipment located at strategic points on site, specific to the classes of fire likely to occur. The appropriate notices and signs must be posted up as required. A Fire risk survey must be conducted by a competent person; proof of survey must be kept in the Site Safety File

5.7.5. Hired Plant and Machinery

The Principal Contractor shall ensure that any hired plant and machinery used on site is safe for use. The necessary requirements as stipulated by the OHS Act 85/1993 and Construction Regulations shall apply. The Principal Contractor shall ensure that operators hired with machinery are competent and that certificates are kept on site in the health & safety file. All relevant Sub-Contractors must ensure the same

5.7.6. Scaffolding / Working at heights / Falsework / Formwork for Structures Fall Protection

Working at heights includes any work that takes place in an elevated position. The Principal Contractor must submit a risk-specific fall prevention plan in accordance with the Construction Regulations before this work is undertaken. JGDM must approve the fall prevention plan before work may commence.

Deviations found on any scaffolding, will result in the activity being stopped by JGDM until such time as compliance can be achieved.

5.7.7. Lifting Machinery and Tackle (Includes Tower Cranes)

The Principal Contractor and all Contractors shall ensure that lifting machinery and tackle is inspected before use and thereafter in accordance with the Driven Machinery Regulations 18 and the Construction Regulations 22. There must be competent lifting machinery and tackle inspector who must inspect the equipment daily or before use, taking into account that:

- All lifting machinery and tackle has a safe working load clearly indicated
- Regular inspection and servicing is carried out;
- 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;
- The tower crane bases have been approved by an engineer;

- The operators are competent as well as physically and psychologically fit to work and in possession of a medical certificate of fitness to be available on site

5.7.8. Ladders and Ladder Work

The Principal Contractor shall ensure that 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. Records of inspections must be kept in a register on site. Sub-Contractors using their own ladders must ensure the same. 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.

5.7.9. General Machinery

The Principal Contractor and relevant Sub-Contractors shall ensure compliance with the Driven Machinery Regulations, which include inspecting machinery regularly, appointing a competent person to inspect and ensure maintenance, issuing PPE or clothing, and training those who use machinery.

5.7.10. Portable Electrical Tools / Explosive actuated fastening device

The Principal Contractor shall ensure that use and storage of all explosive powered tools and portable electrical tools are in compliance with relevant legislation. The Principal Contractor shall ensure that all-electrical tools, electrical distribution boards, extension leads, and plugs are kept in safe working order. Regular inspections and toolbox talks must be conducted to make workers aware of the dangers and control measures to be implemented e.g. personal protection equipment, guards, etc.

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 rounds;
- Ensure that the cartridges and explosive tool is lock up separately
- Signs to be posted up in the areas where explosive actuated fastening devices are being used.
(WARNING – EXPLOSIVE ACTUATED FASTENING DEVICE IN USE - KEEP CLEAR).

5.7.11. Public Health and Safety

In the interests of public safety, The Principal Contractor shall ensure that all persons who may be affected by the work being conducted on site are informed and kept aware of the dangers, which may arise from the work being conducted on site. This awareness shall be in the form of posters and inductions for visitors on site and warning signs.

The Principal Contractor shall ensure that a copy of the Public Liability insurance is available prior the commencement of the project and is kept in a safety file at all times.

5.7.12. Night Work

Night work shall only be conducted with the same safety standard being applied for these activities as with day work activities with adequate luminance.

5.7.13. Facilities for Safe Keeping / eating areas

The Principal Contractor must supply sufficient toilets (1 toilet per 30 workers), showers with hot and cold water (1 for every 15 workers), changing facilities, hand washing facilities, soap and toilet paper must be provided. Waste bins must be strategically placed and emptied regularly. Safe, clean storage areas must be provided for workers to store personal belongings and personal protective equipment. Workers should not be exposed to hazardous materials/substances while eating and must be provided with sheltered eating areas.

6. THERMAL REQUIREMENTS

Subjects to the provisions of Environmental Regulations for Workplaces, no employer shall permit an employee to work in an environment in which the time-weighted average dry-bulb temperature taken over a period of 4 hours is < 6 degrees Celsius, unless the employer takes reasonable measures to protect such employee against the cold and further takes all precautions necessary for the safety of such employee.

No employer shall require or permit an employee to work in a refrigerated environment in which the actual dry-bulb temperature is below 0 degrees Celsius unless the maximum exposure limit is observed and an appropriate PPE is provided to the employees.

6.1. Heat-stress

This program targets employees working in conditions where:

- The measured WBGT- Wet Bulb Globe Temperature index exceeds 30 in 1 hour (as per the heat stress monitor).
- WBGT is a number which characterizes the thermal conditions in the environment calculated from wet bulb, globe and a dry-bulb thermometer.

6.2. Allowance for heat stress (work-rest cycles)

The heat stress measurements must take place between 09:00 am and 15:00 pm and where the WBGT index exceeds 30, a 15 minutes break should be taken per hour.

First hour:

09:00 to 10:00 – runs concurrently with the official tea break of between 10:00-10:15 therefore no allowance would be granted.

Second hour:

10:00 to 11:00 = 60 minutes worked therefore 15 minutes break to be taken from 11:00-11:15

Third hour

11:00 to 12:00= 60 minutes worked therefore 15 minutes break to be taken from 13:30-13:45

Fourth hour

24

12:00 to 13:00 where the hour coincides with official lunch period no allowance would be granted, e.g. Official lunch period is 12:00 – 12:30 therefore no allowance would be granted.

Fifth hour

14:00 to 15:00 = 60 minutes worked therefore 15 minutes break to be taken from 15:00 to 15:15

Therefore the total allowance to be granted in a day is **45 minutes**. Permission to grant rest allowances must be authorized by the person in charge. **NB: Where the WBGT index exceeds 30 degrees Celsius employees must be encouraged to drink at least 600ml of water and rest in a shady area during the 15 minutes allowed.**

7. 7. ALCOHOL AND OTHER DRUGS

No alcohol and 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. 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 that 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. Any person suspected of being under the influence of alcohol or other drugs must be sent home immediately, to report back the next day for a preliminary inquiry. A full disciplinary procedure must be followed by the Principal Contractor or Sub-Contractors concerned and a copy of the disciplinary action must be forwarded to the Principal Contractor for his records.

ANNEXURE A		
REQUIREMENT	OHSA REQUIREMENT	SUBMISSION DATE
Notification of Construction Work	Construction Regulations	Before commencement on site
Appointment of the Principal Constructor	Construction Regulations	Before commencement on site
Letter of Good Standing	COIDA requirements	Before commencement on site
Initial Hazard Identification and Risk Assessment	Construction Regulations	Together with H&S plan
Safe Working Procedures	Construction Regulations	Together with H&S plan
Competency of Responsible persons	OHS Act & Construction Regulations	Together with H&S plan
All employees Valid Medical Certificate of fitness specific to the construction work to be performed	Construction Regulations	Before commencement on site
37(2) Agreement	OHS Act	Before commencement on site
Public Liability Insurance	OHS Act	Before commencement on site

ANNEXURE B		
REFERENCE	APPOINTMENTS	RESPONSIBLE PERSON
Section 16(2)	CEO Assignee	Contractor
Section 17	Health and Safety Representative	Contractor
Section 19	Health and Safety Committee Member(s)	Contractor
CR5(1) (k)	Principal Contractor	Client
CR 8(1)(2)	Construction Manager & sub-ordinate	Contractor
CR 8(5)	Construction Health & Safety Officer (Full-time or part-time)	Contractor
CR 8(7)	Construction Supervisor	Contractor
CR 9(1)	Person to carry out risk assessment	Contractor
CR 10(1)(a)	Fall protection planner	Contractor
CR 12(1)	Temporary works designer	Contractor
CR13(1)	Excavation Supervisor	Contractor
CR 14(1)	Supervisor demolition work	Contractor
CR 14(2)(3)	Demolition expert	Contractor
CR 16(1)	Scaffold supervisor	Contractor
CR 17(1)(8)(c)	Suspended platform supervisor & expert	Contractor
CR18(a)	Rope access supervisor	Contractor
CR 19(6)	Material hoist inspector	Contractor

CR 20(1)	Bulk mixing supervisor	Contractor
CR 21(2)(b)	Explosive actuated fastening device inspector	Contractor
CR 22(a)	Tower crane operator	Contractor
CR 23(1)(d)(i)	Construction vehicle & mobile plant operator & inspector	Contractor
CR 24(c)(d)	Temporary electrical installations inspector & controller	Contractor
CR 28(a)	Stacking and storage supervisor	Contractor
CR 29(h)	Fire equipment inspector	Contractor
GAR 8	Incident Investigator	Contractor
GSR 2(1)	Machinery Inspector	Contractor
GSR 3	First Aider	Contractor
GSR 13A	Ladder Inspector	Contractor
GSR 13(D)	Scaffolding Erector	Contractor
DMR 18	Lifting Machine & equipment inspector	Contractor

ANNEXURE C			
What	When	Output	Accepted by Client
Induction training	Every worker before he/she starts work	Attendance registers	
Awareness training	At least weekly	Attendance registers	
Health and Safety Reports	Monthly	Report covering: • Incidents / accidents and investigation • Nonconformances by employees & contractor • Internal & External H&S audit reports	
Emergency procedures	Ongoing evaluation of procedure	Table the procedure in writing as well as tel. numbers	

Risk assessment	Updated and signed off at least monthly	Documented risk assessment	
Safe work procedure	Drawn up before workers are exposed to new risks	Documented set of safe work procedures (methods statements) updated and signed off	
General inspections	Weekly & daily	• Scaffolding • Excavations • Formwork & support work • Explosive tools	
	Monthly	• Firefighting equipment • Portable electrical equipment • Ladders • Lifting equipment	
List of Contractor	List to be updated weekly	Table list, number of workers & Company tel. numbers	

Workman's Compensation	Ongoing	Table a list of Contractors' workman' compensation letter of good standing	
Construction site rule	Ongoing		

ANNEXURE D

Name and address of Project:

.....

Reference	Y/N	Comment
CR 6(1) (a) Has the designer familiarized himself with the Construction Regulations 2014 (particularly Regulation 6) and the Safety Standards incorporated into these Regulations?		
CR 6(1) (b) During the design stage, was the Client's Health and Safety Specifications given due consideration?		
CR 6(1) (c) The designer's report before the contract is put out to tender must include the following information:		
I. The structural design aspects that could have an effect on the pricing of construction work?		
II. The geotechnical-science aspects?		
III. The weight which the structure is designed to safely withstand?		

CR 6(1)(d) Has the designer communicated all known and anticipated hazards and risks associated with the construction of the designed structure?		
CR 6 (1) (e) As far as is reasonably practicable, are the dangerous processes and materials been eliminated or replaced in the design?		
CR 6(1) (f) Has due consideration been taken during the design stage, for the safe maintenance of the structure after its completion?		
CR 6 (g-i) Is the designer aware of his/her responsibility to carry out periodic site inspections to ensure that the structure is constructed correctly in accordance with the design?		
CR 6(1) (j) Have all ergonomic hazards been considered for the lifecycle of the structure (i.e. during construction and after completion)?		

Designer's Title (e.g. Engineer, Architect):

Name of Designer:

Signature:

Date:

C3.7.3 Employer's Environmental Specification



ENVIRONMENTAL MANAGEMENT PLAN (EMP)

This document forms an integral part of the **Health and Safety Specification** and, in particular, shall be a part of the **ENVIRONMENTAL MANAGEMENT PLAN FOR CONSTRUCTION WORK**. The Contractor shall comply with the requirements of the following specification:

1. Introduction

The following is a generic Environmental Management Plan to mitigate against “generally occurring impacts” associated with the construction phase of Joe Gqabi District Municipality’s activities. The findings of this EMP will be implemented at all sites. The management of impacts associated with various categories of concern is discussed as separate topics, as indicated in Table 1(a) below.

TABLE 1(a): Category of Concerns

Paragraph number	Category of concern
1.1	Soil
1.2	Water
1.3	Air
1.4	Social and Cultural
1.5	Aesthetics
1.6	Archaeological and Cultural sites.
1.7	Flora
1.8	Fauna
1.9	Infrastructure
1.10	Safety
1.11	Waste
1.12	Rehabilitation and Site clearance.

1.1 Soil

- a) Topsoil should be temporarily stockpiled, separately from (clay) subsoil and rocky material, when areas are cleared. If mixed with clay sub-soil the usefulness of the topsoil for rehabilitation of the site will be lost.
- b) Stockpiled topsoil should not be compacted and should be replaced as the final soil layer. No vehicles are allowed access onto the stockpiles after they have been placed.

- c) Stockpiled soil should be protected by erosion-control berms if exposed for a period of greater than 14 days during the wet season. The need for such measures will be indicated in the site-specific report.
- d) Topsoil stripped from different sites must be stockpiled separately and clearly identified as such. Topsoil obtained from sites with different soil types must not be mixed.
- e) Topsoil stockpiles must not be contaminated with oil, diesel, petrol, waste or any other foreign matter, which may inhibit the later growth of vegetation and micro-organisms in the soil.
- f) Soil must not be stockpiled on drainage lines or near watercourses without prior consent from the Project Manager.
- g) Soil should be exposed for the minimum time possible once cleared of invasive vegetation, that is the timing of clearing and grubbing should be co-ordinated as much as possible to avoid prolonged exposure of soils to wind and water erosion. Stockpiled topsoil must be either vegetated with indigenous grasses or covered with a suitable fabric to prevent erosion and invasion by weeds.
- h) Limited vehicular access is allowed across rocky outcrops and ridges.
- i) All cut and fill surfaces need to be stabilized with appropriate material or measures when major civil works are complete.
- j) Erosion and donga crossings must be dealt with as river crossings. Appropriate soil erosion and control procedures must be applied to all embankments that are disturbed and destabilized.
- k) All equipment must be inspected regularly for oil or fuel leaks before it is operated. Leakages must be repaired on mobile equipment or containment trays placed underneath immobile equipment until such leakage has been repaired.
- l) Soil contaminated with oil must be appropriately treated and disposed of at a permitted landfill site or the soil can be regenerated using bio-remediation methods.
- m) Runoff must be reduced by channelling water into existing surface drainage system.

1.2 Water

- a) Adequate sedimentation control measures must be instituted at any river crossings when excavations or disturbance of a riverbanks or riverbeds takes place.
- b) Adequate sedimentation control measures must be implemented where excavations or disturbance of drainage lines of a wetland may take place.
- c) All fuel, chemical, oil, etc spills must be confined to areas where the drainage of water can be controlled. Use appropriate structures and methods to confine spillages such as the construction of berms and pans, or through the application of surface treatments that neutralise the toxic effects prior to the entry into a water course.
- d) Oil absorbent fibres must be used to contain oil spilt in water.
- e) During construction through a wetland, the majority of the flow of the wetland should be allowed to pass downstream.
- f) Vehicular traffic across wetland areas must be avoided.
- g) No dumping of foreign material in streams, rivers and/or wetland areas is allowed.

- h) The wetland area and/or river must not be drained, filled or altered in any way including alteration of a bed and/or, banks, without prior consent from the DWAF. The necessary licenses must be obtained in terms of Section 21 and 22 of the National Water Act, 36 of 1998 from DWAF.
- i) No fires or open flames are allowed in the vicinity of the wetland, especially during the dry season.
- j) No swimming, washing (including vehicles and equipment), fishing or related activity is permitted in a wetland or river without written permission from the Project Manager.
- k) Disturbances to nesting, breeding and roaming sites of animals in or adjacent to wetland areas must be minimized.

1.3 Air

- a) Speed limits must be implemented in all areas, including public roads and private property to limit the levels of dust pollution.
- b) Dust must be suppressed on access roads and construction sites during dry periods by the regular application of water or a biodegradable soil stabilisation agent. Water used for this purpose must be used in quantities that must not result in the generation of run-off.
- c) The site-specific investigation will quantify the impact of dust on nearby wetlands, rivers and dams in terms of sedimentation. Mitigation measures identified during the site specific study must be implemented.
- d) The Contractor must notify the Principal of all schools within 50m of the site of proposed activities. The Principal must in turn ensure that children with allergies and respiratory ailments take the necessary precautionary measures during the construction period. The Contractor must ensure that construction activities do not disturb school activities e.g. dust clouds may reduce visibility affecting sports activities.
- e) Waste must be disposed of, as soon as possible at a municipal transfer station, skip or on a permitted landfill site. Waste must not be allowed to stand on site to decay, resulting in malodours.
- f) Noise control measures must be implemented. All noise levels must be controlled at the source. All employees must be given the necessary ear protection gear. IAP's must be informed of the excessive noise factors.
- g) The Contractor must inform all adjacent landowners of any after-hour construction activities and any other activity that could cause a nuisance e.g. the application of chemicals to the work surface. Normal working hours must be clearly indicated to adjacent land owners.
- h) No loud music is allowed on site and in construction camps.
- i) No fires are allowed if smoke from such fires will cause a nuisance to IAPs.

1.4 Social and Cultural

- a) Access by non-construction people onto any construction sites must be restricted. The Contractors activities and movement of staff must be restricted to designated construction areas only.

- b) The Contractors crew must be easily identifiable due to clothing, identification cards or other methods.
- c) Rapid migration of job seekers could lead to squatting and social conflict with resident communities and increase in social pathologies if not properly addressed. The Contractor must ensure that signs indicating the availability of jobs are installed.
- d) Criteria for selection and appointment (by the Contractor) of construction labour must be established to allow for preferential employment of local communities. The Local Authority must be actively involved in the process of appointing temporary labourers.
- e) Sub-Contractors and their employees must comply with all the requirements of this document and supporting documents e.g. the Contract document that applies to the Contractor. Absence of specific reference to the sub-contractor in any specification does not imply that the sub-contractor is not bound by this document.
- f) No member of the construction workforce is allowed to wander around private property, except within the immediate surroundings of the site.
- g) The Contractor must provide suitable sanitation facilities for site staff. Sanitation provided during the construction phase should be managed so that it does not cause environmental health problems. The use of the surrounding veld for toilet purposes is not permitted under any circumstance.
- h) The Contractor must arrange for all his employees and those of his sub-contractors to be informed of the findings of the environmental report before the commencement of construction to ensure:
 - A basic understanding of the key environmental features of the work site and environments, and
 - Familiarity with the requirements of this document and the site specific report.
- i) Supervisory staff of the Contractor or his sub-contractors must not direct any person to undertake any activities which would place such person in contravention of the specifications of this document endanger his/her life or cause him/her to damage the environment.
- j) The demand for construction materials and supplies will have an effect on the local economy. This impact can be optimised by sourcing and purchasing materials locally and regionally wherever possible, insofar as the material complies with the design specification.
- k) The Contractor must maintain a detailed complaints register. This must be forwarded, together with solutions, to the authorities when requested.

1.5 Aesthetics

1. Scenic Quality

- Damage to the natural environment must be minimized.
- Trees and tall woody shrubs must be protected from damage to provide a natural visual shield. Excavated material must not be placed on such plants and movement across them must not be allowed, as far as practical.

- The clearing of all sites must be kept to a minimum and surrounding vegetation must, as far as possible, be left intact as a natural shield.
 - No painting or marking of natural features must be allowed.
2. Above-ground Structures (reservoirs, water hammer tanks, valve chambers, pump stations etc)
 - All above ground structures should be located in areas where the visual impact from roads, houses etc is minimised.
 - All above ground structures could be treated or painted to blend in with the natural environment.
 3. Cut and fill areas, river and stream crossings and other soil stabilisation works must be constructed to blend in with the natural environment.
 4. Natural outcrops, rocky ridges and other natural linear features, must not be bisected. Vegetation on such features must, as far as possible, not be cut unless absolutely necessary for construction.
 5. Excavated material must be flattened (not compacted) or removed from site. No heaps of spoil material must be left on site once the Contractor has moved to a new construction site.
 6. Any complaints from interest groups regarding the appearance of the construction site must be recorded and addressed promptly by the Contractor.

1.6 Archaeology and Cultural Sites

- a) All finds of human remains must be reported to the nearest police station.
- b) Human remains from the graves of victims of conflict, or any burial ground or part thereof which contains such graves and any other graves that are deemed to be of cultural significance may not be destroyed, damaged, altered, exhumed or removed from their original positions without a permit from the South African Heritage and Resource Agency (SAHRA).
- c) Work in areas where artefacts are found must cease immediately.
- d) Under no circumstances must the Contractor, his/her employees, his/her sub-contractors or his/her sub-contractors' employees remove, destroy or interfere with archaeological artefacts. 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.
- e) A fence at least 2m outside the extremities of the site must be erected to protect archaeological sites.
- f) All known and identified archaeological and historical sites must be left untouched.
- g) Work in the area can only be resumed once the site has been completely investigated. The Project Manager will inform the Contractor when work can resume.

1.7 Flora

- a) All suitable and rare flora and seeds must be rescued and removed from the site. They must be suitably stored, for future use in rehabilitation.
- b) The felling and/or cutting of trees and clearing of bush must be minimised.
- c) Bush must only be cleared to provide essential access for construction purposes.
- d) The spread of alien vegetation must be minimized.
- e) Any incident of unauthorised removal of plant material, as well as accidental damage to priority plants, must be documented by the Contractor.
- f) Woody vegetative matter stripped during construction must either be spread randomly throughout the surrounding veld so as to provide biomass for other micro-organisms and habitats for small mammals and birds, or it may be stockpiled for later redistribution over the reinstated topsoiled surface. No vegetative matter must be burnt or removed for firewood other than those removed during the grubbing and clearing phase. Such vegetation can be made available to the local inhabitants to be used as firewood.
- g) No tree outside the footprint of the Works area must be damaged.

1.8 Fauna

- a) No species of animal may be poached, snared, hunted, captured or wilfully damaged or destroyed.
- b) Snakes and other reptiles that may be encountered on the construction site must not be killed unless the animal endangers the life of an employee.
- c) Anthills and/or termite nests that occur must not be disturbed unless it is unavoidable for construction purposes.
- d) Disturbances to nesting sites of birds must be minimized.
- e) The Contractor must ensure that the work site is kept clean and free from rubbish, which could attract pests.

1.9 Infrastructure

- a) The relevant authorities must be notified of any interruptions of services, especially the Local Municipality, National Road Agency, TELKOM and ESKOM. In addition, care must be taken to avoid damaging major and minor pipelines and other services.
- b) The integrity of property fences must be maintained.
- c) No telephone lines must be dropped during the construction operations, except where prior agreement by relevant parties is obtained. All crossings must be protected, raised or relocated as necessary.
- d) All complaints and/or problems related to impacts on man-made facilities and activities must be promptly addressed by the Contractor and documented.
- e) Storage Facilities
 - Proper storage facilities should be provided for the storage of oils, grease, fuels, chemicals and hazardous materials.
 - The Contractor must ensure that accidental spillage does not pollute soil and water resources.

- Fuel stock reconciliation must be done on all underground tanks to ensure no loss of oil, which could pollute groundwater resources.
- Cement must be stored and mixed on an impermeable substratum.

f) Traffic Control

- All reasonable precautions must be taken during construction to avoid severely interrupting the traffic flow on existing roads, especially during peak periods.
- Before any work can start the Local Traffic Department must be consulted about measures to be taken regarding pedestrian and vehicular traffic control.

g) Access Roads

- The Contractor and the affected landowner must collaborate on the planning and construction of new access routes and the repair or upgrading of existing routes.
- Access to the site must be controlled such that only vehicles and persons directly associated with the work gains access to the site.
- Temporary access roads must not be opened until required and must be restored to its former state as soon as the road is no longer needed.

h) Batching Plants

- Concrete must be mixed only in an area demarcated for this purpose. All concrete spilled outside this area, must be promptly removed by the Contractor and taken to a permitted waste disposal site. After all concrete mixing is complete, all waste concrete must be removed from the batching area and disposed of at an approved dumpsite. Storm water must not be allowed to flow through the batching area. Water laden with cement must be collected in a retention area for evaporation and not allowed to escape the batching area. Operators must wear suitable safety clothing.

i) Chemical toilet facilities should be managed and serviced by a qualified company. No disposal or leakage of sewerage should occur on or near the site.

j) Blasting

- Blasting must not endanger public or private property.
- Noise mufflers and/or soft explosives must be used to minimize the impact on animals.
- All the provisions of the Explosives Act, 26 of 1956 and the Minerals Act, 50 of 1991 must be complied with.
- The Contractor must take measures to limit flyrock.

1.10 Safety

- a) Measures must be taken to prevent any interference that could result in flashover of power lines due to breaching of clearances or the collapse of power lines due to collisions by vehicles and equipment.
- b) Measures must be taken during thunderstorms to protect workers and equipment from lightning strikes.
- c) All tall structures must be properly earthed and protected against lightning strikes.
- d) Fire prevention
The Contractor must take all the necessary precautions to protect the materials on site and to avoid veld fires.
 - No fires or open flames are allowed on site unless directly used for construction purposes, e.g. acetylene blowtorch.
 - Review all SABS standards relating to fire precautions and fire control namely, SABS 0131-3 Section 8 and SABS 089-1 or as amended.
 - The Contractor must have fire-fighting equipment and a first aid box available on site and on all vehicles working on site.
 - All waste bins must be kept away from fuel tank installations.
 - All fuel tanks must be installed above ground, depending on the volume of stored fuel, for easy detection of fuel leaks.
 - Any welding or other sources of heating of materials must be done in a controlled environment, wherever possible and under appropriate supervision, in such a manner as to minimise the risk of veld fires and/or injury to staff.
 - Fires lit for comfort (warmth) must be actively discouraged by the Contractor, due to the risk of veld fires and the risk to adjacent properties. Also, no waste material must be burnt.
- e) The process of excavation and back filling must be carried out as a sequential process following one another as quickly as possible. Excavations must only remain open for a minimum period of time and during this time they must be clearly demarcated. If excavations place the public at risk these sites must be fenced.
- f) The residents directly affected by open trenches must be notified of the dangers. This will be done during the site-specific phase.

1.11 Waste

Solid Waste

- a) Littering on site and the surrounding areas is prohibited.
- b) Clearly marked litterbins must be provided on site. The Contractor must monitor the presence of litter on the work sites as well as the construction campsite.
- c) All bins must be cleaned of litter regularly.

- d) All waste removed from site must be disposed at a municipal/permitted waste disposal site.
- e) Excess concrete, building rubble or other material must be disposed of in areas designated specifically for this purpose and not indiscriminately over the construction site.
- f) The entire works area and all construction sites must be swept of all pieces of wire, metal, wood or other material foreign to the natural environment.
- g) Contaminated soil must be treated and disposed of at a permitted waste disposal site, or be removed and the area rehabilitated immediately.
- h) Waste must be recycled wherever possible.

Liquid Waste

- a) The Contractor must install and maintain mobile toilets at work sites.
- b) The Contractor must provide adequate and approved facilities for the storage and recycling of used oil and contaminated hydrocarbons. Such facilities must be designed and sited with the intention of preventing pollution of the surrounding area and environment.
- c) All vehicles must be regularly serviced in designated area within the Contractors camp such that they do not drip oil.
- d) All chemical spills must be contained and cleaned up by the supplier or professional pollution control personnel. Run-off from wash bays must be intercepted.

Hazardous Waste

- a) No hazardous materials must be disposed of in the veld or anyplace other than a registered landfill for hazardous material. Hazardous waste must be stored in containers with tight lids that must be sealed and must be disposed at an appropriately permitted hazardous waste disposal site. Such containers must not be used for purposes other than those originally designed for.
- b) The Contractor must maintain a hazardous material register.

1.12 Rehabilitation

- a) When all major construction activities are completed, the site must be inspected to determine site-specific rehabilitation measures. This may be considered as unplanned work e.g. soil rehabilitation due to oil spills.
- b) All temporary buildings and foundations, equipment, lumber, refuse, surplus materials, waste, construction rubble fencing and other materials foreign to the area must be removed.
- c) If waste products cannot be recycled they must be disposed of at a permitted landfill site.
- d) All drainage deficiencies including abandoned pit latrines and waste pits must be corrected.
- e) Cut and fill areas must be restored and re-shaped.
- f) The area must be restored to its natural vegetation condition using indigenous trees, shrubs and grasses as directed by a grassland and/or rehabilitation expert.
- g) Borrow pits must be re-shaped into even slopes and surfaces to blend with the natural terrain and topsoil must be replaced.
- h) The grass mix, shrubs and trees used for rehabilitation must be compatible with the species identified in the site-specific investigation.

