Province of the
EASTERN CAPE
EDUCATION

DoE Cluster 04

UPGRADING AND REFURBISHMENT OF BULK WATER SUPPLY AND SANITATION AT VARIOUS DEPARTMENT OF EDUCATION SCHOOLS IN THE EASTERN CAPE PROVINCE (ECDOE) – NYANGA SENIOR SECONDARY SCHOOL, CHDM, NGCOBO

BIDDER'S NAME :……..

EMIS No: 200400893

P-No: P9011641

CONTRACT NO: AW2023/24/06

Closing date and Time:	08th September 2023 at 11:00 am

AMATOLA WATER

DoE Cluster 04

UPGRADING AND REFURBISHMENT OF BULK WATER SUPPLY AND SANITATION AT VARIOUS DEPARTMENT OF EDUCATION SCHOOLS IN THE EASTERN CAPE PROVINCE (ECDOE) – NYANGA SENIOR SECONDARY SCHOOL, CHDM, NGCOBO

Principal Agent:	**Implementing Agent:**
ROMH CONSULTING Leadwood House, Cedar Square Bonza Bay Road Beacon Bay East London 5247 TEL: 043 748 0018	AMATOLA WATER 6 Lancaster Road Amatola Water House VINCENT, EAST LONDON 5217 TEL: 043 707 3700

PARTICULARS OF TENDERER

Name of Tenderer	
Postal Address	
Street Address	
Telephone Number	Code: Number:
Cell phone Number	
Facsimile Number	Code: Number:
E-Mail Address	
VAT Registration Number	

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Amatola Water · Amanzi

AMATOLA WATER

CONTRACT NO: AW2023/24/06

UPGRADING AND REFURBISHMENT OF BULK WATER SUPPLY AND SANITATION AT VARIOUS DEPARTMENT OF EDUCATION SCHOOLS IN THE EASTERN CAPE PROVINCE (ECDOE) – NYANGA SENIOR SECONDARY SCHOOL, CHDM, NGCOBO.

T1: TENDERING PROCEDURE

T1.1: TENDER NOTICE AND INVITATION TO TENDER

Amatola Water Board is a state-owned, South African water utility established in November 1997 and is mandated to render water services to water sector institutions, to local government and other customers in the Eastern Cape.

Amatola Water is in the secondary procurement process and is hereby, inviting suitably qualified service providers to tender for Appointment of Contractors for the implementation, construction monitoring and supervision and closeout for upgrading and refurbishment of bulk water supply and sanitation, of projects managed for the Eastern Cape Department of Education (ECDoE), including outstanding projects which have started but needs to be completed.

The DoE Rollout Recovery Plan Programme is clustered into five (5) clusters which comprise of 19 schools and have been split amongst 5 PSP's for ease of management and control. This bid is one of the 19 bids under the programme, that have gone out to tender and will be considered in totality for the purpose of allocating work to the successful bidders. The objective criteria will be applicable in this bid as the intention of Amatola Water is to spread the work opportunities to a number of Contractors/Bidders. Therefore, only one school will be awarded to a bidder in cases where a bidder scores the highest number of points in more than one school. In such cases, the school with the highest value will be allocated to the successful bidder.

This bid is for the following school/s:

- NYANGA SENIOR SECONDARY SCHOOL

Each bidder must have all required professional personnel in their team, as a Single Entity or Joint Venture / Consortium.

The duration of the contract is 6 calendar months, which excludes Sundays and special non-working days. If the project is concluded before the 6th month period, disbursement fees will be pro-rated accordingly but if the project exceeds the allowed 6 months period, for reasons beyond our control, the current disbursement fees will be kept the same for the extended period.

An open competitive bidding process is to be followed. A bid invitation will be published in the regional newspaper and on Amatola Water website, CIDB Website and National Treasury Website (e-tender).

Only 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 of 5CE or higher and those who satisfy the criteria stated in the tender data, will be eligible to tender.

A bid invitation will be published in the regional newspaper and on Amatola Water website, CIDB Website and National Treasury Website (e-tender). Tender documents shall be available from the Amatola Water Website (www.amatolawater.co.za) and National Treasury Website from **Friday, 18th August 2023 at 09:00am.**

The tender closing date will be 21 Calendar days (3 weeks) after the publication date, on the 29th August 2023.

The closing date will be scheduled as follows:

BIDNUMBER	Bid Description and Scope of Works	CIDB Grading	CLOSING DATE, TIME AND VENUE.
AW2023/24/06	UPGRADING AND REFURBISHMENT OF BULK WATER SUPPLY AND SANITATION AT VARIOUS DEPARTMENT OF EDUCATION SCHOOLS IN THE EASTERN CAPE PROVINCE (ECDOE) – NYANGA SENIOR SECONDARY SCHOOL, CHDM, NGCOBO	5CE OR HIGHER	08th SEPTEMBER 2023 11H00 AMATOLA WATER'S TENDER BOX, 6 LANCASTER ROAD, VINCENT, EAST LONDON

COMPULSORY CLARIFICATION MEETING

A compulsory clarification meeting with representatives of the Employer will take place at Clarkebury Agricultural School, CHDM, Ngcobo. (**-31.7855739; 28.2873161**) on the 25th August 2023 at 11:00am for Clarkebury Agricultural School and Nyanga SS School.

Any bidder who arrives more than 15 minutes after the proposed meeting time, shall not be allowed to enter and participate in the clarification meeting.

NB: There will be separate attendance registers for each bid and each bidder may only represent one company per bid as there will be a roll-call conducted at the end of the briefing sessions.

The original completed bid documents and all supporting documents (in a separate file) must be submitted in a sealed envelope or parcel endorsed with the Bid Number and Bid Description as detailed in the Tender Data. The sealed envelope must be deposited in the Bid/Tender Box located in the reception area of **Amatola Water, 6 Lancaster Rd, Vincent, East London**, prior to the time and date indicated in the bid notice and the Tender Data. The bid submissions will be opened in public shortly the closing time.

No telephonic enquiries relating to this tender will be entertained. All enquiries regarding this tender must be in writing only and must be directed to: Ms N. Ndlamla – E-mail: nndlamla@amatolawater.co.za.

The requirement of submissions is detailed in the Submission Data (Ref: T1.2 Tender Data) only tenderers who satisfy the eligibility criteria as established for the tender (Ref: T 1.2 Tender Data) to submit tenders.

Telegraphic, telephonic, telex, facsimile, e-mail and late tenders will not be accepted. Tenderers have to submit its tenders using only the tender documentation issued.

Requirements for sealing, addressing, delivery, opening and assessment of tenders are stated in the Tender Data.

Issued by:

Acting Chief Executive
Amatola Water

Amatola Water · Amanzi

AMATOLA WATER

CONTRACT NO: AW2023/24/06

UPGRADING AND REFURBISHMENT OF BULK WATER SUPPLY AND SANITATION AT VARIOUS DEPARTMENT OF EDUCATION SCHOOLS IN THE EASTERN CAPE PROVINCE (ECDOE) – NYANGA SENIOR SECONDARY SCHOOL, CHDM, NGCOBO.

T1.2 TENDER DATA

The conditions of tender are the **Standard Conditions of Tender** as contained in of Board Notice 423 of 2019 in Government Gazette No 42622 of 08 August 2019, Construction Industry Development Board (CIDB) Standard for Uniformity in Engineering and Construction Work Contracts. (see www.cidb.org.za), and the variations to the Standard Conditions of Tender as per the project tender documentation.

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

The additional conditions of tender are:

Clause number	Tender Data
C.1.1.1	The employer is **AMATOLA WATER**
C.1.2	The tender document issued by the Employer comprises of: • Part T1: Tendering procedures; • Part T2: Returnable documents; • Part C1: Agreements and Contract Data; • Part C2: Pricing data; • Part C3: Scope of work; • Part C4: Site Information; and • Appendices
C.1.4	The Employer's Agent is: Name: Royal Mndawe Holdings (Pty) Ltd t/a ROMH Consulting Address: Leadwood House, Cedar Square, Bonza Bay Road, Beacon Bay East London 5247 Contact person: Simnikiwe Xawuka Tel: 043 748 0018 email: simnikiwex@romh.co.za
C.2.1.1	Only 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 of 5CE or higher and those who satisfy the criteria stated in the tender data, will be eligible to tender.

C.2.1.1	The following tenderers who are registered with the CIDB, or capable of being so prior to the evaluation of submissions, are eligible to have their tender evaluated: **A. Construction Industry Development Board (CIDB) Registration** Only those tenderers who are registered (as "Active") with the CIDB (at time of tender closing), 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, specified levels from 5CE or higher will be permitted to tender as stipulated on the Table under Item No. 1. **B. Joint Ventures are eligible to submit a tender offer provided that:** 1. Every member of the joint venture is registered (as "Active") with the CIDB (at the time of tender closing). 2. The lead partner has a contractor grading designation in the CE class of construction work and has a grading designation of not lower than one level below the required grading designation. 3. The value of work to be undertaken by each partner must be within their CIDB grading limit. 4. The combined contractor grading designation calculated in accordance with the Construction Industry Development Board Regulations (2016) is equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a CE class of construction work or a value determined in accordance with Regulation 25(1B) or 25(7A) of the Construction Industry Development Regulations. 5. Tenders submitted by joint ventures of two or more firms must 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 it defines precisely the conditions under which the joint venture will function, its period of duration, the persons authorized 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. 6. The Tenderer, if a Joint Venture, must submit a signed JV Agreement with the tender specific to the tendered Contract and showing clearly the percentage contribution of each partner to the Joint Venture. The value of work to be undertaken by each partner must be within their CIDB grading limit. **C. National Treasury Central Supplier Database Registration** Only Tenderers who are to be registered on the National Treasury Central Supplier (CSD) Database and have provided proof of their registration will be eligible to submit a tender offer. Proof of registration must be in the form of the Tenderers CSD registration number. Tenderers who are not registered are not precluded from submitting bids but must be registered prior to Contract Award. In the case of Joint Venture partnerships this requirement will apply individually to each party to the Joint Venture. Tenderers who wish to register as service providers on the CSD can register online at https://secure.csd.gov.za/Account/Register.

Clause number	Tender Data
	For further enquiries contact the Supply Chain Management Unit on Tel: 043 707 3700. **D. Attendance of Compulsory Site Briefing** A compulsory clarification meeting with representatives of the Employer will take place at Clarkebury Agricultural School, CHDM, Ngcobo. (**-31.7855739; 28.2873161**) on the 25th August 2023 at 11:00am for Clarkebury Agricultural School and Nyanga SS School.
C.2.1.4	Once the tender has been awarded the tenderer will need to be registered on the Amatola Water database as a service provider. In the case of joint venture partnerships this requirement will apply individually to each party of the joint venture.
C.2.10	All Tenderers that are registered for Value Added Tax (VAT) with the South African Revenue Service (SARS) must include VAT in their tender offer.
C.2.11	Add the following to the Clause*:* "In the event of a mistake having been made on the Bill of Quantities, it shall be crossed out in non-erasable ink and be accompanied by a full signature of each signatory to the Tender at each and every price alteration." "If correction fluid has been used on any specific item price, such item will not be considered. Corrections in terms of price may not be made by means of correction fluid such as Tippex or similar product. No correction fluid may be used in a Bill of Quantities where prices are calculated to arrive at a total amount. If correction fluid has been used, the tender as a whole will be classified non-responsive and not be considered. **The Employer will reject and classify the tender non-responsive if corrections are not made in accordance with the above**."
C.2.12	No alternative bid offers will be considered. The scope and design are as per the documentation in the Contract Data.
C.2.13.3	Parts of each tender offer communicated on paper shall be submitted as an original, plus 1 copy of all returnables.
C.2.13.5	The employer's address for delivery of tender offers and identification details to be shown on each tender offer package are as indicated on the Tender Notice.
C.2.13.6	A two-envelope procedure will not be followed.
C.2.13.9	Telephonic, telegraphic, telex, facsimile or e-mailed tender offers will not be accepted.
C.2.14	The tenderer is required to provide all the data or information as requested below: All the documents and schedules as listed under T2.1: List of Compulsory Returnable Documents. Should a Tenderer not provide all of the above-mentioned data or information, the Tenderer could be considered non-responsive. Satisfy the Employer and Employer's Agent as to his ability to perform and complete the Works timeously, safely and with satisfactory quality, by furnishing details in Part T2.1: – List of Compulsory Returnable Documents.

Clause number	Tender Data
	Accept that the Employer is restricted in accordance with clause 5(1) (c) of the Construction Regulations, 2014, to only appoint a contractor who 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 (as required in clause F2.23) shall be regarded as justifiable and compelling reasons not to award a contract to a Tenderer.
C.2.15.1	The closing time for submission of tender offers is as stated in the Tender Notice and Invitation to Tender.
C.2.16	The tender offer validity period is **90** days after the closing date.
C.2.23	The tenderer is required to submit with their tender: 1) An original valid Tax Clearance Certificate/PIN issued by the South African Revenue Services; and 2) Proof that the tenderer of any of its directors' municipal rates and taxes or municipal charges are not in arrears more than three (3) months. 3) Evidence of registration and proof of good standing with a compensation insurer who is approved by the Department of Labour in terms of Section 80 of the Compensation for Occupational Injuries and Diseases Act (Act No 130 of 1993) (COID). The Tenderer is required to disclose all inspections, investigations and their outcomes conducted by the Department of Labour into the conduct of the Tenderer at a time during the 36 months preceding the date of this Tender.
C.2.24	Add the following new Clause: "Additional conditions of bid Amatola Water reserves the right to cancel whole or any part the tender and or to alter the scope of the tender where applicable."
C.3.4	The Bid documents are to be deposited in Amatola Water's Tender Box**, 6 Lancaster Road, Vincent, East London**. The bid submissions will be opened by Amatola Water officials shortly after the closing time. Tender offer results will be published onto Amatola Water Website from the closing date.

Clause number	Tender Data
C.3.11.1	Bid Conditions: • The 2022 Preferential Procurement Policy Framework Act 2000 (PPPFA) principles shall apply, whereby submissions will be evaluated according to the provisions of the Act. • Points for Specific Goals will be scored in accordance with the SBD 6.1 Form. Failure to claim points on SBD 6.1 will lead in non-awarding of points for specific goals. • Amatola Water does not bind itself to accept the lowest or any tender and reserves the right to accept any tender or portion of a tender. 1. Tenders which are late, incomplete, unsigned or submitted electronically will not be accepted. 2. All tenders are to remain valid for a period of 90 days from the closing date of the submission. 3. A Tax Compliance status PIN (an original valid SARS certificate) must be submitted with the tender document in order to be considered. 4. Failure to provide supplementary information specified and completion of the returnable schedules will result in the tender being regarded as non-responsive. 5. Tender Forms (Form C1.1: Form of Offer and Acceptance) that are incomplete or incorrectly completed will result in the disqualification of the tender. 6. SBD 4 – Bidders Disclosure must be fully completed and signed.
C3.13	Tender offers will only be accepted if: a) the tenderer's tax matters have been declared by the South African Revenue Service to be in order; b) the Tenderer submits **an original** valid Tax Clearance Certificate issued by the South African Revenue Services c) the tenderer is registered with the Construction Industry Development Board in an appropriate contractor grading designation; d) the tenderer or any of its directors is not listed on the Register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the public sector; e) the tenderer has not: i) abused the Employer's Supply Chain Management System; or ii) failed to perform on any previous contract and has been given a written notice to this effect; and f) has completed the Compulsory Enterprise Questionnaire and there are no conflicts of interest which may impact on the tenderer's ability to perform the contract in the best interests of the employer or potentially compromise the tender process. g) the Tenderer is registered and in good standing with the compensation fund or with a licensed compensation insurer. h) the Employer is reasonably satisfied that the Tenderer has in terms of the Construction Regulations, 2014, issued in terms of the Occupational Health and Safety Act, 1993, the necessary competencies and resources to carry out the work safely. i) the Tenderer has not failed to perform on any previous contracts and has not been given a written notice to this effect. j) the Tenderer has a Bank Rating of at least C.

<table>
<tr><th>Clause number</th><th>Tender Data</th></tr>
<tr><td>C.3.13(b)

C.3.13(b) cont'd</td><td>
Acceptance of tender offer:

The 80/20 preference points system as prescribed in the Preferential Procurement Regulations, 2022 Pertaining to the Preferential Procurement Policy Framework Act, (ACT No 5 of 2000) (PPPFA) will be applied to evaluate all bids. The lowest acceptable bid will score 80 points for price and a maximum of 20 points will be awarded depending on the Specific Goals. Bids received will be evaluated in three (3) phases, namely Determine Completeness of tender offer, Capability requirements and compliance assessment and Price and Specific goals.

STEP 1: DETERMINE COMPLETENESS OF TENDER OFFER

1. Tender submissions will be screened to identify schedules and requested documents that are incomplete or have not been submitted.
2. Tender offers will be tested for compliance with all the requirements of the as-amended Standard Conditions of Tender including the following:
• Eligibility
• Pricing the tender offer
• Alterations to documents
• Alternative tenders offer
• Submitting a tender offer
• SBD 4 – Bidder's Disclosure
3. Tender offers will be declared non-responsive should they fail to comply with any one of the requirements of the above.
4. Non-responsive Tender Offers will not be further evaluated.

STEP 2: CAPABILITY REQUIREMENTS AND COMPLIANCE ASSESSMENT

A Compliance Assessment will be undertaken on the shortlisted tenderers.

The compliance assessment will be based on the information submitted in the Returnable Schedules and will assess the likely risk of the Tenderer not being able to successfully perform the work under this contract and meet all his/her contractual obligations.

If the assessment indicates that, there is an unacceptably high risk of the Works not being successfully completed, the bid will be rejected. The overall assessment will consider all of the following:

Civil Engineering Works:

<table>
<tr><th>Criteria</th><th>Description of requirements</th><th>Compliant</th><th>Non-Compliant</th></tr>
<tr><td>Tendering Entity's Relevant Experience</td><td>Number of contracts of a similar nature successfully completed by Tendering Entity.

Minimum Qualifying Requirements on Tenderer's Experience:</td><td></td><td></td></tr>
</table>
</td></tr>
</table>

Clause number	Tender Data

	At least one construction contract within the last 10 years which entails Civil work for construction of the relevant stipulated Scope of Works. At least one Practical Completion Certificate/s to be attached (Reference letters will not be acceptable).		
Key Staff's Relevant Roles and Experience	Key Staff's relevant roles and experience: ***Minimum Qualifying Requirements on Key Staff:*** Construction Manager (Site Agent) and Construction Supervisor (Main Foreman) to both have at least 5 years' experience in the same roles and areas of expertise as proposed for this Contract. Construction Manager (Site Agent) to have a degree or national diploma in the Civil Engineering discipline, professionally registered with ECSA (Pr Techni Eng or Pr Tech Eng or Pr Eng) or SACPCMP (Pr CPM or Pr CM). The Construction Supervisor (Main Foreman) must have previously supervised the Civil works for the construction of the relevant Scope of Works. Provide CVs and certified qualifications of the above Key Staff. The CVs must demonstrate the above minimum qualifying experience required and the CV's should be declared as true by the tenderer and will be used to evaluate the capability of the key personnel. **NOTE:** If the above proposed individuals are not available at time of award, it is a **CONDITION OF AWARD** requirement that equally-qualifying or better key staff are made available for the execution of this Contract.		

STEP 3: PRICE AND PREFERENCE

In terms of the Preferential Procurement Policy Framework Act (PPPFA) the 80/20 scoring system will be applicable to this tender.

The maximum points for this tender are allocated as follows:

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

<table>
<tr><th>Clause number</th><th>Tender Data</th></tr>
<tr><td></td><td>
<u>PRICE EVALUATION (80)</u>

The price points out of 80 will be allocated to the Price Tendered or evaluated price.