- i) Areas compacted by vehicles during construction must be scarified to allow penetration of plant roots and the regrowth of natural vegetation.

2. Monitoring

The correct and successful implementation of environmental management measures, to reduce negative impact on environmental conditions, is ensured by proper monitoring based on a firm programme.

2.1 Construction Phase

The Contractor and the Independent Environmental Consultant (IEC) must monitor the implementation of these management measures.

Monitoring should be focused to on-site conditions during the establishment of the site and for the full duration of the construction period when the site is operational.

The following Environmental Monitoring Programme is recommended:

ISSUE	FREQUENCIES OF MONITORING	RESPONSIBLE PERSON
WATER		
Prevention of water pollution Prevention of stagnant water on site. Proper functioning of sanitation facilities	Weekly in rainy season Weekly in rainy season Weekly	Contractor's Representative (CR)
SOIL		
Surface or gully erosion on site Soil contamination with oils If small, clean up. If large, appoint a suitable contractor for clean-up .	Weekly in rainy season Monthly Immediately	CR CR CR
Air		
Control domestic fires. Heavy vehicle emission control. Dust control of access roads. Wetting when required.	Weekly Monthly Weekly inspection	CR CR CR
WASTE		
Efficiency of domestic waste collection.	Bi Weekly	CR
Prevention of burning of solid/liquid wastes on site.	Weekly	CR
Proper collection and containment of liquid wastes (petroleum, oils, paints, resins & cooking oils)	Monthly	CR
The recycling and/or disposal thereof.	Bi Weekly	CR
The collection and disposal of construction waste (concrete, wood, steel)	Monthly	CR
Collection of hazardous waste.	Bi Weekly	CR

WILDLIFE		
Weed Control	Weekly	CR
Control of illegal hunting or snaring of game, birds or other wild animals.	Weekly	CR
SOCIAL		
Inspect overall appearance of site. (paint work, cleanliness & housekeeping)	Weekly	CR
Resolve complaints	Daily	CR and IEC
Monitor behaviour of labourers	Daily	CR
SAFETY		
Inspect road signs, pedestrian and vehicle behaviour	At least once a week	CR

3. Form for Completion

The following page contains a pro-forma for completion by the Contractor to assist with the implementation of the Environmental Management Plan. The style and content may be easily amended to suit all other identified environmental effects.

IDENTIFICATION OF ENVIRONMENTAL AFFECTS

DATE:

SITE:

CONTROLLED AND UNCONTROLLED EMISSIONS TO THE ATMOSPHERE			
LOCATION	TYPE OF EMISSION UNDER NORMAL OPERATING CONDITIONS	TYPE OF EMISSION UNDER ABNORMAL OPERATING CONDITIONS	TYPE OF EMISSION IN CASE OF INCIDENT, POTENTIAL EMERGENCY SITUATIONS

Project Manager

Contractor's Representative

C3.7.4 Health and Safety Specification



safe working practice
OCCUPATIONAL HEALTH AND SAFETY GROUP

Project Health and Safety Specification

In terms of Construction Regulations 2014

Client



Joe Gqabi District Municipality

Description of Project Works

Treatment of raw water together with the storage and distribution of potable water for the town of Maclear

Project Location

Maclear, Eastern Cape

The Maclear Bulk Water Supply Scheme is located in the Elundini Local Municipal area and to the west of the Town of Maclear

Maclear is a small town situated in the Eastern Cape province of South Africa, near the Mooi River, 172 km north of East London and 80 km north-east of Elliot

Date

8 June 2018

Project Health and Safety Specification developed by:

Jay Bhana, Grad IOSHSA

SACPCMP Registration Number: Can CHSA/049/2016

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South African Institute of
Occupational Safety and Health



Institute of Safety Management (IOSM) - South Africa
South African Institute of Safety and Health (SAIOSH) - South Africa
Association of Construction Health and Safety Management- South Africa



PROJECT HEALTH AND SAFETY SPECIFICATION

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- 2.22 Occupational Health and Safety Signage
- 2.23 Management of Contractors by Principal Contractor
- 2.24 Stacking of Materials
- 2.25 Housekeeping and General Safeguarding on Construction Sites
- 2.26 Construction Vehicles and Mobile Plant
- 2.27 Electrical Installations and Machinery on Construction Sites
- 2.28 Use and Temporary Storage of Flammable Liquids on Construction Sites
- 2.29 Water Environments



- 2.30 Fire Precautions on Construction Sites
- 2.31 Construction Employees' Facilities
- 2.32 Fall Protection
- 2.33 Temporary Works
- 2.34 Excavation
- 2.35 Demolition Work
- 2.36 Tunnelling
- 2.37 Scaffolding
- 2.38 Bulk Mixing Plant
- 2.39 Rope Access Work
- 2.40 Hazardous Chemical Substances (HCS)
- 2.41 Noise Induced Hearing Loss
- 2.42 Explosives and Blasting
- 2.43 Personal Protective Equipment (PPE)
- 2.44 Asbestos
- 2.45 Pressure Vessels (Including Gas Bottles)
- 2.46 Fire Extinguishers and Fire Fighting Equipment
- 2.47 Lifting Machinery and Tackle
- 2.48 Ladders and Ladder Work
- 2.49 General Machinery
- 2.50 Portable Electrical Tools
- 2.51 High Voltage Electrical Equipment
- 2.52 Public Health and Safety
- 2.53 Night Work
- 2.54 Environmental Conditions and Flora and Fauna
- 2.55 Occupational Health
- 2.56 Suspended Scaffolds
- 2.57 Material Hoists
- 2.58 Explosive Actuating Fastening Devices
- 2.59 Confined Spaces

Annexure A

- Task Completion Form

Annexure B

- Contractor's Responsible Persons

Baseline Risk Assessments

Health and Safety Specification Acknowledgement Receipt



1.0 SPECIFIC PROJECT INFORMATION

1. 1 INTRODUCTION AND DEFINITIONS

PLEASE NOTE THAT THE REQUIREMENTS OF THE NEW CONSTRUCTION REGULATIONS 2014 HAVE BEEN IN EFFECT SINCE 7TH AUGUST 2014. THE NEW REGULATIONS PLACE ADDITIONAL LEGAL DUTIES UPON PRINCIPAL CONTRACTORS AND CONTRACTORS. ALTHOUGH THIS HEALTH AND SAFETY SPECIFICATION INCLUDES MUCH OF THE CONTENT OF THESE NEW REQUIREMENTS, THE CONTRACTOR WILL BE DEEMED TO BE FAMILIAR WITH THE REQUIREMENTS OF THESE REGULATIONS, AND TO HAVE FACTORED IN ALL THE DUTIES PLACED UPON CONTRACTORS AND PRINCIPAL CONTRACTORS IN THE TENDER. A COPY OF THE REGULATIONS CAN BE VIEWED ON THE DEPARTMENT OF LABOUR'S WEBSITE.

This Health and Safety Specification contains clauses that are generally applicable to construction activities, as well as imposing pro-active controls associated with activities that impact on Health and Safety as it relates to plant and machinery. Compliance to the requirements of the Occupational Health and Safety Act 1993 is in addition to the requirements of this Health and Safety Specification and is part of the Contractor's responsibility. The Client will monitor that the Contractors comply with the requirements of such legislation.

ALL REFERENCES TO CLIENT IN THIS HEALTH AND SAFETY SPECIFICATION ALSO REFER TO SAFETY AGENT, WHERE SO APPOINTED.

Definitions (as per the Construction Regulations 2014) applicable to this Health and Safety Specification:

"agent" means a competent person who acts as a representative for a Client;

"angle of repose" means the steepest angle of a surface at which a mass of loose or fragmented material will remain stationary in a pile on the surface, rather than sliding or crumbling away;

"bulk mixing plant" means machinery, appliances or other similar devices that are assembled in such a manner so as to be able to mix materials in bulk for the purposes of using the mixed product for construction work;

"client" means any person for whom construction work is being performed;

"competent person" means a person who has, in respect of the work or task to be performed, the required knowledge, training and experience and, where applicable, qualifications, specific to that work or task: Provided that where appropriate qualifications and training are registered in terms of the provisions of the National Qualification Framework Act, 2000 (Act No.67 of 2000), those qualifications and that training must be regarded as the required qualifications and training; and is familiar with the Act and with the applicable regulations made under the Act;

"construction manager" means a competent person responsible for the management of the physical construction processes and the coordination, administration and management of resources on a construction site;

"construction site" means a work place where construction work is being performed;

"construction supervisor" means a competent person responsible for supervising construction activities on a construction site;

"construction vehicle" means a vehicle used as a means of conveyance for transporting persons or material, or persons and material, on and off the construction site for the purposes of performing construction work;

"construction work" means any work in connection with-



- the construction, erection, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure; or
- the construction, erection, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system; or the moving of earth, clearing of land, the making of excavation, piling, or any similar civil engineering structure or type of work ;

"construction work permit" means a document issued in terms of regulation 3;

"contractor" means an employer who performs construction work;

Note:

a) Includes organisations and or self-employed person that contracts with a client, principal contractor, or a contractor to carry out construction work.

"demolition work" means a method to dismantle, wreck, break, pull down or knock down of a structure or part thereof by way of manual labour, machinery, or the use of explosives;

"design" in relation to any structure, includes drawings, calculations, design details and specifications ;

"designer" means a competent person who-

- prepares a design;
- checks and approves a design;
- arranges for a person at work under his or her control to prepare a design, including an employee of that person where he or she is the employer; or
- designs temporary work, including its components;
- an architect or engineer contributing to, or having overall responsibility for a design;
- a building services engineer designing details for fixed plant;
- a surveyor specifying articles or drawing up specifications;
- a contractor carrying out design work as part of a design and building project; or
- an interior designer, shop-fitter or landscape architect;

"excavation work" means the making of any man-made cavity, trench, pit or depression formed by cutting, digging or scooping;

"explosive actuated fastening device" means a tool that is activated by an explosive charge and that is used for driving bolts, nails and similar objects for the purpose of providing fixing;

"fall arrest equipment" means equipment used to arrest a person in a fall, including personal equipment, a body harness, lanyards, deceleration devices, lifelines or similar equipment;

"fall prevention equipment" means equipment used to prevent persons from falling from a fall risk position, including personal equipment, a body harness, lanyards, lifelines or physical equipment such as guard-rails, screens, barricades, anchorages or similar equipment;

"fall protection plan" means a documented plan, which includes and provides for -

- all risks relating to working from a fall risk position, considering the nature of work undertaken;
- the procedures and methods to be applied in order to eliminate the risk of falling; and
- a rescue plan and procedures;

"fall risk" means any potential exposure to falling either from, off or into;

"health and safety file " means a file, or other record containing the information in writing required by these Regulations;

"health and safety plan" means a site, activity or project specific documented plan in accordance with the Client's health and safety specification;



"health and safety specification" means a site, activity or project specific document prepared by the Client pertaining to all health and safety requirements related to construction work;

"material hoist" means a hoist used to lower or raise material and equipment, excluding passengers;

"medical certificate of fitness" means a certificate contemplated in regulation 7(8);

"mobile plant" means any machinery, appliance or other similar device that is able to move independently, and is used for the purpose of performing construction work on a construction site;

"National Building Regulations" means the National Building Regulations made under the National Building Regulations and Building Standards Act, 1977 (Act No. 103 of 1977), and promulgated by Government Notice No. R. 2378 of 30 July 1990, as amended by Government Notices No's R. 432 of 8 March 1991, R. 919 of 30 July 1999 and R. 547 of 30 May 2008;

"person day" means one normal working shift of carrying out construction work by a person on a construction site;

"principal contractor" means an employer appointed by the Client to perform construction work;

"Professional Engineer or Professional Certificated Engineer" means a person holding registration as either a Professional Engineer or Professional Certificated Engineer in terms of the Engineering Profession Act, 2000 (Act No. 46 of 2000);

"Professional Technologist" means a person holding registration as a Professional Engineering Technologist in terms of the Engineering Profession Act, 2000;

"provincial director" means the provincial director as defined in regulation 1 of the General Administrative Regulations, 2003;

"scaffold" means a temporary elevated platform and supporting structure used for providing access to and supporting workmen or materials or both;

"shoring" means a system used to support the sides of an excavation and which is intended to prevent the cave-in or the collapse of the sides of an excavation;

"structure" means-

- any building, steel or reinforced concrete structure (not being a building), railway line or siding, bridge, waterworks, reservoir, pipe or pipeline, cable, sewer, sewage works, fixed vessels, road, drainage works, earthworks, dam, wall, mast, tower, tower crane, bulk mixing plant, pylon, surface and underground tanks, earth retaining structure or any structure designed to preserve or alter any natural feature, and any other similar structure;
- any falsework, scaffold or other structure designed or used to provide support or means of access during construction work; or
- any fixed plant in respect of construction work which includes installation, commissioning, decommissioning or dismantling and where any construction work involves a risk of a person falling;

"suspended platform" means a working platform suspended from supports by means of one or more separate ropes from each support ;

"temporary works" means any falsework, formwork, support work, scaffold, shoring or other temporary structure designed to provide support or means of access during construction work;

"the Act" means the Occupational Health and Safety Act , 1993 (Act No. 85 of 1993);



"tunneling" means the construction of any tunnel beneath the natural surface of the earth for a purpose other than the searching for or winning of a mineral.

Reference should be made to the following documentation in conjunction with this Safety Specification (including existing surveys, drawings and reports):

List of Drawings Geo Tech Report Design Report Tender documents

IMPORTANT NOTE:

This Health and Safety Specification has been prepared to comply with the requirements of the Construction Regulations 2014.

1.2 BACKGROUND TO THE HEALTH AND SAFETY SPECIFICATION

Historically, the Construction Industry has had a poor health and safety record. Due to the complex and potentially dangerous operations being undertaken, there is a high risk of incidents, accidents and injuries. In many instances poor adherence to the Act and Regulations has resulted in severe consequences for Health and Safety performance. The Client is determined that the highest Health and Safety standards will prevail throughout the Contract and that there will be full commitment from all parties involved.

To achieve this goal the Client has prepared this Health and Safety Specification. The Health and Safety Specification sets out guidelines and minimum levels of awareness and guidance for Health and Safety requirements for the project. Contractual responsibility for adhering to these requirements rests with the Contractors. All employees are encouraged to be pro-active in compliance.

The Client is committed to ensuring the highest Health and Safety standards for all work undertaken within the Contract.

Contractors as employers are fully responsible and accountable for compliance with all Health and Safety requirements.

IMPORTANT NOTE:

Compliance with the Occupational Health and Safety Act and Regulations shall not be limited to this Health and Safety Specification and definitions contained in this document.

Contractors shall be conversant with the requirements and effects of Health and Safety legislation upon their activities, in particular the Construction Regulations, 2014, and the Occupational Health and Safety Act, 1993, and to have made adequate resource in their tender submission to comply with all legislative requirements.

The Contractor's personnel will be responsible for the auditing of the implementation of the Health and Safety Specification and maintaining the document control and record systems associated with the Health and Safety Specification. The Client will conduct Health and Safety audits of the works too.

1.3 PURPOSE OF THE HEALTH AND SAFETY SPECIFICATION

The purpose of this site specific Health and Safety Specification is to comply with legal requirements and to provide health and safety information about specific project risks known by the Client, Designer and Safety Agent to be applicable to this project. This document also provides minimum health and safety requirements, standards and expectations that the principal contractor and contractors must adhere to.



The Contractor must take into account all information in this specification and ensure that their tenders include adequate resource and competence to deal with the matters detailed herein so that all relevant contents are dealt with in a way which is in compliance with legislation and the ethical concerns for the safeguarding of employees, contractors and other persons affected by the construction activities.

The Health and Safety Specification will be implemented during construction of the works and any construction activity that the Client has control over.

This will also assist in ensuring that all the costs related to the compliance with Occupational Health Act 85 of 1993 and the Construction Regulations 2014, as well as this Health and Safety Specification, are taken into consideration at Tender stage.

No advice, approval of any document required by the Health and Safety Specification such as hazard identification and risk assessment action plans or any other form shall be construed as an acceptance by the Client of any obligation that absolves the Contractor from achieving the required level of performance and compliance with legal requirements.

Further, there is no acceptance of liability by the Client which may result from the Contractor failing to comply with the Health and Safety Specification unless the Client has issued an instruction to any requirement, i.e. the Contractor remains responsible for achieving the required performance levels.

1.4 IMPLEMENTATION OF THE HEALTH AND SAFETY SPECIFICATION

This Health and Safety Specification forms an integral part of the Contract, and Contractors shall make it an integral part of their Contracts with Contractors and Suppliers. Contractors employed by the Client are to ensure that the provisions of the Health and Safety Specification are applied both on the site and in respect of all off site activities relating to the project, in particular in transport activities and project dedicated off site fabrication works.

The Contractor shall enforce the provisions of the Health and Safety Specification amongst all Contractors and suppliers for the project.

The Contractor shall sign the acknowledgment on the last page of this safety specification that he/she has familiarized him/herself with the content of the Health and Safety Specification and shall comply with all obligations in respect thereof.

The successful Contractor will be required to compile a Health and Safety Plan based on the requirements of the Occupational Health Act 85 of 1993 and these Specifications, which will need to be approved by Client prior to commencement with construction work.

1.4.1 Client Duties

In terms of the Construction Regulations 2014 the Client (or their Agent, where appointed) has legal duties. Where an Agent (refer to "definitions" section of this document) is appointed in terms of this project, these Health and Safety duties assigned will also apply.

All references to "Client" will apply to their appointed "Safety Agent", where so appointed, in this Health and Safety Specification.

The Client must:

- Prepare a baseline risk assessment for the construction work
- Prepare a suitable, sufficiently documented and coherent site specific Health and Safety specification for the intended construction work, based on the baseline risk assessment
- Include the health and safety specification in the tender documents



- Ensure that potential principal contractors submitting tenders have made adequate provision for the cost of health and safety measures
- Ensure that the principal contractor to be appointed has the necessary competencies and resources to carry out the construction work safely.
- Take reasonable steps to ensure co-operation between all contractors appointed by the Client to enable each of those contractors to comply with the regulations
- Ensure, before work commences, that every principal 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 (Act no 130 of 1993)
- Appoint each principal contractor in writing for the project, or part thereof
- Discuss and negotiate with the principal contractor the contents of the principal contractor's safety plan and thereafter finally approve that plan for implementation
- Ensure that a copy of the principal contractor's health and safety plan is implemented and maintained
- Ensure that periodic health and safety 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
- Ensure that a copy of the health and safety audit report is provided to the principal contractor within 7 days after the audit
- Stop any contractor from executing a construction activity which poses a threat to the health and safety of persons which is not in accordance with the principal contractor's health and safety plan for site
- Where changes are brought about to the design or construction work, make sufficient health and safety information and appropriate resources available to the principal contractor to execute the work safely
- Ensure that the health and safety file is kept and maintained by the principal contractor.
- Where the Client requires additional work to be performed as a result of a design change or error in construction due to the actions of the Client, the Client must ensure that sufficient safety information and appropriate additional resources are available to execute the required work safely.
- Where more than one principal contractor is appointed, the Client must take reasonable steps to ensure co-operation between all principal contractors and contractors to ensure compliance with the Regulations
- Where the Client has appointed a Safety Agent for the project, their details for this project are contained in the Project Directory section of this health and safety specification.

1.4.2 Designer Duties

It must be noted that the Designer also has Health and Safety duties assigned in terms of the Construction Regulations. Where the contractor fulfils a design function in terms of this project (refer to "definitions" section of this document), these duties will also apply. Please refer to Regulation 6 of the Construction Regulations 2014.

Please note that 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 by the contractor, and in the event of any uncertainty consult the contractor;
- 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; and
- the loads caused by the temporary works and any imposed loads are clearly indicated in the design.



1.5 PROJECT DIRECTORY		
Project Client	Joe Gqabi District Municipality Cnr Cole & Graham Street Barkley East	Tel: 045 979 3000 Fax: 045 971 0251 e-mail: lumanyano@jgdm.gov.za
Contact Person	Lumanyano Wana	
Project Manager	GIBB – East London 9 Pearce Street, Berea	Tel: 043 706 3600 Fax: 043 721 0141 e-mail: vdewet@gibb.co.za
Contact Person	Victor De Wet	
Consulting Engineer	GIBB – East London 9 Pearce Street, Berea	Tel: 043 706 3600 Fax: 043 721 0141 e-mail: vdewet@gibb.co.za
Contact Person	Victor De Wet	
Electrical Engineer	GIBB – East London 9 Pearce Street, Berea	Tel: 043 706 3600 Fax: 043 721 0141 e-mail: ghobson@gibb.co.za
Contact Person	G Hobson	
Designer	GIBB – East London 9 Pearce Street, Berea	Tel: 043 706 3600 Fax: 043 721 0141 e-mail: lsmit@gibb.co.za
Contact Person	Lize Smit	
Construction Safety Agent	Safe Working Practice 12 Putney Avenue Nahoon Valley East London	Tel: 043 735 1774 Fax: 086 720 1149 e-mail: buffalo@safeppractice.co.za
Contact Person	Jay Bhana	

OTHER PARTIES DIRECTORY	
Department of Labour Department of Labour – Maclear 133 Van Riebeeck Street, Maclear	Tel: 045 932 1424 e-mail: Liyanda.Goso@labour.gov.za



Telecommunications Contractor to refer all queries on location and nature of existing services to the Project Manager / Client, etc. OR Contractor to apply for and refer to wayleave information from service providers for the nature and location of services. Refer all queries Project Manager. Company: Telkom	Tel: 10212
Water Company : Joe Gqabi District Municipality	Tel: 045 979 3000
Electricity Company: Joe Gqabi District Municipality	Tel: 045 979 3000

1.6 PROJECT DETAILS

Description of Works

This description of the works is not necessarily complete and shall not limit the work to be carried out by the Contractor under this Contract.

1. *Construction of a new Water Treatment Works comprising of the following:*
 - a. *Inlet/Dosing building*
 - b. *Flocculation channel*
 - c. *Sedimentation tank*
 - d. *Filter building*
 - e. *1Ml Clear water reservoir*
 - f. *Pump station building*
 - g. *Sludge lagoons with offtake chamber and supernatant return pump station*
 - h. *Office/ Laboratory*
 - i. *Gate house*
 - j. *Connecting pipelines (from 160mm Ø up to 400mm Ø)*
 - k. *Potable water supply*
 - l. *Internal roadworks - concrete surfacing*
 - m. *Storm water drainage*
 - n. *Gabions and retaining walls*
 - o. *Prefabricated reservoirs - 2Ml and 100Kl*
 - p. *Elevated pressed steel tank - 100Kl*
2. *Remedial works on an existing 315mm Ø uPVC gravity main from the Maclear Dam and the connection thereof to the new WTW.*
3. *Construction of a dam outlet chamber in the Aucamp Dam with 355mm Ø x 350m long uPVC gravity main connecting to the WTW.*
4. *Construction of a 150m long concrete access road*

Anticipated Construction Duration

18 Months from the Hand over meeting after the Permit has been Issued by the Department of Labour



1.7 EXISTING ENVIRONMENT

Hazards particular to this project by virtue of location:

Water Treatment Works to Greenfield

Overhead, Above Ground and Underground Services crossing the site:

Overhead: Telkom Lines

Underground: Water Lines

Ground level: Normal Services

Existing structures and surrounding land use (with a significant impact on Health & Safety):

This is a Greenfield

Existing ground conditions and ground survey report:

Geo Tech Report No1

Geo Tech Report No 2

Existing Traffic Systems

Condition: Gravel Road with is being utilized by the Plantation

Restrictions to access: No known restrictions to access

Speed restrictions: Normal Road Speed is apply to Normal Vehicles and Construction Vehicles and plant must not exceed limit of 40 km/h

1.8 AVAILABLE DRAWINGS

J35030/101	GENERAL LAYOUT	J35030/136B	SAND FILTER BUILDING SECTIONS
J35030/102	BULK EARTWORKS AND SETTING OUT	J35030/136C	SAND FILTER BUILDING SECTIONS
J35030/103	ROADS AND STORMWATER LAYOUT	J35030/136D	SAND FILTER BUILDING DETAILS
J35030/105	AUCAMP OUTLET PIPELINE	J35030/136E	SAND FILTER BUILDING ARCH
J35030/106	AUCAMP OUTLET PIPELINE LAYOUT & LS	J35030/136F	SAND FILTER BUILDING STEEL STAIRS
J35030/107	RISING MAIN LAYOUT & LS 1 OF 2	J35030/136G	SAND FILTER BUILDING MANHOLE DETAILS
J35030/108	RISING MAIN LAYOUT & LS 2 OF 2	J35030/137A	1MI CLEAR WATER RESERVOIR FOUNDATION LAYOUT
J35030/109	HYDRAULIC GRADELINE	J35030/137B	1MI CLEAR WATER RESERVOIR ROOF LAYOUT
J35030/110	TYPICAL DETAIL: SITE WORKS	J35030/137C	1MI CLEAR WATER RESERVOIR SUBSOIL LAYOUT
J35030/111	TYPICAL DETAIL: ROADS	J35030/137D	1MI CLEAR WATER RESERVOIR SECTIONS
J35030/112A	TYPICAL DETAIL: STORMWATER MANHOLE	J35030/137E	1MI CLEAR WATER RESERVOIR DETAILS
J35030/113A	TYPICAL DETAIL: WATER 1 OF 2	J35030/137F	1MI CLEAR WATER RESERVOIR MANHOLES & LADDERS
J35030/113B	TYPICAL DETAIL: WATER 2 OF 2	J35030/137G	1MI CLEAR WATER RESERVOIR CLEARWATER CHAMBER



J35030/113C	TYPICAL DETAIL: SEWER	J35030/139A	PUMP STATION LAYOUTS
J35030/114A	AUCAMP DAM PIPELINE INLET STRUCTURE	J35030/139B	PUMP STATION LAYOUTS & DETAILS
J35030/114B	AUCAMP DAM PIPELINE OUTLET STRUCTURE	J35030/139C	PUMP STATION LAYOUTS
J35030/115	RESERVOIR INLET & OUTLET CHAMBERS	J35030/139D	PUMP STATION SECTIONS
J35030/118	FENCE DETAILS	J35030/139D	PUMP STATION SECTIONS
		J35030/139D	PUMP STATION DETAILS
J35030/130A	GATE HOUSE ARCH	J35030/139D	PUMP STATION DETAILS
J35030/130B	GATE HOUSE CONCRETE	J35030/140	SLUDGE LAGOON LAYOUT
J35030/132A	LABORATORY / OFFICE ARCH	J35030/141	SLUDGE LAGOON PUMP STATION
J35030/132B	LABORATORY / OFFICE CONCRETE	J35030/142	SLUDGE LAGOON OUTLET CHAMBER AND HEADWALL DETAIL
J35030/133A	INLET WORKS AND DOSING ARCH & DETAILS	J35030/143	SLUDGE LAGOON MANHOLE
J35030/133B	INLET WORKS AND DOSING LAYOUTS	J35030/150E	WASTEWATER TREATMENT WORKS LAYOUT: ELECTRICAL DISTRIBUTION
J35030/133C	INLET WORKS AND DOSING SECTIONS	J35030/151E	PUMP STATION: ELECTRICAL LAYOUT
J35030/134	FLOCCULATION TANK	J35030/152E	PUMP STATION: SMALL POWER AND LIGHTING INSTALLATION
J35030/135A	SEDIMENTATION TANK LAYOUTS & SECTIONS	J35030/153E	INLET WORKS AND DOSING: ELECTRICAL INSTALLATION
J35030/135B	SEDIMENTATION TANK LAYOUTS & SECTIONS	J35030/154E	LABORATORY/OFFICE: ELECTRICAL INSTALLATION
J35030/135C	SEDIMENTATION TANK LAYOUTS & SECTIONS	J35030/155E	GATE HOUSE: ELECTRICAL INSTALLATION
J35030/135D	SEDIMENTATION TANK DETAILS	J35030/156E	SLUDGE LAGOON PUMP STATION: ELECTRICAL INSTALLATION
J35030/136A	SAND FILTER BUILDING LAYOUTS	J35030/157E	SINGLE LINE DIAGRAMS AND PROCESS & INSTRUMENTATION DIAGRAMS

1.9 PROJECT HEALTH AND SAFETY REQUIREMENTS

Significant health and safety hazards identified by Designer and Safety Agent:

The Site is from Sloped to even
There will be 2-3 meter Retainer Wall
Gabions for Flood protection – for Dam Wall Breaks
Sludge lagoon will be 2.5 meter deep
Inlet - 1 ½ meter drop
Fix – 1 ½
Sediment – 7 – 8 meter deep (shoring)
Pump Station has Generators and Pumps – 4 ½ meter deep
Recur – 3 1/5 Deep on the 1mL Reservoir
CH Building – OSEC 0.8 % - H2 Release

Other construction hazards expected are as follows:

Bricklaying
Brush cutting
Bulk Mixing Plant
Chainsaw Use
Compacting and Filling
Compactor Operations
Concrete Pumping
Confined Spaces
Crusher Operation
Cutting Kerbs
Cutting Off Disc



Electric Tools and Electrical Installations
 Excavations
 Explosive use
 Fire
 Form work
 Fragile Materials
 Hand tools
 Hazardous Substances
 Hot Works
 Kerb Laying
 Lead
 Lifting Operations
 Manhole Rings and Pipes Storage
 Manual Handling of General Items
 Material / Passenger Hoist Operation
 Members of Public
 Mobile Crane
 Night Work
 Noise and Dust
 Overhead Services (Working near)
 Painting
 Paving (Laying)
 Plant/Vehicle and Equipment Operation
 Plastering
 Public Safety – Country Club
 Plumbing
 Road Crossing – Forestry Road
 Road Working – in or next to (incl Traffic Management)
 Rope Access Work
 Scaffold Erection / Dismantling
 Shuttering Walls, Beams, Columns
 Site Strip
 Skipping of Concrete
 Snakes
 Steel Erection
 Steel Fixing
 Street Lighting
 Temporary Work (include False Work, Scaffold and Shoring)
 Underground Services
 Underpinning
 Work over or next to Water
 Working at Height (excluding scaffold)
 Working with Cartridge Tools

NOTE: Please refer to end of this Health and Safety Specification for the baseline risk assessment for these risks.

ACTIVITIES REQUIRING APPROVED METHOD STATEMENTS (FOR HEALTH AND SAFETY)

Site establishment
 Excavations
 Public Safety



ACTIVITIES REQUIRING PERMITS (FOR HEALTH AND SAFETY PURPOSES)	
Permit to Dig:	Yes
Permit to Enter Excavations:	Yes
Permit to Work with Electricity:	Yes
Confined Space Permit:	Yes
Hot Works Permit:	Yes
Permit to Work under Power Lines:	Yes
Blasting:	Yes
Temporary Works:	Yes
CONTRACTOR SAFETY PERSONAL PROVISION Records of safety audits undertaken by the Contractor's Safety Officer must be kept on site in the safety file and non-conformances reported by the Safety Officer to the Contractor's management team. All non-conformances identified by the Safety Officer must be investigated and corrective action taken by the Contractor to prevent re-occurrence. Please note that as from 7 th August 2015 the safety officer must have formally applied to be professionally registered with the SACPCMP. If their registration is not yet complete, the safety officer must be in possession of a "Registration Verification Letter" which will be issued by the SACPCMP. PART TIME SAFETY MANAGER AND FULL TIME SAFETY OFFICER	
MEDICAL CERTIFICATE OF FITNESS The contractor must ensure that their employees on site have a valid medical certificate of fitness, specific to the construction work being performed, issued by an occupational health practitioner in the form of an Annexure 3 template.	
MANAGEMENT AND SUPERVISION OF CONSTRUCTION WORK 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. Proof of all-inclusive assessment of the Construction Manager's Competency in construction management and H&S competency must be available in the Safety File. The Construction Manager and designated construction supervisor/s must, as a minimum, have training in Legal Liability, Construction Regulation 2014 and the OHS Act and Regulations.	
TRAFFIC MANAGEMENT AND TRAFFIC SAFETY OFFICER PROVISION The Traffic Management Plan must be approved by the Traffic Chief as per the National Road Traffic Act, No. 93 of 1996. The Traffic Safety Officer must have training as per Unit Standard 14561 or similar.	
ENVIRONMENTAL CONDITIONS Contractor must take into account adverse weather conditions on site activities and implement control measures to mitigate risk. This includes risk of exposure to excessive heat, cold, rain and wind. The open nature of the site works will not preclude any of the above.	



ARRANGEMENTS FOR ACCESS, PARKING, DELIVERIES, ETC.

Access to site by Construction Vehicles: Access is on gravel and will be confirmed on day of the tender briefing or handover meeting

Access to site by Construction Workers and Visitors: Access is on gravel and will be confirmed on day of the tender briefing or handover meeting

All service providers must sign a 37.2 Mandatory Agreement and must be inducted before they can be allowed on site.

ARRANGEMENTS FOR SITE CAMP, ABLUTIONS AND YARD

Site camp location and set up

- **Restrictions / requirements:** }
 - **Storage areas:** }
 - **Security:** }
- Contractor to advise in consultation with Engineer / Professional Team

Ablutions and Welfare Arrangements

Contractor to supply ablutions and facilities in line with the Construction Regulations 2014, refer to section 2.31 of this health and safety specification regarding the below. Please note that toilets should be provided with built in facilities for hand washing:

- **Toilets:** }
 - **Washing facilities:** }
 - **Drinking Water:** }
 - **Shelter:** }
 - **Showers:** }
- Contractor to provide as per Regulations

PROTECTION OF SITE AGAINST UNAUTHORISED ACCESS BY PUBLIC

Excavation Fencing: Note that excavations accessible to public, or adjacent to public roads / thoroughfares, must have (1) barrier / fence of at least 1m in height, and (2) warning illuminants at night or when visibility is poor, or have other suitable precautionary measures if of both these are not practicable.

General Fencing of Site: Note that construction sites in built up areas adjacent to public way must be fenced off and have controlled access points.

Warning Notices: Is to be utilised on the enter site and must be SABS approved signs example : Deep Excavations, construction Site.

Look Outs: When applicable

PERSONAL PROTECTIVE EQUIPMENT (PPE)

The Client requires the Contractor to ensure that employees (and others under his/her control) wear the following minimum PPE:



Overalls:	Yes
Safety Harnesses:	Yes, when working on heights
Hard Hats:	Yes
Reflective Vests:	Yes
Goggles / gloves / ear defenders / respiratory protection:	Yes, when needed
Safety Footwear:	Yes
Specialist Equipment (e.g. for confined Spaces):	Yes, when needed
<i>HAZARDOUS SUBSTANCES</i>	
The following materials and substances have, or may have, to be used in the works and are identified as potentially posing special health and / or safety hazards during the project. Appropriate measures will need to be specified for their control:	
Poly Electro - Flocculant Hyper CH Solution	

<i>1.10 INTERFACE AND RESTRICTIONS BY CLIENT</i>
Contractor must note that the following Client activities will continue during construction:
The following Client safety rules and/or requirements are to be observed: All workers are to receive induction prior to commencement of work on site. Other safety rules and requirements to be advised at induction. Please also refer to tender document.
Restrictions on times, access or other restrictions by Client Please refer to tender document. Other restrictions may be advised at induction.

<i>1.11 SAFETY FILE RETURN TO CLIENT</i>
The Safety File for the Project is to be handed over by the Principal Contractor to the Client upon Project Completion in either a hard copy format or on CD.



2.0 FURTHER REQUIREMENTS

2.1 Duties of Principal Contractor / Contractor in terms of Construction Regulations 2014

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, 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 Safety Agent or a Contractor; and
- 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 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
 - take reasonable steps to ensure that each contractor's health and safety plan 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 specifications 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;
- discuss and negotiate with the contractor the contents of their health and safety plan and finally approve that plan for implementation;
- ensure that a copy of both the principal contractor and contractor's health and safety plan is available on request to an employee, an inspector, a contractor, the Client or the Client's Safety Agent;
- hand over a consolidated health and safety file to the Client upon completion of the construction work, to 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 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;
- 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.

A 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 and provided by the principal contractor, 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 Safety 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;
- 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.

Where a contractor appoints another contractor to perform construction work, the duties that apply to the principal contractor will apply to the contractor as if he or she were the principal contractor.

A principal 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 and such records must be made available on request to an inspector, the Client, the Client's Safety 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 (a template of which can be found in the Construction Regulations, 2014).



2.2 Management and Supervision of Construction Work

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. Proof of all-inclusive assessment of the Construction Manager's Competency in construction management and H&S competency must be available in the Safety File. The Construction Manager must, as a minimum, have a Construction Regulation course. No contractors may be left unsupervised on site by the principal contractor.

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.

Where the construction manager has not appointed assistant construction managers, 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.

No construction manager appointed in terms of the Regulations 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.

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.

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

A construction manager must in writing appoint construction supervisors responsible for construction activities and ensuring occupational health and safety compliance on the construction site. Proof of all-inclusive assessment of the Construction Supervisor's competency in construction supervision and H&S competency must be available in the Safety File. The Construction Supervisor must, as a minimum, have a supervision course as per Unit Standard 262845 (Civil Engineering), 119080 (Building Construction) and 262884 (Civil Engineering).

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, 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 such employee does not relieve the construction supervisor of any personal accountability for failing in his or her supervisory duties.

Where the contractor has not appointed such an employee, 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.

No construction supervisor appointed 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 on all the relevant construction sites, the appointed construction supervisor may supervise more than one site.

2.3 Notification of Intention to Commence Construction Work (Not applicable if a Permit is being issued)

The Contractor shall notify the Provincial Director of the Department of Labour of the intention to commence construction work at least 7 days prior to the works commencing if the intended construction work will:

- Include excavation work
- Include work at height where there is a risk of falling
- Include the demolition of a structure, or
- Include the use of explosives to perform construction work.

If the construction work involves construction of a single storey dwelling for a Client, and such Client will be residing in such dwelling upon completion, the contractor must also notify the Provincial Director of the Department of Labour at least 7 days before the works commence.

This must be done on a form similar to an Annexure 2 (template of which can be found in the Construction Regulations, 2014). A copy of the notification letter to the Provincial Director shall be forwarded to the Client for record purposes.

2.4 Construction Work Permit

A client who intends to have construction work carried out, must at least 30 days before that work is to be carried out apply to the provincial director in writing for a construction work permit to perform construction work if the intended construction work starts on or after the 7th of February 2017 and the works contract is of a value exceeding R40 million or Construction Industry Grading Board (CIDB) grading level 8.

It is the Construction Health and Safety Agent's responsibility to apply for this permit from the Provincial Director and construction work may not commence until the permit has been issued by the Provincial Director.

A copy of this permit will be required to be kept in the principal contractors safety file, and the site specific number issued by the Provincial Director must be displayed at the site entrance.

The Health and Safety file must be approved by the Health and Safety Agent for the permit application, over and above the approved file the following documents must be available to the Health and Safety Agent for the Permit application from the Principal Contractor :

1. The Appointment letter from the Client to the Principal Contractor which is signed by both parties and shows the project value on the Appointment letter.
2. Valid CIDB – registration certificate / letter
3. Safety Manager appointment including : CV, Training Certificates, Valid Medical, and SACPCMP registration
4. Copy of the priced Health and Safety part of the BOQ

2.5 Assignment of Contractor's Responsible Persons to Manage Health and Safety on Site

The Contractor shall submit management and supervisory appointments as well as any relevant appointments in writing (as stipulated by the Construction Regulations 2014 and the Occupational Safety and Health Act 1993), prior to commencement of work (refer to **Annexure B** at the end of this Health and Safety Specification).



2.6 Competency for Contractor's Responsible Persons

The Contractor's responsible persons shall be competent in health and safety and be familiar with the Occupational Health and Safety Act 1993, and applicable regulations. Valid proof of pertinent health and safety courses attended by such persons will be required to be presented to the Client.

2.7 Compensation of Occupational Injuries and Diseases Act 130 of 1993 (COIDA)

The successful Contractor shall submit to the Client a valid letter of good standing with the Compensation Insurer prior to appointment.

2.8 Occupational Health and Safety Policy

The Contractor shall submit their Health and Safety Policy, prior to construction commencement, signed by the Chief Executive Officer. The Policy must outline objectives and how they will be achieved and implemented within the company operations. The Policy must be communicated to all employees and proof thereof must be available in the Safety File.

2.9 Health and Safety Organogram

The Contractor shall submit an organogram, prior to construction commencement, outlining the Health and Safety Site Team that will be assigned to the project, if successful with the tender. In cases where appointments have not been made, the organogram shall reflect the position. The organogram shall be updated, when there is a change in the site team.

2.10 Risk Assessments

Baseline Risk Assessment

The Client shall cause a baseline risk assessment to be conducted by a competent person before the design process and tender process commence, and the assessed risks shall form part of the health and safety specifications.

The Contractor must, before commencement of any construction work, and during construction work, have risk assessments performed by a competent person appointed in writing, which risk assessments form part of the health and safety plan to be applied on the site and must include:

- 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 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

The Contractor must ensure that, as far as is reasonably practicable, ergonomic related hazards are analysed, evaluated and addressed in a risk assessment.

The Contractor must ensure that all employees under his control are informed, instructed and trained by a competent person regarding any hazard and the related work procedures and/or control measures **before any work commences** and thereafter **at the times determined in the risk assessment monitoring and review plan of the relevant site**.

The Principal Contractor must ensure that all contractors are informed regarding any hazard that is stipulated in the risk assessment **before any work commences** and thereafter **at the times determined in the risk assessment monitoring and review plan of the relevant site**.



The Contractor must consult with the health and safety committee or with a representative trade union or representative group of employees if no health and safety committee exists, on the monitoring and review of the risk assessments for the site.

The Contractor must ensure that copies of risk assessment for this site are available on site for inspection purposes by interested parties (inspector, the Client, Client's Safety Agent, any contractor, any employee, a representative trade union, a health and safety representative or safety committee member.

A Contractor must review the relevant risk assessment where changes are effected to the design and/or construction that result in a change to the risk profile, or when an incident has occurred.

Preventative measures must first address the elimination of the hazard or risk. Should PPE be required to reduce risk, the equipment or clothing to be used must be SABS approved.

In general the Contractor must ensure that the Risk Assessment involves identifying the hazards present in a work activity on site. This is followed by an evaluation of the extent of the risk involved taking into account those precautions already being taken.

The following general principle should be followed when conducting a risk assessment:

- All relevant risks and/or hazards should be systematically addressed;
- The risk assessment should address what actually happens in the workplace during the work activity;
- All employees and those who may be affected must be considered, including maintenance staff, security guards, visitors and Contractors;
- The risk assessment should highlight those groups and individuals who may be required to work alone or who have disabilities;
- The risk assessment process should take into account the existing safety measures and controls.
- The level of detail on a risk assessment should be appropriate to the level of risk.

2.11 Health and Safety Representative(s)

The Contractor shall ensure that Health and Safety Representative(s) is/are elected and trained to carry out his / her functions. The Safety Representative(s) must be democratically nominated, elected and appointed in writing. The Health and Safety Representative(s) shall carry out regular inspections, keep records and report to the supervisor to take appropriate action. The Safety Representative(s) shall attend Health and Safety Committee Meetings. The Health and Safety Representative shall be part of the team that will investigate incidents, accidents and non-conformances. The Safety Representative(s) must be (a) full time employee(s) who is/are acquainted with conditions and activities at that workplace or section thereof. The Safety Representatives must have Safety Representative training and must be capable of performing their duties.

2.12 Health and Safety Committee

Where two or more health and safety representatives have been appointed on site, the Contractor shall ensure that monthly health and safety meetings are held with such representatives and minutes are kept on record. Meetings must be organized and chaired by the Contractor's Health and Safety Committee Chairperson. Minutes of these meetings must be available for the employees of the contractor to refer to.

2.13 Medical Certificate of Fitness

The contractor must ensure that their employees on site have a valid medical certificate of fitness, specific to the construction work being performed, issued by an occupational health practitioner in the form of an



Annexure 3 template (refer to the Construction Regulations 2014 on the Department of Labour website for a sample of this form).

2.14 Health and Safety Training

The Contractor shall quarterly conduct a training needs analysis to ascertain what health and safety training is required. A plan of action should be devised and forwarded to the Client for records. Once the identified people have attended the training, the Contractor must provide the Client with copies of certificates obtained.

2.14.1 Induction

No Contractor may allow or permit any employee or person to enter site unless they have undergone health and safety induction training pertaining to the hazards prevalent on site at the time of entry. This includes visitors to site. The Contractor must ensure that visitors to site have the necessary protective equipment (PPE). A copy of attendance registers of all employees who attend inductions shall be kept.

2.14.2 Awareness

The Contractor shall conduct periodic toolbox talks on site, weekly or before any hazardous work takes place. The talks shall cover the relevant activity and an attendance register must be signed by all attendees. This record of who attended and the content of the topic will be kept on the site health and safety file as evidence of training.

2.15 Competency

After the Contractor has identified the training to be conducted as part of the competency requirement, and based on Risk Assessment, he shall send the relevant persons on appropriate courses and keep certificates of training for reference. Familiarity with the Health and Safety Act and Regulations is an integral part of the definition of competence.

2.16 General Record Keeping

The Contractor shall keep and maintain Health and Safety records to demonstrate compliance with the Health and Safety Specification and the Occupational Health and Safety Act. The contractor shall ensure that all records of incidents, spot fines, training, etc. are kept on site. All documents shall be available for inspection by the Client, or the Department of Labour's Inspectors.

2.17 General Inspection, Monitoring and Reporting

The Contractor shall carry out inspections as required by this Health and Safety Specification, as well as by health and safety legislation.

2.18 Emergency Procedures

The Contractor shall submit a detailed Emergency Procedure for approval by the Client prior to commencement on site. The procedure shall detail the response plan including the following:

- List of key personnel;
- Details of emergency services;
- Actions or steps to be taken in the event of the emergency; and
- Information on hazardous materials / situations, including each material's hazardous potential impact or risk on the environment or human and measures to be taken in the event of an accident.

Emergency procedure(s) shall include, but shall not be limited to, fire, spills, accidents to employees, use of hazardous substances, dangers as a result of riot / service delivery protests / intimidation, etc. The Contractor shall advise the Client in writing of any on-site emergencies, together with a record of action



taken, within 24 hours of the emergency occurring. A contact list of all service providers (Fire Department, Ambulance, Police, Medical and Hospital, etc.) must be maintained and available to site personnel.

2.19 First Aid Box and First Aid Equipment

The Contractor shall provide first aid box/es and appoint, in writing, First Aider(s) for this project in line with the results of the Contractor's risk assessment for the project, this health and safety specification as well as the provisions of the General Safety Regulations. The appointed First Aider(s) are to be sent for accredited first aid training before starting on site. Valid certificates are to be kept on site.

First Aid box/es must be adequately stocked at all time, accessible and be controlled by a qualified First Aider. If required by the Client, the Contractor shall have a stretcher on site to be used in case of a serious incident.

2.20 Accident / Incident Reporting and Investigation

The Contractor shall, in addition to the prescribed requirements of the Occupational Health and Safety Act and General Safety Regulations, investigate, record and report all Section 24 reportable incidents to the Client within 24 hours of the incident occurring. Incident investigations shall be conducted by the Contractor's appointed Accident Investigator – this Investigator must be a competent person or persons who have sufficient knowledge to carry out an investigation.

In the event of a fatality or a permanent disabling injury the Contractor must submit proof of reporting of incident to Department of Labour as well as proof of preventative measures to the Client. The Client reserves the right to conduct investigations into any incidents that they deem fit and the Contractor is required to provide full co-operation in this regard.

2.21 Hazards and Potential Situations

The Contractor shall immediately notify other Contractors of any hazardous or potentially hazardous situations, which may arise during performance of the activities.

2.22 Occupational Health and Safety Signage

The Contractor shall ascertain and provide adequate on site health and safety signage. This signage shall include, but shall not be limited to, Hard Hat / Helmet Area; Safety Shoes to be worn on site; Dust Masks to be worn in areas where there might be exposure to excessive dust; Ear Plugs / Muffs to be worn where there might be noise exposure over 85 db; Gloves; Safety Goggles; Safety Harness, Workers in Excavation, traffic management, etc. The Contractor shall be responsible to maintain the quality and replacement of signage. Signage must comply with the requirements of SANS.

2.23 Management Of Contractors by Principal Contractor

The Principal Contractor shall ensure that all contractors under his control are complying with the respective Health and Safety Plans, as well as Health and Safety Legislation.

2.24 Stacking of Materials

In addition to the provisions for the stacking of articles in the General Safety Regulations, 2003, the contractor must ensure that –

- a competent person is appointed in writing with the duty of supervising all stacking and storage on a construction site;
- adequate storage areas are provided;
- there are demarcated storage areas; and
- storage areas are kept neat and under control.



2.25 Housekeeping and General Safeguarding on Construction Sites

A contractor must, in addition to compliance with the Environmental Regulations for Workplaces, 1987, promulgated by Government Notice No. R. 2281 of 16 October 1987, ensure that suitable housekeeping is continuously implemented on each construction site, including-

- the proper storage of materials and equipment;
- the removal of scrap, waste and debris at appropriate intervals;
- ensuring that materials required for use, are not placed on the site so as to obstruct means of access to and egress from workplaces and passageways;
- ensuring that materials which are no longer required for use, do not accumulate on and are removed from the site at appropriate intervals;
- ensuring that waste and debris are not disposed of from a high place with a chute, unless the chute complies with the requirements set out in the regulations;
- ensuring that construction sites in built-up areas adjacent to a public way are suitably and sufficiently fenced off and provided with controlled access points to prevent the entry of unauthorized persons; and
- ensuring that a catch platform or net is erected above an entrance or passageway or above a place where persons work or pass under, or fencing off the danger area if work is being performed above such entrance, passageway, or place so as to ensure that all persons are kept safe in the case of danger or possibility of persons being struck by falling objects.

2.26 Construction Vehicles and Mobile Plant

A contractor must ensure that all construction vehicles and mobile plant-

- are of an acceptable design and construction;
- are maintained in a good working order;
- are used in accordance with their design and the intention for which they were designed, having due regard to safety and health;
- are operated by a person who-
 - has received appropriate training, is certified competent and in possession of proof of competency and is authorised in writing to operate those construction vehicles and mobile plant;
 - has a medical certificate of fitness to operate those construction vehicles and mobile plant, issued by an occupational health practitioner in the form of Annexure 3.
- have safe and suitable means of access and egress;
- are properly organized and controlled in any work situation by providing adequate signalling or other control arrangements to guard against the dangers relating to the movement of vehicles and plant, in order to ensure their continued safe operation;
- are prevented from falling into excavations, water or any other area lower than the working surface by installing adequate edge protection, which may include guard-rails and crash barriers;
- are fitted with structures designed to protect the operator from falling material or from being crushed should the vehicle or mobile plant overturn;
- are equipped with an acoustic warning device which can be activated by the operator;
- are equipped with an automatic acoustic reversing alarm; and
- are inspected by the authorised operator or driver on a daily basis using a relevant checklist prior to use and that the findings of such inspection are recorded in a register kept in the construction vehicle or mobile plant.

A contractor must ensure that-

- no person rides or is required or permitted to ride on a construction vehicle or mobile plant otherwise than in a safe place provided thereon for that purpose;
- every construction site is organized in such a way that, as far as is reasonably practicable, pedestrians and vehicles can move safely and without risks to health;
- the traffic routes are suitable for the persons, construction vehicles or mobile plant using them, are



- sufficient in number, in suitable positions and of sufficient size;
- every traffic route is, where necessary, indicated by suitable signs;
- all construction vehicles and mobile plant left unattended at night, adjacent to a public road in normal use or adjacent to construction areas where work is in progress, have appropriate lights or reflectors, or barricades equipped with appropriate lights or reflectors, in order to identify the location of the vehicles or plant;
- all construction vehicles or mobile plant when not in use, have buckets, booms or similar appendages, fully lowered or blocked, controls in a neutral position, motors stopped, wheels chocked, brakes set and ignition secured;
- whenever visibility conditions warrant additional lighting, all mobile plant are equipped with at least two headlights and two taillights when in operation;
- tools, material and equipment are secured and separated by means of a physical barrier in order to prevent movement when transported in the same compartment with employees;
- vehicles used to transport employees have seats firmly secured and adequate for the number of employees to be carried; and
- all construction vehicles or mobile plant travelling, working or operating on public roads comply with the requirements of the National Road Traffic Act, 1996.
- that all plant and vehicles are fitted with amber rotating beacons and reverse alarms.

2.27 Electrical Installations and Machinery on Construction Sites

A contractor must, in addition to compliance with the Electrical Installation Regulations and the Electrical Machinery Regulations, ensure that –

- before construction commences and during the progress thereof, adequate steps are taken to ascertain the presence of and guard against danger to workers from any electrical cable or apparatus which is under, over or on the site;
- all parts of electrical installations and machinery are of adequate strength to withstand the working conditions on construction sites;
- the control of all temporary electrical installations on the construction site is designated to a competent person who has been appointed in writing for that purpose;
- all temporary electrical installations used by the contractor are inspected at least once a week by a competent person and the inspection findings are recorded in a register kept on the construction site; and
- all electrical machinery is inspected by the authorized operator or user on a daily basis using a relevant checklist prior to use and the inspection findings are recorded in a register kept on the construction site.

2.28 Use and Temporary Storage of Flammable Liquids on Construction Sites

A contractor must, in addition to compliance with the provisions for the use and storage of flammable liquids in the General Safety Regulations, 2003, ensure that –

- where flammable liquids are being used, applied or stored at the workplace concerned, it is done in a manner that does not cause a fire or explosion hazard, and that the workplace is effectively ventilated;
- no person smokes in any place in which flammable liquid is used or stored, and the contractor must affix a suitable and conspicuous notice at all entrances to any such areas prohibiting such smoking;
- an adequate amount of efficient fire-fighting equipment is installed in suitable locations around the flammable liquids store with the recognized symbolic signs;
- only the quantity of flammable liquid needed for work on one day is taken out of the store for use;
- all containers holding flammable liquids are kept tightly closed when not in actual use and, after their contents have been used up, are removed from the construction site and safely disposed of;
- where flammable liquids are decanted, the metal containers are bonded and earthed; and
- no flammable material, including cotton waste, paper, cleaning rags or similar material is stored



together with flammable liquids

2.29 *Water environments*

A contractor must ensure that where construction work is done over or in close proximity to water, provision is made for –

- preventing persons from falling into water; and
- the rescuing of persons in danger of drowning.

A contractor must ensure that where a person is exposed to the risk of drowning by falling into the water, the person is provided with and wears a lifejacket.

2.30 *Fire precautions on Construction Sites*

A contractor must, in addition to compliance with the Environmental Regulations for Workplaces, 1987, ensure that –

- all appropriate measures are taken to avoid the risk of fire;
- sufficient and suitable storage is provided for flammable liquids, solids and gases;
- smoking is prohibited and notices in this regard are prominently displayed in all places containing readily combustible or flammable materials;
- in confined spaces and other places in which flammable gases, vapours or dust can cause danger-
 - only suitably protected electrical installations and equipment, including portable lights, are used;
 - there are no flames or similar means of ignition;
 - there are conspicuous notices prohibiting smoking;
 - oily rags, waste and other substances liable to ignite are without delay removed to a safe place; and
- adequate ventilation is provided;
- combustible materials do not accumulate on the construction site;
- welding, flame cutting and other hot work are done only after appropriate precautions have been taken to reduce the risk of fire;
- suitable and sufficient fire-extinguishing equipment is placed at strategic locations or as may be recommended by the Fire Chief or local authority concerned, and that such equipment is maintained in a good working order;
- the fire equipment contemplated above is inspected by a competent person, who has been appointed in writing for that purpose, in the manner indicated by the manufacturer thereof;
- a sufficient number of workers are trained in the use of fire- extinguishing equipment;
- where appropriate, suitable visual signs are provided to clearly indicate the escape routes in the case of a fire;
- the means of escape is kept clear at all times;
- there is an effective evacuation plan providing for all -
 - persons to be evacuated speedily without panic;
 - persons to be accounted for; and
 - plant and processes to be shut down; and
- a siren is installed and sounded in the event of a fire.