<table>
<tr><th>Adjudication Criteria</th><th>Points</th></tr>
<tr><td>Price Evaluation
$Ps = 80\left(1 - \frac{Pt - P\min}{P\min}\right)$</td><td>80</td></tr>
</table>

Where:
Ps = Points scored for price of Bid under consideration
Pt = Rand value of Bid under consideration
Pmin = Rand value of lowest acceptable Bid

<u>SPECIFIC GOALS (20)</u>

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.)
<table>
<tr><th>The specific goals allocated points in terms of this tender</th><th>Number of points allocated (80/20 system) (To be completed by the organ of state)</th><th>Number of points claimed (80/20 system) (To be completed by the tenderer)</th></tr>
<tr><td>HDI (51% or more black ownership)</td><td>6</td><td></td></tr>
<tr><td>Black women (51% or more women ownership)</td><td>3</td><td></td></tr>
<tr><td>Black youth (51% or more youth ownership)</td><td>3</td><td></td></tr>
<tr><td>People with disability (20% or more disabled people ownership)</td><td>2</td><td></td></tr>
<tr><td>Locality (Enterprise within the Eastern Cape)</td><td>6</td><td></td></tr>
</table>
- SBD 6.1 must be fully completed and signed by the bidders in order to claim the above points, failure to claim points will result in non-awarding of points.
</td></tr>
<tr><td>C.3.17</td><td>The number of paper copies of the signed contract to be provided by the employer is one.</td></tr>
</table>

T1.3 STANDARD CONDITIONS OF TENDER

CIDB STANDARD CONDITIONS OF TENDER

As published in Annex C of the CIDB Standard for Uniformity in Construction Procurement in Board Notice 423 of 2019 in Government Gazette No 42622 of 8 August 2019.

C.1 GENERAL

C.1.1 ACTIONS

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

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

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

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

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

C.1.2 TENDER DOCUMENTS

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

C.1.3 INTERPRETATION

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

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

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

a) **conflict of interest** means any situation in which:
   i) someone in a position of trust has competing professional or personal interests which make it difficult to fulfill his or her duties impartially;
   ii) an individual or organization 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 organization 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; or

c) no acceptable tenders are received.

d) there is a material irregularity in the tender process.

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

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

C.1.6 PROCUREMENT PROCEDURES

C.1.6.1 General

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

C.1.6.2 Competitive negotiation procedure

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

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

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

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

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

C.1.6.3 Proposal procedure using the two stage-system

C.1.6.3.1 Option 1

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

C.1.6.3.2 Option 2

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

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

C.2 TENDERER'S OBLIGATIONS

C.2.1 ELIGIBILITY

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

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

C.2.2 COST OF TENDERING

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

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

C.2.3 CHECK DOCUMENTS

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

C.2.4 CONFIDENTIALITY AND COPYRIGHT OF DOCUMENTS

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

C.2.5 REFERENCE DOCUMENTS

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

C.2.6 ACKNOWLEDGE ADDENDA

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

C.2.7 CLARIFICATION MEETING

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

C.2.8 SEEK CLARIFICATION

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

C.2.9 INSURANCE

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

C.2.10 PRICING THE TENDER OFFER

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

C2.10.2 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 may only be considered in the event that 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, services or supply identified in the contract data and described in the scope of works, unless stated otherwise in the tender data.

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

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

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

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

C.2.13.6 Where a two-envelope system is required in terms of the tender data, place and seal the returnable documents listed in the tender data in an envelope marked “financial proposal” and place the remaining returnable documents in an envelope marked “technical proposal”. Each envelope shall state on the outside the employer’s address and identification details stated in the tender data, as well as the tenderer's name and contact address.

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

C.2.13.8 Accept that the employer will not assume any responsibility for the misplacement or premature opening of the tender offer if the outer package is not sealed and marked as stated.

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

C.2.14 INFORMATION AND DATA TO BE COMPLETED IN ALL RESPECTS

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

C.2.15 CLOSING TIME

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

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

C.2.16 TENDER OFFER VALIDITY

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

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

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

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

C.2.17 CLARIFICATION OF TENDER OFFER AFTER SUBMISSION

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

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

C.2.18 PROVIDE OTHER MATERIAL

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

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

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

C.2.19 INSPECTIONS, TESTS AND ANALYSIS

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

C.2.20 SUBMIT SECURITIES, BONDS, POLICIES, ETC.

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 28 days after the expiry of the validity period stated in the tender data.

C.2.23 CERTIFICATES

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

C.3 THE EMPLOYER'S UNDERTAKINGS

C.3.1 RESPOND TO REQUESTS FROM THE TENDERER

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

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

a) an individual firm, or a joint venture as a whole or any individual member of the joint venture fails to meet any of the collective or individual qualifying requirements;
b) the new partners to a joint venture were not prequalified in the first instance, either as individual firms or as another joint venture; or
c) in the opinion of the Employer, acceptance of the material change would compromise the outcome of the prequalification process.

C.3.2 ISSUE ADDENDA

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

C.3.3 RETURN LATE TENDER OFFERS

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

C.3.4 OPENING OF TENDER SUBMISSIONS

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

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

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.3.9.2 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.

C3.9.4 Where the tenderer elects to confirm the tender offer as tendered, correct the errors as follows:

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

C.3.10 CLARIFICATION OF A TENDER OFFER

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

C.3.11 EVALUATION OF TENDER OFFERS

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

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

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

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, 2008, bankrupt or being wound up, has his affairs administered by a court or a judicial officer, has suspended his business activities, or is subject to legal proceedings in respect of any of the foregoing,
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.

T1.4 ADDITIONAL CONDITIONS OF TENDER

The Additional Conditions of Tender (ACT) are:

ACT. 1 RISK ANALYSIS

Notwithstanding compliance with regard to CIDB registration or any other requirements of the tender, the employer will perform a risk analysis in respect of the following:

(a) reasonableness of the financial offer
(b) reasonableness of unit rates and prices
(c) reasonableness of commitments
(d) Audited Financial Statements

The conclusions drawn from this risk analysis will be used by the Bid Evaluation Committee in determining the acceptability of the tender offer in terms of F3.13.

ACT. 2 TENDERER'S DIRECT PARTICIPATION OF LOCAL LABOUR

1. Local Labour

For the purposes of this bid local labour is defined as within the demarcated local wards within the vicinity of a specific school.

The local labour should consist of the following:

- Minimum 15% of the total local labour force should consist out of the employment of women
- Minimum 15% of the total local labour force should consist out of the employment of youth (18 – 35 years)
- Minimum of 1 number of disabled persons, if required.

The intention is that this Contract should make maximum use of the local labour force that is presently unemployed.

To this end the Contractor shall limit the utilisation on the Contract of non-local employees to that of key personnel only and to employ and train local labour to the extent necessary for the execution and completion of this Contract.

The minimum wages for local labour shall be those prescribed by the South African Forum of Civil Engineering Contractors (SAFCEC).

2. Conditions associated with the granting of preferences

The tenderer, undertakes to:

- engage one or more targeted labour in accordance with the provisions of the SANS 10845-7 in section 3 hereunder;
- accept the sanctions set out in Section 4 below, should such conditions be breached;
- complete the Targeted Labour (CPG) calculation form contained in Section 5 below; and
- complete the Supporting Contract Participation Goal Calculation contained in Section 6 below;
- complete the Supporting Documentation for training in Section 7 below.

3. Variation to the targeted construction procurement specification SANS 10845-7

The variations to SANS 10845-7 are set out below. Should any requirements of the variations of the variations conflict with the requirements of SANS 10845-7 the requirements of the variations shall prevail.

Calculations shall be based as a % of targeted labour costs of the Tender Sum (excluding VAT) and not calculated in accordance with methods 1 or 2 in Annexure A of SANS 10845-7.

4. Sanctions

In the event that the Tenderer fails to substantiate that any failure to achieve the Contract Participation Goal was due to quantitative under runs, the elimination of items, or any other reasons beyond the Contractor's control which may be acceptable to the Employer, it shall be liable to pay to the Employer a financial penalty calculated in the following manner:

$$P = \frac{0.50 \times (D - D_0) \times N_A}{(100)}$$

Where D = tendered Contract Participation Goal percentage

D_0 = the Contract Participation Goal which the Employer's representative based on the credits passed, certifies as being achieved upon completion of the contract.

N_A = Net amount (Actual contract expenditure, excluding VAT)

P = Rand value of penalty payable

5. Tender Contract Participation Goal in respect of Local Labour

I/we hereby tender a Contract Participation Goal of ……..%

The undersigned, who warrants that he/she is duly authorized to do so on behalf of the firm or sole proprietor confirms that he/she understands the conditions under which such preferences are and confirms that the tender satisfies the conditions pertaining to Contract Participation goals for direct participation of local labour.

Signature: ……

Name: ……...

Duly authorized to sign on behalf of: ……...

Telephone: ……

Fax: ……...

6. Supporting Contract Participation Goal (CPG) Calculation

Labour Category	Total Estimated Working Days	Estimated Rate	Total Estimated Wage Cost	Percentage Contribution
Male Local Labour				
Female Local Labour				
Youth Local Labour				
Disabled Local Labour				
		Total		

Signed on behalf of the tenderer: ……

***Note: Forms attached as annexure A to be completed and submitted with each payment certificate in order to monitor the CPG on a monthly basis**

ACT. 3 TENDERER'S DIRECT PARTICIPATION OF LOCAL ENTREPRISES

1. Local Enterprises

For the purposes of this bid local enterprises is defined as:

- any local supplier whose business address is located within the various clusters of the Department of Education in the Eastern Cape; or
- any EME within the various clusters of the Department of Education in the Eastern Cape.

The combined input from the local supplier's and EME's shall contribute a minimum of 15% of the contract value (including material).

2. Conditions associated with the construction participation goals (CPG)

The tenderer, undertakes to:

- engage one or more local enterprise in accordance with the provisions of the SANS 10845-7 as varied in section 3 hereunder;
- deliver to the Employer, within 5 working days of being requested in writing to do so, a completed Joint Venture Disclosure Form (Annex D of SANS 10845-6) and a joint venture agreement, should a joint venture be proposed at prime contract level with Targeted Partners to satisfy the Contract Participation Goal undertakings;
- deliver to the Employer, within 5 working days of being requested in writing to do so, a targeted Enterprise Declaration Affidavit in respect of all Targeted Enterprises engaged at prime contract level to satisfy the Contract Participation Goal undertakings;
- accept the sanctions set out in Section 4 below should such conditions be breached;
- complete the Contract Participation Goal commitment form contained in Section 5 below; and
- complete the Supporting Contract Participation Goal Calculation contained in Section 6 below;
- to obtain detailed listing of local enterprises;
- Should no appropriate local enterprises be located within the various clusters of the Department of Education, then enterprises outside of the cluster boundary may be utilized following approval by the Employer's Agent.

3. Variation to the targeted construction procurement specification SANS 10845-7

The variations to SANS 10845-7 are set out below. Should any requirements of the variations conflict with the requirements of SANS 10845-7 the requirements of the variations shall prevail.

Calculations of the contract participation goals shall be based as a % of targeted enterprise costs of the Tender Sum (excluding VAT) and not calculated in accordance with methods 1 or 2 in Annexure B of SANS 10845-7.

4. Sanctions

In the event that the Tenderer fails to substantiate that any failure to achieve the Contract Participation Goal was due to quantitative under runs, the elimination of items, or any other reasons beyond the Contractor's control which may be acceptable to the Employer, it shall be liable to pay to the Employer a financial penalty calculated in the following manner:

$$P = \frac{0.50 \times (D - D_0) \times N_A}{(100)}$$

Where D = tendered Contract Participation Goal percentage

D_0 = the Contract Participation Goal which the Employer's representative based on the credits passed, certifies as being achieved upon completion of the contract.

N_A = Net amount (Actual contract expenditure, excluding VAT)

P = Rand value of penalty payable

5. Tender Contract Participation Goal in respect of local enterprises

I/we hereby tender a Contract Participation Goal of ……..%

The undersigned, who warrants that he/she is duly authorized to do so on behalf of the firm or sole proprietor confirms that he/she understands the conditions under which such preferences are approved and confirms that the tender satisfies the conditions pertaining to Contract Participation goals for direct participation of local enterprises.

Signature: ……

Name:……

Duly authorized to sign on behalf of: ……..

Telephone:……

Fax:……...

6. Supporting Contract Participation Goal (CPG) Calculation

Schedule Item No	Name of EME / Supplier	Item description and services to be provided	Value (Rands)
		Total	

Signed on behalf of the tenderer: ……

*Note: Forms attached as annexure A to be completed and submitted with each payment certificate in order to monitor the CPG on a monthly basis

Amatola Water · Amanzi

AMATOLA WATER

CONTRACT NO: AW2023/24/06

UPGRADING AND REFURBISHMENT OF BULK WATER SUPPLY AND SANITATION AT VARIOUS DEPARTMENT OF EDUCATION SCHOOLS IN THE EASTERN CAPE PROVINCE (ECDOE) – NYANGA SENIOR SECONDARY SCHOOL, CHDM, NGCOBO.

T2 RETURNABLE DOCUMENTS

T2.1 LIST OF RETURNABLE DOCUMENTS

T2.1.1 General

The Tender Document must be submitted as a whole. All forms must be properly completed as required, and the document shall not be taken apart or altered in any way whatsoever.

The Tenderer is required to complete each and every Schedule and Form listed below to the best of his ability as the evaluation of tenders and the eventual contract will be based on the information provided by the Tenderer. Failure of a Tenderer to complete the Schedules and Forms to the satisfaction of the Employer will inevitably prejudice the tender and may lead to rejection on the grounds that the tender is not responsive.

T2.1.2 Returnable Schedules, Forms and Certificates

Below is the list of returnable schedules to be completed and returned with the bid.

SCHEDULE	DESCRIPTION
A	Record Of Addenda to Tender Documents
B	Compulsory Enterprise Questionnaire
C	Standard Bidding Documents
D	Certificate of Authority
E	B-BBEE Status Level Verification Certificate
F	Certificate of Authority for Signatory
G	Construction Experience
H	Key Personnel
I	Construction Equipment
J	Proposed Subcontractors
K	Health and Safety Declaration
L	Deviations and Qualifications

T2.2 RETURNABLE SCHEDULES

The returnable schedules, forms, and certificates as listed in T2.1.2 follow:

A. RECORD OF ADDENDA TO TENDER DOCUMENTS

The undersigned confirm that the following communications received from the Employer or his representative before the date of submission of this tender offer, amending the tender documents, have been considered in this tender offer. ***(Addenda can only be issued following approval from the Employer. The Employer's representative is not allowed to issue addenda to bidders without prior approval in terms of the SCM Delegations).***

ADDENDUM NO.	DATE

SIGNATURE: .....……... DATE: ….....

(Of person authorised to sign on behalf of the Tenderer)

Failure to complete, sign and date this form or failure to acknowledge receipt of each Addendum issued shall result in the tender being considered non-responsive and rejected in terms of clause C.3.8 of the Conditions of Tender.

B. 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: SBD4 issued by National Treasury must be completed for each tender and be attached as a tender requirement.

Section 8: SBD 6 issued by National Treasury must be completed for each tender and be attached as a tender requirement.

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 clearance status from the South African Revenue Services that it is in order;

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

iii) confirms that no partner, member, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears, 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

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

Signed		Date	
Name		Position	
Enterprise name			

Failure to complete, sign and date this form shall result in the tender being considered non-responsive and rejected in terms of clause C.3.8 of the Conditions of Tender.

C. STANDARD BIDDING DOCUMENTS

SBD 4

BIDDER'S DISCLOSURE

1. PURPOSE OF THE FORM

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

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

2. BIDDER'S DECLARATION

2.1 Is the bidder, or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest1 in the enterprise, employed by the state? **YES/NO**

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

Full Name	**Identity Number**	**Name of State institution**

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

2.2.1 If so, furnish particulars:

……

……

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

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

2.3.1 If so, furnish particulars:

……

……

3 DECLARATION

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

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

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

3.3 The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However, communication between partners in a joint venture or consortium2 will not be construed as collusive bidding.

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

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

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

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

3.7 exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

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

I CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 1, 2 and 3 ABOVE IS CORRECT.

I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME IN TERMS OF PARAGRAPH 6 OF PFMA SCM INSTRUCTION 03 OF 2021/22 ON PREVENTING AND COMBATING ABUSE IN THE SUPPLY CHAIN MANAGEMENT SYSTEM SHOULD THIS DECLARATION PROVE TO BE FALSE.

…… ……

Signature Date

…… ……

Position Name of bidder

SBD 6.1

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

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

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

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1. GENERAL CONDITIONS

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

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

1.2 To be completed by the organ of state

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

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

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

c) Either the 90/10 or 80/20 preference point system will be applicable in this tender. The lowest/ highest acceptable tender will be used to determine the accurate system once tenders are received.

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

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

1.4 To be completed by the organ of state:

The maximum points for this tender are allocated as follows:

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

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

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

2. DEFINITIONS

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

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

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

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

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

3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

3.1. POINTS AWARDED FOR PRICE

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

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

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

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

Where

Ps = Points scored for price of tender under consideration

Pt = Price of tender under consideration

Pmin = Price of lowest acceptable tender

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

3.2.1. **POINTS AWARDED FOR PRICE**

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

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

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

Where

Ps = Points scored for price of tender under consideration
Pt = Price of tender under consideration
Pmax = Price of highest acceptable tender

4. POINTS AWARDED FOR SPECIFIC GOALS

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

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

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

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

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

Table 1: Specific goals for the tender and points claimed are indicated per the table below.
(Note to organs of state: Where either the 90/10 or 80/20 preference point system is applicable, corresponding points must also be indicated as such.
***Note to tenderers: The tenderer must indicate how they claim points for each preference point system.*)**

The specific goals allocated points in terms of this tender	Number of points allocated (80/20 system) (To be completed by the organ of state)	Number of points claimed (80/20 system) (To be completed by the tenderer)
HDI (51% or more black ownership)	6	
Black women (51% or more women ownership)	3	
Black youth (51% or more youth ownership)	3	
People with disability (20% or more disabled people ownership)	2	
Locality (Enterprise within the Eastern Cape)	6	

DECLARATION WITH REGARD TO COMPANY/FIRM

4.3. Name of company/firm…….

4.4. Company registration number: ……...

4.5. 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 Owned Company

[TICK APPLICABLE BOX]

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

i) The information furnished is true and correct;

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

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

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

(a) disqualify the person from the tendering process;

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

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

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

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

…… **SIGNATURE(S) OF TENDERER(S)**
SURNAME AND NAME: ……
DATE: ……
ADDRESS: ……
……

D. CERTIFICATE OF AUTHORITY

The Tenderer must indicate the enterprise status by ticking the appropriate box hereunder.

(I) SOLE PROPRIETOR	(II) CLOSE CORPORATION	(III) PARTNERSHIP	(IV) COMPANY	(V) JOINT VENTURE / CONSORTIUM

The Tenderer must complete the relevant certificate(s) set out hereafter or must provide a certificate in the form of a resolution of the partners or directors authorizing the signatory on behalf of the enterprise(s) **and such resolution shall include a specimen signature of the signatory.**

Failure to complete, sign and date the relevant certificate(s) set out hereafter or failure to provide the certificate(s) in the form of a resolution as described above shall result in the quotation being considered non-responsive in terms of subclause F.3.8 of the Conditions of Tender and such a quotation shall be rejected.

E. B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE

Notes to tenderer:

1. The tenderer shall submit proof of B-BBEE Status Level of Contributor by submitting a copy of a valid B-BBEE Verification Certificate issued in accordance with the Amended Construction Sector Code published in Notice 931 of 2017 of Government Gazette No. 41287 of 1 December 2017.

2. The certificate shall:

   (i) have been issued by a verification agency accredited by the South African National Accreditation System (SANAS); or
   (ii) in the case of an Exempted Micro Enterprise (EME) with a total annual revenue of R10 million and less, be in the form of a sworn affidavit or a certificate issued by the Companies and Intellectual Property Commission (CIPC), in respect of their ownership and annual turnover, for the year ending not earlier than 12 (twelve) months prior to the tender closing date;
   (iii) in the case of a Qualifying Small Enterprise (QSE) with a total annual revenue of more than R10 million but less than 50 million, be in the form of a sworn affidavit or a certificate issued by the Companies and Intellectual Property Commission (CIPC), in respect of their ownership and annual turnover, for the year ending not earlier than 12 (twelve) months prior to the tender closing date; and
   (iv) have a date of issue not earlier than 12 (twelve) months prior to the tender closing date.

3. A consortium or joint venture (including unincorporated consortia and joint ventures) must submit a consolidated B-BBEE Status Level Verification Certificate. In addition, the consolidated B-BBEE Status Level Verification Certificate for unincorporated joint ventures shall only be applicable to this project (Tender No. to be indicated on the certificate).

4. An enterprise will qualify as an Exempted Micro Enterprise (EME) if it has a total annual revenue of R10 million or less, and is deemed to have the following B-BBEE Status in accordance with their black ownership levels:

   (i) if less than 30% Black Owned then **"Level Five Contributor"**;
   (ii) if at least 30% Black Owned but less than 51% Black Owned then **"Level Four Contributor"**;
   (iii) if at least 51% Black Owned but less than 100% Black Owned, then **"Level Two Contributor"**; and
   (iv) if 100% Black Owned then **"Level One Contributor"**.