2.31 *Construction Employees' Facilities*

A contractor must, in terms of the Construction Regulations 2014, provide:

- Shower facilities after consultation with the employees or employees representatives, or at least one shower facility for every 15 persons;
- at least one sanitary facility for each sex and for every 30 workers;
- changing facilities for each sex;
- and sheltered eating area.



A contractor must provide reasonable and suitable living accommodation for the workers at construction sites who are far removed from their homes and where adequate transportation between the site and their homes, or other suitable living accommodation, is not available.

2.32 Fall protection

The Contractor must:

- designate a competent person to be responsible for the preparation of a fall protection plan
- ensure that the fall protection plan contemplated above is implemented, amended where and when necessary and maintained as required; and
- take steps to ensure continued adherence to the fall protection plan.

A fall protection plan contemplated above must include-

- 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 the evaluation of the employees' medical fitness necessary to work at a fall risk position and the records thereof;
- a programme for the training of employees working from a fall risk position and the records thereof;
- the procedure addressing the inspection, testing and maintenance of all fall protection equipment; and
- 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.

A contractor must ensure that a construction manager appointed under regulation 8(1) is in possession of the most recently updated version of the fall protection plan.

A contractor must ensure that 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;

Also that no person is required to work in a fall risk position, unless such work is performed safely as contemplated in above and fall prevention and fall arrest equipment are approved as suitable and of sufficient strength for the purpose for which they are being used, having regard to the work being carried out and the load, including any person, they are intended to bear; and securely attached to a structure or plant, and the structure of plant and the means of attachment thereto are suitable and of sufficient strength and stability for the purpose of safely supporting the equipment and person who could fall, and fall arrest equipment is used only where it is not reasonably practicable to use fall prevention equipment.

2.33 Temporary works

A contractor must appoint a temporary works designer in writing to design, inspect and approve the erected temporary works on site before use.

A contractor must ensure that all temporary works operations are carried out under the supervision of a competent person who has been appointed in writing for that purpose.

A contractor must ensure that-

- all temporary works structures are adequately erected, supported, braced and maintained by a competent person so that they are capable of supporting all anticipated vertical and lateral loads that may be applied to them, and that no loads are imposed onto the structure that the structure is not designed to withstand;
- all temporary works structures are done with close reference to the structural design drawings, and where any uncertainty exists the structural designer should be consulted;
- detailed activity specific drawings pertaining to the design of temporary works structures are kept on the site and are available on request to an inspector, other contractors, the Client, the Client's Safety Agent or any employee;



- all persons required to erect, move or dismantle temporary works structures are provided with adequate training and instruction to perform those operations safely;
- all equipment used in temporary works structure are carefully examined and checked for suitability by a competent person, before being used;
- all temporary works structures are inspected by a competent person immediately before, during and after the placement of concrete, after inclement weather or any other imposed load and at least on a daily basis until the temporary works structure has been removed and the results have been recorded in a register and made available on site;
- no person may cast concrete, until authorization in writing has been given by the competent person contemplated above;
- if, after erection, any temporary works structure is found to be damaged or weakened to such a degree that its integrity is affected, it is safely removed or reinforced immediately;
- adequate precautionary measures are taken in order to-
 - secure any deck panels against displacement; and
 - prevent any person from slipping on temporary works due to the application of release agents;
- as far as is reasonably practicable, the health of any person is not affected through the use of solvents or oils or any other similar substances;
- upon casting concrete, the temporary works structure is left in place until the concrete has acquired sufficient strength to safely support its own weight and any imposed load, and is not removed until authorization in writing has been given by the competent person
- the foundation conditions are suitable to withstand the loads caused by the temporary works structure and any imposed load in accordance with the temporary works design.
- provision is made for safe access by means of secured ladders or staircases for all work to be carried out above the foundation bearing level;
- a temporary works drawing or any other relevant document includes construction sequences and methods statements;
- the temporary works designer has been issued with the latest revision of any relevant structural design drawing;
- a temporary works design and drawing is used only for its intended purpose and for a specific portion of a construction site; and
- the temporary works drawings are approved by the temporary works designer before the erection of any temporary works.

No contractor may use a temporary works design and drawing for any work other than its intended purpose.

2.34 Excavation

A contractor must-

- ensure that all excavation work is carried out under the supervision of a competent person who has been appointed in writing for that purpose; and
- evaluate, as far as is reasonably practicable, the stability of the ground before excavation work begins.

A contractor who performs excavation work-

- must take reasonable and sufficient steps in order to prevent, as far as is reasonably practicable, any person from being buried or trapped by a fall or dislodgement of material in an excavation;
- may not require or permit any person to work in an excavation which has not been adequately shored or braced: Provided that shoring and bracing may not be necessary where-
 - the sides of the excavation are sloped to at least the maximum angle of repose measured relative to the horizontal plane; or
 - such an excavation is in stable material: Provided that-
 - permission has been given in writing by the appointed competent person contemplated above upon evaluation by him or her of the site conditions; and

- where any uncertainty pertaining to the stability of the soil still exists, the decision from a professional engineer or a professional technologist competent in excavations is decisive and such a decision must be noted in writing and signed by both the competent person and the professional engineer or technologist, as the case may be;
- must take steps to ensure that the shoring or bracing contemplated above is designed and constructed in a manner that renders it strong enough to support the sides of the excavation in question;
- must ensure that no load, material, plant or equipment is placed or moved near the edge of any excavation where it may cause its collapse and consequently endangers 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;
- must 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 to ensure the stability of such building, structure or road and the safety of persons;
- must cause convenient and safe means of access to be provided to every excavation in which persons are required to work, and such access may not be further than six metres from the point where any worker within the excavation is working;
- must 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, and must before the commencement of excavation work that may affect any such service, take the steps that are necessary to render the circumstances safe for all persons involved;
- must ensure that every excavation, including all bracing and shoring, is inspected-
 - daily, prior to the commencement of each shift;
 - after every blasting operation;
 - after an unexpected fall of ground;
 - after damage to supports; and
 - after rain,
 by the competent person, in order to ensure the safety of the excavation and of persons, and those results must be recorded in a register kept on site and made available on request to an inspector, the Client, the Client's Safety Agent, any other contractor or any employee;
- must cause every excavation which is accessible to the public or which is adjacent to public roads or thoroughfares, or whereby the safety of persons may be endangered, to be –
 - adequately protected by a barrier or fence of at least one metre in height and as close to the excavation as is practicable; and
 - provided with warning illuminants or any other clearly visible boundary indicators at night or when visibility is poor, or have resort to any other suitable and sufficient precautionary measure where this is not practicable;
- must ensure that all precautionary measures stipulated for confined spaces as determined in the General Safety Regulations, 2003, are complied with by any person entering any excavation;
- must, where the excavation work involves the use of explosives, appoint a competent person in the use of explosives for excavation, and must ensure that a method statement is developed by that person in accordance with the applicable explosives legislation; and
- must cause warning signs to be positioned next to an excavation within which or where persons are working or carrying out inspections or tests.

2.35 Demolition Work

A contractor must appoint a competent person in writing to supervise and control all demolition work on site.

A contractor must ensure that before any demolition work is carried out, and in order to ascertain the method of demolition to be used, a detailed structural engineering survey of the structure to be demolished is carried out by a competent person and that a method statement on the procedure to be followed in demolishing the structure is developed by that person.



During a demolition, the competent person contemplated in above must check the structural integrity of the structure at intervals determined in the method statement contemplated in above, in order to avoid any premature collapses.

A contractor who performs demolition work must with regard to a structure being demolished, take steps to ensure that-

- no floor, roof or other part of the structure is overloaded with debris or material in a manner which would render it unsafe;
- all reasonably practicable precautions are taken to avoid the danger of the structure collapsing when any part of the framing of a framed or partly framed building is removed, or when reinforced concrete is cut; and
- precautions are taken in the form of adequate shoring or other means that may be necessary to prevent the accidental collapse of any part of the structure or adjoining structure;
- ensure that no person works under overhanging material or a structure which has not been adequately supported, shored or braced;
- ensure that any support, shoring or bracing contemplated above, is designed and constructed so that it is strong enough to support the overhanging material;
- where the stability of an adjoining building, structure or road is likely to be affected by demolition work on a structure, take steps to ensure the stability of such structure or road and the safety of persons;
- 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, and must before the commencement of demolition work that may affect any such service, take the steps that are necessary to render circumstances safe for all persons involved;
- cause every stairwell used and every floor where work is being performed in a building being demolished, to be adequately illuminated by either natural or artificial means;
- cause convenient and safe means of access to be provided to every part of the demolition site in which persons are required to work; and
- erect a catch platform or net above an entrance or passageway or above a place where persons work or pass under, or fence off the danger areas if work is being performed above such entrance, passageway, or place so as to ensure that all persons are kept safe where there is a danger or possibility of persons being struck by falling objects.

A contractor must ensure that no material is dropped to any point, which falls outside the exterior walls of the structure, unless the area is effectively protected.

No person may dispose of waste and debris from a high place by a chute unless the chute-

- is adequately constructed and rigidly fastened;
- if inclined at an angle of more than 45 degrees to the horizontal, is enclosed on its four sides;
- if of the open type, is inclined at an angle of less than 45 degrees to the horizontal;
- where necessary, is fitted with a gate at the bottom end to control the flow of material; and discharges into a container or an enclosed area surrounded by barriers.

A contractor must ensure that every chute used to dispose of rubble is designed in such a manner that rubble does not free-fall and that the chute is strong enough to withstand the force of the debris travelling along the chute.

A contractor must ensure that no equipment is used on floors or working surfaces, unless such floors or surfaces are of sufficient strength to support the imposed loads.

Where a risk assessment indicates the presence of asbestos, a contractor must ensure that all asbestos related work is conducted in accordance with the Asbestos Regulations 2001.

Where a risk assessment indicates the presence of lead, a contractor must ensure that all lead related work is conducted in accordance with the Lead Regulations, 2001.



Where the demolition work involves the use of explosives, a method statement must be developed in accordance with the applicable explosives legislation, by an appointed person who is competent in the use of explosives for demolition work and all persons involved in the demolition works must adhere to demolition procedures issued by the appointed person.

A contractor must ensure that all waste and debris are as soon as reasonably practicable removed and disposed of from the site in accordance with the applicable legislation.

2.36 Tunneling

No person may enter a tunnel which has a height dimension of less than 800 mm.

2.37 Scaffolding

A contractor must appoint a competent person in writing who must ensure that all scaffolding work operations are carried out under his or her supervision and that all scaffold erectors, team leaders and inspectors are competent to carry out their work.

A contractor using access scaffolding must ensure that such scaffolding, when in use, complies with the safety standards incorporated for this purpose into these Regulations under section 44 of the Act and SANS 10085. Scaffold must be fully boarded and access to the scaffold should be from the inside ONLY, signage must be displayed to indicate if the scaffold is safe or unsafe to use. Scaffold higher than 60 metres must be designed by an engineer.

2.38 Bulk mixing plant

A contractor must ensure that the operation of a bulk mixing plant is supervised by a competent person who has been appointed in writing and is –

- aware of all the dangers involved in the operation thereof; and
- conversant with the precautionary measures to be taken in the interest of health and safety.

No person supervising or operating a bulk mixing plant may authorize any other person to operate the plant, unless that person is competent to operate a bulk mixing plant.

A contractor must ensure that the placement and erection of a bulk mixing plant complies with the requirements set out by the manufacturer and that such plant is erected as designed.

A contractor must ensure that all devices to start and stop a bulk mixing plant are provided and that those devices are placed in an easily accessible position and constructed in a manner to prevent accidental starting.

A contractor must ensure that the machinery and plant selected is suitable for the mixing task and that all dangerous moving parts of a mixer are placed beyond the reach of persons by means of doors, covers or other similar means.

No person may remove or modify any guard or safety equipment relating to a bulk mixing plant, unless authorized to do so by the appointed person.

A contractor must ensure that all precautionary measures stipulated for confined spaces as determined in the General Safety Regulations, 2003, are complied with when entering any silo.

A contractor must ensure that a record is kept of all repairs or maintenance to a bulk mixing plant and that the record is available on site to an inspector, the Client, the Client's Safety Agent or any employee.



2.39 Rope Access Work

A contractor must –

- appoint a competent person in writing as a rope access supervisor with the duty of supervising all rope access work on the site, including the duty of ensuring occupational health and safety compliance in relation to rope access work: Provided that the appointment of any such person does not relieve the construction manager of any personal accountability for failing in his management duties in terms of this regulation;
- ensure that all rope access work on the construction site is carried out under the supervision of a competent person; and
- ensure that all rope access operators are competent and licensed to carry out their work.

No contractor may use or allow the use of rope access work unless –

- the design, selection and use of the equipment and anchors comply with the safety standards incorporated for this purpose into these Regulations under section 44 of the Act; and
- he or she is in possession of a site specific fall protection plan developed by a competent person applicable to the specific work and environment prior to the commencement of the work, including records of maintenance and inspections of all the equipment used for the work operations.

A contractor must ensure that adequate measures are in place to allow rescue procedures to commence immediately in the event of a fall incident taking place.

2.40 Hazardous Chemical Substances (HCS)

In addition to the requirements in the HCS Regulations, the principal contractor must provide proof in the Health and Safety Plan that:

- Material Safety Data Sheets (MSDS's) of the relevant materials / hazardous chemical substances are available prior to use by the contractor. All MSDS's shall be available for inspection by the agent at all times.
- Risk assessments are done at least once every 6 months.
- Exposure monitoring is done according to OESSM and by an Approved Inspection Authority (AIA) and that the medical surveillance programme is based on the outcomes of the exposure monitoring.
- How the relevant HCS's are being/going to be controlled by referring to:
 - Limiting the amount of HCS
 - Limiting the number of employees
 - Limiting the period of exposure
 - Substituting the HCS
 - Using engineering controls
 - Using appropriate written work procedures
- The correct PPE is being used.
- HCS are stored and transported according to SABS 072 and 0228.
- Training with regards to these regulations was given.

The Health and Safety plan should make reference to the disposal of hazardous waste on classified sites and the location thereof (where applicable).

The First Aider must be made aware of the MSDS and trained in how to treat HCS incidents appropriately.

2.41 Noise Induced Hearing Loss

Where noise is identified as a hazard the requirements of the NIHL regulations must be complied with and the following must be included / referred to in the Health and Safety Plan:



- Proof of training with regards to these regulations.
- Risk assessment done within 1 month of commencement of work.
- That monitoring carried out by an AIA and done according to SABS 083.
- Medical surveillance programme established and maintained for the necessary employees.
- Control of noise by referring to:
- Engineering methods considered
- Admin control (number of employees exposed) considered
- Personal protective equipment considered/decided on
- Describe how records are going to be kept for 40 years.

2.42 Explosives and Blasting

The Contractor shall ensure that the use of explosives and blasting (where required) be undertaken by a specialist contractor or a Contractor with proven track record in the type of work to be performed.

The Contractor may only use explosives for work purposes where the following conditions in place:

- Explosives Regulations to be complied with in all respects.
- Contractor must be in possession of a Blasting Licence
- Blasting permit to be obtained
- Permit to transport explosives to be obtained
- Method statement to be drawn up and approved by professional team
- Municipal authorities may require advance notice of planned use of explosives
- Contractor must notify Provincial Director of Department of Labour on Annexure 2 at least 7 days prior to blasting taking place
- Contractor must have Workman's Compensation and appropriate insurances in place

2.43 Personal Protective Equipment (PPE)

The Contractor shall carry out PPE or clothing needs analysis in accordance with his risk assessment, to determine the necessary PPE or clothing to be used during construction. The Contractor shall make provision to keep adequate quantities of appropriate, SABS approved PPE or clothing on site at all times.

The Contractor must ensure that personnel are trained in the correct use of PPE to be used.

The Contractor must ensure that lost, stolen, worn out or damaged PPE is replaced as required and receipt signed for by employees on site.

2.44 Asbestos

The Contractor shall ensure that all asbestos work is done only by registered "Asbestos Contractor" as prescribed by the Asbestos Regulations, 2001. The Contractor shall submit an Asbestos Certificate from Department of Labour which refer to the prescribed requirements. The Contractor shall notify The Client if there are any asbestos materials to be used on site.

Besides the requirements listed above, should asbestos be identified as a hazard at the workplace, the following must be included in the health and safety plan or as soon as its available:

- Notification to the Provincial Director in writing, prior to commencement of asbestos work.
- Proof of a structured medical surveillance programme, drawn up by an occupational medicine practitioner.
- Proof that an initial health evaluation was carried out by an occupational health practitioner within 14 days after commencement of work.



- Copies of the results of all assessments, exposure monitoring and the written inventory of the location of the asbestos at the workplace.
- Only proof that medical surveillance has been conducted and not the actual records itself since these areas of a confidential nature.
- How records are going to be kept safe for the stipulated period of 40 years.
- Proof that asbestos demolition (if applicable) is going to be done by a registered asbestos contractor and provide proof that a plan of work for such demolition is submitted to an Approved Asbestos Inspection Authority 30 days prior to commencement of the demolition.
- Provide proof that the plan of work was approved by the asbestos AIA and submitted to the provincial director 14 days prior to commencement of demolition work together with the approved standardized procedures for demolition work.

2.45 Pressure Vessels (Including Gas Bottles)

The Contractor shall comply with Pressure Vessel Regulations, including:

- Providing competency and awareness training to the operators;
- Providing PPE or clothing;
- Providing and maintain appropriate signage in areas where pressure vessels are used, as applicable;
- Inspect equipment regularly and keep records of inspections;
- Providing appropriate fire fighting equipment (Fire Extinguishers).

2.46 Fire Extinguishers and Fire Fighting Equipment

The Contractor shall provide adequate, regularly serviced fire extinguishers located at strategic points on site. The Contractor shall keep spare serviced portable fire extinguishers. The Contractor shall have adequate persons trained or competent to use the Fire Fighting Equipment.

Safety signage shall be posted up in all areas where fire extinguishers are located.

2.47 Lifting Machinery and Tackle

The Contractor shall ensure that lifting machinery and tackle is inspected before use and on a monthly basis. The Contractor shall have lifting machinery and tackle inspector who will inspect the equipment at intervals required by the Driven Machinery Regulations, taking into account that:

- All lifting machinery and tackle have a safe working load clearly indicated;
- Regular inspection and servicing is carried out;
- Records are kept of inspections and of service certificates;
- Thorough examinations are carried out by competent personnel at the frequencies required by legislation
- There is proper supervision in terms of guiding the loads which includes a trained banks man to direct and check lifting tackle if it is safe for use.

2.48 Ladders and Ladder work

The Contractor shall ensure that all ladders are numbered and inspected regularly keeping record of inspections. It should be noted that Aluminium ladders are preferred to wooden ladders.

2.49 General Machinery

The Contractor shall comply with the Driven Machinery Regulations, which include inspecting machinery regularly, appointing a competent person to inspect and ensure maintenance, issuing PPE or clothing and training those that use machinery and enforce compliance.



2.50 Portable Electrical Tools

The Contractor shall ensure that use and storage of all explosive actuating fastening devices and portable electrical tools are in compliance with relevant legislation.

The Contractor shall consider that:

- A competent person undertakes routine inspections;
- Only authorised persons use the tools;
- There are safe working procedures applied;
- Awareness training is carried out and compliance is enforced at all times; and
- PPE and clothing is provided and maintained.

2.51 High Voltage Electrical Equipment

The Contractor shall ensure that, where the work is under, on or near high-voltage electrical equipment the Electrical Installation Regulations, together with safety instructions (Regulations of the Owner of the Equipment) are complied with. Such equipment includes:

- Eskom and the Local Authority equipment
- The Contractor's own power supply; and
- Electrical equipment being installed but not yet taken over from a Contractor by The Client.

2.52 Public Health and Safety

The Contractor shall ensure that each person working on or visiting a site, and the surrounding community, shall be made aware of the dangers likely to arise from on site activities and the precautions to be observed to avoid or minimize those dangers. Appropriate health and safety signage shall be posted at all times.

In the interests of public safety, The Principal Contractor shall ensure that all persons who may be affected by the work being conducted on site are informed and kept aware of the dangers, which may arise from the work being conducted on site. This awareness shall be in the form of posters and inductions for visitors on site and warning signs.

The Principal Contractor shall ensure that a copy of the Public Liability insurance is available prior the commencement of the project and is kept in a safety file at all times

2.53 Night Work

The Contractor shall not undertake any night work without prior arrangement and a written permit from the Client. The Contractor shall ensure that adequate lighting is provided for all night work and failure to do so shall result in work being stopped.

2.54 Environmental Conditions and Flora and Fauna

The Contractor must be mindful of adverse weather conditions upon the health and safety of the workforce. This includes inclement weather, strong wind, heat stress, extreme cold, etc. The Contractor's risk assessment process must take into account the risks associated with such weather conditions. The same is true when working in an environment where there is a risk to employees' health and safety from presence of poisonous flora, or wildlife (including bees, snakes, etc). The Contractor's risk assessment process must take these risks into account.

2.54.1 THERMAL REQUIREMENTS

Subjects to the provisions of Environmental Regulations for Workplaces, no employer shall permit an employee to work in an environment in which the time-weighted average dry-bulb temperature taken over a period of 4 hours is < 6 degrees Celsius, unless the employer takes reasonable measures to protect such



employee against the cold and further takes all precautions necessary for the safety of such employee. No employer shall require or permit an employee to work in a refrigerated environment in which the actual dry-bulb temperature is below 0 degrees Celsius unless the maximum exposure limit is observed and an appropriate PPE is provided to the employees.

2.54.1.1 Heat-stress

This program targets employees working in conditions where:

- The measured WBGT- Wet Bulb Globe Temperature index exceeds 30 in 1 hour (as per the heat stress monitor).
- WBGT is a number which characterizes the thermal conditions in the environment calculated from wet bulb, globe and a dry-bulb thermometer.

2.54.1.2 Allowance for heat stress (work-rest cycles)

The heat stress measurements must take place between 09:00 am and 15:00 pm and where the WBGT index exceeds 30, a 15 minutes break should be taken per hour.

First hour:

09:00 to 10:00 – runs concurrently with the official tea break of between 10:00-10:15 therefore no allowance would be granted.

Second hour:

10:00 to 11:00 = 60 minutes worked therefore 15 minutes break to be taken from 11:00-11:15

Third hour

11:00 to 12:00= 60 minutes worked therefore 15 minutes break to be taken from 13:30-13:45

Fourth hour

12:00 to 13:00 where the hour coincides with official lunch period no allowance would be granted, e.g. Official lunch period is 12:00 – 12:30 therefore no allowance would be granted.

Fifth hour

14:00 to 15:00 = 60 minutes worked therefore 15 minutes break to be taken from 15:00 to 15:15
Therefore the total allowance to be granted in a day is 45 minutes. Permission to grant rest allowances must be authorized by the person in charge. NB: Where the WBGT index exceeds 30 degrees Celsius employees must be encouraged to drink at least 600ml of water and rest in a shady area during the 15 minutes allowed.

2.55 Occupational Health

Exposure of workers to occupational health hazards and risks are very common in any work environment, especially in construction. Occupational health hazards and risks exposure is a major problem and all Contractors are to ensure that proper health and hygiene measures are put in place to prevent exposure to these hazards and risks.

The occupational hazards and risks may enter the body in three ways:

- Inhalation through breathing e.g. cement dust;
- Ingestion through swallowing maybe through food intake;
- Absorption through the skin (pores) e.g. painting or use of thinners.

The contractor is required to ensure that all his personnel are medically fit prior to being allowed onto the work site.



All Contractors should ensure that Occupational Hygiene surveys are conducted as per the Occupational Health and Safety Act to ensure employees are not exposed to hazards. Risk Assessments should identify areas where surveys are to be conducted.

2.56 *Suspended Platforms*

A contractor must appoint a competent person in writing who must ensure that all suspended platforms work operations are carried out under his or her supervision and that all suspended platform erectors, operators and inspectors are competent to carry out their work.

No contractor may use or permit the use of a suspended platform, unless-

- the design, stability and construction thereof comply with the safety standards incorporated for this purpose into these Regulations under section 44 of the Act;
- he or she is in possession of a certificate of system design issued by a professional engineer, certificated engineer or a professional technologist for the use of the suspended platform system; and
- he or she is, before the commencement of the work, in possession of an operational compliance plan developed by a competent person based on the certificate of system design contemplated above and applicable to the environment in which the system is being used, which operational compliance plan must include proof of the-
 - appointment of the competent person;
 - competency of erectors, operators and inspectors;
 - operational design calculations, which must comply with the requirements of the system design certificate;
 - performance test results;
 - sketches indicating the completed system with the operational loading capacity of the platform;
 - procedures for and records of inspections having been carried out; and
 - procedures for and records of maintenance work having been carried out.

A contractor making use of a suspended platform system must submit a copy of the certificate of system design, including a copy of the operational design calculations, sketches and test results, to the provincial director before commencement of the use of the system and must further indicate the intended type of work that the system will be used for.

A contractor must submit a copy of the certificate of system design as per regulations for every new project.

A contractor must ensure that the outriggers of each suspended platform-

- are constructed of material of adequate strength and have a safety factor of at least four in relation to the load it is to carry; and
- have suspension points provided with stop devices or other effective devices at the outer ends to prevent the displacement of ropes.

A contractor must ensure that-

- the parts of the building or structure on which the outriggers of a suspended platform are supported, are checked by means of calculations to ensure that the required safety factor is adhered to without risk of damage to the building or structure;
- the suspension wire rope and the safety wire rope are separately connected to the outrigger;
- each person on a suspended platform is provided with and wears a body harness as a fall prevention device, which must at all times be attached to the suspended platform;
- the hand or power driven machinery to be used for the lifting or lowering of the working platform of a suspended platform is constructed and maintained in such a manner that an uncontrolled movement of the working platform cannot occur;
- the machinery referred to above is so situated that it is easily accessible for inspection;



- the rope connections to the outriggers are vertically above the connections to the working platform; and
- when the working platform is suspended by two ropes only, the connections of the ropes to the working platform are of a height above the level of the working platform to ensure the stability of the working platform.

A contractor must ensure that a suspended platform-

- is suspended as near as possible to the structure to which work is being done to prevent as far as is reasonably practicable horizontal movement away from the face of the structure;
- is fitted with anchorage points to which workers must attach the lanyard of the safety harness worn and used by the worker, and such anchorage connections must have sufficient strength to withstand any potential load applied to it; and
- is fitted with a conspicuous notice easily understandable by all workers working with the suspended platform, showing-
 - the maximum mass load;
 - the maximum number of persons; and
 - the maximum total mass load, including load and persons, which the suspended platform can carry.

A contractor must cause-

- the whole installation and all working parts of a suspended platform to be thoroughly examined by a competent person in accordance with manufacturer's specification;
- the whole installation to be subjected to a performance test as determined by the standard to which the suspended platform was manufactured;
- the performance test contemplated above to be done by a competent person appointed in writing, with the knowledge and experience of erection and maintenance of suspended platforms or similar machinery, and who must determine the serviceability of the structures, ropes, machinery and safety devices before they are used, every time suspended platforms are erected; and
- the performance test contemplated above of the whole installation of the suspended platform to be subjected to a load equal to that prescribed by the manufacturer or, in the absence of such load, to a load of 110% of the rated mass load, at intervals not exceeding 12 months and in such a manner that every part of the installation is stressed accordingly.

A contractor must cause every hoisting rope, hook or other load-attaching device which forms part of the suspended platform to be thoroughly examined in accordance with the manufacturer's specification by the competent person before they are used every time they are assembled, and, in cases of continuous use, at intervals not exceeding three months.

A contractor must ensure that the suspended platform supervisor or the suspended platform inspector carries out a daily inspection of all the equipment prior to use, including establishing whether –

- all connection bolts are secure;
- all safety devices are functioning;
- all safety devices are not tampered with or vandalized;
- the total maximum mass load of the platform is not exceeded;
- the occupants in the suspended platform are using body harnesses which have been properly attached;
- there are no visible signs of damage to the equipment; and
- all reported operating problems have been attended to.

A contractor must ensure that all inspection and performance test records are kept on the construction site at all times and made available to an inspector, the Client, the Client's Safety Agent or any employee upon request.

A contractor must ensure that all employees required to work or to be supported on a suspended platform are –



- medically fit to work safely in a fall risk position or such similar environment by being in possession of a medical certificate of fitness;
- competent in conducting work related to suspended platforms safely;
- trained or received training, which includes at least-
 - how to access and egress the suspended platform safely;
 - how to correctly operate the controls and safety devices of the equipment;
 - information on the dangers related to the misuse of safety devices; and
 - information on the procedures to be followed in the case of-
 - an emergency;
 - the malfunctioning of equipment; and
 - the discovery of a suspected defect in the equipment; and
 - instructions on the proper use of body harnesses.

A contractor must ensure that where the outriggers of a suspended platform are to be moved, only persons trained and under the supervision of the competent person effect such move, within the limitation stipulated in the operational compliance plan, and that the supervisor must carry out an inspection and record the result thereof prior to re-use of the suspended platform.

A contractor must ensure that the suspended platform is properly isolated after use at the end of each working day in such a manner that no part of the suspended platform presents a danger to any person thereafter.

2.57 Material Hoists

A contractor must ensure that every material hoist and its tower have been constructed in accordance with the generally accepted technical standards and are strong enough and free from defects.

A contractor must ensure that the tower of every material hoist is —

- erected on firm foundations and secured to the structure or braced by steel wire guy ropes, and extends to a distance above the highest landing to allow a clear and unobstructed space of at least 900 mm for over travel;
- enclosed on all sides at the bottom, and at all floors where persons are at risk of being struck by moving parts of the hoist, except on the side or sides giving access to the material hoist, with walls or other effective means to a height of at least 2100 mm from the ground or floor level; and
- provided with a door or gate at least 2100mm in height at each landing, and that door or gate must be kept closed except when the platform is at rest at such a landing.

A contractor must cause-

- the platform of every material hoist to be designed in a manner that it safely contains the loads being conveyed and that the combined mass 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 by any external cause to the portion of the hoisting rope between the winch and the tower of the hoist; and
- every material hoist to be provided with an efficient brake capable of holding the platform with its maximum load in any position when power is not being supplied to the hoisting machinery.

No contractor may require or permit trucks, barrows or material to be conveyed on the platform of a material hoist and no person may so convey trucks, barrows or material unless those articles are secured or contained in a manner that displacement thereof cannot take place during movement.

A contractor must cause a notice, indicating the maximum mass 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 may not require or permit any person to operate a hoist, unless the person is competent in the operation of that hoist.

No contractor may require or permit any person to ride on a material hoist.

A contractor must ensure that every material hoist-

- is inspected on daily basis by a competent person appointed in writing by the contractor and such competent person must have the experience pertaining to the erection and maintenance of material hoists or similar machinery;
- inspection contemplated above, includes 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 are entered and signed in a record book by a competent person, which book must be kept on the premises for that purpose;
- is properly maintained and the maintenance records in this regard are kept on site.

2.58 Explosive Actuated Fastening Device

No contractor may use or permit any person to use an explosive actuated fastening device, unless-

- the user is provided with and uses suitable protective equipment;
- the user is trained in the operation, maintenance and use of such a device
- the explosive actuated fastening device is provided with a protective guard around the muzzle end, which effectively confines any flying fragments or particles; and
- the firing mechanism is so designed that the explosive actuated fastening device, will not function unless-
 - it is held against the surface with a force of at least twice its weight; and
 - the angle of inclination of the barrel to the work surface is not more than 15 degrees from a right angle.

A contractor must ensure that-

- only cartridges suited for the relevant explosive actuated fastening device, and the work to be performed, are used;
- an explosive actuated fastening device is cleaned and examined daily before use and as often as may be necessary for its safe operation by a competent person who has been appointed for that purpose;
- the safety devices of an explosive actuated fastening device are in good working order prior to use;
- when not in use, an explosive actuated fastening device and its cartridges are locked up in a safe place, which is inaccessible to unauthorized persons;
- an explosive actuated fastening device is not stored in a loaded condition;
- a warning notice is displayed in a conspicuous manner in the immediate vicinity wherever an explosive actuated fastening device is used; and
- the issuing and collection of cartridges and nails or studs of an explosive actuated fastening device are-
 - controlled and done in writing by a person having been appointed in writing for that purpose; and
 - recorded in a register by a competent person and that the recipient has accordingly signed for the receipt thereof as well as the returning of any spent and unspent cartridges.

2.59 Confined Spaces



Confined space work must be closely monitored by a competent person appointed by the contractor, to include, but not restricted to, ensuring that the confined space is sufficiently ventilated prior to entry. Oxygen levels to be tested in confined space to ensure that it is safe for entry. Permit system to be in place to declare confined space safe for entry. PPE must be worn (such as proper masks) if air supply is insufficient or not of sufficient quality.

Sufficient training must take place in use of all confined space monitoring and access equipment prior to any works commencing in such confined space. It is strongly recommended that a tripod and winch system be in place to afford easy access and egress and for emergency evacuation from the confined space (manholes and chambers). Please also refer to GSR5 on safety requirements for Work in Confined Spaces.

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Both the Client and the Contractor have a duty in terms of health and safety legislation to do all that is reasonably practicable to make members of the public and others being affected by the construction processes aware of possible risks and put preventative measures in place to mitigate the risks. The public and/or visitors shall go through a brief health and safety induction detailing hazards and risks they may be exposed to and what measures are in place to control these hazards and risks.



OTHER HEALTH AND SAFETY SPECIFICATION REQUIREMENTS

The contractor must be aware of the following additional requirements:

What	When	Output
Awareness training (Toolbox Talks)	At least fortnightly and before hazardous work is carried out	Attendance Register
Health and Safety Committee Meetings	Monthly	Minutes signed by the employer (Contractor) covering: a) Health and Safety Representative Checklist
Health and Safety Reports	Monthly	Report covering: a) Incidents/Accidents and Investigations b) Non-conformance c) Health and Safety Training d) HIRA Updates e) Internal and External Audits
General Inspections	As per Health and Safety Specification and OHSA	Report on Health and Safety Specification and OHSA compliance: a) Scaffolding b) Lifting Machinery c) Excavation
General Inspections	Monthly	Covering: a) Fire fighting Equipment b) Portable Electrical Equipment c) Ladders
Record keeping	Ongoing	Covering: a) General complaints b) Fines c) General incidents d) MSDS e) Surveillance Medicals f) Inspection Register g) Dept of Labour Notices
Permits	Before commencement with certain activities	As stipulated by the Health and Safety Specification and the OHSA / Construction Regulations

Key:

OHSA – Occupational Health and Safety Act, 1993



ANNEXURE A

The Contractor shall submit the info below in an Annexure 2 prior to construction commencement.

Item No.	Health and Safety Specification Requirement	OHSA Requirement	Submission date
1.	Notification of Intention to Commence Construction	Construction Regulations 2014	At least 7 days before commencement on site
2.	Construction Work Permit	Construction Regulations 2014 (only with certain size and duration projects)	At least 30 days prior to project commencement
3.	Assignment of Responsible Person to Manage Building Work via Health and Safety Organogram	Construction Regulations 2014	Before commencement on site
4.	Competency for Health and Safety Positions	Client / Safety Agent requirement	Before commencement on site
5.	Compensation of Occupational Injuries and Diseases Act (COIDA) 130 of 1993	COIDA Requirement	Before commencement on site
6.	Occupational Health and Safety Policy	Client / Safety Agent requirement	Before commencement on site
7.	Risk Assessment, Safety Plan and Fall Protection Plan, Demolition Method Statement	Client / Safety Agent requirement	Before construction work commences



ANNEXURE B - The contractor shall make the following appointments, as required:
Chief Executive Officer (OSHACT 16(1))
Contract Director/Manager (OSHACT 16(2))
Construction Manager (CR 8(1))
Construction Supervisor (CR 8(7))
Assistant Construction Supervisor (CR 8(8))
Construction Safety Officer (CR 8(5))
Traffic Safety Officer
Safety Representative (where > 20 employees on site)
Temporary work Designer (CR 12(1))
Temporary work Supervisor (CR12(2))
Construction risk assessor (CR 9(1))
Excavation Supervisor (CR13(1)(a))
Demolition Supervisor (CR14(1))
Scaffold Supervisor (CR16(1))
Suspended Platform Supervisor (CR17(1))
Material Hoist Inspector (CR19(8)(a))
Material Hoist Operator (CR19(6))
Bulk Mixing Plant Supervisor (CR20(1))
Bulk Mixing Plant Operator (CR20(2))
Controller of Explosive Actuated Fastening Devices Nails, Cartridges or Studs Issue and Collection (CR21(2)(g)(1))
Construction Vehicle and Mobile Plant Operator (CR23(1)(d)(i))
Controller of Temporary Electrical Installations (CR24(c))
Stacking Supervisor (CR28(a))
Fire Extinguishing Equipment Inspector (CR29(h))
Fall Protection Plan Developer (CR 10(1)(a))
Incident Investigator (OSHACT 9(2))
Competent Person – Confined Spaces (GAR 5(1))



BASELINE RISK ASSESSMENT FOR PROJECT

Irrespective of the risk presented on site, it will be ensured that sufficient supervision is in place on site, that personnel are trained in accordance with legislation, including the requirement for site specific inductions on site to inform personnel on site of the risks and hazards applicable to the site. Site supervision is responsible for ensuring that the control measures required below are implemented on site.

	HAZARD	RISK	MINIMUM CONTROL MEASURES
1.	Bricklaying	Caustic contamination with mortar Contact with sharp bladed tools	- Use only trained personnel - Safe means of access to be provided - Safe/Suitable working platform required where working at height - PPE for mortar to include gloves where practicable and goggles/ masks where there is a risk of contamination
2.	Brushcutting	Injury from contact with blade/nylon Fire (where petrol used) Electrocution (where electrical tool used)	- Person using brushcutter must be trained and competent - Use personal protective equipment (PPE) such as goggles, safety boots, ear protection, gloves, hard hat - Brushcutter must be in good condition and maintained - Adequate supervision on site at all times. - No smoking when refuelling, fire extinguisher to be on hand (where petrol used as fuel source)
3.	Chainsaw Use	Falling tree or branches causing injury to persons Incorrect use of chainsaw causing injury	- Person using chainsaw must be trained and competent - Use personal protective equipment (PPE) such as goggles, safety boots, ear protection, gloves, hard hat, chainsaw trousers and jacket - Chainsaw must be in good condition including guards. - Clear area below area of chainsaw use and where tree felling. - When using chainsaw at height practice safety procedures.
4.	Compacting and Filling	Contact with tipping materials Contact with moving plant Vehicles/personnel falling into excavations Contact with underground services	- Trained banksman to control vehicles movement - Only trained personnel use plant - Personal Protective Equipment to be worn - Personnel to stand clear as materials are being tipped - Use stop blocks and signs to warn vehicles of excavations, where applicable - Stand clear of plant whilst materials are being compacted - Establish position of underground services and protect services from damage
5.	Compactor Operations	Crushing of feet	- Only trained and competent personnel to use the machine - Ensure operative wears steel toe cap shoes or boots at all times
6.	Concrete Pumping	Sprains and strains Hit by pump Concrete burns Collapse/bursting of structure	- Personnel to be in clear vision of pump operator - Trained pump operator - Personnel working with the concrete to wear the appropriate personal protective equipment to protect against cement burns - Design of structure being loaded to be approved by competent designer and inspected before, during and after loading - Pump to be well maintained
7.	Confined Spaces	Suffocation Fumes	- Ensure that confined space is sufficiently ventilated - Wear personal protective equipment such as proper masks if air supply insufficient or not of sufficient quality - Test oxygen levels in confined space to ensure that is safe for entry - Ensure that emergency procedures in place



8.	Crusher Operation	Dust Noise Flying particles Contact with machinery/equipment Contact with substance being crushed	- Only trained and competent personnel to use the equipment - Appropriate protective equipment must be worn, including eye, ear, respiratory and head protection at all times. Dust suppression measures to be employed. - Crusher must be fitted with guards to prevent unauthorised access. - All access ways must be fitted with adequate guard rails to reduce chance of injury from falls from height. - No person to enter dump hopper to release blockage unless feeder mechanism is stopped and isolated. Another person to be in attendance to ensure tipping does not take place. Control of crusher is duty of crusher attendant and only that person can give dump signal.
9.	Cutting Kerbs	Saw slipping, Blade disintegrating, Noise and dust	- Only trained operators to use saw and change blades. - Personal Protective Equipment must be worn. Gloves, goggles, dust mask and hearing protection. - People to be kept away from the work area. - Work to cease if people have to pass. - Sparks, etc. to be directed away from people and any flammable material.
10.	Cutting Off Disc	Noise Cuts from machine Fire (particularly at refuelling) Flying debris Blade shattering Contamination by fume created or exhaust fume	- Use competent personnel. - Hot works control- fire extinguisher, fire watchman. (Permit may be required) - PPE to include gloves, eye protection, hearing protection - Solid working position. - Clear working area - Correct grade of blade must be used. - Good ventilation to be provided (forced if necessary). - Changing of wheels to be by competent persons only - Cut off discs must not be used for grinding (grinding disc thicker) - Bystanders to wear hearing protection, as applicable
11.	Electrical Commissioning	Electric shock	- Personnel to comply with permits to work issued by Client - Personal protective equipment to be worn by employees to prevent electric shock - First aid treatment to be readily available - Only competent and trained persons may decommission or commission electrical equipment
12.	Electric Tools and Electrical Installations	Electric shock Fire	- Electric tools and installations to be in good condition - Inspect electric tools before use - Do not use electric tools in wet/damp conditions - Use personal protective equipment such as insulated gloves - Electrical installations register to be maintained, inspected by competent person
13.	Excavations (Working in and around)	Toxic fumes Collapse of trench walls/trapping Falling into excavation Collapse of adjacent structures	- Deep excavations / monitor air for toxic fumes - Prevent collapse by battering back sides to a safe angle or install temporary support - Protect vehicles from falling into excavations – provide barriers, signage, etc. as necessary - Beware of undermining of other structures (e.g. buildings, scaffolds) - Record excavation inspections by competent person on daily basis - Provide suitable means of access/egress in case of emergency. - Excavations formed by explosives must be accompanied by method statement approved by Client



14.	Explosive Actuated Fastening Devices	Noise Being struck by cartridge or fixing	- Operators to be trained, competent and wear appropriate protective equipment, e.g. goggles, gloves, ear defenders, head protection. - Cartridge gun to be in good condition, inspected for damage and faults regularly and results entered into register - Used and unused cartridges and cartridge gun should be kept in secure place when not in use, maintain register for return and issue.
15.	Explosive use	Injuries to personnel, passers-by by blast Property damage	- Blaster must have all relevant permits, permissions and licences in place before blasting. - Method statement must be approved. - Maintain exclusion zone around perimeter of blasting, warn persons away, erect warning signage and barriers. - Obtain permission from local authority and police. - Blaster must be competent in blasting - Ensure that blasting does not affect stability of adjacent structures/buildings
16.	Fire	Injuries to workers, pedestrians, residents, road users, damage to property through fire	- No littering on site which could become fire hazard, maintain site in clean condition. - No fires to be lit on site. Have a working fire extinguisher at hand at all times. - No smoking or naked flame near flammable substances or in unauthorised areas - Ensure proper storage/use of Petrol/diesel/flammable substances – post warning notices
17.	Flammable Liquids and Gases (Use of)	Fire Explosion	- No littering on site which could become fire hazard, maintain site in clean condition. - Have a working fire extinguisher at hand at all times. - No smoking or naked flame near flammable substances or in unauthorised areas - Ensure proper storage/use of Petrol/diesel/flammable substances – post warning notices - Equipment must be in good condition, maintained - Personnel using substances must be trained in safe use and risks
18.	Fragile Materials	Persons or items falling through fragile materials	- All fragile materials to be identified and protected prior to work commencing. - Protection to include either covering the fragile materials or excluding activity. - Any coverings to be secured in place - The location of the fragile materials to be indicated by signage
19.	Hand tools	Injuries caused by use of hand tool Impact with the tool Falls due to access problems Contamination with substance being worked	- Ensure: - Tool is correct for job - Tool is in good order and suitably sharp - Personnel must be competent/instructed in tool usage and tool safely - Lighting is sufficient - Access is safe, working platform is secure, leading edge is guarded - Operative is wearing all necessary PPE
20.	Hazardous Substances	Injuries to workers through use of hazardous substances, e.g. injuries to eyes, skin, etc.	- Use substances in accordance with data sheet, particularly reference protective clothing required (example: gloves, goggles, etc.) - Know what First Aid measures are - Have welfare facilities available for washing of hands, etc.
21.	Hot Works	Burns to eyes or other parts of the body	- Personal Protective Equipment to include eye, skin and hearing protection - Respirator maybe be required where cutting galvanized steel or anywhere else toxic fumes and gases arise. Dust can also be a problem and forced ventilation may be required.



22.	Kerb Laying	Nips at joints Crushing by kerbs Caustic burns	• Impervious gloves and barrier cream to be used to protect hands. • Personnel should be aware of safe manual handling techniques when handling kerbs.
23.	Lead – working with; removal of tiles	Toxic effects from exposure to lead and its compounds Risk of inhalation, ingestion and absorption Personnel falling from Height Debris falling from height	• Demarcation of the workplace; • Restriction of entry by unauthorised persons • Restriction of substances that can release airborne lead to certain areas. • Limit number of workers exposed to lead • Regular cleaning of workplaces and equipment • All employees who are exposed to lead must be provided with suitable and adequate protective clothing and respirators where applicable • Lead is to be packed in impermeable containers that are tightly sealed and clearly marked for removal • The need for medical surveillance and the nature thereof is to be based on both the risk assessment and air monitoring results and safety legislation.
24.	Lifting Operations	Falling material Crushing by materials Hand injuries to the slinger Toppling crane	• Check test certificate • Check examination certificate • Check inspection have been carried out • Check certificates for lifting equipment (chains, slings, shackles, etc.) • Ensure lifting gear is rated to carry load (SWL) • Ensure materials being lifted are properly packaged and slung. • Be aware that there should be a minimum clearance of 600mm between any slewing parts of a crane and any fixed installation to prevent being trapped. • Access to the work area during lifting operations is to be restricted to those involved with and trained in the work in hand. Do not allow members of the public to gain access to the area. • Only trained banksmen to be used. • The crane driver and the banksman are to ensure that the signals given are clearly understood.
25.	Manhole Rings and Pipes Storage	Rolling of rings Collapse of pipes Crushing of persons Stock pile collapse	• Manhole rings must be stored flat to prevent them being rolled. • Banks of pipe stock piles are not to be broken until they are ready for use. • Personnel must stand to the side when breaking bands so as not to be hit by falling pipes. • Pipes must be wedged to prevent rolling
26.	Manual Handling of General Items	Muscular skeletal injuries if the load is too heavy or awkward Operative falling/ tripping Contamination from the substance being carried Fall of material being carried	• Personnel should be aware of safe manual handling techniques • Personnel to wear Personal Protective Equipment when carrying items, e.g. safety footwear and gloves. • Ensure good housekeeping against tripping/fall hazards. • Operative to get assistance if load too heavy- team lift if necessary. • Utilise mechanical lifting and carrying aids where possible. • Personnel to ensure access equipment, ladders will take weight of operative and load being carried. • Personnel to ensure item being carried is properly bonded or is not be liable to break apart whilst being manually handled.
27.	Material Hoist	Mechanical failure Overloading Hoist gateway being left open at landings	• Safe working limit to be indicated on hoist. • Hoist operator to be trained/ competent. • Regular maintenance and inspection of hoist by competent person • Records of maintenance and inspection to be maintained. • Hoist gate should be fitted with mechanical and electrical interlocking devices.



28.	Night Work	Security Lighting	- The Contractor shall not undertake any night work without prior arrangement and a written permit from the Client. - The Contractor shall ensure that adequate lighting is provided for all night work and failure to do so shall result in work being stopped.
29.	Noise and Dust	Breathing in dust can cause long term health problems, noise can damage hearing	- Wear respiratory and hearing protection - Dampen down and minimise dust where possible.
30.	Overhead Services (Working near)	Contact with live services causing injury to personnel Damage caused to services	- Maintain safe clearance levels - Establish presence of any services via proper walk through survey of site and/or means of service drawings - Wear personal protective clothing - Ensure height of plant/vehicles does not compromise or exceed clearance levels for overhead services - Obtain information on clearance levels from service provider
31.	Painting	Contact with paint	- Refer to safety data sheet for usage instructions, hazards and precautions required. - When working at height, refer to risk assessment addressing this hazard below.
32.	Paving (Laying)	Impact injuries from tile / mallet Caustic burns Sore knees Cuts from cutter	- Impervious gloves to be worn/ barrier cream to be used - Kneelers or similar to be available - Personal protective equipment to be worn – for example if saw used to cut pavers
33.	Plant or Vehicles and Equipment Operation	Workers injured by passing traffic Road users and pedestrians at risk from plant operation Noise	- Implement traffic protection measures - Trained and competent operators must be used - Check plant and vehicles on daily basis before use and record inspections. Maintain vehicles in safe condition. - Medical certificates of fitness required for construction plant. - Crossing of road by construction vehicles or machines must be limited to the practical minimum - Plant and vehicles must be fitted with amber rotating beacons and reverse alarms. - Wear appropriate protective clothing/equipment, e.g. goggles, gloves, ear defenders, etc. as appropriate.
34.	Plastering	Falling materials Fall from height Contact with materials	- Ensure standard safety procedures are followed - Ensure there is a safe working area - Ensure safe access and egress - Ensure competent personnel are used
35.	Plumbing	Falling material Falling from height Fire Burns Exposure to lead fumes	- Ensure standard safety procedures are followed at all times - Only use trained and competent personnel - Ensure there is a safe working area at all times - Ensure materials are stored neatly - Ensure there is safe access and egress at all times - Ensure all personnel wear suitable and sufficient personal protective equipment - Consider a hot works permit system prior to commencing any hot works - Make sure emergency procedures are in place and ensure all personnel are aware of where to go in case of a fire
36.	Precast Slab / Unit Laying and Fixing	Falls Falling materials Manual Handling	- Emergency procedures in place and personnel explained details - Use competent personnel - Ensure suitable and sufficient access and egress is provided - Safe place of work must be provided - Ensure all personnel wear correct personal protective equipment - Exclusion zone may be required for protection against risk of falling objects



37.	Working next to Railway line/in Railway reserve	Risk of being struck by train Damage to track or Railway property by works	Specific advice to be sought from safety advisor
38.	Road Construction	Risk of being struck by vehicles	- Ensure traffic management measures in place - No construction activities to commence until adequate provision made to accommodate traffic in accordance with the South African Traffic Signs Manual. - Wear reflective waistcoats when working on or near the road or road shoulder as well as any other required personal protective clothing. - Crossing of road by personnel must be limited to the practical minimum - Use of fencing or other barriers as appropriate
39.	Road Marking	Contact with moving vehicles Fire	- Ensure suitable and sufficient road signs are erected, as applicable - Possible road or lane closure may be required – traffic management may be required - Fire Extinguisher to be situated in a suitable area, use dry powder or foam
40.	Road Working – working in or next to road	Injury to workers caused by passing traffic Injury to road users and pedestrians by works	- Flagmen to be used where interface with construction plant with passers-by or where hazard posed by delivery vehicles turning into/out of site. - Traffic management plan to be approved by Municipality and, if necessary, traffic department - No construction activities to commence until adequate provision made to accommodate traffic in accordance with the South African Traffic Signs Manual. - Use safety signage to warn traffic and pedestrians of construction works - Where existing walk ways/pavements affected by works, must direct pedestrian traffic away to safe walking area. - Wear reflective waistcoats when working on or near the road or road shoulder as well as any other required personal protective clothing. - Crossing of road by personnel must be limited to the practical minimum - Use of fencing or other barriers as appropriate
41.	Rope access	Personnel falling from height Falling debris Those beneath being injured	Ensure: - competent person appointed in writing to supervise all rope access work on the site, - compliance to Construction Regulations 2014, particularly regulation 18 and 10; - ensure all rope access work is carried out under supervision of a competent person; - all rope access operators are competent and licensed to carry out their work. - the design, selection and use of the equipment and anchors comply with the safety standards incorporated for this purpose into these Regulations under section 44 of the Act - Site specific fall protection plan has been developed by a competent person applicable to the specific work and environment prior to the commencement of the work, including records of maintenance and inspections of all the equipment used for the work operations. - adequate measures are in place to allow rescue procedures to commence immediately in the event of a fall incident taking place.
42.	Scaffold Erection/ Dismantling	Personnel falling from a height Items of scaffold falling onto personnel Scaffold collapsing onto those below	- Ensure - scaffold is designed to take the imposed loads - scaffolding is constructed properly - scaffold is not overloaded - scaffolders are fully trained



			- scaffolding is regularly checked by competent person and record of inspection retained. Written inspections to be recorded on weekly basis - scaffolders must adhere to the safe systems of work. - all fall arrest equipment to be checked and certified in good working order - that ALL understand the safe system of work
43.	Shuttering Walls, Beams, Columns	Falling from height Falling materials from height Cuts and abrasions from splinters and nails	- Ensure all personnel wear the appropriate Personal Protective Equipment - Ensure at all times there is a safe working platform - Use only trained and competent personnel - If electrical tools are being used ensure they have been tested and safe to use - Ensure timber is de-nailed after use - Ensure safety standards are followed at all times - Ensure there is a safe means of access and egress at all times
44.	Site Strip	Overturning Vehicles	- Follow standard safety procedures - Only use trained and competent personnel - Ensure there is a suitable and safe means of access and egress - Ensure banksman used when required - Ensure all personnel wear suitable reflector vests as required
45.	Snakes	Snake bite	- Qualified first aider required for site who can treat snakebite - Snake bite kit to be on hand - Check area before working - Find out nearest hospital and get emergency telephone numbers.
46.	Steel Erection	Falls from height Falling components Contact injuries from falling lifting equipment	- Adhere to all general precautions for working at height (See risk assessment below) - Barrier off / exclude area below work - All lifting appliances to be examined and inspected - Inspection register in place and up to date - All personnel to be trained and competent and wear clipped on safety harnessed when working at height - Ensure that lifting equipment (slings, chains, shackles) test certificates are current and on site. - Competent persons only to connect loads and direct plant
47.	Steel Fixing	Back injuries caused by manual handling Eye injuries from tie wire Trips / falls Falling form height	- PPE must include safety boots and goggles - Manual handling training may be required - Care to be taken when working near over head lines - Use only trained personnel - Provide safe means of access - Maintain and regularly inspect all lifting appliances and equipment - Cap starter bars to prevent injuries where feasible - Construct scaffold walk ways to cross reinforcing mesh, as required
48.	Street Lighting	Contact with vehicles Electrical Shock Collapse of columns	- Ensure competent personnel are used - Area to be kept clear – keep unauthorised persons away - Plant and lifting equipment to be maintained as per risk assessments above - Electrical connections to be done by qualified personnel only
49.	Temporary Works – shoring, scaffold, falsework, formwork	Collapse of form work	- Wear personal protective equipment such as gloves and goggles - Formwork must be built by trained person and also be inspected by competent person and results entered into register on site



50.	Tower (Mobile Aluminium Tower) Scaffold	Over Turning Falls	• Tower to be on firm level ground with wheels or feet properly supported. • Height not to exceed 3 times the base dimension. i.e. 2x3m Base Tower not exceed 6m. • Erection by competent person • Inspection before first use • Weekly record of inspection required • Guard rails and Toe boards as per normal scaffolds • Beware when moving of overhead obstructions, such as power lines • Never move in strong winds
51.	Underground Services	Striking of buried services	• Make all necessary enquiries to establish what services are in the area. Consult drawings and advice from service provider (e.g. Municipality or ESKOM) when planning work. • Assume all service to be live (Unless confirmation is received to confirm that services are isolated or otherwise made safe). Do not work near live services without authorisation from site management. • Comply with the requirements of the safe system of work for underground services. • Where available, locate services with a locator • Hand dig around services
52.	Working at Height	Personnel falling from height Falling debris Those beneath being injured	• All access equipment is properly constructed (inspections record must be maintained) • Only trained personnel construct, dismantle or control the access equipment • All access equipment must have full toe boards and guardrails - comply with SANS 10085 on erection, use and dismantling of scaffolding • No access equipment may be loaded above the level of the guardrail • No access equipment to be loaded above its safe working load • Where work involves leaning out on an open leading edge, then all personnel are to be fitted with full body harness. The harness must be connected at all times • All fall arrest equipment to be correctly maintained • Ensure if ladders are being used for access, they are either footed or tied. Also the ladder must be set at the correct level of 1 in 4 or approximately 75°
53.	Work over or next to Water	Drowning	• Evaluate depth of water, height above water that work takes place, whether workers can swim or not and then determine safety precautions required: these may include such measures such as barriers, signage, life belts, safety harnesses, etc. • When working on river/harbour/dam edge - erect life saving devices and barriers to protect workers and vehicles (stop blocks may also be required). Only trained and competent persons to be used.
54.	Working with Effluent	Contact with effluent causing sickness or disease	• ensure good hygiene facilities • personnel to be competent in work activity • personnel to wear appropriate personal protective equipment such as goggles, overall, gloves and goggles
55.	Include any other risks not included in above into this section		



ISSUE REGISTER

Date of Original Safety Specification Compilation	Compiled By	Issue Date	Revision Date

Acknowledgement:

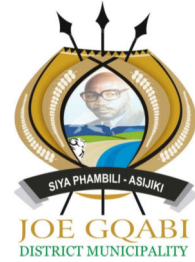
I, _____ representing
_____(Contractor), have satisfied myself with the content of this Health and Safety Specification and shall ensure that our employees and contractors on site comply with the requirements of this document, our safety documentation and health and safety legislation.