5. Tenderers are advised that any misrepresentation in the affidavits is a criminal offence.

F. CERTIFICATE OF AUTHORITY FOR SIGNATORY

The Tenderer must indicate the enterprise status by ticking the appropriate box hereunder.

(I) COOPERATIVE	(II) SOLE PROPRIETOR	(III) CLOSE CORPORATION	(IV) PARTNERSHIP	(V) COMPANY	(VI) JOINT VENTURE / CONSORTIUM	
					Incorporated	
					Unincorporated	

I/We, the undersigned, being the Member(s) (Cooperative), Sole Owner (Sole Proprietor), Member(s) (Close Corporation), Partners (Partnership), Representative (Company) or Lead Partner (Joint Venture / Consortium), in the enterprise trading as:

.....

hereby authorise Mr/Mrs/Ms .....

acting in the capacity of .....

whose signature is .....

to sign all documents in connection with this bid and any contract resulting therefrom on behalf of the enterprise.

NAME	ADDRESS	SIGNATURE	DATE

Note:
The following document must be attached to this form according to the status of the enterprise, in the form of a resolution authorising the signatory to sign all documents in connection with this bid and any contract resulting therefrom on behalf of the enterprise, and **such resolution shall include a specimen signature of the signatory.**

Cooperative:	'Resolution of the Members'
Close Corporation:	'Resolution of the Members'
Company:	'Resolution of the Board' signed by the chairperson
Joint Venture / Consortium:	'Resolution/agreement passed/reached' signed by the authorised representatives of the enterprises

Failure to complete, sign and date this form or failure to provide the certificate(s) in the form of a resolution as described above shall result in the tender being considered non-responsive and rejected in terms of clause C.3.8 of the Conditions of Tender.

G. CONSTRUCTION EXPERIENCE

The following is a statement of work of similar nature recently successfully executed by myself / ourselves:

EMPLOYER: CONTACT PERSON AND TELEPHONE NUMBER	EMPLOYER'S AGENT: CONTACT PERSON AND TELEPHONE NUMBER	NATURE OF WORK	VALUE OF WORK (inclusive of VAT)	DATE COMPLETED OR EXPECTED TO BE COMPLETED

Attach additional pages if more space is required

SIGNATURE: .....……... DATE: .....

(Of person authorised to sign on behalf of the Tenderer)

H. KEY PERSONNEL

MANAGEMENT

The Tenderer must insert in the spaces provided below a list of the key personnel to be employed in the management of the construction of the Works, together with a resume of their experience with particular reference to the construction of similar Works.

The Tenderer shall attach the curriculum vitae of the listed key management personnel to the page included below for this purpose.

DESIGNATION	NAME	PROJECT TYPE	VALUE OF WORK	YEAR COMPLETED
CONSTRUCTION MANAGER (SITE AGENT).				
CONSTRUCTION SUPERVISOR (MAIN FOREMAN)				

Attach additional pages if more space is required

SIGNATURE: .....…….. DATE: …..

(Of person authorised to sign on behalf of the Tenderer)

SIGNATURE: .....…….. DATE: …..

(Of person authorised to sign on behalf of the Tenderer)

CURRICULUM VITAE OF KEY PERSONNEL – MANAGEMENT

Refer to H1.

Curriculum Vitae and Qualifications of key management personnel to be attached to this page.

I. CONSTRUCTION EQUIPMENT

The following are lists of major construction equipment that I / we presently own or will acquire for this contract if my / our tender is accepted.

(a) Details of major construction equipment owned by me / us:

DESCRIPTION *(type, size and capacity)*	**QUANTITY**	**YEAR OF MANUFACTURE**

Attach additional pages if more space is required

(b) Details of major construction equipment that will be acquired:

DESCRIPTION *(type, size and capacity)*	**QUANTITY**	**HOW ACQUIRED**	
		HIRE / BUY	**SOURCE**

Attach additional pages if more space is required

SIGNATURE: .....……..... DATE: .....

(Of person authorised to sign on behalf of the Tenderer)

J. PROPOSED SUBCONTRACTORS

I/We hereby notify you that it is my/our intention to employ the following subcontractors for work under this contract. If I/we am/are awarded a contract I/we agree that this notification does not change the requirement for me/us to submit the names of proposed subcontractors in accordance with the requirements of the contract for such appointments.

Acceptance of this tender shall not be construed as approval of any or all of the listed subcontractors. Should any or all of the subcontractors not be approved subsequent to the acceptance of the tender, it shall in no way invalidate this tender, and the tendered unit rates for the various items of work shall remain final and binding, even in the event of a subcontractor not listed below being approved by the Employer.

NAME OF SUBCONTRACTOR	CSD NUMBER	DESIGNATED GROUP AND OWNERSHIP %	B-BBEE LEVEL	NATURE OF WORK	PERCENTAGE TO BE SUBCONTRACTED

Attach additional pages if more space is required.

NB: The subcontractors listed above will not contribute to the achievements of the objectives specified in Section C3.3 Part G of this tender document.

SIGNATURE: .....…….. DATE: ….....

(Of person authorised to sign on behalf of the Tenderer)

K. HEALTH AND SAFETY DECLARATION

In terms of Regulation 5(1)(h) of the OHSA 1993 Construction Regulations 2014 (referred to as 'the Regulations' hereafter), a Contractor may only be appointed to perform construction work if the Employer is satisfied that the Contractor has the necessary competencies and resources to carry out the work safely in accordance with the Occupational Health and Safety Act No 85 of 1993, as amended and the OHSA 1993 Construction Regulations 2014.

To that effect a person duly authorised by the Tenderer must complete and sign the declaration hereafter in detail.

Declaration by Tenderer

1. I, the undersigned, hereby declare and confirm that I am fully conversant with the Occupational Health and Safety Act No. 85 of 1993 (as amended by the Occupational Health and Safety Amendment Act No. 181 of 1993), and the OHSA 1993 Construction Regulations 2014.

2. I hereby declare that my company has the competence and the necessary resources to safely carry out the construction work under this contract in compliance with the Construction Regulations and the Employer's Health and Safety Specification.

3. I propose to achieve compliance with the Regulations by one of the following:

   (a) From my own competent resources as detailed in 4(a) hereafter: ..... ***Yes / No**

   (b) From my own resources or still to be appointed, and trained until competency is achieved, as detailed in 4(b) hereafter: ..... ***Yes / No**

   (c) From outside sources by appointment of competent specialist subcontractors as detailed in 4(c) hereafter: ..... ***Yes / No**

   (***** = *delete whatever is not applicable*)

4. Details of resources I propose:

   Note: *Competent resources shall include safety personnel such as the construction manager, construction health and safety officer and construction supervisor as defined in Regulation 8, and competent persons as defined in the OHSA 1993 Construction Regulations 2014, as applicable to this contract.*

   (a) Details of the competent and qualified key persons from my company's own resources, who will form part of the contract team:

NAME OF COMPETENT PERSONS	POSITION TO BE FILLED BY COMPETENT PERSONS

(b) Details of training of persons from my company's own resources (or to be hired) who still have to be trained to achieve the necessary competency:

(i) By whom will training be provided? .....

(ii) When will training be undertaken? .....

(iii) List the positions to be filled by persons to be trained or hired: .....

(c) Details of competent resources to be appointed as subcontractors if competent persons cannot be supplied from own company:

Name of proposed subcontractor: .....

Qualifications or details of competency of the subcontractor: .....

5. I hereby undertake, if my tender is accepted, to provide, before commencement of the works under the contract, a suitable, sufficiently documented and coherent site-specific Health and Safety Plan in accordance with Regulation 7(1)(a) of the Construction Regulations, which plan shall be subject to approval by the Employer.

6. I confirm that copies of my company's approved Health and Safety Plan, the Employer's Health and Safety Specification as well as the OHSA 1993 Construction Regulations 2014 will be provided on site and will at all times be available for inspection by the Contractor's personnel, the Employer's personnel, the Employer's Agent, Construction Health and Safety Agent, visitors, and officials and inspectors of the Department of Labour.

7. I hereby confirm that adequate provision has been made in my tendered rates and prices in the schedule of quantities to cover the cost of all resources, actions, training and all health and safety measures envisaged in the OHSA 1993 Construction Regulations 2014, and that I will be liable for any penalties that may be applied in terms of the said Regulations (Regulation 33) as a result of contravening or failing to comply with the provisions of the Act and the Regulations.

8. I agree that my failure to complete and execute this declaration to the satisfaction of the Employer will mean that I am unable to comply with the requirements of the OHSA 1993 Construction Regulations 2014, and accept that my tender will be prejudiced and may be rejected at the discretion of the Employer.

SIGNATURE: ..... DATE: .....…….....

(Of person authorised to sign on behalf of the Tenderer)

L. DEVIATIONS AND QUALIFICATIONS

Should the Tenderer wish to make any deviation from or any qualification to the Special Conditions of Contract, Specifications, Bill of Quantities, or Drawings, or should he wish to qualify the tender in any way, he shall indicate the proposals clearly hereunder or alternatively on photocopies of the original tender documentation which shall be attached to this page.

Please note: The extent of deviations from the tender documents issued by the Employer prior to the tender closing date is limited to those permissible in terms of the Conditions of Tender. Please also refer to Returnable Schedule N.

SECTION	PAGE	DEVIATION OR QUALIFICATION, INCLUDING REFERENCE CLAUSE OR ITEM NUMBER

Attach additional pages if more space is required

SIGNATURE: .....…….. DATE: …….....

(Of person authorised to sign on behalf of the Tenderer)

AMATOLA WATER

CONTRACT NO: AW2023/24/06

UPGRADING AND REFURBISHMENT OF BULK WATER SUPPLY AND SANITATION AT VARIOUS DEPARTMENT OF EDUCATION SCHOOLS IN THE EASTERN CAPE PROVINCE (ECDOE) – NYANGA SENIOR SECONDARY SCHOOL, CHDM, NGCOBO.

The Contract

CONTRACT NO: AW2023/24/06 – DoE CLUSTER 04

UPGRADING AND REFURBISHMENT OF BULK WATER SUPPLY AND SANITATION AT VARIOUS DEPARTMENT OF EDUCATION SCHOOLS IN THE EASTERN CAPE PROVINCE (ECDOE) – NYANGA SENIOR SECONDARY SCHOOL, CHDM, NGCOBO.

Based on

GCC 3rd edition (2015): General Conditions of Contract (GCC)

C1 AGREEMENTS AND CONTRACT DATA

C1.1 FORM OF OFFER AND ACCEPTANCE

C1.1.1: OFFER

The Employer, identified in the Acceptance signature block, has solicited offers to enter into a contract in respect of the following works:

UPGRADING AND REFURBISHMENT OF BULK WATER SUPPLY AND SANITATION AT VARIOUS DEPARTMENT OF EDUCATION SCHOOLS IN THE EASTERN CAPE PROVINCE (ECDOE) – NYANGA SENIOR SECONDARY SCHOOL, CHDM, NGCOBO.

The Tenderer, identified in the Offer signature block below, has examined the documents listed in the Tender Data and addenda thereto as listed in the Tender 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:

Amount 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: *(of person authorised to sign the tender)* .....
Name: (*of signatory in capitals)* .....
Capacity: (*of signatory*) .....
Name of Tenderer: (*organisation*) .....
Address: ……..
.....
Telephone number: …… **E-mail:** .....
Witness:
Signature: .....
Name: *(in capitals)* .....
Date: .....

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

C1.1.2: ACCEPTANCE

By signing this part of the 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 the schedules, forms, drawings and documents or parts thereof, which may be incorporated by reference into Parts C1 to C4 above.

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

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

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

Signature: ....
Name: *(in capitals)* ....
Capacity: ....
Name of Employer: *(organisation)* ....
Address: ....
.....

Witness:
Signature: ..... **Name:** *(in capitals)* .....

Date: .....

C1.1.3: SCHEDULE OF DEVIATIONS

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 Tender Data and the Conditions of Tender.

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 agreement reached during the process of offer and acceptance, the outcome of such agreement shall be recorded here.

Any other matter arising from the process of offer and acceptance either as a confirmation, clarification or change to the tender documents and which it is agreed by the Parties becomes an obligation of the contract shall also be recorded here.

Any change or addition to the tender documents arising from the above agreement 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: .....
.....

5 **Subject:** .....
Details: .....
.....

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

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

FOR THE TENDERER:

Signature: .....
Name: .....
Capacity: .....
Tenderer: *(Name and address of organisation)*.....
.....
Witness:
Signature: .....
Name: .....
Date: .....

FOR THE EMPLOYER:

Signature: .....
Name: .....
Capacity: .....
Employer: *(Name and address of organisation)* .....
.....
Witness:
Signature: .....
Name: .....
Date: .....

AMATOLA WATER

CONTRACT NO: AW2023/24/06

UPGRADING AND REFURBISHMENT OF BULK WATER SUPPLY AND SANITATION AT VARIOUS DEPARTMENT OF EDUCATION SCHOOLS IN THE EASTERN CAPE PROVINCE (ECDOE) – NYANGA SENIOR SECONDARY SCHOOL, CHDM, NGCOBO.

C1.2 CONTRACT DATA

C1.2.1: CONDITIONS OF CONTRACT

C1.2.1.1 General Conditions of Contract

This Contract will be based on the 'General Conditions of Contract for Construction Works, Third Edition (2015)', issued by the South African Institution of Civil Engineering (abbreviated title: 'GCC 2015').

It is agreed that the only variations from the GCC 2015 are those set out hereafter under "C1.2.1.2 SPECIAL CONDITIONS OF CONTRACT".

C1.2.1.2 Special Conditions of Contract (SCC)

These Special Conditions of Contract (SCC) form an integral part of the Contract. The Special Conditions of Contract shall amplify, modify, or supersede, as the case may be, the GCC 2015 to the extent specified below, and shall take precedence and shall govern.

The clauses of the Special Conditions of Contract hereafter are numbered "SCC" followed in each case by the number of the applicable clause or subclause in the GCC 2015, and the applicable heading, or (where a new special condition that has no relation to the existing clauses is introduced) by a number that follows after the last clause number in the GCC 2015, and an appropriate heading.

CLAUSE	DESCRIPTION / WORDING
SCC 3.2.3	The Employer's Agent shall obtain the specific approval of the Employer before carrying out any of his functions or duties according to the following Clauses of the General Conditions of Contract: 1 Clause 5.11.1: Suspension of the Works 2 Clause 5.12: Extension of Time for Practical Completion
SCC 3.2.4	The Employer's Agent has been appointed as Agent on this contract, in terms of Clause 5 of the Construction Regulations, 2014 as promulgated in terms of Section 43 of the Occupational Health and Safety Act, 1993. Occupational Health, Safety & Wellness Sub Directorate – Public Health and the duly appointed H&S Officials has been appointed as Client Agents on this contract, in terms of Clause 5 of the Construction Regulations, 2014 as promulgated in terms of Section 43 of the Occupational Health and Safety Act, 1993. The Principal Contractor shall perform a preliminary assessment of the project generated H&S plan and submit such to Occupational Health, Safety & Wellness Sub Directorate – Public Health for legal compliance reassessment & verification / approval prior to any works commencing. The duly appointed H&S Officials will be responsible for further monitoring and the auditing of the approved H&S plan for legal compliance.
SCC 4.1.3	**Add the following new clauses at the end of clause 4.1.2:** "The Employer and the Contractor hereby agree, in terms of the provisions of Section 37(2) of the Occupational Health and Safety Amendment Act, 1993 (Act 85 of 1993), hereinafter referred to as 'the Act', that the following arrangements and procedures shall apply between them to ensure compliance by the Contractor with the provisions of the Act: (i) The Contractor undertakes to acquaint the appropriate officials and employees of the Contractor with all relevant provisions of the Act and the Regulations promulgated in terms of the Act. (ii) The Contractor undertakes that all relevant duties, obligations and prohibitions imposed in terms of the Act and Regulations on the Contractor will be fully complied with. (iii) The Contractor accepts sole liability for such due compliance with the relevant duties, obligations and prohibitions imposed by the Act and Regulations and expressly absolves the Employer from himself being obliged to comply with any of the aforesaid duties, obligations and prohibitions, with the exception of such duties, obligations and prohibitions expressly assigned to the Employer in terms of the Act and its associated Regulations. (iv) The Contractor agrees that any duly authorised officials of the Employer shall be entitled, although not obliged, to take such steps as may be necessary to monitor that the Contractor has conformed to his undertakings as described in paragraphs (i) and (ii) above, which steps may include, but will not be limited to, the right to inspect any appropriate site or premises occupied by the Contractor, or any appropriate records or safety plans held by the Contractor. (v)The Contractor shall be obliged to report forthwith to the Employer and Employer's Agent any investigation, complaint or criminal charge which may arise as a consequence of the provisions of the Act and Regulations, pursuant to work performed in terms of this Contract, and shall, on written demand, provide full details in writing, to the Employer and Employer's Agent, of such investigation, complaint or criminal charge
SCC 4.3.1	**Add the following** to the clause: For conventional construction works the Basic Conditions of Employment Act of 1997 (Act No 75 of 1997) shall apply and the minimum employment conditions which will apply shall be guided by the latest Sectorial Determination: Civil Engineering Sector published from time to time. Compliance with the National Environmental Management Act (**NEMA**), **Act** 107 of 1998.

	Basic Conditions of Employment Act of 1997 (Act No 75 of 1997) as per Government Notice R63 of 25 January 2002, shall apply to works described in the Scope of Work as being labour intensive and which are undertaken by unskilled or semi-skilled workers." "The Contractor shall comply with the Occupational Health and Safety Specification prepared by the Employer in terms of the Construction Regulations, 2014 promulgated in terms of Section 43 of the Occupational Health and Safety Act (Act No. 85 of 1993). Without limiting the Contractor's obligations in terms of the Contract, the Contractor shall before commencement of the Works or any part thereof, be in the possession of an approved Health and Safety Plan."
SCC 4.3.3	**Add the following at the end of Clause 4.3:** "4.3.3 The Employer and the Contractor hereby agree, in terms of the provisions of Section 37(2) of the Occupational Health and Safety Amendment Act, 1993 (Act 85 of 1993), hereinafter referred to as 'the Act', that the following arrangements and procedures shall apply between them to ensure compliance by the Contractor with the provisions of the Act: (i) The Contractor undertakes to acquaint the appropriate officials and employees of the Contractor with all relevant provisions of the Act and the Regulations promulgated in terms of the Act. (ii) The Contractor undertakes that all relevant duties, obligations and prohibitions imposed in terms of the Act and Regulations on the Contractor will be fully complied with. The Contractor accepts sole liability for such due compliance with the relevant duties, obligations and prohibitions imposed by the Act and Regulations and expressly absolves the Employer from himself being obliged to comply with any of the aforesaid duties, obligations and prohibitions, with the exception of such duties, obligations and prohibitions expressly assigned to the Employer in terms of the Act and its associated Regulations. (iii) The Contractor agrees that any duly authorised officials of the Employer shall be entitled, although not obliged, to take such steps as may be necessary to monitor that the Contractor has conformed to his undertakings as described in paragraphs (i) and (ii) above, which steps may include, but will not be limited to, the right to inspect any appropriate site or premises occupied by the Contractor, or any appropriate records or safety plans held by the Contractor. (iv) The Contractor shall be obliged to report forthwith to the Employer and Employer's Agent any investigation, complaint or criminal charge which may arise as a consequence of the provisions of the Act and Regulations, pursuant to work performed in terms of this Contract, and shall, on written demand, provide full details in writing, to the Employer and Employer's Agent, of such investigation, complaint or criminal charge. 4.3.4 The Contractor shall furthermore, in compliance with Constructional Regulations 2014 to the Act: (i) Acquaint himself with the requirements of the Employer's health and safety specification as laid down in regulation 5(1)(b) of the Construction Regulation 2014 and prepare a suitably and sufficiently documented health and safety plan as contemplated in regulation 7(1)(a) of the Construction Regulation 2014 for approval by the Employer or his assigned agent. The Contractor's health and safety plan and risk assessment shall be submitted to the Employer for approval within seven (7) days after **the Commencement Date** and shall be implemented and maintained from the Commencement of the Works.