Signature of Contractor

Date

Comments:

C3.7.5 Environmental Management Programme



ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE CONSTRUCTION OF THE PROPOSED MACLEAR WTW AND ASSOCIATED PIPELINE AND RESERVOIRS, MACLEAR, EASTERN CAPE

ORIGINAL

12 November 2018

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ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE CONSTRUCTION OF THE PROPOSED MACLEAR WTW AND ASSOCIATED PIPELINE AND RESERVOIRS, MACLEAR, EASTERN CAPE

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GLOSSARY OF TERMS, DEFINITIONS AND ABBREVIATIONS

Construction Activity	A construction activity is any action taken by the Contractor, his subcontractors, suppliers or personnel during the construction process.
Contractor	That main organisation appointed by the Developer, through the Project Manager, to undertake construction activities on the site.
Demolition	The tearing down of buildings and other structures: the opposite of construction.
Developer	Joe Gqabi District Municipality
DWS	Regional Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer The ECO monitors compliance with the EMPr during the construction phase and advises the Project Manager on environmental matters relating to construction.
EMPr	Environmental Management Programme: The EMPr for the project sets out general instructions that will be included in a contract document for the construction phase of the project. The EMPr will ensure the construction activities are conducted and managed in an environmentally sound and responsible manner.
Environment	Means the surroundings within which humans exist and that are made up of: a. The land, water and atmosphere of the earth; b. Micro-organisms, plant and animal life; c. Any part or combination of a) and b) and the interrelationships among and between them; and d. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.
Environmental Specifications	Instructions and guidelines for specific construction activities designed to help prevent, reduce and/or control the potential environmental implications of these construction activities.
DEDEA	Eastern Cape Department of Economic Development and Environmental Affairs
I&AP(s)	Interested and Affected Party(ies)
Method Statement	A written submission by the Contractor to the Project Manager in response to the Specification setting out the plant, materials,

labour, timing and method the Contractor proposes using to carry out an activity. The Method Statement shall cover applicable details with regard to:

- Construction procedures;
- Materials and equipment to be used;
- Getting 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 solid material that may occur;
- Timing and location of activities;
- Compliance/ non-compliance with the Specifications; and
- Any other information deemed necessary by the PM.

MSDS	Material Safety Data Sheet
Project	This refers to all construction activities associated with the proposed activities.
PM	Project Manager: Appointed firm responsible for overall management of the construction phase of the project including the management of all contractors.
PPE	Personal Protective Equipment
Rehabilitation	Rehabilitation is defined as the return of a disturbed area, feature or structure to a state that approximates to the state (where possible) that it was before disruption, or to an improved state.
SHE	Safety, Health and Environment
Solid Waste	Means all solid waste, including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).
SSC	Species of Special Concern

1 INTRODUCTION

GIBB (Pty) Ltd. (hereunder referred to as GIBB) has been appointed by the Joe Gqabi District Municipality to undertake the Environmental Authorisation (EA) application process in terms of the Environmental Impact Assessment (EIA) Regulations of 2014, as amended, (Government Notice, GN, No. 326) promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA), for the proposed Maclear Bulk Water Treatment Works (WTW) to be situated within Maclear which is located under the governance of Elundini Local Municipality and Joe Gqabi District Municipality.

To comply with the legislative requirements, GIBB (on behalf of Joe Gqabi District Municipality) has submitted a Draft Basic Assessment Report (BAR) and associated appendices to the Eastern Cape Department of Economic Development and Environmental Affairs (DEDEA - Joe Gqabi Region), the Competent Authority (CA) in this case. The DBAR was also subjected to a public review for a 30 day period as legislated. An EA application has also been submitted to the same department. GIBB is now submitting the Final Basic Assessment Report (FBAR) on behalf of the applicant.

The proposed project includes the development of a 6 megalitres per day (ML/d) WTW facility, a pipeline of approximately 7.5 kilometres (km) and the construction of four reservoirs of which two reservoirs have existing footprints (Sonwabile and Greenfields). The Sonwabile reservoir site has a pressed steel tank, the tank will be removed from site and on its place a reservoir of about 3 mega litres (ML) will be installed. A 1ML reservoir exists on the Greenfields reservoir site, an additional 0.5ML reservoir is proposed to be installed in close proximity to this one. The capacity of the proposed Command and Small Holdings reservoirs is 2ML and 0.25ML, respectively. The applicant is also proposing to install an elevated tank on a stand of about 5 metres (m) within the footprint of the existing and operational Maclear WTW.

The pipeline will commence at the proposed WTW facility (situated at WTW Site Alternative 1 or 2, refer to Figure 1 below) and travel a distance of about 6.4km south and south-easterly and then split where one pipeline heads north-easterly to Sonwabile Reservoir and the other pipeline continues south of south-east to Greenfields Reservoir. The proposed Old Town Reservoir and Command Reservoir are situated on top of the hill, immediately before the partially urbanised area (Small Holdings). WTW Site Alternative 1 is preferred, with Site Alternative 2 the least preferred due to sensitivity (wetland); the two sites as well as a 50m corridor of the proposed pipeline route were assessed for the proposed project.

This Environmental Management Programme (EMPr) was compiled as part of the BA process as required by the EIA Regulations of 2014, as amended, published under NEMA. The EMPr looks at the potential environmental impacts the proposed WTW and associated pipeline and reservoirs could pose on the environment, and which mitigation and monitoring procedures will need to be put in place to manage these impacts within the smallest environmental footprint as possible.

The proposed WTW and associated pipeline and reservoirs, trigger the following listed activities:

Table 1: NEMA Listed Activities

Detailed Description of Listed Activities Associated with the Project	
Listed activity as described in GN 327 and 324	Description of project activity that triggers listed activity
GN 327, Activity 12: The development of: (ii) infrastructure or structures with a physical footprint of 100 square metres (m ²) or more; where such development occurs: (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32m of a watercourse, measured from the edge of a watercourse.	The proposed route of the pipeline will traverse through a watercourse.
GN 327, Activity 13: The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres (m ³) or more, unless such storage falls within the ambit of Activity 16 in Listing Notice 2 of 2014.	The proposed development includes the construction of four water reservoirs.
GN 327, Activity 19: The infilling or depositing of any material of more than 10m ³ into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10m ³ from a watercourse.	The watercourse and or the banks, flood-line and other characteristics of the watercourse which lies on the proposed route of the pipeline will be altered.
GN 327, Activity 27: The clearance of an area of 1 hectare (ha) or more, but less than 20ha of indigenous vegetation.	The proposed site will be cleared of vegetation particularly where the proposed WTW facility is to be constructed
GN 324, Activity 2: The development of reservoirs, excluding dams, with a capacity of more than 250m ³ . (b) In Eastern Cape: iii. Outside urban areas, in: (dd) Critical Biodiversity Areas (CBAs) as identified in systematic biodiversity plans adopted by the CA or in bioregional plans.	As per the Eastern Cape Biodiversity Conservation Plan (ECBCP) the proposed project site is categorised as CBAs 1 and 2.
GN 324, Activity 12: The clearance of an area of 300m ² or more of indigenous vegetation. (a) In Eastern Cape: ii. Within CBAs identified in bioregional plans.	The proposed development site is categorised as CBA 1 and 2 as per ECBCP, SANBI ¹ 2017. The clearance of vegetation applies to the site of the WTW facility.

¹ South African National Biodiversity Institute

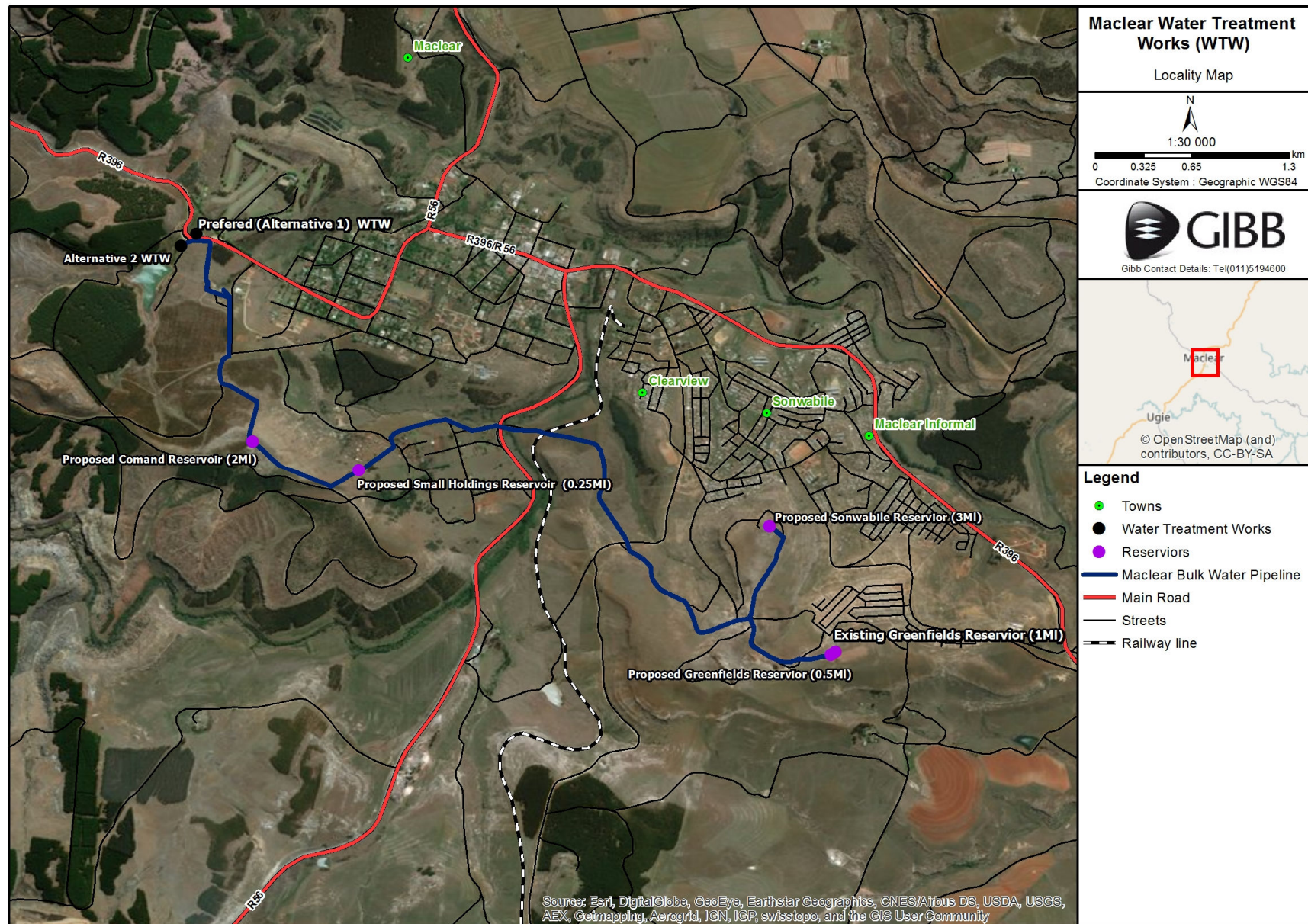


Figure 1: Locality Map

1.1 Applicable Documentation

The following environmental documentation is applicable to the proposed WTW and associated pipeline and reservoirs development, and must be read in conjunction with this EMPr:

- BAR for the WTW and associated pipeline and reservoirs;
 - The EA for the WTW and associated pipeline and reservoirs, if it has been issued by DEDEA. Where necessary, this EMPr must be amended to comply with the conditions of the EA, if granted;
 - Permits and/or licences that may need to be acquired before construction of the proposed WTW and associated pipeline and reservoirs, i.e. Water Use License (WUL) in terms of the National Water Act, 1998 (Act No. 36 of 1998), as amended; and
 - All acts, ordinances and by-laws relevant to the proposed project.
-

1.2 Structure of the Environmental Management Programme

This EMPr provides mitigation and management measures for the following phases of the proposed WTW and associated pipeline and reservoirs development:

- Construction Phase: This section of the EMPr provides management principles for the construction phase of the proposed WTW and associated pipeline and reservoirs development. Environmental actions, procedures and responsibilities, as required within the construction phase, are specified. These specifications shall form part of the contract documentation and, therefore, the Contractor will be required to comply with the specifications to the satisfaction of the Project Co-ordinator and Environmental Control Officer (ECO), in terms of the construction contract;
- Operational and Maintenance Phase: This section of the EMPr provides management principles for the operation phase of the proposed WTW and associated pipeline and reservoirs development as well as that of the maintenance phase. The operational and maintenance phase will run concurrent, with the maintenance taking place from time-to-time in comparison to the operation. Environmental actions, procedures and responsibilities, as required from Eskom within the operation phase, are specified; and
- Decommissioning Phase: Due to the nature of the proposed development and its operational lifespan, decommissioning is not envisaged at this time. This EMPr will be updated if decommissioning is to take place.

It should be noted that this EMPr is a dynamic document which must be updated as and when required, i.e. the granting of the EA by DEDEA, etc. Any amendments made must be submitted to both the ECO and Proponent for approval prior to implementation.

1.3 Objectives of the EMPr

The EMPr has the following objectives:

- To outline functions and responsibilities of responsible persons;
- To state standards and guidelines which are required to be achieved in terms of environmental legislation;
- To outline mitigation measures and environmental specifications which are required to be implemented for all phases of the proposed WTW and associated pipeline and reservoirs in order to minimise the extent of environmental impacts, and to manage environmental impacts; and
- To prevent long-term or permanent environmental degradation.

2 FUNCTIONS AND RESPONSIBILITIES

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the various personnel for this project are detailed below.

The Developer / Proponent:

- The proponent (Joe Gqabi District Municipality) is ultimately accountable for ensuring compliance to the EMPr and conditions contained in the EA (if granted). The ECO must be contracted by the developer (Joe Gqabi District Municipality) as an independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of the EA (if or when granted), conditions of the WUL (if and when granted) and the EMPr for the proposed WTW and associated pipeline and reservoirs development; and
- The developer is further responsible for providing and giving a mandate to enable the ECO to perform responsibilities. The developer must ensure that the ECO is integrated as part of the project team.

The Consulting Engineer (CE):

- Contracted by the developer to design and specify the project engineering aspects. Generally the engineer runs the works contract. The CE may also fulfil the role of Project Manager (PM) on the proponent's behalf.

Project Manager:

- The PM has over-all responsibility for managing the proposed WTW and associated pipeline and reservoirs development, contractors, and consultants and for ensuring that the environmental management requirements are met. The CE may also act as the PM. All decisions regarding environmental procedures must be approved by the PM. The PM has the authority to stop any construction activity in contravention of the EMPr, EA and/or WUL in accordance with an agreed warning procedure.

Engineers Representative (ER):

- The consulting engineer's representative on site. Has the power/mandate to issue site instructions and in some instances, variation orders to the contractor, following request by the Environmental Officer (EO) or ECO. The ER oversees site works, liaise with Contractor and ECO.

Environmental Officer / Environmental Manager (EO):

- Appointed by the CEs as their environmental representative on site. The EO is not independent but must rather act on behalf of the consulting engineers with the mandate to enforce compliance under the proposed development contract, which must include the EMPr. The EO has the directive to issue non-conformance and hazard certificates. Further, in terms of accepted industry practice the EO could issue the equivalent of a "cease works" instruction only in exceptional circumstances where serious environmental harm has been or is about to be caused i.e. in cases of extreme urgency and then only when the ER is absent;

- The EO must form part of the proposed project team and be involved in all aspects of the proposed project planning that can influence environmental conditions on the site. On certain types of activities, i.e. linear developments such as the proposed WTW and associated pipeline and reservoirs development, the EO must also be the liaison between the contractor and landowners (where required);
- The EO must attend relevant project meetings, conduct daily inspections to monitor compliance with the EMPr, and be responsible for providing reports and feedback on potential environmental problems associated with the development to the proposed project team and ECO;
- The EO must convey the contents of this EMPr to the Contractor site team and discuss the contents in detail with the Contractor as well as undertake to conduct an induction and an environmental awareness training session prior to site handover to all contractors and their workforce; and
- The EO must be suitably experienced with the relevant qualifications and preferably competent in construction related methods and practices.

The Environmental Control Officer:

- An independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of EA (if and when granted), conditions of WUL (if and when granted) and the EMPr for the project. The ECO must be on site prior to any site establishment and must endeavour to form an integral part of the project team;
- The ECO must be proactive and have access to specialist expertise as and when required, these include heritage, wetland, ecological specialists, etc.;
- The ECO must conduct audits on compliance to relevant environmental legislation, conditions of EA (if granted), conditions of the WUL, (if granted), and the EMPr prepared for the proposed WTW and associated pipeline and reservoirs development. The size and sensitivity of the proposed WTW and associated pipeline and reservoirs development, based on the BAR, and the EA (if granted) will determine the frequency at which the ECO will be required to conduct audits. (A minimum of a monthly site inspection must be undertaken);
- The ECO must be the liaison between the relevant authorities, DEDEA and the Department of Water and Sanitation (DWS), and the proposed project team. The ECO must communicate and inform the developer and CEs of any changes to environmental conditions as required by relevant authority bodies. The ECO must ensure that the registration and updating of all relevant EMPr documentation is carried out;
- The ECO must be suitably experienced with the relevant environmental management qualifications and preferably competent in construction related methods and practices; and
- The ECO must handle information received from whistle blowers as confidential and must address and report these incidences to the relevant Authority as soon as possible.

The Contractor:

- Is to ensure that the environmental specifications of this document (including any revisions, additions or amendments) are effectively implemented. This includes the on-site implementation of steps to mitigate environmental impacts;
 - Will ensure that all Employees and co-contractors employed comply with the requirements and provisions of this EMPr;
 - Prepares method statements;
 - Monitors environmental performance and conformance with the specifications contained in this document during daily site inspections;
 - Discusses implementation of and compliance with this document with staff at routine site meetings;
 - Reports progress towards implementation of and non-conformances with this document at site meetings with the ECO;
 - Will notify the ECO of the anticipated programme of works and fully disclose all details of activities involved;
 - Will ensure that suitable records are kept and that the appropriate documentation is available to the ECO;
 - Will Notify the ECO of all incidents, accidents and transgressions on site with respect to environmental management as well as requirements of the EMPr and corrective actions/remedial action taken;
 - Reports and records all accidents and incidents resulting in injury or death, as well as those that to do result in the above;
 - Informs the ECO of problems arising when implementing the EMPr and ways of improving the EMPr; and
 - Informs the ECO of any complaints received.
-

2.1 General Guidelines

The following measures provide guideline solutions to frequently anticipated issues on most development activities:

- The prevention of any site degradation due to non-compliance, administrative or financial problems, and inactivity during the construction phase, illegal activities, delays caused by archaeological finds etc. is ultimately the responsibility of the applicant/developer. Refer to Section 28 of NEMA;
- The study area must be clearly defined according to the proposed project authorisation. All workforce members and other construction personnel are not to go beyond the designated footprint;
- The Contractors must adhere to agreed and approved access points and haul roads;
- No camping is allowed on any private property;
- Damage to private or public property such as fences, gates and other infrastructure may occur at any time during the development of the proposed WTW and associated pipeline and reservoirs. All damage to be repaired immediately and to the satisfaction of the owner or his/her representative;
- The Contractor must adhere to all conditions of the contract including this EMPr;

- Proper planning of the proposed WTW and associated pipeline and reservoirs construction process must be undertaken so as to allow for disruptions such as rainfall and very wet conditions;
 - All private and public manmade structures near the proposed project site must be protected against damage at all times and any damage must be rectified immediately;
 - Proper site management and regular monitoring of the proposed site works;
 - Proper documentation and record keeping of all complaints and actions taken;
 - Regular site inspections and good control over the construction process throughout the proposed construction period;
 - A positive attitude towards Environmental Management by all site personnel must be motivated through regular and effective awareness and training sessions;
 - An EO, on behalf of the Contractor, is to be appointed to implement this EMP. The EO and not the Contractor is to deal with any landowner related matters; and
 - Environmental Audits to be carried out prior, during and upon completion of the proposed WTW and associated pipeline and reservoirs construction.
-

2.2 **Awareness Training**

The EO or ECO where an EO is not appointed, is responsible for ensuring everyone on site is given an environmental awareness induction session which not only clearly defines what the environment is and gives specifics detailing the local environment but outlines the requirements of the EMP as a management tool to protect the environment.

Refresher courses must be conducted as and when required. The EO must ensure daily toolbox talks include alerting the workforce to particular environmental concerns associated with the tasks for that day or the area/habitat in which they are working. Awareness posters and a hand out must be produced to create awareness throughout the site (as needed).

2.3 **Contractor Environmental Method Statements**

Method Statements are written submissions to the Engineer by the Contractor, in collaboration with the EO, in response to a request by the Engineer. The Method Statements set out the plant, materials, labour and method that the contractor proposes using to carry out the proposed activity (ies), identified by the EO and/or Engineer. The Method Statements contain the appropriate detail such that the EO and Engineer are able to assess whether the Contractor's proposal is in accordance with the requirements of the EMP. The contractor must sign each Method Statement along with the EO and Engineer to formalise the approved Method Statement.

All Method Statements including those which may be required as ad hoc or emergency construction method statements must be submitted to the Engineer for approval prior to the commencement of the activity.

Any changes to the method of works must be reflected by amendments to the original approved Method Statement. Any changes in this regard must be approved by the EO and Engineer on the understanding that such changes are environmentally acceptable and in line with the requirements of this EMPr.

The pro forma Method Statements attached (amongst others) must be used and method statements for the following activities must be submitted to the EO, ECO and Engineer for approval before construction commences *inter alia*:

- Solid waste management;
- Crew camps and construction lay down areas;
- Cement and concrete batching;
- Dust control;
- Noise control
- Hydrocarbon and emergency spills procedures;
- Fire Management; and
- Diesel tanks and refuelling procedures (if applicable).

2.4 Site Documentation

The following is a list of documentation amongst others, which must be held on site and must be made available to the ECO and/or Approving Authority on request.

- Site daily diary /instruction book/ Incident reports;
- Records of all remediation / rehabilitation activities;
- Copies of ECO reports (management and monitoring);
- EMPr;
- Complaints register;
- Method statements; and
- EA.

2.5 Pro forma Documentation

(a) Prior to the commencement of construction activities

The following attached *pro forma* documentation is to be filled out and is binding to the EMPr and project contract and includes, but is not limited to the following:

- Declaration of understanding by the Developer;
- Declaration of understanding by the Engineer;
- Declaration of understanding by the Contractor;
- Method statements; and

- ECO / Engineer approval for method statements.

(b) During construction activities

The following attached pro forma documentation is to be filled out and maintained. These are binding to the EMPr and project contract. They include, but are not limited to, the following:

- Amended Method Statements;
- ECO / Engineer approval for amended method statements;
- Environmental incidents; and
- Records of all remediation / rehabilitation activities.

3 ENVIRONMENTAL MANAGEMENT REQUIREMENTS

3.1 Section A: Planning and Pre-construction Phase Activities

A.1. Project contract and programme		Responsibility	Frequency	Notes
Contingencies for minimising negative impacts anticipated to occur during the construction phase need to be implemented. Ensure environmental awareness and formalise environmental responsibilities and implementation.	A.1.1 Project contract and programme (a) The EMPr must be included as part of the tender documentation thereby making it part of the enquiry document to make the recommendations and constraints, as set out in this document, enforceable under the general conditions of contract. (b) A copy of this EMPr must be available on site. The Contractor must ensure that all the personnel on site, sub-contractors and their team, suppliers, etc. are familiar with and understand the specifications contained in the EMPr.	Proponent		
A.2. Appointments and duties of project team		Responsibility	Frequency	Notes
	A.2.1 Pro forma document and contracts (a) The contact details of the ECO, Contractor and SHE officer must be completed as part of the pro-forma documents and a copy must be kept on site. This document must be made available to the approving authority on request. (b) Subcontractor(s) contracts with the principle contractor must contain a clause to the effect that the disposal of all construction-generated refuse / waste to an officially approved dumping site is the responsibility of the subcontractor in	Proponent	Once - off	

	question and that the subcontractors are bound to the management activities stipulated in this EMPr.			
	A.2.2 Roles and responsibilities (a) Before construction activities commence, role players must have a clear indication of their role in the implementation of this EMPr.	Proponent	Once - off	
A.3. Method Statements		Responsibility	Frequency	Notes
	A.3.1 Method Statements (a) Certain method statement must be provided by the contractor. All activities which require method statements may only commence once the method statements have been approved by the engineer and/or ECO as applicable. (b) Where applicable, the contractor will provide job-specific training on an ad hoc basis when workers are engaged in activities, which require method statements.	PM/ Contractor	Prior to commencing activities requiring method statements, on site.	Approved method statements and relevant pro forma documents along with training records to be kept on file on site.
A.4. Emergencies, non-compliance and communication		Responsibility	Frequency	Notes
	A.4.1 Emergencies and communication (a) The contractor must provide method statements on the protocols to be followed, and contingencies to be put in place for the following potential incidents before construction may begin: Contamination of natural water resources from spills; contamination of soils from spills; and fire. (b) Communication in emergencies must follow the suggested lines of communication.	Contractor	On-going	

	A.4.2 Non-compliance The contractor understands that failure to adhere to the requirements of the EMPr will result in fines over and above the costs incurred for any remediation required as result of the specific non-compliance.	Contractor	On-going	
A.5. Construction Camp set up (if required)		Responsibility	Frequency	Notes
Careful planning of the construction camp can ensure that the time and costs associated with environmental management and rehabilitation are reduced. Therefore the camp should be established on previously disturbed areas such as school / municipal show grounds, etc.	A.5.1 Layout (a) The choice of the Contractor's camp requires the Project Manager's and ECO's permission and must ensure that the camp is located in an area that will ensure a minimum impact. (b) The camp must be located on already disturbed areas, such as school grounds, sports fields or previous construction camp sites. (c) The contractor must submit plans of exact location, extent and construction details of the temporary construction camp facilities to the Project Manager for approval, prior to establishment of the camp. The layout plans must reflect the proposed camp's location in relation to any existing infrastructure (water mains, electricity cables, sewage mains, etc.) on site. Access to the construction camp must be through an existing route that is clearly demarcated and agreed upon. (d) The construction camp can comprise of the following (as required): a. Site office b. Ablution facilities c. Designated first aid area	PM/ Contractor	Prior to site establishment	

	d. Eating area e. Laydown areas			
	A.5.2 Ablutions (a) Ablution facilities must be provided and must be located within the construction camp at a ratio of 1:20 workers.	PM/ Contractor		
	A.5.3. Provision for camp waste disposal (a) Bins and skips must be provided at convenient intervals for disposal of waste within the construction camp/site. (b) Recycling and provision of separate waste receptacles for different types of waste must be encouraged.	PM/ Contractor	On-going	
A.6. Establishing storage areas		Responsibility	Frequency	Notes
Storage areas can be hazardous and unsightly. These storage areas can also cause environmental pollution if not designed and managed properly.	A.6.1. General Substances and Materials (a) When deciding on the location of temporary stockpiles, the following needs to be considered: - road access, - length of time the stockpile(s) will be kept. (b) Additionally all stockpiles must be located away from sensitive ecosystems (rivers and drainage lines) and protected from the prevailing winds. (c) Storage areas must be designated, demarcated and fenced if necessary. (d) Storage areas must be secured, to minimize the risk of crime and contamination.	EO/ ECO approval	During site establishment.	
	A.6.2 Hazardous Substances and Materials (a) Fuel must be stored in a bunded area with at least a volume of 110% of the tank. (b) No smoking must be allowed in the vicinity of	EO/ ECO approval	During site establishment	

	the fuel storage area. Erect at least one no-smoking warning sign, which is clearly visible at the fuel storage area, to warn all staff of associated dangers. (c) Provide adequate firefighting equipment at or close to the fuel storage and dispensing area(s). (d) Keep fuel under lock and key at all times. (e) Hazardous chemical workings/ refuelling areas must be bunded with an impermeable liner. (f) Ensure that there is always a supply of absorbent material readily available to absorb/break down any hydrocarbon spillage. (g) In the case of a spill, contaminated material must be removed from the site immediately and disposed of at an appropriate licensed hazardous waste facility.			
A.7. Waste management activities		Responsibility	Frequency	Notes
	A.7.1 Waste management (a) A dedicated area must be allocated for waste sorting and storage. (b) Individual waste skip or wheelie bins for different types of waste must be provided (if none currently exist).	EO/ ECO	During site establishment	
A.8. Education of site staff		Responsibility	Frequency	Notes
These points must be communicated to all staff prior to site establishment.	A.8.1. Environmental Education and Awareness Ensure that all site personnel have a basic level of environmental awareness training. Topics covered must include: • What is meant by 'Environment'? • Why do we have to protect the environment?	EO/ ECO	During staff induction and weekly "Toolbox Talks"	"Toolbox talks" and lunchtime Q&A.

	• How construction activities can impact on the environment? • How can these impacts be mitigated? • Awareness of emergency and spills response provisions. • Social responsibility during construction, e.g. being considerate to local residents. It is the contractor's responsibility to provide the site foreman with no less than 1 hour's environmental training (per week or as directed by the ECO) and to ensure that the foreman has sufficient understanding to pass the information onto the construction staff. (a) Translators are to be used where necessary. (b) The use of pictures and real-life examples is encouraged as these are easier to remember. (c) The need for a 'clean site' policy also needs to be explained to the construction workers.			
	A.8.2. Worker Conduct on Site Under no circumstances may open areas or surrounding bush be used as toilet facilities. A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: • No alcohol/drugs to be present on site. • No fire arms allowed on site or in vehicles transporting staff to/from the site (unless authorised by security personnel). • Construction staff is to make use of facilities provided for them, as opposed to ad hoc alternatives.	PM/ Contractor	During staff induction, followed by on-going monitoring.	

A.9. Water Quality		Responsibility	Frequency	Notes
Incorrect disposal of substances and materials and polluted run-off can cause serious negative impacts on surrounding water resources.	A.9.1. Water Quality (a) Equipment and machinery must be in good operation condition, clean (power washed), free of leaks, excess oil and grease. The equipment must be washed/ cleaned in the wash bays or demarcated areas only. (b) Ensure that machinery is operated by a skilled driver who has been trained to use it correctly and who will be able to identify if something is wrong with the engine and conduct regular inspections identifying engine related leaks.	EO/ ECO	During site set up.	
A.10. Security and safety		Responsibility	Frequency	Notes
	A.10.1. Risk Associated with materials on site (a) Material stockpiles or stacks such as cement, steel, bricks, corrugated iron sheeting, plastic piping, etc. must be stable and well packed to avoid collapse and possible injury to site workers, stockpiles must also be covered to avoid seepage and ground water pollution (where applicable). (b) No materials are to be stored in unstable or high risk areas such as in close proximity of the entrance road, excavated areas, etc.	PM/ Contractor	On-going	

3.2 Section B: Construction Phase Activities

B.1. Site Access		Responsibility	Frequency	Notes
	B.1.1 Access to the site (a) Existing access roads must be used as far as possible. Please note that all existing access roads utilised will have to be maintained to the satisfaction of the landowners. (b) If access roads must pass through drainage lines, the footprint must be as small as possible. (c) A road management plan must be compiled, showing allocated access points and roads, to prevent tracks all over the landscape. (d) Construction vehicles must be limited to a speed of 20km/h on access roads and keep to the speed limit on public roads.	Proponent		
B.2. Construction camp		Responsibility	Frequency	Notes
	B.2.1 Ablution (a) Portable chemical toilets must be acquired and placed at the construction site(s). At least 1 toilet to 20 workers must be erected. (b) Chemical toilets to be used on site, grey water must be disposed of off-site at a licensed waste treatment works. (c) The toilets must be located within the construction camp site(s) or as directed by the ECO / PM. (d) Construction camps, toilets and temporary laydown areas must be located at least 30m away from the edge of any drainage lines.	Proponent	As per the proponent's current procedures or as directed by the EO / PM	
	B.2.2. Eating Areas (a) Eating areas must be serviced and cleaned regularly to ensure the highest possible standards of hygiene and cleanliness.	Contractor	Daily and Weekly inspection	

	(b) All litter throughout the site must be picked up and placed in the appropriate recycling bins provided.			
	B.2.3. Housekeeping (a) The contractor must ensure that his camp and working areas are kept clean and tidy at all times. (b) The contractor must implement good housekeeping practises to minimise the visual impact of waste and discarded materials.	Contractor	Daily	
B.3. Staff Conduct		Responsibility	Frequency	Notes
	B.3.1. Environmental Education and Awareness/ Safety (a) The contractor must monitor the performance of construction workers to ensure that all the topics that were covered in the induction meeting are properly understood, and followed. (b) HIV & AIDS awareness talks must be given at the construction camp site(s) on a regular basis by the relevant personnel.	Contractor	Daily/ Weekly	“Toolbox talks” and lunch time Q&A.
B.4. Waste Management		Responsibility	Frequency	Notes
Activities in the construction site such as office work, usage of construction materials, etc., generate different types of waste that requires to be managed properly. These wastes could result in environmental pollution such as soil contamination/ pollution or health hazards to employees working on-site, if	B.4.1 On-site waste management (a) Waste is grouped into “general” or “hazardous”, depending on its characteristics. The classification determines the handling methods and the ultimate disposal of the material. The Contractor/ ECO must classify waste into general or hazardous based on the toxicity or hazard nature of waste. (b) Waste must be placed in the designated or marked skips/ bins which must be emptied on a regular basis by a contracted waste collector. These must remain within the demarcated areas and must be designed to	Contractor/ EO/ PM	During the start-up of construction on site and on-going thereafter. During waste collection Prior to signing an agreement with the waste removal contractor.	ECO and PM need to ensure that all construction staff is educated on waste management.

not managed properly.	prevent refuse from being blown out by wind. (c) Separation of waste and recycling of paper, glass, cans, scrap, metals, plastic bottles, etc., must be considered prior to disposal. The disposal at the landfill site must be considered as the last option, after having taken into consideration the prevention of waste generation, reduction waste generation, reuse and recycling. (d) Hazardous waste that requires disposal (oily rags, used fuel/ oil, etc.) must be placed in a suitable leak proof skip or wheelie bin for disposal at an approved hazardous waste disposal facility. (e) The contractor is responsible for arranging the removal of all waste from site generated through construction activities. Waste must be removed to a registered, appropriate disposal and recycling facility. (f) No burning and littering of waste on site must be allowed. (g) All drainage lines must generally be treated as “no-go” areas and appropriately demarcated as such. No vehicles, machinery, personnel, construction materials, cement, fuel, oil or waste must be allowed into these areas without the express permission of and supervision by the ECO. (h) Keep waste in vermin proof bins with lids. (i) Request the following from the waste contractors: • Copies of the weighbridge receipt from the waste removal contractor for all waste collected on site. (j) Under no circumstances should waste be disposed of within the delineated wetland or			

	other watercourses, i.e. Mooi River.			
B.5. Construction vehicles/ equipment		Responsibility	Frequency	Notes
Engine machines such as compressors, pumps, air conditioners and arc welders can have small leaks (usually oil) that can accumulate to become spills, which require clean-up. These leaks become more evident if the equipment remains in the same place for an extended period of time. Damaged fuel tanks, fuel hoses, and fuel pumps can be sources of significant fuel leaks. Hydraulic systems can blow gaskets or hoses resulting in large quantities of hydraulic fluid spilled to the ground.	B.5.1 Construction equipment (a) Vehicles and machinery are to be kept in good working order and to meet manufactures specification for safety, fuel consumption and emission. (b) Should excessive emissions be observed, the site manager needs to implement an effective vehicle and equipment service and maintenance plan. (c) Vehicle parking and equipment storage must be done on a hardened and sealed surface area such that oil, fuel and other fluid leaks do not pollute soil or ground water sources. (d) Drip trays must be placed underneath vehicles when not in use.	Contractor/ EO	On going	Contractor must follow a detailed checklist for machinery and equipment maintenance.
Increased noise and dust emissions from construction vehicles carrying out construction activities may occur.	B.5.2 Construction activities – increase in dust and noise generation (a) Use existing roads to access the site in order to limit the amount of dust on site. General housekeeping must also be maintained. (b) Avoid unnecessary movement of transportation vehicles on site. (c) Apply appropriate dust suppression methods. (d) No potable water may be used for dust suppression (as far as is practically possible). (e) Construction time must be restricted to working hours (07:00-18:00) Monday to Friday excluding public holidays (unless prior	Contractor/ EO	On-going/ daily	Contractor/ EO must ensure that the necessary noise and dust control measures be implemented and applied throughout the entire construction phase of the project.

	permission is obtained from the adjacent landowners. (f) All noise and sounds generated during the proposed activity must comply with the relevant SANS codes and standards. (g) All construction equipment or machinery must be switched off when not in use. (h) Construction equipment must be kept in good working condition. (i) Plant and vehicles must be in good working order and visually inspected daily. (j) Use silencers on all equipment, where appropriate.			
B.6. Emergency Response to spillages		Responsibility	Frequency	Notes
This section aims to provide measures to manage spillages from equipment used on site and measures for other construction materials handled on site.	B.6.1 Emergency Response to spillages The contractor must take into account the following prevention measures to be applied during spillages. (a) Immediately repair all leaks of hydrocarbons, oil, etc. (b) Take reasonable measure to prevent further spills or leaks. (c) Dispose contaminated materials to a location designated thereto, for further disposal at a registered landfill site. (d) The contractor must have its own spill response plan in the event of any spills (oil, fuel, hazardous materials) from his machinery or equipment used on site.	Contractor	During spillages	The ECO/ EO and contractor must ensure that the Emergency response procedure is well understood by all workers on site and that a summary is available for site visitors.
This section aims to provide measures to prevent pollution of the environment as well as to minimise the chances of transgression of the acts	B.6.2 Oil and chemicals (a) The contractor must provide method statements for the “handling & storage of oils and chemicals”, “fire”, and “emergency spills procedures”.	Contractor	On-going/ daily	

controlling pollution.	(b) These substances must be confined to specific and secured areas within the contractor's camp, and in a way that does not pose a danger of pollution even during times of high rainfall. These areas must be imperviously bunded with adequate containment (at least 110% the volume of the fuel) for potential spills or leaks. (c) Drip trays (minimum of 10cm deep or appropriate alternative viz. eco-blocks) must be placed under all vehicles that stand for more than 24 hours. Vehicles suspected of leaking must not be left unattended, drip trays must be utilised. (d) The surface area of the drip trays will be dependent on the vehicle and must be large enough to catch any hydrocarbons that may leak from the vehicle while standing. (e) The depth of the drip tray must be determined considering the total amount/ volume of oil in the vehicle. The drip tray must be able to contain the volume of oil in the vehicle. (f) Spill kits must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the construction site. Spill kits must be made up of material/ product that is in line with environmental best practice (SUNSORB is a recommended product that is environmentally friendly). (g) All spilled hazardous substances must be contained in impermeable containers for removal to a licensed hazardous waste site, (this includes contaminated soils, and drenched spill kit material).			
B.7. Cement handling		Responsibility	Frequency	Notes
This section aims to provide measures to minimise the	B.7.1 Concrete batching and mixing	Contractor	On-going/ daily	
	(a) The contractor must provide and maintain a			

possibility of cement residue entering into the surrounding environment.	method statement for “cement and concrete batching”. The method statement must provide information on proposed storage, washing & disposal of cement, packaging, tools and plant. (b) The mixing of concrete must only be done at specifically selected sites on mortar boards or similar structures to contain run-off into soils, streams and natural vegetation. (c) No mixing of cement/concrete must take place within 30m of aquatic features. (d) Cleaning of cement mixing and handling equipment must be done using proper cleaning trays and at designated areas only. (e) Water used to clean concrete off of machinery must be treated as grey water and disposed of at a licensed water treatment works.			
This section aims to provide measures to minimise pollution of soil, surface and groundwater resources.	B.7.2 Storage and disposal requirements (a) All empty cement bags must be stored in a dedicated area and later removed from the site for appropriate disposal at a licensed facility. The burning of cement bags is strictly forbidden. (b) Any spillage that may occur must be investigated and immediate remedial action must be taken. (c) The visible remains of concrete, either solid, or from washings, must be physically removed immediately and disposed of as waste to a registered landfill site. (d) Cement batching areas must be located in consultation with the ECO to ensure residues are contained and that the proposed location does not fall within sensitive areas such as drainage lines, storm water channels, etc.	Contractor	On-going/ daily	
B.8 Dangerous and toxic materials		Responsibility	Frequency	Notes

This section aims to provide measures to prevent pollution of soil, surface and ground water resources in the immediate and surrounding environments. It also proposes measures to minimise the chances of transgression of the legislation controlling pollution.	B.8.1 Provision of storage facilities (a) Materials such as fuel, oil, paint, herbicide and insecticides must be sealed and stored in bermed areas or under lock and key, as appropriate, in well-ventilated areas. (b) Sufficient care must be taken when handling these materials to prevent pollution. Training on the handling of dangerous and toxic materials must be conducted for all staff prior to the commencement of construction. (c) In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water and Sanitation (DWS) must be informed immediately. (d) Storage areas must display the required safety signs depicting “no smoking”, No Naked lights” and “Danger” containers must be clearly marked to indicate contents as well as safety requirements. (e) The contractor must supply a method statement for the storage of hazardous materials at tender stage. (f) Material Safety Data Sheets (MSDS) must be prepared for all hazardous substances on site and supplied by the supplier where relevant. MSDS’s must be updated as required.	Contractor	On-going/ daily	
B.9. Bulk storage of fuels and oils (as applicable)		Responsibility	Frequency	Notes
This section aims to provide measures to prevent pollution of soil, surface and ground water resources in the immediate and surrounding environments. It also proposes measures to minimise the chances of transgression of the	B.9.1 Bulk storage of fuels and oils (a) The contractor must provide and maintain a method statement for “Diesel tanks and refuelling procedures”. (b) Bulk fuel storage tanks on the site must be on an impervious surface that is bunded and able to contain at least 110% of the volume of the tanks. The filler tap must be inside the bunded	Contractor	Once of as required	

acts controlling pollution.	area where possible and the bund wall must not have a tap or valve. (c) The bunded area must have a water/ fuel sump separator. (d) A Flammable Liquid License must be obtained for diesel volumes greater than 200 litres. (e) Bulk fuel storage tanks must be located in a portion of the construction camp where they do not pose a high risk in terms of water pollution (i.e. they must be located away from water courses and drainage lines) (f) Bulk fuel storage tanks must be placed so that they are out of the way of traffic, so that the risk of the tanks being ruptured or damaged by vehicles is minimised. (g) Bulk fuel storage areas must be covered during the rainy season. (h) No fuel storage, refuelling, vehicle maintenance or vehicle depots must be allowed within 30m of the edge of any drainage lines. (i) Refuelling and fuel storage areas, and areas used for the servicing or parking of vehicles and machinery must be located on impervious bases and must have bunds around them. Bunds must be sufficiently high to ensure that all the fuel kept in the area will be captured in the event of a major spillage.			
B.10. Use of dangerous and toxic materials		Responsibility	Frequency	Notes
This section aims to provide measures to prevent pollution of soil, surface and ground water resources in the immediate and surrounding environments. It also proposes measures to minimise the	B.10.1 Use of dangerous and toxic materials (a) The contractor must keep the necessary materials and equipment on site to deal with spills/ fire of the materials present should they occur. (b) The contractor must set up a procedure (which will be stipulated in a method statement) for	Contractor	As required	

chances of transgression of the acts controlling pollution.	dealing with spills/ fire, which will include notifying the ECO and the relevant authorities prior to commencing with construction. These procedures must be developed with consultation and approval by the appointed EO. (c) A record must be kept of all spills and the corrective action taken.			
B.11. Stockpile handling		Responsibility	Frequency	Notes
Stockpiles need to be managed in accordance with the outlined specifications in order to minimise the scarring of the soil surface and land features, disturbance and loss of soil, construction footprint, sedimentation of nearby drainage lines; maintain the integrity of the topsoil for landscaping, containment of invasive plant growth as well as the contamination of storm water run-off.	B.11.1 Stockpiles (a) All stockpiled material must be easily accessible without any environmental damage. (b) All temporarily stockpiled material must be stockpiled in such a way that the spread of materials are minimised. (c) The stockpiles may only be placed within the demarcated areas the location of which must be approved by the ECO. (d) The contractor must avoid all clearly marked vegetated areas that will not be cleared. (e) Storm water run-off from the stockpile sites and other related areas must be directed into the storm water system with the necessary pollution prevention measures such as silt traps and may not run freely into the immediate and surrounding environments. (f) Stockpiles are to be stabilised if signs of erosion are visible. (g) During construction, all materials and stockpiles will be covered with tarps to prevent erosion as well as dust, and to mitigate the visibility thereof (where required and as directed by the ECO). (h) Soils from different horizons must be stockpiled such that topsoil stockpiles do not get contaminated by sub-soil material. (i) Topsoil stockpiles must be monitored for	Contractor	On-going/ daily	

	invasive exotic vegetation growth. Contractors must remediate as and when required in consultation with the ECO. (j) No plant, workforce or any construction related activities may be allowed onto the topsoil stockpiles. (k) Topsoil stockpiles must be clearly demarcated as no-go areas. (l) Stockpiles must not be higher than 2m to avoid compaction thereby maintaining the soil integrity and chemical composition. (m) No spoil material, including stripped topsoil, must be temporarily stockpiled within 30m of the edge of any drainage line. (n) No stockpiles must be placed on drainage areas, delineated wetland and Mooi River.			
B.12 Fire Management		Responsibility	Frequency	Notes
This section aims to provide measures to minimise the destruction of natural fauna and flora as well as maintain the general safety on site.	B.12.1 Fire management (a) The contractors must provide and maintain a method statement for “fires”, clearly indicating where and for what reason fires will be utilised and details on the fuel to be utilised. (b) Absolutely no burning of waste is permitted. (c) No open fires permitted on site at any time. (d) No wood is to be collected, chopped or felled for fires from private or public property as well as from no-go or sensitive areas within the site and any surrounding natural vegetation. (e) Employ a fire officer for on-site control. (f) Fire-fighting equipment to be kept on site and serviced regularly.	Contractor	On-going/ daily	
B.13. Erosion and sedimentation		Responsibility	Frequency	Notes
This section aims to provide measures to minimise the damage caused by erosion, impedance of the natural flow	B.13.1 Erosion and sedimentation management (a) To reduce the loss of material by erosion, the contractor must ensure that disturbance on	Contractor	On-going/ daily	

of water, scarring of the soil surface and land features, disturbance and loss of topsoil as well as enable the re-growth of disturbed areas.	site is kept to a minimum. The contractor is responsible for rehabilitating all eroded areas in such a way that the erosion potential is minimised after construction has been completed. (b) Should there be any disturbed areas during the construction phase, this must be rehabilitated after the completion of the construction phase. (c) These areas must be cordoned off so that vehicles or construction personnel cannot gain access to these areas. (d) Limit the footprint area of the construction activities to what is absolutely essential in order to minimise environmental damage, especially where towers will encroach upon watercourse boundary. Construction vehicles must use existing roads where possible.			
B.14. Fauna and flora		Responsibility	Frequency	Notes
This section aims to provide measures to minimise the disturbance to animals, interruption of breeding patterns of birds as well as the destruction of habitats.	B.14.1 Fauna management (a) All activities on site must comply with the regulations of the Animals Protection Act, 1962 (Act No. 71 of 1962), as amended. (b) All construction workers must be informed that the intentional killing of any animal is not permitted as faunal species are a benefit to society. Poaching is illegal and it must be a condition of employment that any employee caught poaching will be dismissed. Employees must be trained on how to deal with fauna species as intentional killing will not be tolerated. In the case of a problem animal, e.g. a large snake, a specialist must be called in to safely relocate the animal if the EO or ECO is not able to. (c) Environmental induction training and awareness must include aspects dealing in safety with wild animals into and on site. Focus	Contractor	On-going/ daily	

	on animals such as snakes and other reptiles that often generate fear by telling workers how to move safely away and to whom to report the sighting. Workers must also be informed where snakes most often hide so that they can be vigilant when lifting stones, etc. (d) Disturbances to nesting sites of birds must be avoided, as far as possible. (e) Vegetation clearance must be conducted systematically from the start to the end of the route to allow fauna to move away. (f) Construction activities and vehicle traffic should be restricted to daylight hours when the majority of faunal species are inactive. (g) Species such as tortoises and porcupines must be removed to surrounding areas if encountered on site and not collected as this is illegal. (h) Should wild animals be encountered during the construction phase, these animals must not be hunted or harmed, but allowed to escape into surrounding land. (i) Sensitive habitats that include riparian areas, floodplains, rocky habitat, ridges, wetlands and other sensitive sites must be avoided as far as is possible. This will require proactive planning and route alignments to minimize the area that will be directly affected by pylons and construction activities. (j) Where-ever possible, the timing and duration of construction activities must be scheduled to prevent direct impacts on key breeding times and seasons. This would apply specifically to sensitive mammal species, carnivore species and larger bird species.			
This section aims to provide measures to minimise the disturbance to vegetation,	B.14.2 Flora management (a) Trees and natural vegetation or any other natural features inside and outside the work	Contractor	As and when required	

prevent litigation concerning removal of vegetation, encourage natural habitat fauna, minimise scarring of the soil surface and land features, minimise disturbance and loss of topsoil as well as the risk of fauna and flora destruction.	area, which will not be cleared for construction purposes as indicated by the ECO, must be clearly demarcated and not be defaced, removed, painted for benchmarks or otherwise damaged, even for survey purposes. The latter can only be done if stipulated in the EA and must be overseen by the EO and ECO. Any feature defaced by the contractor must be reinstated to the satisfaction of the ECO and penalties/fines may be imposed by the ER. (b) The contractor must rehabilitate any disturbed areas once construction activities have terminated, e.g. by removing all contaminated soils. The crew camp during construction must be located in an area that will be developed to impervious surfaces after construction, so as to ensure that natural vegetation cover is not disturbed. A method statement must be provided and maintained by the contractor. (c) Once construction is complete, rehabilitation of un-built areas must be undertaken in order to restore the aesthetic & ecological value of the area. It is recommended that the ECO be consulted with regard to the most appropriate rehabilitation vegetation and structures. Active re-vegetation must take place with locally indigenous vegetation under the supervision of the ECO. (d) No open fires must be allowed on site under any circumstances, fires will only be permitted in adequate facility within the crew camp, Forest Act, 1984 (Act No. 122 of 1984). (e) Avoid strip clearing. (f) Vegetation must be removed only where construction is to take place. (g) Clearing of the servitude must be as narrow as possible to prevent major destruction of habitats.			

	(h) Prior to construction, the route must be walked by a qualified botanist, to locate and remove sensitive species. (i) Should any sensitive species be found, management measure must be adopted for the species and fenced if applicable. (j) Sensitive plant species must be removed and relocated from points of direct impact before construction starts. (k) Sensitive habitats that include riparian areas, floodplains, rocky habitat, ridges, wetlands and other sensitive sites must be avoided as far as is possible. This will require proactive planning and route alignments to minimize the area that will be directly affected by pylons and construction activities. (l) A strategy must be developed prior to construction to prevent the spread and dispersal of alien plants. Where possible, strategies to prevent the regrowth and coppicing of felled exotic or alien trees must be formulated and enforced throughout the life time of the WTW and associated pipeline and reservoirs. (m) No species of conservation was found on site, however caution must be undertaken when clearing the vegetation.			
This section aims to provide measures to minimise the disturbance to sensitive avifauna species.	B.14.3 Avifauna management (a) Minimise the extent of woodland cleared in the servitude required to track the route of all new pipelines – ideally by routing these lines within existing development corridors.	Contractor	As and when required	
B.15. Wetland and Riparian Features		Responsibility	Frequency	Notes
This section aims to provide	B.15.1 Footprint Management	Contractor	On-going/ daily	

measures to minimise the damage caused by construction activities on the various riverine features found around the study area.	(a) Limit the footprint area of the construction activities to what is absolutely essential in order to minimise environmental damage, especially where towers will encroach upon the riverine boundary. Construction vehicles must use existing roads where possible. (b) During construction all building materials must be kept out of the riverine areas as well as any active stream channels. (c) In any areas where disturbance of banks or riverine vegetation occurs, bank and bed profile must be re-instated in such a way as to reinstate sustainable habitat conditions. (d) Keep all demarcated sensitive zones outside of the construction area off limits during the construction and rehabilitation phases of the development. (e) Appropriate sanitary facilities must be provided during the construction phase and all waste removed to an appropriate waste facility. (f) The wetland area must be treated as a “No-go” area. B.15.2 Vehicle Access (a) All construction footprint areas must remain as small as possible and must not encroach onto surrounding sensitive areas. It must be ensured that these areas are off-limits to construction vehicles and personnel as far as possible. (b) In the event of a breakdown, maintenance of vehicles must be taken with caution and the recollection of spillage must be practiced near the surface area to prevent ingress of hydrocarbons into topsoil. (c) It must be ensured that all hazardous storage			

	containers and storage areas comply with the relevant SABS standards to prevent leakage. All vehicles must be regularly inspected for leaks. Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into topsoil. (d) All spills must be immediately cleaned up and treated accordingly. (e) Absolutely no vehicles on the wetland and river areas. B.15.2 Soil Conditions (a) All soils compacted as a result of construction activities falling outside of project footprint areas must be ripped and profiled. Special attention must be paid to alien and invasive species control within these areas. Alien and invasive vegetation control must take place throughout all construction and rehabilitation phases to prevent loss of floral habitat. (b) Monitor all systems for erosion and incision.			
B. 16. Blasting		Responsibility	Frequency	Notes
This section recommends or provides measures to undertake before, during and after the blast activity (ies).	B. 16.1. Vibrations associated with Blast Activities (a) Vibration on buildings and other building infrastructure (1000m) occupied by people must not exceed 7 millimetres per second (mm/s). (b) The vibration limit by Eskom Holdings SOC Limited (Eskom) at any pylon must not exceed 75 mm/s. (c) Permission must be requested from Eskom before blast(s) can be undertaken under the pylons. (d) Buildings and other structures in close proximity (1000m) to the blast site must be	Person(s) responsible for the blast; contractor	Duration of the blast	

	monitored before, during and after the blast. (e) To minimise the magnitude of vibrations, the diameter of the hole(s) utilised for blasting must be kept to a minimum. Multiple charge decks may also be introduced on to the hole(s). (f) The person(s) responsible for the blast activities must adhere to the legislative requirements pertaining to the use of explosives. (g) Monitoring must be undertaken to ascertain that the stipulated level(s) are complied with, corrections must be made where applicable. Vibration stations are ideal for this, these must be monitored by a third party to eliminate bias. B.16.2. Noise associated with Blast Activities (h) The blast activities must be widely publicised to make the surrounding communities aware of the blast before it takes place. (i) Measures must be undertaken, i.e. screening of the blast holes, to lessen the magnitude of noise resulting from the blast. (j) Noiseless initiation systems must be utilised. B.16.3. Fly Rock and Air Blast (k) The dates and times of blast must be widely publicised. (l) A safe distance must be kept during the blast event, this must be determined by the contractor and person(s) responsible for the blast. (m) Humans and livestock (including other animals) must be cleared from the blast site before undertaking the activity. (n) The gravel roads in close proximity to the area proposed to be blasted must be closed before			

	the blast and opened once it is safe to do so. (o) Air blast amplitudes must not exceed 128 decibels (dB). (p) Pylons must be covered with pillars to lessen the impact on the pylon structures. (q) Apply stringent fly rock and air blast control measures, including stemming control. Fly rock must be limited to a few metres from the corridor of the pipeline route. (r) Noiseless initiation systems must be utilised. (s) A blanket, i.e. soft undisturbed material of about 1m thick, must be placed above the overburden to be blasted to contain air blast and fly rock. (t) Install or apply a screen material in all blast holes to restrict or minimise the escape of air blast and fly rock. B.16.4 Fumes and Smell of Fumes (u) The blasting of the rock must be undertaken by a professional person(s) with expertise in blasting rocks, particularly in relation to construction. (v) The blast material, explosives, must be sourced from reputable explosive retailers so as to ascertain correct formulation of the explosives. This will lessen or eliminate the production of fumes during the blast. (w) The person(s) responsible for blasting rocks must ascertain that explosives are detonated efficiently so as to minimise or eliminate fumes. (x) The smell resulting from trace amounts of ammonia and nitrous oxide fumes must be allowed to escape and dissipate. (y) Proper blasting must be applied to prevent the increase in nitrous oxide fumes which is characterised by an orange or deep red colour			

	and which is poisonous. (z) If gas fumes have a potential of reducing visibility within the gravel roads in close proximity to the blast site, these roads must be closed before the blast takes place and be opened when visibility is restored. (aa) A blanket, i.e. soft undisturbed material of about 1m thick, must be placed above the overburden to be blasted to contain gas fumes. (bb) Should any gas fumes, particularly nitrous oxide, be observed during the blast, the blasting activity must be halted and the cause of the fumes identified and corrected.			