	The Employer, or his assigned agent, reserves the right to conduct periodic audits, as contemplated in the Construction Regulations 2014, to ensure that the Contractor is compliant in respect of his obligations. Failure by the Contractor to comply with the requirements of these Regulations shall entitle the Employer's Agent, at the request of the Employer or his agent, to suspend all or any part of the Works, with no recourse whatsoever by the Contractor for any damages incurred as a result of such suspension, until such time that the Employer or his agents are satisfied that the issues in which the Contractor has been in default have been rectified."
SCC 5.3.3	Add the following to Clause 5.3.3 after the last sentence: "The Contractor shall not commence working until they have an approved project specific health and safety plan in terms of the Occupational Health and Safety Act 1993: Construction Regulations 2014 and complied with the initial requirements thereof."
SCC 5.4.1	Between the wording "… Site," and "the location …." In the third line, add the following: "subject to the Contractor having an approved project specific health and safety plan in terms of the Occupational Health and Safety Act 1993: Construction Regulations 2014 and complied with the initial requirements thereof,"
SCC 5.12.5	Add the following to Clause 5.12 5.12.5 Critical Path Provision A delay in so far as extension of time is concerned, will be regarded as a delay only if, on a claim by the Contractor in accordance with the General Conditions of Contract, the Employer's Agent rules that all progress on an item or items of work on the critical path of the approved programme for the execution of the Works by the Contractor, has been brought to a halt. Delays on normal working days only, based on a working week, of five normal working days, will be taken into account for the extension of time.
SCC 6.2.2	Replace the entire contents of Clause 6.2.2 with the following: "If the Contractor fails in his obligations to provide the stated security within the period stated in Clause 5.3.2, or if the Performance Guarantee shall differ from the pro-forma provided under Clause C1.3: Performance Guarantee of the Contract Data, the Employer may terminate the Contract in terms of Clause 9.2."
SCC 6.2.3	Replace the entire contents of Clause 6.2.3 with the following: "The Contractor shall ensure that the Performance Guarantee remains valid and enforceable until the issue of the Certificate of Completion."
SCC 8.6.8	Add Clause 8.6.8: "In the event of any claim arising under the policies held in terms of this Clause, the Contractor shall forthwith take all necessary steps to lodge his claim on the joint behalf of himself and the Employer, and to secure settlement of such claim, and he shall submit to the Employer's Agent copies of all claims and associated documents. The claim submitted by the Contractor shall cover the cost of repairing and making good as required by Clauses 8.2.2.1 and 8.2.2.3."
SCC 8.6.9	Add Clause 8.6.9: "With regard to the Compensation for Occupational Injuries and Diseases Act (Act no. 130 of 1993), where applicable, the Contractor shall before commencement of the Works deliver to the Employer a letter, either (a) from his insurance company certifying that the Contractor has effected insurance with the company for the full extent of his potential liability in respect of all workmen employed by him on the contract and undertaking to notify the Employer of the expiry date of the policy at least one calendar month before such date, or from the Compensation Commissioner certifying that the Contractor has complied with the requirements of the above-mentioned Act and is at present in good standing with the Compensation Fund."

C1.2.2: DATA PROVIDED BY THE EMPLOYER

The following amendments and additions to the Clauses are the contract specific data applicable to this Contract:

Clause	Description / Wording
1.1.1.13	The Defects Liability Period is **twelve (12) calendar months** measured from the date of the Certificate of Completion.
1.1.1.14	The time for achieving Practical Completion is **6 calendar months**, calculated from the Commencement Date, including special non-working days.
1.1.1.15	The Employer is: **Amatola Water**
1.1.1.16	The Employer's Agent is Royal Mndawe Holdings (Pty) Ltd t/a ROMH Consulting, also referred to in the Contract as "**ROMH**" or "Engineer".
1.1.1.26	The Pricing Strategy is: **Re-measurable Contract**
1.2.1.2	The Employer's address for receipt of communications is: Telephone: (0)43 707 3700 Facsimile: (0)43 707 3701 Address (Postal): Private Bag X3 VINCENT 5217 Address (Physical): 6 Lancaster Road Vincent EAST LONDON 5247
1.2.1.2	The Employer's Agent's address for receipt of communications and notices is: Address (Physical): Leadwood House Cedar Square Bonza Bay Road Beacon Bay East London 5247 Telephone: +27 (43) 748 0018
5.1.1 and 5.8.1	The non-working days are Sundays The special non-working days are: 1 Public holidays 2 The year-end break commencing and ending on dates as specified by SAFCEC.
5.3.1	The documentation required before commencement with Works execution are: • Health and Safety Plan (Refer to Clause 4.3) • Initial programme (Refer to Clause 5.6) • Insurance (Refer to Clause 8.6) • Security (Refer to Clause 6.2) • Letter of Good Standing from the Compensation Commissioner (if not insured with a Licensed Compensation Insurer) • Cash flow Projection • Quality Management Plan
5.3.2	The Contractor is required, **within 7** days of the Commencement Date, to submit the documents listed below to the Employer's Agent for his approval. **Health and Safety Plan**

Clause	Description / Wording
	The Contractor shall deliver his health and safety plan, in terms of Clause 7(1) (d) of the Construction Regulations 2014. **Initial Programme** The Contractor shall deliver his Initial Programme of work in terms of Clause 5.6 **Insurance** Submit copies of receipts of registration, or payment for the premiums for the following insurances, as required by the new Clause 8.6 in this Contact Data. (a) Proof of registration with the Department of Labour as an employer, in terms of the Compensation for Occupational Injuries and Diseases Act 1993, as amended (b) Common Law Liability Insurance for the duration of the Contract Period and with a minimum Limit of Indemnity of not less than R1 000 000 for any one accident; (c) Insurance on an All-Risks basis for construction plant, equipment and other things (except those intended to incorporation into the works) brought onto the site to the full value of such construction plant, equipment and other things; (d) Motor Vehicle Liability Insurance, comprising a minimum of Balance of Third Party motor risks, including Passenger Liability, subject to a minimum limit of R2.5 million; (e) Where the Contract involves manufacturing and/or fabrication of the works or part thereof at premises other than the site, the Contractor shall satisfy the employer that all materials and equipment for incorporation in the works are adequately insured during manufacture and/or fabrication. In the event of the Employer having an insurable interest in such works during manufacture or fabrication, then such interest shall be noted by endorsement to the Contractor's Policies of Insurance. (f) Imported equipment or component parts or materials to be supplied in terms of this Contract which require any process of assembly or finishing in South Africa prior to delivery to the site are to be insured by the Contractor up to the commencement of transit to site of the assembled or finished equipment, component parts or materials, unless special arrangements are made with the Employer. These insurances shall be maintained in force for the duration of the Contract, including any Defects Liability Period and in respect of Sub-Contractors, the Contractor shall be deemed to have complied with the provisions of the requirements relating to insurance by ensuring that the Sub-Contractors have affected such insurance. **Security** Submit a Guarantee of an Insurance Company or Bank to be jointly and severally bound with the Contractor for an amount equal to **ten per cent (10%)** of the Contract Price if required. The wording of the Guarantee shall be identical to the pro forma provided in Part C1.3 of this tender document.
5.4.2	The access and possession of Site shall not be exclusive to the Contractor but as set out in the Site Information.
5.5.1	The Works shall be completed within **6 months.**

Clause	Description / Wording
5.6.1	The Contractor shall deliver his Works programme within seven (7) days after the Commencement Date.
5.8.1	Delete the words “between sunset and sunrise” in the first line and replace with “outside normal working hours”. Normal working hours shall be those as stated in the applicable Sectoral Determination applicable to a 6 (six) day week, Monday to Friday from 07:00 to 17:00, and Saturday from 07:00 to 13:00. Non-working days are Sundays. Special non-working days are all applicable gazetted public holidays, election day of the local government elections and national elections (when applicable) and the year-end break. For the purposes of this Contract the year-end break shall be as declared by SAFCEC.
5.12.2.2	Add the following to Clause 5.12.2.2: The time period specified as the time for completion includes allowances for delays and days on which it is expected that work, on the critical path items of the Works, would be prevented due to normal weather conditions such as wind, rainfall or the subsequent waterlogged condition. Based on average weather conditions of wind, rain and sunshine the allowances are actual and consequential delays shall be as follows: • 3 working days per month for the months of May to October • 2 working days per month for the months of November to April If the Contractor has been prevented by these weather conditions from working on the critical path items of the works, then he must notify the Employer’s Agent in writing. The submission shall be made within five calendar days of the resumption of work. The Employer’s Agent shall upon considering all the relevant factors determine the extension of time to be granted on the basis that an extension of time to the contract will only be granted if the total number of days upon which work on the critical items was prevented, exceeds the total number of days calculated in terms of the above allowance and considering the official contract period as a whole. The tendered sums of the appropriate time-related items shall be increased to take account of the extensions of time granted.
5.12.3	Replace the entire sub-clause with the following: “If extension of time is granted for whatever reason, the Contractor shall be paid for such actual delays incurred within the extension period granted, at the rate tendered in the Bill of Quantities for extension of time. For the evaluation of delays, the Contractual Law Society protocol will be followed.”
5.12.2.4	In the event of any disruption which is entirely beyond the Contractor’s control, no compensation will be allowed.
5.13.1	**The penalty for failing to complete the Works is R 1 000 per day.** Deductions for penalties imposed in terms of not achieving the Contract Participation Goal as stipulated under C3.3
5.16.3	The latent defect period is 10 years.
6.2.1	Replace the wording “as selected” in Clause 6.2.1 with “as stated”. The security to be provided by the Contractor shall be: • a Performance Guarantee of **ten per cent (10%)** of the Contract Sum, plus • Retention Money amounting to **five per cent (5%)** of the Contract Price. Retention monies due shall be subjected to Clauses 6.10.1.3 and 6.10.3. A mandatory 10% retention of interim payments (up to a ceiling of 5% of the Contract Value) in line with National Treasury’s Directive is applicable. Half of this is released upon issue of the Certificate of Completion. The remainder is released upon expiry of the Defects Liability Period.

Clause	Description / Wording
	The Performance Guarantee shall be from an approved Insurance Company or Bank to be jointly and severally bound with the Contractor, in accordance with the provisions of the Performance Guarantee. A Retention Money Guarantee is not permitted. The wording of the Performance Guarantee shall be identical to the pro-forma provided under Clause C1.3: Performance Guarantee of the Contract Data The time to deliver the Performance Guarantee is within seven (7) days after the Commencement Date.
6.3.3	Replace sub clause 6.3.3 with the following: "Any increase in the quantity of work scheduled for a particular order and which would result in over-expenditure for that particular order shall be subject to the prior approval by the Employer's Agent."
6.7.2	Replace sub clause 6.7.2 with the following: "The Employer's Agent shall ascertain and determine the value of the Works but, when required to do so by the Employer's Agent, the Contractor shall measure the work executed and shall deliver to the Employer's Agent a supporting statement with his statement in terms of Clause 6.10.1, showing the said measurements and all other particulars required by the Employer's Agent, and in the format required by the Employer's Agent."
6.8.2	Contract Price Adjustment shall **not** be applied on this Contract.
6.8.3	Price adjustments for variations in the costs of special materials are **not** allowed.
6.10.1.5	The percentage advance on materials on site not yet built into the Permanent Works is 80%.
6.10.4	**Replace** the wording "28 days" in the seventh line with "within 30 days of the Employer receiving payment by the relevant funding institution(s) who is/are funding this contract or within 30 days". Insert "whichever occurs last" at the end of the second last sentence.
8.6.1.1.2:	The value of Plant and materials supplied by the Employer to be included in the insurance sum is **NIL**.
8.6.1.1.3:	The amount to cover professional fees for repairing damage and loss to be included in the insurance sum is 15% of the Contract Price.
8.6.1.2	A Coupon Policy for Special Risks Insurance issued by the South African Special Risks Insurance Association is required.
8.6.1.3:	The limit of indemnity for liability insurance is: Project < R5m, limit R2m Project > R5m, limit R5m Add to Clause 8.6.1.3: "The minimum amount of insurance required in terms of this Clause shall be per event, the number of events being unlimited."
8.6.1.5	Amend Clause 8.6.1.5 to read: "Insurance of all materials stored off Site, and intended for incorporation in the Permanent Works, including their delivery to the Site and off-loading on Site, to the value of such materials for which payment is made in terms of Clause 6.10.1.1 hereof."
8.6.5	Add to Clause 8.6.5: "The Employer shall approve (or disapprove) the terms of the insurances within fourteen (14) days from the date of receipt of the policies provided in terms of Clause 8.6.5."
8.6.6	Add to Clause 8.6.6: "The policies and the proof of payment of premiums and continuity of the policies shall be produced within seven (7) days."
9.1.4	Replace the contents of Clause 9.1.4 with the following: "Up to the time of termination of the Contract by either party in terms of this Clause, or

Clause	Description / Wording
	until the Contractor gives notice in terms of this Clause to terminate the Contract and the Contractor is precluded from exercising his right to terminate the Contract because the Employer agrees to bear any resultant additional costs provided for in Clause 9.1.2.2 hereof, the Contractor: a) will be entitled to an extension of calendar time for working days lost as may be approved by the Employer's Agent, and b) will be reimbursed the cost of delays per working day, where the number of working days will be determined pro rata the effect the delays have on the progress of the work as agreed with the Employer's Agent. Payment in full and final settlement will be made at the rates tendered for the payment items specially provided in the Bill of Quantities Where the circumstances described in Clauses 9.1.1 and 9.1.2 are applicable only to a certain portion of the contract, the Employer's Agent will decide after consulting the Contractor, to what extent the contract as a whole is affected and whether or not a claim in terms of this Clause can be submitted. No payment will be made in terms of this Clause after the Due Completion Date.
10.3.2	Amicable settlement in terms of Clause 10.4 shall be contemplated for all disputes prior to referring any dispute to adjudication or arbitration.
10.4.1	Dispute resolution shall be by amicable settlement.
10.5.1	Dispute resolution shall be by ad-hoc adjudication.
10.5.3	The number of Adjudication Board Members to be appointed is one (1).
10.7.1	The determination of disputes which are unresolved in terms of Clause 10.5.3 shall be by arbitration.
10.11	*Add the following additional clause:* Details to be confidential The Contractor shall treat the details of the Works comprised in this Contract as private and confidential (save in so far as may be necessary for the purposes hereof) and shall not publish or disclose the same or any particulars thereof in any trade or technical paper elsewhere without the prior written consent of the Employer's Agent.

Part 2: Data provided by the Contractor

The contractor is advised to read the *General Conditions of Contract for Construction Works, Third Edition, 2015* published by the South African Institution of Civil Engineering, Private Bag X200, Halfway House, 1685, in order to understand the implications of this data which is required to be completed. Copies of these conditions of contract may be obtained from www.saice.org.za .

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

Clause	Data
1.1.1.9	The name of the Contractor is: .....
1.2.1.2	The address of the Contractor is Address (physical): .... Address (postal): .... Telephone. ..... Facsimile: ..... e-mail: .....
6.5.1.2.3	The percentage allowance to cover overhead charges is ..... %

C1.3 PERFORMANCE GUARANTEE (PRO FORMA)

GUARANTOR DETAILS AND DEFINITIONS

“Guarantor”: means:
.....

Physical address:
.....

“Employer” means: **AMATOLA WATER**

“Contractor”means:
.....

“Employer’s Agent” means: **ROMH CONSULTING**

“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
.....

Amount in words:
.....

“Expiry Date” means:
.....

CONTRACT DETAILS

Engineer issues: Interim Payment certificates, Final Payment certificate and the certificate Completion of the Works as defined in the Contract.

PERFORMANCE GUARANTEE

1. The Guarantor's liability shall be limited to the amount of the Guaranteed Sum.

2. The Guarantor's period of liability shall be from and including the date of issue of this Performance Guarantee and up to and including the Expiry Date or the date of issue by the Engineer of the Final Taking Over Certificate or the date of payment in full of the Guaranteed Sum, whichever occurs first. The Engineer and/or the Employer shall advise the Guarantor in writing of the date on which the certificate of Completion of the Works has been issued.

3. The Guarantor hereby acknowledges that:

   3.1. 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;

   3.2. its obligation under this Performance Guarantee is restricted to the payment of money.

4. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor hereby undertakes to pay the Employer the sum certified upon receipt of the documents identified in 4.1 to 4.3:

   4.1. A copy of a first written demand issued by the Employer to the Contractor stating that payment of a sum certified by the Engineer in an Interim or Final Payment certificate has not been made in terms of the Contract and failing such payment within seven (7) calendar days, the Employer intends to call upon the Guarantor to make payment in terms of 4.2;

   4.2. 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 seven (7) days has elapsed since the first written demand in terms of 4.1 and the sum certified has still not been paid;

   4.3. A copy of the aforesaid payment certificate which entitles the Employer to receive payment in terms of the Contract of the sum certified in 4.

5. Subject to the Guarantor's maximum liability referred to in 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:

   5.1. the Contract has been terminated due to the Contractor's default and that this Performance Guarantee is called up in terms of 5; or

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

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

6. It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 4 and 5 shall not exceed the Guarantor's maximum liability in terms of 1.

7. Where the Guarantor has made payment in terms of 5, the 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.

8. Payment by the Guarantor in terms of 4 or 5 shall be made within seven (7) calendar days upon receipt of the first written demand to the Guarantor.

9. Payment by the Guarantor in terms of 5 will only be made against the return of the original Performance Guarantee by the Employer.

10. The Employer shall have the absolute right to arrange his/her affairs with the Contractor in any manner which the Employer may deem fit and the Guarantor shall not have the right to claim his/her release from this Performance Guarantee on account of any conduct alleged to be prejudicial to the Guarantor.

11. The Guarantor chooses the physical address as stated above for the service of all Notices for all purposes in connection herewith.

12. This Performance Guarantee is neither negotiable nor transferable and shall expire in terms of 2, where after no claims will be considered by the Guarantor. The original of this Guarantee shall be returned to the Guarantor after it has expired.

13. This Performance Guarantee, with the required demand Notices in terms of 4 or 5, shall be regarded as a liquid document for the purposes of obtaining a court order.

14. Where this Performance Guarantee is issued in the Republic of South Africa, the Guarantor hereby consents in terms of Section 45 of the Magistrate's Courts Act No 32 of 1944, as amended, to the jurisdiction of the Magistrate's Court of any district having jurisdiction in terms of Section 28 of the said Act notwithstanding that the amount of the claim may exceed the
15. jurisdiction of the Magistrate's Court.

SIGNED AT: ……

GUARANTOR (1)	**SIGNATURE**
DATE	**CAPACITY**
GUARANTOR (2)	**SIGNATURE**
DATE	**CAPACITY**
WITNESS (1)	**SIGNATURE**
WITNESS (2)	**SIGNATURE**

C1.4 AGREEMENT IN TERMS OF SECTION 37 (2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT, 1993 (ACT 85 OF 1993)

THIS AGREEMENT made between: .....

(hereinafter referred to as "the Employer") of the one part, herein represented by:

.....

in his capacity as .....

AND: .....

(hereinafter referred to as "the Mandatory") of the other part, herein represented by:

.....

in his capacity as .....

and being duly authorised to act as Mandatory on behalf of the Contractor;

WHEREAS the Employer is desirous that certain works be constructed, viz. (contract No.)

..... (title) .....

and has accepted a tender by the Mandatory for the construction, completion and defects correction of such works and whereas the Employer and the Mandatory have agreed to certain arrangements and procedures to be followed in order to ensure compliance by the Mandatory with the provisions of the Occupational Health and Safety Act 1993 (Act 85 of 1993);

NOW THEREFORE THIS AGREEMENT WITNESSESS AS FOLLOWS:

1 The Mandatory shall execute the work in accordance with the Contract Documents pertaining to this Contract.

2 This Agreement shall hold good from its Commencement Date, which shall be the date of a written notice from the Employer or Employer's Agent requiring him to commence the execution of the Works, to either

(a) the date of the Final Approval Certificate issued in terms of Clause 5.16.1 of the General Conditions of Contract 2015 (hereinafter referred to as "the GCC"),

(b) The date of termination of the Contract in terms of Clauses 9.1, 9.2 or clause 9.3 of the GCC.

3 The Mandatory declares himself to be conversant with the following:

(a) All the requirements, regulations and standards of the Occupational Health and Safety Act (Act 85 of 1993), hereinafter referred to as "The Act", together with its amendments and with special reference to the following Sections of The Act:

(i) Section 8 : General duties of employers to their employees;

(ii) Section 9 : General duties of employers and self-employed persons to persons other than employees;

(iii) Section 37 : Acts or omissions by employees or mandatories, and

(iv) Subsection 37(2) relating to the purpose and meaning of this Agreement.

(b) The procedures and safety rules of the Employer as pertaining to the Mandatory and to all his subcontractors.

4 In addition to the requirements of Clause 8.4 of the GCC and all relevant requirements of the above-mentioned Volume 3, the Mandatory agrees to execute all the Works forming part of this Contract and to operate and utilise all machinery, plant and equipment in accordance with the Act.

5 The Mandatory is responsible for the compliance with the Act by all his subcontractors, whether or not selected and/or approved by the Employer.

6 The Mandatory warrants that all his and his subcontractors' workmen are covered in terms of the Compensation for Occupational Injuries and Diseases Act, 1993 which cover shall remain in force whilst any such workmen are present on site. A letter of good standing from the Compensation Commissioner to this effect must be produced to the Employer upon signature of the agreement.

7 The Mandatory undertakes to ensure that he and/or subcontractors and/or their respective employers will at all times comply with the following conditions:

(a) The Mandatory shall assume the responsibility in terms of Section 16.1 of the Occupational Health and Safety Act. The Mandatory shall not delegate any duty in terms of Section 16.2 of this Act without the prior written approval of the Employer. If the Mandatory obtains such approval and delegates any duty in terms of section 16.2 a copy of such written delegation shall immediately be forwarded to the Employer.

(b) All incidents referred to in the Occupational Health and Safety Act shall be reported by the Mandatory to the Department of Labour as well as to the Employer. The Employer will further be provided with copies of all written documentation relating to any incident.

(c) The Employer hereby obtains an interest in the issue of any formal inquiry conducted in terms of section 32 of the Occupational Health and Safety Act into any incident involving the Mandatory and/or his employees and/or his subcontractors.

At _____ for and on behalf of the **EMPLOYER** on

this the _____ day of _____ 20 _____ .

SIGNATURE: _____

CAPACITY: _____

WITNESSES:

SIGNATURES: (1) _____

(2) _____

NAMES: (1) _____

(2) _____

At _____ for and on behalf of the **MANDATORY**

on this the _____ day of _____ 20 _____ .

SIGNATURE: _____

CAPACITY: _____

WITNESSES:

SIGNATURES: (1) _____

(2) _____

NAMES: (1) _____

(2) _____

CERTIFICATE OF AUTHORITY FOR SIGNATORY TO AGREEMENT IN TERMS OF OCCUPATIONAL HEALTH AND SAFETY ACT, 1993 (ACT NO 85 OF 1993)

The signatory for the company that is the Contractor in terms of the above-mentioned Contract and the Mandatary in terms of the above-mentioned Act shall confirm his or her authority thereto by attaching to this page a duly signed and dated copy of the relevant resolution of the Board of Directors.

An example is given below:

"By resolution of the Board of Directors passed at a meeting held on ..... 20……,

Mr/Ms ..... whose signature

appears below, has been duly authorised to sign the AGREEMENT in terms of THE OCCUPATIONAL

HEALTH AND SAFETY ACT, 1993 (ACT NO 85 OF 1993) on behalf of .....

.....

SIGNED ON BEHALF OF THE COMPANY : .....

IN HIS/HER CAPACITY AS : .....

DATE : .....

SIGNATURE OF SIGNATORY : .....

WITNESS: 1. ..... 2. .....

NAME (IN CAPITALS): 1. ..... 2. .....

Amatola Water · Amanzi

AMATOLA WATER

CONTRACT NO: AW2023/24/06

UPGRADING AND REFURBISHMENT OF BULK WATER SUPPLY AND SANITATION AT VARIOUS DEPARTMENT OF EDUCATION SCHOOLS IN THE EASTERN CAPE PROVINCE (ECDOE) – NYANGA SENIOR SECONDARY SCHOOL, CHDM, NGCOBO.

C2 PRICING DATA

C2.1 PRICING INSTRUCTION

C2.1.1 PREAMBLE TO THE BILL OF QUANTITIES

C2.1.1.1 The Conditions of Contract, the Contract Data, the Scope of Work, the Site Information and the Drawings shall be read in conjunction with the Bill of Quantities.

C2.1.1.2 Measurement and payment shall be in accordance with the relevant provisions of clause 8 of each of the SANS 1200 Standardized Specifications for Civil Engineering Construction or the Particular Specifications referred to in the Scope of Work, subject to the variations and amendments contained therein.

C2.1.1.3 The Bill of Quantities comprises items covering the Contractor's profit and costs of general liabilities and of the construction of Temporary and Permanent Works.

Although the Tenderer is at liberty to insert a rate of his own choosing for each item in the Bill of Quantities, he should note the fact that the Contractor is entitled, under various circumstances, to payment for additional work carried out and that the Employer's Agent is obliged to base his assessment of the rates to be paid for such additional work on the rates the Contractor inserted in the Bill of Quantities.

Clause 8 of each Standardized Specification, and the measurement and payment clause of each Particular Specification, read together with the relevant clauses of the Scope of Work, all set out which ancillary or associated activities are included in the rates for the specified operations.

C2.1.1.4 Descriptions in the Bill of Quantities are abbreviated and comply generally but may differ from those in the Standardized Specifications and Scope of Work. No consideration will be given to any claim by the Contractor submitted on such a basis. The Bill of Quantities has been drawn up generally in accordance with the latest issue of Civil Engineering Quantities[3]. Should any requirement of the measurement and payment clause of the appropriate Standardized or Particular Specifications be contrary to the terms of the Bill of Quantities or, when relevant, to the Civil Engineering Quantities, the requirement of the appropriate Standardized or Particular Specification, as the case may be, shall prevail.

C2.1.1.5 Unless stated to the contrary, items are measured net in accordance with the Drawings without any allowance having been made for waste.

C2.1.1.6 The amounts and rates to be inserted in the Bill of Quantities shall be the full inclusive amounts to the Employer for the work described under the several items. Such amounts shall cover all the costs and expenses that may be required in and for the construction of the work described, and shall cover the costs of all general risks, profits, taxes (but excluding Value Added Tax), liabilities and obligations set forth or implied in the documents on which the tender is based.

C2.1.1.7 An amount or rate shall be entered against each item in the Bill of Quantities, whether or not quantities are stated. An item against which no amount or rate is entered will be considered to be covered by the other amounts or rates in the Bill.

The Tenderer shall also fill in a rate against the items where the words "rate only" appears in the amount column. Although no work is foreseen under these items and no quantities are consequently given in the quantity column, the tendered rates shall apply should work under these items actually be required.

Should the Tenderer group a number of items together and tender one sum for such group of items, the single tendered sum shall apply to that group of items and not to each individual item, or should he indicate against any item that full compensation for such item has been included in another item, the rate for the item included in another item shall be deemed to be nil.

The tendered rates, prices and sums shall, subject only to the provisions of the Conditions of Contract, remain valid irrespective of any change in the quantities during the execution of the Contract.

C2.1.1.8 The quantities of work, as measured and accepted and certified for payment in accordance with the Conditions of Contract, and not the quantities stated in the Bill of Quantities will be used to determine payments to the Contractor. The validity of the Contract shall in no

[3] The standard system of measurement of civil engineering quantities published by the South African Institution of Civil Engineering.

way be affected by differences between the quantities in the Works Assignment and the quantities certified for payment.

Ordering of materials is not to be based on the Bill of Quantities, but only on information issued for construction purposes.

C2.1.1.9 For the purposes of this Bill of Quantities, the following words shall have the meanings hereby assigned to them:

Unit: The unit of measurement for each item of work as defined in the Standardized or Particular Specifications

Quantity: The number of units of work for each item.

Rate: The payment per unit of work at which the Tenderer tenders to do the work

Amount: The quantity of an item multiplied by the tendered rate of the (same) item

Sum: An amount tendered for an item, the extent of which is described in the Bill of Quantities, the Specifications or elsewhere, but of which the quantity of work is not measured in units

C2.1.1.10 The units of measurement indicated in the Bill of Quantities are metric units. The following abbreviations may appear in the Bill of Quantities:

mm	=	millimetre	h	=	hour
m	=	metre	kg	=	kilogram
km	=	kilometre	t	=	ton (1 000 kg)
m^2	=	square metre	No	=	number
m^2.pass	=	square metre-pass	sum	=	lump sum
ha	=	hectare	MN	=	Meganewton
m^3	=	cubic metre	MN.m	=	Meganewton-metre
m^3.km	=	cubic metre-kilometre	PC sum	=	Prime Cost sum
ℓ	=	litre	Prov sum	=	Provisional sum
kℓ	=	kilolitre	%	=	per cent
MPa	=	MegaPascal	kW	=	kilowatt
Mℓ	=	Megalitre (1000 kℓ)	kN	=	kilonewton

C2.1.1.11 Tenderers shall complete at least one section of Sections A to B in the Bill of Quantities.

CORRECTION OF ENTRIES MADE BY TENDERER

Any entry made by the Tenderer in the Price Schedule, forms, etc., which the tenderer desires to change, shall not be erased or painted out. A line shall be drawn through the incorrect entry and the correct entry shall be written above in black ink and the full signature of the Tenderer shall be placed next to the correction

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C2.2 BILL OF QUANTITIES

SECTION A: PRELIMINARY AND GENERAL						
Item	**Payment**	**Description**	**Unit**	**Quantity**	**Rate**	**Amount**
1		**SECTION A: PRELIMINARY AND GENERAL**				
	SANS 1200 A	**GENERAL** (as specified in SANS 1200 A and in the Scope of Work)				
1.1	8.3	**SCHEDULED FIXED-CHARGE AND VALUE**				
1.1.1	8.3.1	(a) Fixed preliminary and general charges	Sum	-		
1.1.2	8.3.2	(b) Value-related preliminary and general charges	Sum	-		
1.2	8.4	**SCHEDULED TIME RELATED ITEMS :** (Refer PSA 8.1.2.1 and PSA 8.2.2)				
1.2.1	8.4.1	(a) Time-related preliminary and general charges	Month	6.00		
1.3	PSA 8.5	**SUMS STATED PROVISIONALLY BY THE EMPLOYER'S AGENT:**				
	PSA 8.5.1	Works to be executed by the Contractor:				
1.3.1		Minor repairs at all sites as instructed by the Employer's Agent	Prov Sum	-		
1.4	PSA 8.6	**PRIME COST SUMS:**				
1.4.1	PSA 8.6.1	Allowance for acceptance control testing by Employer's Agent (not for process control testing to be carried out by the Contractor)	PC Sum	-		
1.4.2	PSA 8.6.1	Overheads, charges and profit on 1.4.1	%	R 10 000.00		
1.5	8.7	**DAYWORK**				
		(a) Labour: (rates shall include for on costs)				
1.5.1		(i) Unskilled	hour	100		
1.5.2		(ii) Semi-skilled	hour	16		
1.5.3		(iii) Ganger	hour	16		
1.5.4		(iv) Artisan	hour	40		
1.5.5		(v) Engineer	hour	40		
TOTAL CARRIED FORWARD						

BROUGHT FORWARD						
		(b) Materials:				
1.5.6		Allow Provisional sum for materials based on their nett cost	Prov Sum	-		
1.5.7		Charge required by Contractor on 1.5.6	%	R 10 000.00		
		(c) Plant:				
		(Rates shall include for on costs)				
1.5.8		(i) LDV 1 ton 4 x 4, State make ..... and model	hour	8		
1.5.9		(ii) Backhoe Loader minimum 60 kW, State make ..... and model	hour	24		
1.5.10		(iii) Truck minimum 4 ton, State make ..... and model	hour	16		
1.5.11		(iv) Compressor complete with hand tools and attachments - minimum 250 cfm, State make ..... and model	hour	24		
1.5.12		(v) Crane Truck minimum 8 ton, State make ..... and model	hour	16		
1.5.13		(vi) Revolving drum type concrete mixer-minimum capacity 0.3m^3. State make ..... and model	hour	24		
1.5.14		(vii) Pedestrian type vibrating roller, State make ..... and model	hour	16		
1.6	8.8	**TEMPORARY WORKS**				
	8.8.4	Existing services				
1.6.1		(a) Excavate by hand in soft material to expose existing services	m^3	50		
1.6.2	PSA 8.9	Dealing with water	Sum/day	10		
TOTAL CARRIED FORWARD						

BROUGHT FORWARD						
1.7	PSA 8.10	**COMPLIANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY ACT (ACT 85 OF 1993) AND ALL RELEVANT AND APPLICABLE REGULATIONS, ESPECIALLY THE CONSTRUCTION REGULATIONS, 2014 AS PROMULGATED ON 7 FEBRUARY 2014 UNDER SECTION 43 OF THE OCCUPATIONAL HEALTH AND SAFETY ACT (ACT 85 OF 1993), AS AMENDED FROM TIME TO TIME, FOR THE DURATION OF THE CONTRACT**				
1.7.1		- Contractor	Sum	1		
1.7.2		- Subcontractors (own)	Sum	1		
1.8	PSA 8.11	**Allowance for EME Construction Manager**	Month	8		
1.9	PE	**ENVIRONMENTAL MANAGEMENT** (as specified in Particular Specification PE)				
1.9.1	PE 8.2.1	Method Statements: Additional work	Sum	-		
1.9.2	PE 8.2.2	All requirements of the environmental management specification (All work not measured elsewhere, associated with complying with any requirements of the environmental management specification)	Sum	-		
1.10	**PSA 8.12**	**Time related charges for delays and extension of time granted in terms of caluse 5.12.3 of the GCC 2015**				
1.10.1		- All costs incurred for any delays or extension of time granted (including time related and any other costs)	day	20		
TOTAL CARRIED FORWARD TO SUMMARY						

SECTION B: POND REPAIR AND SCREENING CHAMBER						
Item	**Payment**	**Description**	**Unit**	**Quantity**	**Rate**	**Amount**
2		**SECTION B: POND REPAIR AND SCREENING CHAMBER**				
		(Drg 110875-PIP14-CC-2401 & Drg 110875-PIP14-CC-002)				
2.1	**SANS 1200 C**	**SITE CLEARANCE** (as specified in SANS 1200 C and in the project specifications)				
2.1.1	PSC 8.2.1	Clear and grub (including trees up to 1m girth):				
2.1.1.1		Pond areas	m^2	4300.00		
2.1.2	8.2.2	Remove and grub large trees and tree stumps of girth:				
2.1.2.1		(i) Over 1,0 m and up to and including 2,0 m	No	10.00		
2.1.3	PSC 8.2.10	Remove topsoil to nominal depth of 150 mm, stockpile and maintain	m^3	180.00		
2.1.4	PSC 8.2.11	Removal and disposal of existing lining from ponds	Sum			
2.1.5	PSC 8.2.12	Pump water from one pond to another, sequencing to be confirmed. Maximum two ponds out of commissioning at any one time	m^3	100		
2.2	**SANS 1200D & 1200DB & 1200DE**	**EARTHWORKS (5km free haul)** (as specified in SANS 1200 D, SABS 1200 DB and in the project specification)				
2.2.1		Excavate in all materials, selection, stockpiling, transporting, backfilling, compacting and disposal of surplus material:				
		Trench:				
		For pond wall repair material and sludge spoil for depths where ordered by the Engineer:				
2.2.1.1	PSDB 8.3.2	up to 1,5 m	m	1100		
		Bulk Excavation:				
2.2.1.2	PSD 8.3.2	For new pond construction and floor leveling of existing ponds.	m^3	2000		
2.2.1.3		Extra-over items 2.2.1.2 above for excavation in:				
2.2.1.3.1	8.3.2	Intermediate material	m^3	50		
2.2.1.3.2	8.3.2	Hard rock material	m^3	100		
TOTAL CARRIED FORWARD						

BROUGHT FORWARD						
2.2.2	PSD 8.3.14	Remove of sludge from ponds and spoil in excavated trench.	m^3	1500		
2.2.3	SANS 1200 DE 8.3.5	Forming embankment with material obtained from essential excavations, including stockpiling (if desired by Contractor), selection (where applicable), load, haul, place, spread and compact.	m^3	250		
2.2.4	PSD 8.3.15	Repair breaches in pond walls	m^3	650		
2.2.5	PSD 8.3.16	Trimming of the existing Ponds Side slopes	m^2	1350		
2.2.6	PSD 8.3.17	Cut new storm water cutt off drains where directed by engineer	m^3	100		
2.2.7	PSD 8.3.18	Extra over item 2.1.1, 2.1.2, 2.2.1.2, 2.2.1.3 and 2.2.5 for disposing of spoil material on a site provided by the contractor.	m^3	350		
2.2.8	PSD 8.3.6	Over Haul	m^3/km	50		rate only
2.3	**SANS 1200 L**	**MEDIUM-PRESSURE PIPELINES** (as specified in SANS 1200 L and in the project specification)				
2.3.1		Excavate, supply, lay, bed and backfill				
2.3.1.1	PSL 8.2.1	400mm uPVC class 9 overflow pipe	m	30		
2.4	**SANS 1200 DK**	**GABIONS AND PITCHING** (as specified in SANS 1200 L and in the project specification)				
2.4.1		Surface preparation for bedding of gabions:				
2.4.1.1	8.2.1	Cavities filled with approved excavated material or rock	m^2	50		
2.4.1.2	8.2.1	Cavities filled with grade 15 concrete	m^2	25		
2.4.2		Gabions:				
2.4.2.1		Gabion boxes of galvanized wire: (Mesh Type 80 to SANS 1580:2005)				
2.4.2.1.1	8.2.2	80 mm mesh, 2.7 mm dia wire, 2 m x 1 m x 1 m boxes	m^3	80		
2.4.2.1.2	8.2.2	80 mm mesh, 2.7 mm dia wire, 2 m x 1 m x 0.5 m boxes	m^3	40		
TOTAL CARRIED FORWARD						

BROUGHT FORWARD						
2.4.2.2		Gabion mattresses of galvanized wire, up to 0,3 m deep: (Mesh Type 60 to SANS 1580:2005)				
2.4.2.2.1	8.2.2	60 mm mesh, 2.2 mm dia wire, 6 m x 2 m x 0.3 m mattress	m³	50		
2.4.3		Geotextile:				
2.4.3.1	8.2.4	Bidim U24 or approved equivalent	m²	350		
2.4.4		Pitching:				
		Grouted pitching:				
2.4.4.1	8.2.5	Heavy pitching	m²	50		
2.5		**Screening Chamber**				
2.5.1	SANS 1200 D	Excavation: Excavate in all materials for foundations and structures and use for backfill or embankment or dispose:				
2.5.1.1	PSD 8.3.2	Depth up to 1,5 m	m³	5		
2.5.2	SABS 1200 G PSG 8.9	Construct Screening Chamber complete as per Drg 110875-PIP14-CC-001	No	1		rate only
2.5.3	PSG 8.10	Glavanised mild steel screen	No	1		rate only
2.5.4	PSG 8.10	Galvanised Angle iron door frame	No	1		
2.5.5	PSG 8.10	Galvanised chequer plate doors	No	3		
2.5.6	PSG 8.10	Glavanised rake to fit screen	No	1		
2.6		**Miscellaneous**				
2.6.1		Demolish existing concrete lining (Rate to include for the breaking, removing and disposing of spoil material on a site provided by the contractor.)	m²	200		
TOTAL CARRIED FORWARD						

BROUGHT FORWARD						
2.6	**SANS 1200G**	**Overflow channel and Discharge Chamber** (Drg 110875-PIP14-CC-004)				
2.6.1		Formwork (Smooth):				
2.6.1.1		Vertical	m²	25		
2.6.2		Reinforcement (High-tensile welded mesh):				
2.6.2.1		Ref 617 with minimum laps of 300 mm	m²	30		
2.6.3		Strength Concrete				
2.6.3.1		Blinding layer 15Mpa/19mm concrete	m³	0.3		
2.6.3.2		Overflow Channel 25Mpa/19mm concrete	m³	1.2		
2.6.3.3		Discharge Chamber 25Mpa/19mm concrete	m³	2.5		
2.6.4	SANS 1200L SANS 1200LD	Supply and installing specials Table 10 (pipes and valves)				
2.6.4.1		450mm x 300mm ND GMS extension piece (flanged one end, with puddle flange 50mm from other end)	No	1		
2.6.4.2		300mm ND Flanged Gate valve with handwheel	No	1		
2.6.4.3		450mm x 100mm ND GMS extension piece (flanged one end, with puddle flange 50mm from other end)	No	1		
2.6.4.4		100mm ND Flanged Gate valve with handwheel	No	1		
2.6.4.5		100mm GMS blank flange	No	1		
TOTAL CARRIED FORWARD TO SUMMARY						