3.3 Section C: Operation Phase Activities

C.1. WTW, pipelines & reservoirs		Responsibility	Frequency	Notes
	C.1.1 WTW and associated pipeline and reservoirs (a) Inspect pipelines regularly for signs of vandalism or theft or leakages. (b) Monitor the growth of vegetation in the servitude and keep the clearance between vegetation and lines to those legally required. (c) Install leak detectors particularly on the areas where the pipeline will be buried under the ground.	Proponent	In accordance with the proponent specifications and guidelines	
C.2. Access Tracks		Responsibility	Frequency	Notes
	C.2.1 Access Tracks (a) The maintenance of access tracks is the responsibility of the proponent. (b) No vehicles are allowed to driver within or in close proximity to the delineated wetland area and the Mooi River. (c) Access tracks must be repaired when necessary to avoid the formation of ruts; (d) Erosion Guidelines must be used to manage erosion of access routes and servitudes; (e) All weeds and invasive vegetation in the electrical servitude must be monitored and eradicated on a continuous basis for the period the servitude will be in use.	Proponent	In accordance with the proponent's specifications and guidelines	

This section must be updated as operational needs dictate.

3.4 Section D: Decommissioning Phase Activities

Please note that that it is not envisaged that the development will be decommissioned. However should this come into effect at a later point in time, this EMPr will be updated to include specific measures and methodologies for the decommissioning activities. Below are the major activities anticipated to occur if the decommissioning does occur.

D.1. Waste Management		Responsibility	Frequency	Notes
	D.1.1 Waste Management (a) Waste generation must be managed according to international best practice. (b) All materials that can be recycled must be recycled where possible.	Proponent	In accordance with the proponent's specifications and guidelines	
D.2. Emergency		Responsibility	Frequency	Notes
	D.2.1 Soil Contamination (a) Contaminated soil must be removed and disposed of at an appropriate registered landfill site.	Proponent	In accordance with the proponent's specifications and guidelines	

D.3. Decommissioning		Responsibility	Frequency	Notes
	D.3.1 Alteration of Hydrology of Drainage Lines (a) All decommissioning vehicles must be kept in good working condition. (b) All decommissioning vehicles must be parked in demarcated areas when not in use, and the soil in this area must be rehabilitated (if required). (c) No vehicles, machinery, personnel, construction material, cement, fuel, oil or waste must be allowed outside of the demarcated working areas. (d) No fuel storage, refuelling, vehicle maintenance or vehicle depots must be allowed within 30m of the edge of any drainage lines; (e) Vehicles and machinery must not be washed within 30m of the edge of any drainage lines. (f) No effluents or polluted water must be allowed to discharge into any drainage lines or wetland areas.	Proponent	In accordance with the proponent's specifications and guidelines	
D.4. Site Rehabilitation		Responsibility	Frequency	Notes
	D.4.1 Rehabilitation of the environment surrounding the newly constructed WTW and associated pipeline and reservoirs (a) Ensure that all disturbed areas are stabilised as soon as possible after disturbance or usage. Particular attention must be paid to slopes greater than 20° (1:5) and other areas prone to erosion which must be appropriately vegetated. Rehabilitated areas that are susceptible to erosion due to their position in the landscape must be adequately protected by soil conservation measures. (b) Ensure that all construction access roads are closed and the area rehabilitated upon completion of the construction works, unless otherwise specified by the EO and agreed with the landowner. (c) Remove from the site all construction equipment, surplus material, waste and temporary structures	Proponent	On-going	

	and works of every kind before the final hand-over. After completion of construction, the site must be properly cleaned of any construction waste, litter etc. and adequately rehabilitated/re-vegetated (as directed by the ECO). (d) Rehabilitate any environmental damage caused by construction activities before the final hand-over. (e) Removal of all excavated material (rocks, excess soil, etc.) and construction rubble after construction is completed. (f) Re-vegetated areas must be monitored by the ECO within 3 months after re-vegetation and during the next growing season to ensure that the vegetation has stabilised to a determined level prior to construction. (g) Rehabilitated areas showing inadequate surface coverage (less than 30% within 9 months after rehabilitation) must be prepared and re-vegetated from scratch with a suitable grass mix that is compatible with the surrounding vegetation; (h) Exotic weeds and invaders that are likely to establish on the rehabilitated areas are to be controlled to allow natural vegetation to properly establish. (i) Damage to rehabilitated areas must be repaired promptly. (j) The erosion risk will be reduced significantly during the dry season (i.e. winter). Therefore, depending on the construction schedule, excavation activities must be focussed during winter.			

The rehabilitation schedule and procedure to be adhered to is as follows (this methodology should be updated during the construction phase).

Table 2: Rehabilitation Schedule and Procedure

Step	Method	Equipment
1	Remove all construction material from the area where construction has been completed	To be undertaken by hand.
2	The ground must be sloped so as to attain a natural slope and to attain a natural water flow, if it has been altered during construction (the natural slope must be altered as little as possible during construction).	To be undertaken by hand.
3	Topsoil that has been stockpiled during construction must be applied to the area to undergo rehabilitation. The depth of the topsoil layer to be applied depends on the natural depth of topsoil in the area, and the amount of topsoil that may have been lost during construction.	Appropriate machinery that will not result in compaction of the soil.
4	The area must be mulched to improve water retention, and brushwood applied to act as a soil stabiliser. Mulch and brushwood must be applied more heavily in areas which are presently well-wooded (or as directed by the ECO).	The mulch used must be woodchip, obtained commercially or from trees removed during site clearance. The brushwood is obtained from the bushes and trees removed during site clearance.
5	The naked ground will be seeded with a stabilising grass mix suited to the conditions. The quantity of seed used will depend on the slope, with a steeper slope requiring a heavier application of seed. For slopes: • >15°: 25-50 kg/ha • <15°: 15-25 kg/ha The natural seed bank in the topsoil will supplement the seed mix applied. These figures must act as a guide only, and the ECO must determine the correct quantities to be applied.	Appropriate machinery that will not result in compaction of the soil.
6	The areas which have been seeded must be regularly watered directly after seeding until the grass cover becomes established. Watering must ensure that no erosion of the topsoil and seed mix takes place.	A hosepipe must be available on site.
7	If the grasses have not established after a period of two months after seeding, the area must be reseeded. If necessary, another dressing of topsoil must be applied prior to seeding.	As above

8	Slope stabilisation measures may be necessary in places where grass has not been able to establish and there is an erosion risk. The measures implemented depend on the situation, and can be varied as necessary. The ECO will direct the Contractor as required.	Various slope stabilisation measures are available and vary in effectiveness according to the situation including: • Onion bags; and • Logs/bark held in place with pegs.

ANNEXURE 1: DECLARATION OF UNDERSTANDING BY THE DEVELOPER

I, _____

Representing _____

Declare that I have read and understood the contents of the Environmental Management Plan for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2: _____

ANNEXURE 2: DECLARATION OF UNDERSTANDING BY THE ENGINEER

I, _____

Representing _____

Declare that I have read and understood the contents of the Environmental Management Plan for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2: _____

ANNEXURE 3: DECLARATION OF UNDERSTANDING BY THE CONTRACTOR

I, _____

Representing _____

Declare that I have read and understood the contents of the Environmental Management Plan for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2: _____

METHOD STATEMENT: Solid Waste Management

CONTRACT: DATE:

WHAT WORK IS TO BE UNDERTAKEN? [Give a brief description of the works to be undertaken on site that will generate waste (hazardous and non-hazardous wastes)]: * Note: please attach extra pages if more space is required.

*Insert additional pages as required

WHERE ARE THE WORKS TO BE UNDERTAKEN? (Where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

METHOD STATEMENT: Solid Waste Management (contd.)

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:

End Date:

HOW IS WASTE TO BE MANAGED ON SITE? (Provide as much detail as possible, including annotated sketches and plans where possible): * Note: please attach extra pages if more space is required

*Insert additional pages as required

DECLARATIONS for Method Statement: Solid Waste Management **(contd.)**

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed)

(Print name)

Dated: _____

2) ECO

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed)

(Print name)

Dated: _____

2) CONTRACTOR

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

(Signed)

(Print name)

Dated: _____

ANNEXURE 4 B

METHOD STATEMENT: Crew Camps and Construction Lay Down Areas

CONTRACT: **DATE:**

WHAT CREW CAMPS AND CONSTRUCTION LAY DOWN AREAS ARE REQUIRED ON SITE DURING CONSTRUCTION? (Give a brief description of these): * Note: please attach extra pages if more space is required

*Insert additional pages as required

WHERE ARE THE CREW CAMPS AND CONSTRUCTION LAY DOWN AREAS TO BE LOCATED? (Where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

METHOD STATEMENT:

Crew Camps and Construction Lay Down Areas (contd.)

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:

End Date:

HOW ARE CREW CAMPS AND CONSTRUCTION LAY DOWN AREAS TO BE MANAGED?

(Provide as much detail as possible, including annotated sketches and plans where possible): *

Note: please attach extra pages if more space is required

*Insert additional pages as required

DECLARATIONS for Method Statement

Crew Camps and Construction Lay Down Areas (contd.)

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed)

(Print name)

Dated: _____

2) ECO

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed)

(Print name)

Dated: _____

2) CONTRACTOR

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

(Signed)

(Print name)

Dated: _____

METHOD STATEMENT: Cement and Concrete Batching

CONTRACT: DATE:

WHAT WORK IS TO BE UNDERTAKEN? (Give a brief description of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

WHERE ARE THE WORKS TO BE UNDERTAKEN? (Where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

METHOD STATEMENT:

Cement and Concrete Batching (contd.)

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:

End Date:

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

***Insert additional pages as required**

DECLARATIONS for Method Statement

Cement and Concrete Batching (contd.)

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed) (Print name)

Dated: _____

2) ECO

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed) (Print name)

Dated: _____

2) CONTRACTOR

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

(Signed) (Print name)

Dated: _____

METHOD STATEMENT: Dust Control

CONTRACT: DATE:

WHAT WORK IS TO BE UNDERTAKEN ON SITE THAT COULD GENERATE DUST? (Give a brief description of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

METHOD STATEMENT: Dust Control (contd.)

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:

End Date:

HOW ARE THE WORKS TO BE UNDERTAKEN SO AS TO MINIMISE AND CONTROL DUST GENERATION ON SITE? (Provide as much detail as possible, including annotated sketches and plans where possible): * Note: please attach extra pages if more space is required

*Insert additional pages as required

DECLARATIONS for Method Statement: Dust Control (contd.)

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed)

(Print name)

Dated: _____

2) ECO

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed)

(Print name)

Dated: _____

2) CONTRACTOR

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

(Signed)

(Print name)

Dated: _____

METHOD STATEMENT:
Hydrocarbon and Emergency Spill Procedure

CONTRACT: **DATE:**

WHAT HAZARDOUS SUBSTANCES (INCL. FUELS) ARE TO BE STORED ON SITE? (Give a brief description of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

WHERE ARE THE THESE SUBSTANCES TO BE STORED ON SITE? (Where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

METHOD STATEMENT:

Hydrocarbon and Emergency Spill Procedures (contd.)

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:

End Date:

HOW ARE HAZARDOUS SUBSTANCES TO BE MANAGED TO AVOID SPILLAGES AND WHAT EMERGENCY PROCEDURES ARE TO BE IMPLEMENTED IN CASE OF A SPILLAGE?

(Provide as much detail as possible, including annotated sketches and plans where possible): *

Note: please attach extra pages if more space is required

*Insert additional pages as required

DECLARATIONS for Method Statement

Hydrocarbon and Emergency Spill Procedures (contd.)

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed)

(Print name)

Dated: _____

2) ECO

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed)

(Print name)

Dated: _____

2) CONTRACTOR

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

(Signed)

(Print name)

Dated: _____

METHOD STATEMENT: Fire Management

CONTRACT: DATE:

WHAT WORK IS TO BE UNDERTAKEN? (Give a brief description of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

WHERE ARE THE WORKS TO BE UNDERTAKEN? (Where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

METHOD STATEMENT: Fire Management (contd.)

**START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS
REQUIRED:**

Start Date:

End Date:

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

***Insert additional pages as required**

DECLARATIONS for Method Statement

Fire Management (contd.)

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed)

(Print name)

Dated: _____

2) ECO

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed)

(Print name)

Dated: _____

2) CONTRACTOR

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

(Signed)

(Print name)

Dated: _____

METHOD STATEMENT:
Diesel tanks and refueling procedures

CONTRACT: **DATE:**

WHAT WORK IS TO BE UNDERTAKEN? (Give a brief description of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

WHERE ARE THE WORKS TO BE UNDERTAKEN? (Where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

METHOD STATEMENT:

Diesel tanks and refueling procedures (contd.)

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:

End Date:

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

*Insert additional pages as required

DECLARATIONS for Method Statement

Diesel tanks and refuelling procedures (contd.)

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed)

(Print name)

Dated: _____

2) ECO

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed)

(Print name)

Dated: _____

2) CONTRACTOR

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

(Signed)

(Print name)

Dated: _____

METHOD STATEMENT: Noise Control

CONTRACT: DATE:

WHAT WORK IS TO BE UNDERTAKEN ON SITE THAT COULD GENERATE DUST? (Give a brief description of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

METHOD STATEMENT: Noise Control (contd.)

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:

End Date:

HOW ARE THE WORKS TO BE UNDERTAKEN SO AS TO MINIMISE AND CONTROL DUST GENERATION ON SITE? (Provide as much detail as possible, including annotated sketches and plans where possible): * Note: please attach extra pages if more space is required

*Insert additional pages as required

DECLARATIONS for Method Statement: Noise Control (contd.)

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed)

(Print name)

Dated: _____

2) ECO

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed)

(Print name)

Dated: _____

2) CONTRACTOR

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

(Signed)

(Print name)

Dated: _____

TYPICAL INCIDENTS INCURRING PENALTIES	VALUE
Failure to secure construction site from public access	R5,000
Failure to demarcate working areas and servitudes and/or maintain fences and/or demarcation tape.	R1,000
Failure to stockpile topsoil correctly (per incident)	R2,000
Failure to stockpile materials in designated areas (per incident)	R500
Discharging effluent and/or polluted stormwater onto the ground or into surface water (per incident)	R2,000
Failure to provide adequate sanitation, waste disposal facilities or services (per incident)	R1,000
Failure to demarcate construction area boundaries before commencing construction clearance and other activities (per incident)	R5,000
Venturing into or undertaking construction related activities within no-go areas, without formal written approval from the ECO (per incident)	R5,000
No induction regarding environmental matters and site housekeeping practices (per employee)	R2,000
Stockpile of soils and materials outside demarcated areas (per incident)	R1,000
Inappropriate mixing of cement/concrete and poor management of concrete slurry (per incident)	R2,000
Burning of waste on site (including cement bags) (per incident)	R 2,000
Untidiness and litter at camp (per incident)	R200
Unauthorised removal of indigenous trees, medicinal or other plants (per incident)	R2,000
Damaging/killing animals/birds (per incident)	R 1,500
Failure to erect temporary fences as required (per incident)	R2,000
Failure to reinstate disturbed areas within the specified timeframe (per incident)	R2,000
Fire – costs of runaway fires will be borne by the Contractor, should he/she be proven responsible for such fires (per incident)	R25,000
Failure to provide adequate equipment for emergency situations (per incident)	R5,000
Defacing, painting or damaging natural or heritage features (per incident) – mandatory removal of employee from site	R5,000
Damaging cultural, historical and/or archaeological sites of importance (per incident) – mandatory removal of employee from site	R5,000
Failure to maintain basic safety measures on site	R1,000
Failure to carry out required community liaison, damage to property etc, without prior negotiation and/or compensation and other social infringements (per incident)	R1,000
Persistent and un-repaired oil leaks from machinery. The use of inappropriate methods of refuelling (per incident)	R2,000
Failure to provide drip trays and/or empty them frequently (per incident)	R500
Inappropriate use of bins and poor waste management on site (per incident)	R500
Inappropriate off-site disposal of waste from site (per incident)	R10,000
Deliberate lighting of illegal fires on site (per incident)	R1,000

TYPICAL INCIDENTS INCURRING PENALTIES	VALUE
The eating of meals on site outside the defined eating area. Individual not making use of the site ablution facilities (per incident)	R200
Inappropriate use of adjacent watercourses and water bodies – such as for unapproved water abstraction, washing of vehicles, wastewater disposal and use by employees for washing (per incident)	R1000
Any person, vehicle, item of plant, or anything related to the Contractor's operations causing a public nuisance (per incident)	R500
Construction vehicles not adhering to speed limits (per incident)	R200
Failure to maintain and register incidents in the incident register (per incident)	R1,000
Failure to remove all temporary features and leftovers from the construction site and works areas upon completion of the works (per incident)	R50,000
Any contravention with a Method Statement (per incident)	R5,000
Repeated contravention of the specifications or failure to comply with instructions (per incident)	R5,000

NOTE: THE SUBJECTION AND PAYMENT OF A PENALTY DOES NOT ABSOLVE THE CONTRACTOR FROM FULLY REMEDYING ANY TRANSGRESSION OR ENVIRONMENTAL DAMAGE. SHOULD THE CONTRACTOR FAIL TO ADDRESS HIS NON-CONFORMANCE, ESKOM HAS THE RIGHT TO REMEDY THE INCIDENT AND RECOVER THE COSTS FROM THE CONTRACTOR.

ANNEXURE 5: INCIDENT AND ENVIRONMENTAL LOG

ENVIRONMENTAL INCIDENT LOG				
Date	Env. Condition	Comments <i>(Include any possible explanations for current condition and possible responsible parties. Include photographs, records etc. if available)</i>	Corrective Action Taken <i>(Give details and attach documentation as far as possible)</i>	Signature

Document Control

Form IP180_B

CLIENT : Joe Gqabi District Municipality
PROJECT NAME : Maclear Bulk WTW
PROJECT NO : J35030
TITLE OF DOCUMENT : Draft EMP
ELECTRONIC LOCATION : \\jhb-cluster\projects\3230 Environmental\J35030 Maclear Bulk
WTW\Reports\BAR\FBAR\Final BAR submitted to CA\App F EMP

	Approved By	Reviewed By	Prepared By
ORIGINAL	NAME Umeshree Naicker	NAME Umeshree Naicker	NAME Zikhona Wana
DATE 12 November 2018	SIGNATURE 	SIGNATURE 	SIGNATURE 

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- (a) GIBB's written agreement is obtained prior to such release, and
- (b) By release of the report to the Third Party, that Third Party does not acquire any rights, contractual or otherwise, whatsoever against GIBB and GIBB, accordingly, assume no duties, liabilities or obligations to that Third Party, and
- (c) GIBB accepts no responsibility for any loss or damage incurred by the Client or for any conflict of GIBB interests arising out of the Client's release of this report to the Third Party.

GIBB (Pty) Ltd

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Email Address : unaicker@gibb.co.za

Telephone No. : 011 519 4701

Fax No. : 011 807 5670

C3.7.6 List of Drawings

GENERAL LAYOUTS	
J35030/101/A	GENERAL LAYOUT
J35030/102/A	WTW BULK EARTHWORKS AND SETTING OUT
J35030/103A/A	WTW ROAD LAYOUT AND SETTING OUT DETAILS
J35030/103B/A	STORM WATER LAYOUT
J35030/105/A	OUTLET WORKS PLAN AND PROFILE
J35030/106/A	GRAVITY MAIN LAYOUT AND SETTING OUT DETAILS
J35030/107/A	RISING MAIN LAYOUT & LS 1 OF 2
J35030/108/A	RISING MAIN LAYOUT & LS 2 OF 2
J35030/109/A	FENCE LAYOUT AND DETAILS
GENERAL DETAILS	
J35030/110/A	TYPICAL DETAIL: SITE WORKS
J35030/111/A	TYPICAL DETAIL: ROADS
J35030/112A/A	TYPICAL DETAIL: STORM WATER MANHOLE
J35030/112B/A	TYPICAL DETAIL: STORM WATER GULLY
J35030/112C/A	TYPICAL DETAIL: STORM WATER CATCH PIT
J35030/113A/A	TYPICAL DETAIL: WATER 1 OF 2
J35030/113B/A	TYPICAL DETAIL: WATER 2 OF 2
J35030/113C/A	TYPICAL DETAIL: SEWER
J35030/114A/A	AUCAMP DAM PIPELINE INLET STRUCTURE
J35030/114B/A	AUCAMP DAM PIPELINE OUTLET STRUCTURE
J35030/115A/A	RESERVOIR INLET, OUTLET AND HEADWALL DETAILS
J35030/115B/A	METER CHAMBERS
STRUCTURES	
J35030/130A/A	GATE HOUSE ARCH
J35030/130B/A	GATE HOUSE CONCRETE
J35030/131A/A	SUPERVISORS LIVING QUARTERS ARCH
J35030/131B/A	SUPERVISORS LIVING QUARTERS CONCRETE
J35030/131C/A	OPERATORS LIVING QUARTERS ARCH
J35030/131D/A	OPERATORS LIVING QUARTERS CONCRETE
J35030/132A/A	LABORATORY / OFFICE ARCH
J35030/132B/A	LABORATORY / OFFICE CONCRETE
J35030/133A/A	INLET WORKS AND DOSING LAYOUTS
J35030/133B/A	INLET WORKS AND DOSING SECTIONS
J35030/133C/A	INLET WORKS AND DOSING ARCH & DETAILS
J35030/134/A	FLOCCULATION TANK
J35030/135A/A	SEDIMENTATION TANK LAYOUTS & SECTIONS
J35030/135B/A	SEDIMENTATION TANK LAYOUTS & SECTIONS
J35030/135C/A	SEDIMENTATION TANK LAYOUTS & SECTIONS
J35030/135D/A	SEDIMENTATION TANK DETAILS
J35030/136A/A	SAND FILTER BUILDING LAYOUTS
J35030/136B/A	SAND FILTER BUILDING SECTIONS
J35030/136C/A	SAND FILTER BUILDING SECTIONS
J35030/136D/A	SAND FILTER BUILDING DETAILS
J35030/136E/A	SAND FILTER BUILDING ARCH
J35030/136F/A	SAND FILTER BUILDING STEEL STAIRS
J35030/136G/A	SAND FILTER BUILDING MANHOLE DETAILS
J35030/137A/A	1MI CLEAR WATER RESERVOIR FOUNDATION LAYOUT
J35030/137B/A	1MI CLEAR WATER RESERVOIR ROOF LAYOUT
J35030/137C/A	1MI CLEAR WATER RESERVOIR SUBSOIL LAYOUT
J35030/137D/A	1MI CLEAR WATER RESERVOIR SECTIONS
J35030/137E/A	1MI CLEAR WATER RESERVOIR DETAILS
J35030/137F/A	1MI CLEAR WATER RESERVOIR MANHOLES & LADDERS
J35030/137G/A	1MI CLEAR WATER RESERVOIR CLEARWATER CHAMBER
J35030/139A/A	PUMP STATION LAYOUTS

J35030/139B/A	PUMP STATION LAYOUTS
J35030/139C/A	PUMP STATION LAYOUTS & DETAILS
J35030/139D/A	PUMP STATION LAYOUTS
J35030/139E/A	PUMP STATION SECTIONS
J35030/139F/A	PUMP STATION SECTIONS
J35030/139G/A	PUMP STATION DETAILS
J35030/139H/A	PUMP STATION DETAILS
J35030/139J/A	PUMP STATION ARCH
J35030/140/A	SLUDGE LAGOON LAYOUT
J35030/141/A	SLUDGE LAGOON PUMP STATION
J35030/142/A	SLUDGE LAGOON OUTLET CHAMBER AND HEADWALL DETAIL
J35030/143/A	SLUDGE LAGOON MANHOLE
J35030/144A/A	3ML COMMAND RESERVOIR GENERAL ARRANGEMENT
J35030/144B/A	3ML COMMAND RESERVOIR DETAILS
J35030/144C/A	3ML COMMAND RESERVOIR MANHOLE DETAILS
J35030/145A/A	500kL OLD TOWN RESERVOIR GENERAL ARRANGEMENT
J35030/145B/A	500kL OLD TOWN RESERVOIR DETAILS
J35030/145C/A	500kL OLD TOWN RESERVOIR MANHOLE DETAILS
ELECTRICAL	
J35030/150/E	WASTEWATER TREATMENT WORKS LAYOUT: ELECTRICAL DISTRIBUTION
J35030/151/E	PUMP STATION: ELECTRICAL LAYOUT
J35030/152/E	PUMP STATION: SMALL POWER AND LIGHTING INSTALLATION
J35030/153/E	INLET WORKS AND DOSING: ELECTRICAL INSTALLATION
J35030/154/E	LABORATORY/OFFICE: ELECTRICAL INSTALLATION
J35030/155/E	GATE HOUSE: ELECTRICAL INSTALLATION
J35030/156/E	SLUDGE LAGOON PUMP STATION: ELECTRICAL INSTALLATION
J35030/157/E	SINGLE LINE DIAGRAMS AND PROCESS & INSTRUMENTATION DIAGRAMS
J35030/158/E	SUPERVISOR'S LIVING QUARTERS: ELECTRICAL INSTALLATION
J35030/159/E	OPERATOR'S LIVING QUARTERS: ELECTRICAL INSTALLATION

Note: Although, elsewhere in the Contract Document, drawings are referred to by their generic numbers only, the alphabetic suffix (if any) to a drawing number as given in this List of Drawings denotes the revision of the drawing that is applicable to this Document.

Originals of reduced drawings are available for inspection at the offices of the Employer's Agent or prints may be purchased by arrangement with the Employer's Agent. No claim for misunderstanding reduced drawings will be considered.

PART 4 : SITE INFORMATION

Part C4: Site Information

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C4.1. Geotechnical Investigation

Geotechnical information will be made available to the successful Tenderer.