SECTION C: GEOMEMBRANE SHEETING						
Item	**Payment**	**Description**	**Unit**	**Quantit**	**Rate**	**Amount**
3	PA 8	**SECTION C: GEOMEMBRANE SHEETING**				
		(as specified in Particular Specification PA)				
		(Drg 110875-PIP14-CC-003)				
3.1	PA 8.1	Geofabric underling:				
3.1.1	PA 8.1.1	(i) Supply	m^2	3200		
3.1.2	PA 8.1.2	(ii) Install	m^2	3200		
3.2	PA 8.2	Geomembrane sheeting				
3.2.1	PA 8.2.1	(i) Supply	m^2	3200		
3.2.2	PA 8.2.2	(ii) Install	m^2	3200		
3.3	PA 8.3	Extra over PA 8.2 for installation of lining around				
		penetrations	m	50		
3.4	PA 8.4	Vents:				
3.4.1	PA 8.4.1	(i) Supply	No	46		
3.4.2	PA 8.4.2	(ii) Install	No	46		
3.5	PA 8.5	Filling ponds with river water to a depth of 300mm:	m^3	960		

SECTION D: SECURITY FENCING						
Item	**Payment**	**Description**	**Unit**	**Quantity**	**Rate**	**Amount**
		SECTION D: SECURITY FENCING				
		(Drg 110875-PIP14-CC-005 &				
		Drg 110875-PIP14-CC-006)				
4	PB 8	**SECURITY FENCING SPECIFICATION**				
		(as specified in Particular Specification PB)				
4.1	PB 8.1	Clear 1m wide strip for fence line	m	640.00		
4.2	PB 8.2	Supply, delivery and installation of new security fencing:				
	PB 8.2.1	(2.5mm diameter strain fencing wire, single strand as per drawings)				
4.2.1	PB 8.2.1.1	Supply	m	2560.00		
4.2.2	PB 8.2.1.2	Install	m	2560.00		
4.3	PB 8.2.2	Pre-stressed posts embedded in 15Mpa concrete				
4.3.1		100x100mm Pre-stressed concrete gate posts 2400mm long with 500mm over hang set in 500x500x800mm concrete base				
4.3.1.1	PB 8.2.2.1	Supply	No	2		
4.3.1.2	PB 8.2.2.2	Install	No	2		
4.3.2		100x100mm Pre-stressed concrete corner posts 2400mm long with 500mm over hang set in 450x450x700mm concrete base				
4.3.2.1	PB 8.2.2.1	Supply	No	4		
4.3.2.2	PB 8.2.2.2	Install	No	4		
4.3.3		100x100mm Pre-stressed concrete straining posts 2400mm long with 500mm over hang set in 450x450x700mm concrete base				
4.3.3.1	PB 8.2.2.1	Supply	No	12		
4.3.3.2	PB 8.2.2.2	Install	No	12		
4.3.4		80x80mm Pre-stressed concrete stay posts 2200mm long set in 400x700x400mm concrete				
4.3.4	PB 8.2.2.1	Supply	No	34		
4.3.4.2	PB 8.2.2.2	Install	No	34		
TOTAL CARRIED FORWARD						

BROUGHT FORWARD						
4.3.5		100x100mm Pre-stressed concrete intermediate posts 2400mm long with 500mm overhang set in 450x450x700mm concrete base				
4.3.5.1	PB 8.2.2.1	Supply	No	144		
4.3.5.2	PB 8.2.2.2	Install	No	144		
4.3.6	PB 8.2.3	1800mm high ridgeback dropper				
4.3.6.1	PB 8.2.3.1	Supply	No	160		
4.3.6.2	PB 8.2.3.2	Install	No	160		
4.3.7	PB 8.2.4	500mm Flat Wrap razor wire with 3 strands of binding wire				
4.3.7.1	PB 8.2.4.1	Supply	m	640		
4.3.7.2	PB 8.2.4.2	Install	m	640		
4.3.8	PB 8.2.5	1800x300x150x0.3mm Standard density Razor Mesh fixed to straining wires				
4.3.8.1	PB 8.2.5.1	Supply	m^2	1152		
4.3.8.2	PB 8.2.5.2	Install	m^2	1152		
4.3.9	PB 8.2.6	6 m wide sliding gate				
4.3.9.1	PB 8.2.6.1	Supply	No	1		
4.3.9.2	PB 8.2.6.2	Install	No	1		
4.3.10	PB 8.2.7	Signage				
4.3.10.1	PB 8.2.7.1	Supply	No	16		
4.3.10.2	PB 8.2.7.2	Install	No	16		
TOTAL CARRIED FORWARD TO SUMMARY						

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
		SECTION E: BOREHOLE CIVIL WORKS				
SANS 1200 C	**130**	**SITE CLEARANCE**				
PSC 8.2.1	**130.01**	**Clear and grub:**				
		.01 Areas	m²	10		
8.2.10	**130.11**	**Remove topsoil to nominal depth of 150 mm and stockpile**	m³	2		
SANS 1200 D	**140.00**	**EARTHWORKS**				
PSD 8.3.2	**140.01**	**Bulk excavation:**				
		.01 Excavate in all materials and dispose	m³	5		
		.02 Extra over item 140.01.01 above for:				
		.01 Hard rock excavation	m³	10		
PSD 8.3.3	**140.02**	**Restricted excavation:**				
		.01 Excavate for restricted foundations in all materials, and use for backfill or embankment, or dispose	m³	5		
PSD 8.3.3		.02 Extra over items 140.02.01 above for				
		.01 Hard rock excavation	m³	3		
PSD 8.3.10	**140.08**	**Topsoiling**	m³	2		
		PIPEWORK				
SANS 1200 C	**130.00**	**SITE CLEARANCE**				
PSC 8.2.1	**130.01**	**Clear and grub:**				
		.01 Pipeline areas	m²	726		
SANS 1200 DB	**142.00**	**EARTHWORKS (PIPE TRENCHES)**				
		TRENCHES FOR WATER PIPES				
PSDB 8.3.2	**142.01**	**Excavate in all materials for trenches, backfill, compact and dispose of surplus material:**				
		.01 Pipes trenches up to 750 mm wide for depths				
		.01 Up to 1,5 m	m	450		
		.02 Between 1,5 m and 2 m	m	150		
		Carried forward / …				

		Brought forward / …					
		SHARED TRENCHES FOR WATER PIPES					
PSDB 8.3.2	**142.01**	**Excavate in all materials for trenches, backfill, compact and dispose of surplus material:**					
		.01 Pipes trenches up to 1100 mm wide for depths					
			.01	Up to 1,5 m	m	130	
			.02	Between 1,5 m and 2 m	m	30	
PSDB 8.3.2	**142.02**	**Extra over item 142.01 above for:**					
		.01 Hard rock excavation			m³	165	
		.02 Hand excavation where ordered by the Employer's Agent					
			.01	Soft material	m³	10	
			.02	Hard Rock	m³	5	
SANS 8.3.6	**142.16**	**Finishing:**					
8.3.6.1		.01 Reinstate road surfaces complete with all courses:					
PSDB 8.3.6.1(a)			.01	Gravel on shoulders	m³	3	
PSDB 8.3.6.1(a)			.02	Gravel surfacing/driveways	m³	2	
PSDB 8.3.2	**142.03**	**Excavate and dispose of unsuitable material from trench bottom**			m³	30	
PSDB 8.3.3	**142.04**	**Excavation ancillaries:**					
		.01 Make up deficiency in backfill material:					
			.01	From other necessary excavations on site	m³	165	
			.02	By importation from commercial or off-site sources selected by the Contractor	m³	20	
SANS 1200 DK	**146.01**	**Gabions and Reno mattresses**					
		.01 Gabion boxes of PVC-coated galvanized wire:					
			.01	80 mm x 80 mm mesh, 4.4 mm dia wire, 3.0 m x 1.0 m x 1.0 m boxes	m³	10	
		.02 Reno mattress of PVC-coated galvanized wire up to 0,3 m deep:					
			.01	80 mm x 80 mm mesh, 4.4 mm dia wire, 2.0 m x 1.0 m x 0.3 m mattresses	m³	46	
		Carried forward / …					

		Brought forward / …					
		.03	Extra over item 146.01.01 and 146.01.02 above for :				
PSG 8.9*		.01	Tie reno matress into concrete with Y16 eye bolts	No	3		
SANS DK 8.2.4	**146.02**	**Geotextile:**					
		.01	Bidim A2 or approved equivalent for reno mattress and gabions	m²	180		
1200 L	**210.00**	**MEDIUM-PRESSURE PIPELINES**					
8.2.1	**210.01**	**Supply, lay and bed on class C bedding, complete with couplings:**					
		.01	HDPE PN 10				
		.01	63 mm	m	160		
		.02	75 mm	m	700		
	210.02	**Screwed and socketed galvanized mild steel PN 10 (including all approved fasteners to fix pipe to tank)**					
		.01	63 mm	m	5		
		.02	75 mm	m	5		
8.2.2	**210.11**	**Extra over items 210.01 for the supplying, laying, and bedding of specials complete with couplings (PN 10), as per Drawing 110875-0000-DRG-CC-3103:**					
		.01	63 mm Compression Flange Adaptor	No	2		
		.02	63 mm Flanged RSV Gate Valve	No	1		
		.03	63 mm x 90° Bend Flanged one end, threaded other	No	2		
		.04	63 mm Float Control Valve (Vosa or similar appr)	No	1		
		.05	75 mm Compression Flange Adaptor	No	2		
		.06	75 mm Flanged RSV Gate Valve	No	1		
		.07	75mm x 90° Bend Flanged one end, threaded other	No	2		
		.08	75 mm Float Control Valve (Vosa or similar appr)	No	1		
		Carried forward / …					

		Brought forward / …					
SANS 1200 L 8.2.11	**210.65**	**Anchor/thrust blocks and pedestals:**					
		.01	Concrete:				
			.01	Class 15 MPa/19 mm	m³	4	
		.02	Formwork:				
			.01	Rough	m²	20	
8.2.12	**210.66**	**Concrete casing:**					
		.01	Class 15 MPa/19 mm		m³	6	
8.2.13	**210.67**	**Valve Chambers**					
		.01	Construct Gate Valve Chambers complete				
			as per Dwg 110875-0000-DRG-CC-3102		No	5	
		.02	Construct Air Valve Chambers complete				
			as per Dwg 110875-0000-DRG-CC-3102		No	6	
		.03	Construct Scour/Drainage Headwall complete				
			as per Dwg 110875-0000-DRG-CC-3102		No	2	
		.04	Construct Pump station building complete				
			as per Dwg 110875-0000-DRG-CC-3501		No	2	
8.2.3	**210.68**	**Extra over items 210.67 for supplying, fixing and bedding of scour valve, complete with all pipework, flanges and specials as per drawing no. 110875-0000-DRG-CC-3102 PN 10**					
		.01	50 mm ND Scour Valve Assemblies				
			.01	50 mm ND x 50 mm GMS socketed Scour Tee with flanged branch	No	2	
			.02	50 mm ND Flanged Scour Valve	No	2	
			.03	50 mm ND Compression Flanged adaptor	No	2	
			.04	50 mm ND HDPE extension piece	No	2	
8.2.3	**210.71**	**Extra over item 210.67 for supplying, fixing and bedding of air release valves, complete with all pipework, flanges and specials as per drawing no. 110875-0000-DRG-CC-3102 PN 10**					
		.01 25 mm ND Air Valve Assemblies					
			.01	75 mm x 50 mm socketed GMS scour Tee with flanged branch	No	3	
			.02	63 mm x 50 mm socketed GMS scour Tee with flanged branch	No	2	
		Carried forward / …					

		Brought forward / …					
		.03	300 mm Long x 25 mm ND extension piece (MS) with one end flanged to suit 50 mm ND and the other threaded	No	5		
		.04	25 mm ND Threaded Brass Ball Valve	No	5		
		.05	25 mm ND Threaded Air Valve (Vent-O-Mat RBX or similar)	No	5		
PSL	**210.72**	**Marker blocks:**					
8.2.17							
		.01	Route Marker	No	5		
		.02	Valve Marker	No	5		
SANS	**211.00**	**BEDDING (PIPES)**					
1200 LB							
		BEDDING FOR WATER PIPES					
8.2.1	**211.01**	**Provision of bedding from trench excavations:**					
		.01	Selected granular material	m^3	70		
		.02	Selected fill material	m^3	100		
PSLB	**211.02**	**Supply only of bedding by importation:**					
8.2.2							
		.01	From commercial sources:				
		.01	Selected granular material	m^3	23		
		.02	Selected fill material	m^3	24		
		.03	Crushed Stone Bedding	m^3	10		
		.04	Geotextile Filter Blanket	m^2	20		
		TOTAL SECTION 2: Carried to Summary					

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
		SECTION F: BOREHOLE (M&E) INSTALLATIONS				
PR	**3.1**	**Mechanical Items**				
PR 20.1	**3.1.1**	**Design, supply, deliver and install submersible pump and motor complete including cabling to connect to motor control panel and specified accessories**	Sum	1		
PR 20.2	**3.1.2**	**Drop Pipework**	Sum	1		
PR 20.3	**3.1.3**	**Surface Pipework**	Sum	1		
PR 20.4	**3.1.4**	**Regulating Valve**	No	1		
PR 20.5	**3.1.5**	**Check Valve**	No	2		
PR 20.6	**3.1.6**	**Isolating Valve**	No	1		
PR 20.7	**3.1.7**	**Air Release Valve**	No	1		
PR 20.8	**3.1.8**	**Water Level Sensor**	No	1		
PR 20.9	**3.1.9**	**Flow Meter**	No	1		
PR 20.10	**3.1.10**	**Pressure Gauge**	No	1		
PR 20.12	**3.1.11**	**Lockable MCC Panel Protective Cover Hinged Galvanised Mild Steel to suit**	No	1		
PS	**3.2**	**Electrical Items**				
PS13.1	**3.2.1**	**Design, supply, deliver, install, test and commission LV cable, Presure Switch, Timer Switch and Flow Sensor for Motor Control Panel**	Sum	1		
PS 13.2	**3.2.2**	**Design, Supply, install and commission of control panel**	Sum	1		
	3.2.3	**Design, Supply, install and commission of Overhead electrical supply suitable for (as per the Eskom Specifications) the pump selected at BH EC - T12 - 1804**	Sum	1		
PR 20.12	**3.2.4**	**Compilation and supply of Operation and Maintenance Manuals**	Sum	1		
		TOTAL SECTION 3: Carried to Summary				

UPGRADING AND REFURBISHMENT OF BULK WATER SUPPLY AND SANITATION AT VARIOUS DEPARTMENT OF EDUCATION SCHOOLS IN THE EASTERN CAPE PROVINCE (ECDOE) – NYANGA SENIOR SECONDARY SCHOOL, CHDM, NGCOBO.

CONTRACT No. AW2023/24/06

Please note that it is mandatory to submit the complete Priced Bills of Quantities with the Returnable Documents in the following acceptable format:

Filled in, in clearly legible and permanent ink

The final contract price will be dependent on the final construction cost.

C2.3 SUMMARY OF BILL OF QUANTITIES

UPGRADE OF WATER AND SANITATION INFRASTRUCTURE FOR NYANGA SENIOR SECONDARY

TENDER NO: AW2023/24/06 - NYANGA SENIOR SECONARY SCHOOL

SUMMARY OF THE BILL OF QUANTITIES

SECTION A: PRELIMINARY AND GENERAL	R.....
SECTION B: POND REPAIR AND SCREENING CHAMBER	R.....
SECTION C: GEOMEMBRANE SHEETING	R.....
SECTION D: SECURITY FENCING	R.....
SECTION E: BOREHOLE CIVIL WORKS	R.....
SECTION F: BOREHOLE (M&E) INSTALLATIONS	R.....
NETT TOTAL OF TENDER	**R.....**
ADD 10% FOR CONTINGENCIES	R.....
SUB TOTAL	R.....
ADD 14% VALUE ADDED TAX	R.....
AMOUNT CARRIED TO FORM OF OFFER AND ACCEPTANCE	**R.....**

Notes:

1. The Contract Price is **not** subject to Contract Price Adjustment
2. The undersigned, who warrants that he / she is duly authorised to do so on behalf of the enterprise, confirms that the contents of this schedule are within my personal knowledge and are to the best of my belief both true and correct:

AMATOLA WATER

CONTRACT NO: AW2023/24/06

UPGRADING AND REFURBISHMENT OF BULK WATER SUPPLY AND SANITATION AT VARIOUS DEPARTMENT OF EDUCATION SCHOOLS IN THE EASTERN CAPE PROVINCE (ECDOE) – NYANGA SENIOR SECONDARY SCHOOL, CHDM, NGCOBO.

C 3 SCOPE OF WORK

STATUS

In the event of any discrepancy between the Scope of Work and any part of the SABS 1200 Standardized Specifications, the Bill of Quantities or the Drawings, the Scope of Work shall take precedence and prevail in the Contract.

C 3.1 DESCRIPTION OF WORKS

ABBREVIATIONS

AW	Amatola Water
DPW	Department of Public Works
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism
ECDoE	Eastern Cape Department of Education

BACKGROUND

ECDoE allocated new projects to Amatola Water (AW) to implement in Financial Year (FY) of 2021/22 but due to various reasons the projects did not start, resulting in these projects being rolled over into FY 22/23. These are new projects which ECDoE allocated to AW to start in FY 22/23, from inception through to close out.

These projects were previously designed, and tender documentation compiled but did not go ahead due to Client financial constraints, the newly appointed Professional Service Providers (PSP) has checked the previous designs and ensured that the latest norms and standards were used and the information from the school (pupil and teacher numbers, growth etc.) has been included in the final designs.

SCOPE OF WORKS FOR CLARKEBURY AGRICULTURAL SCHOOL:

SCHOOL NAME	DESCRIPTION OF GOODS / SERVICE
NYANGA SENIOR SECONDARY SCHOOL	• Clean, Refurbish, and add Geolining on the Ponds; • Construct additional pond; • Fencing around the ponds; • Metering of inlet inflow and outflow at the ponds; • Construct new sewerage manholes; and • Supply and install Irrigation system.

EXTENT OF THE WORKS FOR CLARKEBURY AGRICULTURAL SCHOOL:

The works which will be constructed under scope of works for this Contract is summarised, as follows:

Inlet Works:

- Construct a new 0.8m x 6m reinforced concrete inlet works including 0.6m wide concrete apron around it.
- Supply and installation of 25mm spaced 5mm bar screen and 3" (76.2mm) throat prefabricated parshall flume.

Oxidation Ponds & Gravity Sewer Main:

- Concrete lining of ± 200 m² crest surface area for the anaerobic pond and lining to specification.
- Geo-lining of two (2) new ± 1512 m² each crest surface area facultative ponds and lining to specification.
- Geo-lining of two (2) new ± 1116 m² each crest surface area maturation ponds and lining to specification.
- Construct three (3) reinforced concrete overflow channels
- Construct a chlorine contact channel ± 15x0.5x1m
- Construct a v-notch weir at the outlet of the chlorine contact channel
- Construct sewerage manholes and 160 mmØ Heavy Duty Class 34 uPVC from the school to the pond inlet.

Borehole:

- Construct a borehole pump station.
- Design, supply and install one borehole pump operating at a duty point of 3l/s at 47m head and 2l/s at 44m head.
- Construct ±600m long 75mm Ø Class 10 HDPE and a ±160m long 63mm Ø Class 10 HDPE rising main with necessary trench excavations and backfilling as specified.
- Construct ancillary chambers for valves and fittings.
- All associated mechanical and electrical work to be carried out by competent sub-contractor.
- Design, supply and install MCC panel to be housed in a concrete structure kiosk adjacent to the pump stations.

Ancillary Works:

- Erect the contract- and a separate facility name board reflecting 'restrictions' at the entrance gate.
- Demolish the existing security fence and create access to the site
- Erect new security fencing along the boundaries of the site
- Construct a berm along the top / northern end of the site
- Construct ± 50m of 1.5m high x 1m x 2m gabion boxes, inclusive of a bidim wrap
- Remove with care re-useable vegetation / trees to an on-site established nursery as per environmental requirements for replanting upon completion of works.
- Remove 100mm topsoil / top cover material in portioned off areas to suit development needs and stock pile for re-use as cover material after completion of pond construction works. Estimated total of topsoil / top cover material is ± 1 600m³.
- Replace top soil, make good the stockpile position, replant vegetation as needed, fertilise and sow grass seed on disturbed areas and pond embankments and maintain until established.
- Plant trees and maintain until established.
- Remove the Contract Name Board.

Temporary 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.

LOCATION OF THE WORKS:

The Works to be carried out by the Contractor under this Contract is as per C3.1.2 above.

Nyanga Senior Secondary School is located under 5 km east of Ngcobo Town and is accessible via the R61 National Road. The locality of the project site is show in the below:

LOCATION	LATITUDE	LONGITUDE
Nyanga Senior Secondary School	31°47'08.16"S	28°17'16.65"E

General

The Tenderer will execute the required services in a professional manner, complying with the appropriate designs and specifications. They will comply with all relevant legislation pertaining to the build environment in general.

C3.2 ENGINEERING

C3.2.1 DESIGN

Concept, Feasibility and overall process	Employer’s Agent
Basic engineering and detail layout to tender stage	Employer’s Agent
Final design approved for construction stage	Employer’s Agent
Temporary works	Contractor
Preparation of as-built drawings and GIS information	Contractor/Employer’s Agent

C3.2.2 EMPLOYER'S DESIGN

Not applicable.

C3.2.3 CONTRACTOR'S DESIGN

Where the Contractor is to supply the design of designated parts of the permanent Works or temporary Works he shall supply full working drawings supported by a professional engineer's design certificate.

The Contractor shall take all statutory requirements, as well as the Site Specific Health and Safety Specification and Basic Risk Assessment (refer to particular specification PB) into consideration when designing the Temporary Works.

C3.2.4 DRAWINGS

The drawings are listed below:

Item	Drawing Number	Rev	Description
			Nameboards, Site Facilities, Diagrams, Figures & Sketches
1	ROM-131-07-076-04-01	0	Contractor's Nameboard
2	ROM-131-07-076-04-02	0	Unauthorized Entry Signboard: English
3	ROM-131-07-076-04-03	0	Unauthorized Entry Signboard: Xhosa
			Water
			Layout Plans, Setout Plans
4	ROM-131-07-076-04-04	0	Borehole and Rising Main Plan
			General Detail Drawings
5	ROM-131-07-076-04-05	0	Water Reticulation:Thrust Block Detail
6	ROM-131-07-076-04-06	0	Water Reticulation: Air Valve, Scour Valve and Gate Valve Details
			Longsections
7	ROM-131-07-076-04-07	0	Pumping Main
			Pumpstations
8	ROM-131-07-076-04-08	0	Borehole Chamber Details
			Sewer
			Layout Plans, Setout Plans
9	ROM-131-07-076-04-09	0	General Layout
10	ROM-131-07-076-04-10	0	General Layout - Sewer
			General Detail Drawings
11	ROM-131-07-076-04-11	0	Inlet Works: Plan, Sections and Details
12	ROM-131-07-076-04-12	0	Sewer Manhole, Trench and Inspection Chamber Details
13	ROM-131-07-076-04-13	0	Sewer: Pond Overflow Channel Details
14	ROM-131-07-076-04-14	0	Sewer: Pond Lining and Emergency Overflow Structure (Sheet 1 of 3)
15	ROM-131-07-076-04-15	0	Sewer: Pond Lining Details (Sheet 2 of 3)
16	ROM-131-07-076-04-16	0	Sewer: Pond Lining Details (Sheet 3 of 3)
17	ROM-131-07-076-04-17	0	Security Fencing Details
18	ROM-131-07-076-04-18	0	Sewage Detention Pond and Protection Berm Detail
			General
			General Detail Drawings
19	ROM-131-07-076-04-19	0	Standard Details: Manholes, Headwall and Outlet Structure

C3.3 PROCUREMENT

C3.3.1 PREFERENTIAL PROCUREMENT

C3.3.1.1 Requirements

Refer to Clauses C.3.11.1, of the Tender Data and Form T2.1: Form SBD 6.1: Specific Goals will be used as the preference mechanism in accordance with Preferential Procurement Regulations of 2022.

C3.3.1.2 Resources Standards pertaining to targeted procurement

Tenders will be evaluated in terms of the Employer's Procurement Points system. The criteria for allocation of procurement points are stated in Clauses C3.11.1 of the Tender Data.

C3.3.2 SUBCONTRACTING

C3.3.2.1 Scope of mandatory subcontract works

The Contractor shall note that the Employer is committed to local Emerging Enterprise development and this forms part of this.

It is the Employer's intention for the Contractor to enter in a subcontract with a local Emerging Enterprise/s, where fifteen percent (15%) of the work shall be subcontracted in accordance with the subcontracting procedures referred to in this scope of work who are registered with the CIDB with a Contractor Grading Designation of 1 in an appropriate class of construction work.

C3.3.2.2 Preferred subcontractors / suppliers

Local Emerging Enterprises registered on the Amatola Water Database and CSD.

C3.3.2.3 Subcontracting procedures

All matters pertaining to subcontractors and the work executed by them shall be dealt with directly between the Employer's Agent and the Contractor in the context of all subcontract work being an integral part of the Works for which the Contractor is responsible.

Subcontractors shall comply in full to all aspects of the Contract.

The Employer's Agent will not liaise directly with any subcontractors nor will he issue instructions concerning the subcontract works directly to any subcontractor.

For local Emerging Enterprises Subcontractors, as stated above, the following shall apply:

The Employer shall provide a list of local EE's, in the required contractor grading designation, for the Contractor to select a suitable EE's to tender and subcontract with. The Contractor shall evaluate the list and shall select EE's to enter into subcontract/s.

The Contractor shall remain responsible for providing the subcontracted portion of the works as if the work had not been subcontracted.

Subcontractors shall comply in full, to all aspects of the Contract.

C3.3.2.4 Attendance on subcontractors

The Contractor shall guide, assist, advise and mentor the local EE subcontractor/s and guidance on how to establish and determine rates.

The Contractor shall be responsible for ensuring that the prospective local EE subcontractor/s fully comprehends the:

- Implications of the liabilities and responsibilities inherent in the contract into which the tenderer entered.
- Implications of the tendered rates.
- Scope and extent of the Works.
- Proper procedures for the submission of a tender.
- Procedures and basis on which tenders will be evaluated and awarded.

The Contractor shall closely manage, mentor, supervise, guide and assist the EE in all aspects of management, planning, execution and the completion of work.

The above shall include inter alia, but is not limited to, the following:

(i) Planning and programming of the Works.
(ii) The sourcing, ordering, purchasing, hiring all the necessary Construction Equipment, Materials, tools and accidentals necessary and required for the successful execution and completion of the Permanent as well as the Temporary Works.
(iii) Labour relations and employment.
(iv) Monthly measurements, costing and invoicing.
(v) General safety, occupational health and safety matters.
(vi) Functions of civil engineering infrastructure, structures, services and systems.
(vii) Interpreting and understanding the contract.
(viii) Construction and maintenance methods and procedures.
(ix) Communication.
(x) Cash-flow control, submitting invoices and payment certificates.
(xi) Planning, programming, scheduling, critical path control and acceleration.
(xii) Maintenance planning.
(xiii) Material procurement and control.
(xiv) Risk limitation and management.
(xv) Quality assurance and procedures.
(xvi) Compliances with all applicable laws, regulations, statutory provisions and agreements.
(xvii) General Conditions of Contract and Contract Data.
(xviii) Contractual claims, if situations arise that entitle a contractor to claims in terms of the Conditions of Contract.
(xix) Profit and loss.
(xx) Replacement and running costs of Construction Equipment.

The extent and level of management, mentorship, supervision, guidance and assistance to be provided by the Contractor shall be in commensuration with the expertise of the relevant EE and should be so directed as to enable the EE to achieve the successful execution and completion of the respective works.

C3.3.3 SANCTIONS

In the event that the Tenderer fails to substantiate that any failure to achieve the Contract Participation Goal outcomes was due to quantitative under runs, the elimination of items, or any other reasons beyond the Contractor's control which may be acceptable to the Employer, the Contractor shall be liable to pay to the Employer a financial penalty calculated in the following manner:

$$P = 0{,}50 \times \frac{(D - D_0) \times N_A}{(100)}$$

Where D = tendered Contractor participation goal percentage.

D_0 = the Contract Participation Goal, which the Employer's Representative based on the credits passed, certifies as being achieved upon completion of the contract.

N_A = Net Amount of the Tender

P = Rand value of penalty payable.

The penalties will be calculated with each certificate, based on the information provided under the monitoring indicated in clause C3.3.4 below.

C3.3.4 MONITORING / REPORTING

The reporting requirements below will be adhered to.

CPG attainment will be monitored on a monthly basis, and for this the Contractor will supply the relevant information at a time set by the Employer's Agent.

C3.3.4.1 The Contractor shall submit all the documentation required in terms of details of his plan to achieve CPG, compliance with the contract and C3.3.4.2 timeously and, together with his programme of activities, a schedule which indicates clearly the expected commencement and completion dates of work and services to be performed by all the targeted enterprises engaged on the contract for the purpose of securing credits towards the contract participation goal. This schedule shall be updated by the Contractor whenever a change in date occurs.

C3.3.4.2 The Contractor shall prepare and attach to his claim for payment, in a form approved by the Employer, the following:

a) a brief report which describes the commercially useful functions performed by the targeted enterprises in the performance of the contract, both over the interim period and on a cumulative basis;

b) a schedule reflecting the estimated total value of the contracts, the cumulative value of the contracts, and the value of supplies provided or work and services performed (or both) over the period for which payment is claimed in respect of each and every targeted enterprise performing commercially useful functions;

C3.3.4.3 Should random inspections conducted by the Employer's Agent on targeted enterprise activities indicate that such enterprises are not performing in accordance with the requirements of this part, the Contractor shall provide, in addition to the requirements of C3.3.4.2, separate weekly resource returns and any other relevant information in respect of such targeted enterprises in a format approved by the Employer's Agent.

C3.3.4.4 The Employer's Agent shall certify the value of the credits counted towards the contract participation goal whenever a claim for payment is issued to the employer, and shall notify the Contractor of this amount.

C3.3.4.5 The Contractor shall, upon completion of each individual targeted enterprise's contract, issue a completion certificate and certify the amount paid to such targeted enterprises. He shall submit the certificates, counter-certified by the relevant targeted enterprise, to the Employer's Agent for record-keeping purposes. The Contractor shall furnish reasons to the Employer whenever it is not possible to obtain such counter certification.

C3.3.5 CONTRACTOR'S OBLIGATIONS TO SUBCONTRACTED EEs

(1) **Dispute Avoidance and Resolution Procedures**

The Contractor shall at all times

(a) apply the terms and conditions of the subcontract fairly and justly, taking due cognisance of the level of sophistication and experience of the EE subcontractor concerned.

(b) closely monitor all EE subcontracts and issue reasonable warnings when any contravention of the terms of the subcontract has occurred or appears likely to occur. The Contractor shall give EEs reasonable opportunity to avoid or make good any such contravention.

When taking any disciplinary actions or imposing any penalties provided for in the subcontract, the Contractor shall explain fully that such actions are in accordance with the conditions of subcontract.

Should any dispute arise between the Contractor and an EE, such dispute shall be resolved in accordance with the provisions of the subcontract.

Should an EE subcontractor be terminated, the Contractor shall replace such subcontractor with a local EE subcontractor listed on the KLM database.

(2) **Quality of Work and Performance of EE subcontractors**

If, in the opinion of the Employer's Agent, an EE Subcontractor fails to comply with any of the criteria listed below, he/she shall issue a written warning to the Contractor stating all the areas of non-compliance.

(a) Acceptable standard of work as set out in the subcontract specifications.
(b) Progress in accordance with the time constraints in the subcontract.
(c) Site safety.

The circumstances that may warrant the issue of a written warning are, however, not limited to those listed above.

A copy of the letter of warning shall be forwarded to the Employer.

C3.3.6 ISSUING OF COMPLETION CERTIFICATE

The Contractor shall, within 7 days of the completion of each subcontract completed in accordance with the provisions of this specification, issue free of charge to the EE a Certificate of Completion co-signed by the Employer's Agent and a senior representative of the Contractor who has been duly authorised to do so.

C3.3.7 MEASUREMENT AND PAYMENT

No direct payment will be made for the cost of dealing with EE's. Payment will be deemed to be covered by the rates and sums tendered and paid for the various items of work included under the contract.

C3.4 CONSTRUCTION

C3.4.1 APPLICABLE SANS 2001 OR SANS 1200 STANDARDS FOR CONSTRUCTION WORKS

The provisions of the SANS 1200 Standardized Specifications, as amended, take preference over the provisions of the SANS 2001 standards.

C3.4.2 APPLICABLE NATIONAL AND INTERNATIONAL STANDARDS

Although not bound in nor issued with this document, but are available at the Tenderer's/Contractor's expense from the relevant specification authorities, for the purpose of this Contract the latest issues of the following Standard Specifications for Civil Engineering Construction, applicable at the date of tender advertisement, shall apply:

SANS 1200 A	: General
SANS 1200 AB	: Engineer's Office
SANS 1200 C	: Site Clearance
SANS 1200 D	: Earthworks
SANS 1200 DB	: Earthworks (Pipe Trenches)
SANS 1200 DE	: Small Earth Dams
SANS 1200 DK	: Gabions and Pitching
SANS 1200 G	: Concrete (Structural)
SANS 1200 GA	: Concrete (Small Works)
SANS 1200 HA	: Structural Steelwork (Sundry Items)
SANS 1200 L	: Medium Pressure Pipelines
SANS 1200 LB	: Bedding
SANS 1200 LD	: Sewers

C3.4.2.1 The term "project specification" appearing in any Standardised Specification must be replaced with "Scope of Work".

C3.4.2.2 Each of the Standard Specifications contains an appendix, which in turn lists further specifications which are not bound into the tender and contract documents.
Both the Standard Specifications, as well as those specifications that are listed in the appendix to the Standard Specifications, shall apply to the Contract to the same extent as if each of these specifications had been bound into the tender/contract documents.

C3.4.2.3 Further to the above, it should be noted that, where in a specific Standardised Specification reference is made to a sub-clause in another Standardised Specification, any amendment or addition to the sub-clause referred to, as provided in the Works Specification, shall apply.

C3.4.2.4 The prefix "PSA" denotes an amendment to SABS 1200A. "PSAB" denotes an amendment to SABS 1200AB and so forth. The number following these prefixes refers to the relevant clause numbers of SABS 1200.
For example: "PSA 8.1" refers to Clause 8.1 of SABS 1200A.

C3.4.2.5 New clauses are followed by an asterisk (*).

C3.4.2.6 The variations and additions to the specifications listed in C3.4.2 above are to be found in Part C5 of this document.

C3.4.3 PARTICULAR SPECIFICATIONS

The following particular specifications, bound into this document under section 3.6 Specification data are applicable to this contract:

C3.4.4 CERTIFICATION BY RECOGNISED BODIES

Only SANAS accredited laboratories or other institutions may be used for certification purposes. For material testing, concrete durability testing, or other the laboratory shall be approved by the Engineer.

C3.4.5 AGRÉMENT CERTIFICATES

No alternative tenders and no tenders offering alternative materials to those stated in the Schedule of Quantities and/or Specifications will be accepted for tender purposes.
The use of alternative materials, which may be fit for purpose and are subject to an Agrément certificate, may however be considered following award of the contract providing the following are adhered to:

- A full copy of the Agrément certificate must be provided,
- The certificate must be currently active,
- All work must be done in accordance with the terms of a specific certificate for the product,
- Details of any and all variations approved by Agrément South Africa must be provided,
- Details of who will erect or install the product must be provided,

The decision as to whether alternative materials complying with the above requirements may be used will be at the sole discretion of the Engineer.

C3.5 MANAGEMENT

C3.5.1 APPLICABLE SANS STANDARDS

The following parts of SANS 1921 (Construction and management requirements for construction works) and associated specifications are applicable:

SANS 1921-1: General engineering and construction works
SANS 1921-2: Accommodation of traffic on public roads occupied by the contractor
SANS 1921-3: Structural steelwork
SANS 1921-4: Third party management support in works contracts
SANS 1921-5: Earthworks activities, which are to be performed by hand
SANS 1921-6: HIV / AIDS awareness

The associated specification data are as follows:

SANS 1921-1: General Engineering and Construction Works	
Clause No	Specification Data
4.1.7	The Contractor will be responsible for the submission of technical data sheets, spares lists, guarantees for all materials supplied under this contract.
4.2.1	The responsibility strategy assigned to the contractor for the works is: A
4.2.2	The Engineer is ROMH Consulting (Pty) Ltd
4.2.3	Drawings and other information are to be submitted in accordance with the Contractor's programme.
4.3	The planning, programme and method statements are to comply with the following: • The Contractor will take into consideration the execution of the definable items of work associated with the scheduled provisional items and provisional quantities within the time period contemplated by the Time for Completion stipulated or tendered, as the case maybe. • The Works must be commenced within a period not exceeding 14 days from the Commencement Date, such Commencement Date to be agreed with the Employer. • The Site will be handed over to the Contractor as early as possible. The works should commence immediately thereafter. • The planning, program and method statements are to comply with the following: o Microsoft Project format o Links between all predecessors to and all dependencies to any particular task must be shown o Critical path must be shown
4.3.3	The notice period for inspection is 72 hours.
4.12.2	Full details of QA programmes and monitoring are required from the Contractor.
4.14.3	No facilities are required for the Employer.
4.17.1	None
4.17.3	Services which are known to exist on site are: a) Shown on the layout drawings and/or will be pointed out on site.
4.17.4	None
4.18	The additional health and safety requirements are: • Refer C3.6 : Health & Safety Requirements & Procedures

SANS 1921-1: General Engineering and Construction Works	
Clause No	Specification Data
4.22	The works to be undertaken by nominated and selected subcontractors comprise: • None
Variations:	
Additional clauses:	
	1. Site Meetings and Procedures The Contractor will be expected to provide the Engineer with full details of deliveries to site, deliveries still to be made to site, full QA records of work to date, work completed to date versus programme, rate of progress, plant, machinery and staff on site, for each of the monthly meetings the Engineer will hold on site with the installation contractor
	2. Water and Electricity The Employer does not warrant that any water or electricity supply may exist at any or all points on site.
4.4	An item for independent quality tests required by the Engineer is included in the Schedule of Quantities. The Contractor shall draft and submit his proposed Quality Assurance Plan to the Engineer for his approval. This plan shall clearly indicate and control all contract activities ensuring that work is carried out fully in compliance with the contract specifications and/or product manufacturer's specifications, whichever is applicable.

C3.5.2 LIAISON WITH EMPLOYER'S STAFF AND OPERATIONAL REQUIREMENTS

The Contractor shall liaise with Amatola Water with regard to the timing of the work so as to fit in with the operational requirements of the TREATMENT WORKS. This shall particularly apply to operations which require the shutting down of the SERVICES supply, as alternate services arrangements must be made. Amatola Water requires 14 days notice of any such shutdown.

C3.5.3 PLANNING, CASHFLOW AND PROGRAMMING

C3.5.3.1 Planning

Disruption of the waste water works must be avoided as far as practically possible throughout the duration of the contract.

The Contractor shall therefore undertake the Works in a manner that ensures no unnecessary disruption of the waste water works. The number of supply system shutdowns must be kept to an absolute minimum with the duration of any shutdown as short as possible.

Tenderers shall provide information as part of the method statements submitted with their tenders as to the number, sequence and durations of proposed supply system shutdowns.

Note : No supply system shutdown shall be allowed at any time or for any reason whatsoever without the written permission of the Employer's authorised official responsible for the contract. Should the Contractor fail to adhere to this requirement, the full costs of any nature whatsoever incurred by the Employer in ensuring continuation of the services to consumers shall be charged to and recovered from the Contractor. This shall include the full cost of any penalties charged to the Employer by industrial and other consumers.

C3.5.3.2 Submitted Programme

The Contractor shall provide basic main activity and cashflow programmes as part of his tender offer.

Detailed activity programmes showing the anticipated quantities of work to be performed, together with the manner in which the required Works shall be constructed, inspected, tested and commissioned, together with an estimated cash flow, shall be submitted by the successful tenderer within 14 days of the Commencement Date (Clause 5.6.1 of the GCC2010 refers).

This programme shall clearly indicate each of the work activities and take into account the work and time constraints.

If, during the progress of the work, the quantities of work performed per month fall below those indicated on the programme, or if the sequence of operations is altered, or if the programme is deviated from in any other way, the Contractor shall produce a revised programme showing the modifications to the original programme necessary to ensure completion of the works or any part thereof within the specified time for completion, within one week, to the Engineer.

The programme, including cashflow to date, shall furthermore be updated for each site meeting showing the work completed and the progress ahead, to or behind schedule as relevant.

During the duration of the contract, the Contractor shall submit written reports to the Engineer each fortnight showing progress related to the agreed programme and shall update the programme and cashflow in accordance with actual progress.

The approval by the Engineer of any programme shall have no contractual significance other than that the Engineer would be satisfied if the work is carried out according to such programme, and that the Contractor undertakes to carry out the work in accordance with the programme. It shall not limit the right of the Engineer to instruct the Contractor to vary the programme should circumstances make this necessary.

The Contractor's programme and method statements will not be accepted as the basis for claims for additional compensation without due reference to all relevant associated factors.

When requested by the Engineer, the Contractor shall submit, within two working days, a Method Statement dealing with his proposed procedure for certain elements of the works. No work to this element shall commence until the Engineer's written approval of the Method Statement has been received.

C3.5.3.3 General Allowances

When drawing up his programme, the Contractor shall take into consideration and make allowance for, inter alia:

(i) provision and approval of the required documentation, insurances and surety,
(ii) preparation and submission of design drawings to the Engineer for approval, and the time allowed for approval by the Engineer, the time for approval being seven (7) days,
(iii) expected weather conditions and their effects,
(iv) known physical conditions or artificial obstructions,
(v) searching for, dealing with and carrying out alterations to the existing services,
(vi) the sequencing of the Works taking all other pertinent information contained in the documents into account,
(vii) lead times for delivery of pipes and other materials,
(viii) allowance for inspection and testing by a third party,
(ix) delivery schedule as agreed to with the Supply Contractor(s),
(x) the provision and implementation of the Health and Safety Plan in terms of the Construction Regulations, 2014 of the Occupational Health and Safety Act.

C3.5.3.4 Engineer's Inspection and Approval of Work

The Contractor shall allow reasonable time in his programme for the Engineer to carry out testing and inspection of the Works. To this end the Contractor shall provide to the Engineer a schedule indicating when inspections are required. Requests for ad hoc inspections should be made in writing to the Engineer at least 24 hours before such inspections are required.

If the Engineer attends with the purpose of examining any part of the Works at the date and time agreed on with the Contractor and it is found that the Works are not ready for inspection, the Contractor shall be responsible for the cost of that visit by the Engineer.

The Engineer's Representative will visit the site regularly for the purpose of supervision of the Contract and inspection and approval of completed work. The Contractor shall therefore arrange his working programme in such a way that all work is inspected and approved at the required time. Under no circumstances shall he proceed with any activity that covers up previous work before the previous work has been approved in writing (e.g. no trench shall be backfilled until the laid pipes and bedding have been inspected and approved).

C3.5.3.5 Review of Progress

The Contractor shall review his progress each month and should progress lag behind the latest accepted programme by more than 1 week, he shall submit a revised programme and method statement of how he proposes making up lost time. If, in the opinion of the Engineer, such revised programme will not make up lost time, the Engineer shall have the right to request the Contractor to reorganize his work in a manner which will ensure an acceptable programme. Claims for additional payments to meet any cost incurred due to such reorganization will not be accepted.

C3.5.4 SEQUENCE OF THE WORKS

Due to the urgent nature of this contract, the Works shall have to be undertaken at several locations at the same time.

Immediately after moving onto Site and establishing, the Contractor shall clear the route of the project areas. After clearing, the Contractor shall construct the temporary gravel access roads. These activities shall receive high priority.

The sequence of construction shall be carefully planned and agreed with the Engineer before any work commences.

C3.5.5 QUALITY PLANS AND CONTROL

C3.5.5.1 General

Quality control forms an essential part of this contract. The Employer will engage the services of an independent third party quality inspectorate who shall carry out quality control inspections and testing at all stages of the manufacturing, supply and construction stages for the entire project, on behalf of the Employer. The Contractor shall agree hold points with the third party inspectorate for quality inspections and testing, to the approval of the Engineer.

The Contractor shall submit to the Engineer for approval his Quality Control plans, method statements and testing methods prior to undertaking or starting any work under the contract.

C3.5.5.2 Quality Control of Workmanship

The Contractor shall be responsible for routine inspection, sampling and testing of all OCIM, workmanship, and plant and measuring devices in order to control the quality of the work and to ensure compliance with the Specification.

The Contractor shall be responsible for establishing and maintaining procedures for Quality Control which ensure that all aspects of the Control Works comply with the conditions of the Contract.

The Contractor shall appoint a suitably qualified member of his staff to be responsible for the Quality Control and to maintain effective liaison with the Engineer. Such appointment shall be subject to the approval of the Engineer.
The cost for the above will be deemed to be included in the rates tendered.

C3.5.5.3 Control Testing of Earthwork Layers and Bedding

The Contractor is required to carry out his own control testing, but if he so wishes, and agrees to abide by the results of the Engineer's check test, he may dispense with his own tests. However, should the Contractor wish to use the Engineer's testing facilities, he will be charged for the various tests at the rates ruling at the time.

Any additional tests requested by the Contractor, or any retests required, due to failure of the initial tests, will be charged to the Contractor at the rates ruling at the time.
The Contractor shall engage the services of an approved independent laboratory or other institution – as applicable for quality testing – to ensure that his work complies with the Specifications. The Contractor shall liaise with Amatola Water and ORTDM regarding the timing of the work so as to fit in with the operational requirements of the TREATMENT WORKS. This shall particularly apply to operations which require the shutting down of the SERVICES supply, as alternate services arrangements must be made. Amatola Water requires 14 day's notice of any such shutdown.

Disruption of the wastewater works must be avoided as far as practically possible throughout the duration of the contract.

The Contractor shall therefore undertake the Works in a manner that ensures no unnecessary disruption of the waste water works. The number of supply system shutdowns must be kept to an absolute minimum with the duration of any shutdown as short as possible.

Tenderers shall provide information as part of the method statements submitted with their tenders as to the number, sequence and durations of proposed supply system shutdowns.

Note : No supply system shutdown shall be allowed at any time or for any reason whatsoever without the written permission of the Employer's authorised official responsible for the contract. Should the Contractor fail to adhere to this requirement, the full costs of any nature whatsoever incurred by the Employer in ensuring continuation of the services to consumers shall be charged to and recovered from the Contractor. This shall include the full cost of any penalties charged to the Employer by industrial and other consumers.

The Contractor shall provide basic main activity and cashflow programmes as part of his tender offer.

Detailed activity programmes showing the anticipated quantities of work to be performed, together with the manner in which the required Works shall be constructed, inspected, tested and commissioned, together with an estimated cash flow, shall be submitted by the successful tenderer within 14 days of the Commencement Date (Clause 5.6.1 of the GCC2010 refers).

This programme shall clearly indicate each of the work activities and take into account the work and time constraints.

If, during the progress of the work, the quantities of work performed per month fall below those indicated on the programme, or if the sequence of operations is altered, or if the programme is deviated from in any other way, the Contractor shall produce a revised programme showing the modifications to the original programme necessary to ensure completion of the works or any part thereof within the specified time for completion, within one week, to the Engineer.

The programme, including cashflow to date, shall furthermore be updated for each site meeting showing the work completed and the progress ahead, to or behind schedule as relevant.

During the duration of the contract, the Contractor shall submit written reports to the Engineer each fortnight showing progress related to the agreed programme, and shall update the programme and cashflow in accordance with actual progress.

The approval by the Engineer of any programme shall have no contractual significance other than that the Engineer would be satisfied if the work is carried out according to such programme, and that the Contractor undertakes to carry out the work in accordance with the programme. It shall not limit the right of the Engineer to instruct the Contractor to vary the programme should circumstances make this necessary.

The Contractor's programme and method statements will not be accepted as the basis for claims for additional compensation without due reference to all relevant associated factors.

When requested by the Engineer, the Contractor shall submit, within two working days, a Method Statement dealing with his proposed procedure for certain elements of the works. No work to this element shall commence until the Engineer's written approval of the Method Statement has been received.

When drawing up his programme, the Contractor shall take into consideration and make allowance for, inter alia:

(i) provision and approval of the required documentation, insurances and surety,
(ii) preparation and submission of design drawings to the Engineer for approval, and the time allowed for approval by the Engineer, the time for approval being seven (7) days,
(iii) expected weather conditions and their effects,
(iv) known physical conditions or artificial obstructions,
(v) searching for, dealing with and carrying out alterations to the existing services,
(vi) the sequencing of the Works taking all other pertinent information contained in the documents into account,
(vii) lead times for delivery of pipes and other materials,
(viii) allowance for inspection and testing by a third party,
(ix) delivery schedule as agreed to with the Supply Contractor(s),
(x) the provision and implementation of the Health and Safety Plan in terms of the Construction Regulations, 2014 of the Occupational Health and Safety Act.

The Contractor shall allow reasonable time in his programme for the Engineer to carry out testing and inspection of the Works. To this end the Contractor shall provide to the Engineer a schedule indicating when inspections are required. Requests for ad hoc inspections should be made in writing to the Engineer at least 24 hours before such inspections are required.
If the Engineer attends with the purpose of examining any part of the Works at the date and time agreed on with the Contractor and it is found that the Works are not ready for inspection, the Contractor shall be responsible for the cost of that visit by the Engineer.

The Engineer's Representative will visit the site regularly for the purpose of supervision of the Contract and inspection and approval of completed work. The Contractor shall therefore arrange his working programme in such a way that all work is inspected and approved at the required time. Under no circumstances shall he proceed with any activity that covers up previous work before the previous work has been approved in writing (e.g. no trench shall be backfilled until the laid pipes and bedding have been inspected and approved).

The Contractor shall review his progress each month and should progress lag behind the latest accepted programme by more than 1 week, he shall submit a revised programme and method statement of how he proposes making up lost time. If, in the opinion of the Engineer, such revised programme will not make up lost time, the Engineer shall have the right to request the Contractor to reorganize his work in a manner which will ensure an acceptable programme. Claims for additional payments to meet any cost incurred due to such reorganization will not be accepted.

Due to the urgent nature of this contract, the Works shall have to be undertaken at several locations at the same time.

Immediately after moving onto Site and establishing, the Contractor shall clear the route of the project areas. After clearing, the Contractor shall construct the temporary gravel access roads. These activities shall receive high priority.

The sequence of construction shall be carefully planned and agreed with the Engineer before any work commences.

Quality control forms an essential part of this contract. The Employer will engage the services of an independent third party quality inspectorate who shall carry out quality control inspections and testing at all stages of the manufacturing, supply and construction stages for the entire project, on behalf of the Employer. The Contractor shall agree hold points with the third party inspectorate for quality inspections and testing, to the approval of the Engineer.

The Contractor shall submit to the Engineer for approval his Quality Control plans, method statements and testing methods prior to undertaking or starting any work under the contract.

The Contractor shall be responsible for routine inspection, sampling and testing of all OCIM, workmanship, and plant and measuring devices in order to control the quality of the work and to ensure compliance with the Specification.
The Contractor shall be responsible for establishing and maintaining procedures for Quality Control which ensure that all aspects of the Control Works comply with the conditions of the Contract.

The Contractor shall appoint a suitably qualified member of his staff to be responsible for the Quality Control and to maintain effective liaison with the Engineer. Such appointment shall be subject to the approval of the Engineer.

The cost for the above will be deemed to be included in the rates tendered.

Contractor to abide by the results of the Engineer’s check test, he may dispense with his own tests. However, should the Contractor wish to use the Engineer’s testing facilities, he will be charged for the various tests at the rates ruling at the time.

Any additional tests requested by the Contractor, or any retests required, due to failure of the initial tests, will be charged to the Contractor at the rates ruling at the time.

The Contractor shall engage the services of an approved independent laboratory or other institution – as applicable for quality testing – to ensure that his work complies with the Specifications.

No separate payment will be made for such testing, the cost of which will be deemed to be included in the Contractor's rates tendered for the items of work that require testing in accordance with the Specifications.

No separate payment will be made for such testing, the cost of which will be deemed to be included in the Contractor's rates tendered for the items of work that require testing in accordance with the Specifications.

C3.5.5.4 Quality Assurance (QA) (Read with SANS 1921 – 1: 2004 clause 4.4)

The onus to produce work that conforms in quality and accuracy of detail to the requirements of the Specifications and Drawings, rests with the Contractor, and the Contractor shall, at his own expense, institute a quality control system and provide experienced engineers, foremen, surveyors, material technicians, other technicians and technical staff, together with all transport, instruments and equipment to ensure adequate supervision and positive control of the Works at all time.

The Contractor will be solely responsible for the production of work that complies with the Specifications to the satisfaction of the Engineer. To this end it will be the full responsibility of the Contractor to institute an appropriate Quality Assurance (QA) system.

The Engineer will audit the Contractor's quality assurance (QA) system on a regular basis to verify that adequate independent checks and tests are being carried out and to ensure that the Contractor's own control is sufficient to identify any possible quality problems which could cause a delay or failure.

The Contractor shall ensure that sufficient supervisory staff, the required transport, instruments, equipment and tools are available to control the quality of his own workmanship in accordance with his QA-system. His attention is drawn to the fact that it is not the duty of the Engineer or the Engineer's representative to act as foreman or surveyor.

C3.5.5.5 Process Control

The cost of supervision and process control, including testing carried out by the Contractor, will be deemed to be included in the rates tendered for the related items of work and no additional payment will be made for testing required.

The Contractor's attention is drawn to the provisions of the various Specifications regarding the minimum frequency of testing required. The Contractor shall, at his own discretion, increase this frequency, where necessary, to ensure adequate control.

On completion and submission of every part of the work to the Engineer for examination, the Contractor shall furnish the Engineer with the results of the relevant tests to indicate compliance with the Specifications.

The Contractor shall arrange for all tests required for process control to be done by a laboratory acceptable to and approved by the Engineer.

The Contractor may establish his own laboratory or he may employ the services of an independent commercial laboratory. Whatever method is used, the Contractor must submit the results of tests carried out on materials and workmanship when submitting work for acceptance by the Engineer. The costs for these tests shall be deemed to be included in the relevant rates.

C3.5.5.6 Acceptance Control

The process control test results submitted by the Contractor for approval of materials and workmanship may be used by the Engineer for acceptance control. However, before accepting any work, the Engineer may have further control tests carried out by a laboratory of his choice. The cost of such additional tests will be covered by a provisional sum provided in the schedule of quantities, but tests that failed to confirm compliance with the specifications, will be for the account of the Contractor.

C3.5.5.7 Data Books

The Contractor shall establish and maintain a comprehensive Data Book, which will provide a complete and permanent record of all inspections and tests relating to the Contract. The Data Books shall be maintained in triplicate format and presented to the Engineer for review and approval at the end of the Contract. After review and approval a copy will be delivered to the Employer (Amatola Water), one copy retained by the Engineer and one copy returned to the Contractor for his permanent records.

C3.5.6 PAYMENT CERTIFICATES

This is a “re-measurable” Contract based on quantities as opposed to Lump Sums for milestones reached or activities completed. Interim payments will be made for works executed in terms of the contract. The sum of the interim payments is to represent a fair and reasonable estimate of the value of works at the time of assessment.

The Contractor should submit his claim for payment on or about the 20th day of each month.

The Engineer’s Representative will either verify claims or return claims where errors are found in the supporting data within 2 days. The Contractor will issue on invoice in respect of verified claims together with all supporting data within 3 days of being requested to do so. In terms of GCC 2010 clause 6.10.4 the Engineer will forward the payment certificate / invoice etc. to Employer for payment within 7 days of receiving the invoice together with all supporting data.
In the event of errors being found in the invoice or supporting data it will be deemed that the claim for verification or invoice has not been received.

Failure to supply claims by the 20th may result in late payments.

Payment certificates shall be submitted in the form of the Bill of Quantities. Columns shall be provided showing the previous quantity, current quantity and total quantity claimed under each item.

Calculations to substantiate the quantities claimed must be submitted with each monthly claim. Claims for payment will be deemed not to have been received until provision by the Contractor to the Engineer of calculations to substantiate the quantities claimed.

The Transfer of Rights declaration must be submitted together with any claim made for payment. No payment for Goods or materials will be made without such a declaration. A pro forma declaration of Transfer of Rights is included in this document.

C3.5.6.1 Electronic payments

Amatola Water does make electronic payments. The Contractor will be responsible for supplying correct bank details to the Employer for electronic payments and the Employer will not be held responsible for any incorrect bank details supplied by the Contractor.

C3.5.6.2 Bonds and Guarantees

The Employer does not accept Bonds or Guarantees for retention.

C3.5.7 FORMAT OF COMMUNICATIONS

Throughout the construction period all communication between parties shall be in writing delivered by means of email or facsimile. All verbal instructions, requests or agreements shall be confirmed in writing to be of effect.

Throughout the contract period, the Contractor shall supply and maintain the following documentation that shall be kept accessible to both the Contractor and the Engineer or Engineer's Representative at all times:

a) Site Request / Instruction book: For the Contractor to provide the Engineer or Engineer's Representative with information required, for giving notification in writing of inspections, drawings, etc., required by the Contractor, and for use by the Engineer or Engineer's Representative for the purpose of writing day-to-day instructions or confirming verbal information or instructions given to the Contractor.

b) Safety File: Containing the safety hierarchy, contact details, safety plan, audits, safety equipment, safety training, injuries log, inspections and all other relevant safety data.

c) Quality Control File: Containing Quality Assurance and Quality Control Forms to be operated and maintained by the Contractor.

d) Measurement File: Containing records of work measurement and calculations.

e) Daily Register: Listing labour and construction equipment status.

f) Daily Contract Diary: For recording the work carried out on site each day – shall reference the specific area of work and shall be signed by the Site Agent and the Engineer's Representative.

g) Monthly Labour Return Schedule.

h) One full set of contract drawings and contract documents.

i) Construction Programme.

C3.5.8 RECORDING OF WEATHER

The Contractor shall record all climatic conditions during the execution of the Works. The recordings shall be submitted to the Engineer's Representative on a weekly basis, together with a statement recording the Contractor's opinion of the effect on the progress of the Works and on his construction Programme of any climatic conditions which he may consider to be abnormal and/or to constitute a reason for an extension of the Time for Completion of the Works.

Should the Contractor wish to invoke or submit a claim for extension of time for the completion of the Works due to the Works being delayed by reason of climatic conditions he shall do so in writing giving, inter alia, the following details:-

- the period and times work or the Works was stopped and proceeded with; and
- a report on resources on Site, active and/or In readiness, at the time of the alleged delay or disruption, which shall be certified by the Engineer's Representative; and
- The reasons construction could not or cannot (as the case may be) proceed or commence, with reference to the approved construction programme activities and an identification of the Critical Path Activity affected; and
- The circumstances surrounding any instruction by a third party to stop work due to inclement weather such as Industrial Council, Safety Officers, etc.

Only when the Works shall have been completed in terms of Sub-clause 5.14.3 of GCC 2010 shall the extension of time for completion resulting from climatic conditions, if any, be finalized by the Engineer.

C3.5.9 PRINCIPLES AND METHOD FOR GRANTING EXTENSION OF TIME RESULTING FROM CLIMATIC CONDITIONS (Refer Sub-Clause 5.12 of GCC 2010)

"Normal climatic conditions" shall not be deemed to constitute "circumstance of any kind" in terms of Sub-clause 5.12.1 of GCC 2010.

Extension of time resulting from "abnormal climatic conditions" in terms of Clause 5.12.2.2 GCC 2010 shall be determined in accordance with a Critical Path Method, as follows :-

A delay caused by "abnormal climatic conditions" will be regarded as an actual delay only if, in the opinion of the Engineer, the execution of an item or items of work on the critical path of the construction programme of the Contractor cannot be proceeded or commenced with. Delays on working days only (based on an ordinary working week having 45 working hours and an ordinary working day having 9 working hours) will be taken into consideration for the determination of an extension of time.

Extension of time due to abnormal climatic conditions shall be considered by the Engineer over the full period of construction up to the authorized Due Completion Date, i.e. including any extension thereof, which may have been granted.

Extension of time for parts of a month shall be determined by pro rata values of the expected delays specified to be used.

C3.5.10 KEY PERSONNEL AND SUPERVISION

The Contractor shall assign as Site Agent a person suitably qualified and experienced in all aspects of the Works and specifically in the construction of large diameter continuously welded mild steel pipelines. This Site Agent shall be responsible for all aspects of the Works on behalf of the Contractor, including receiving instructions, providing quotations, attending meetings, dealing with contractual correspondence, payment certificates, preparation of programs and cash flows, and the like. The Site Agent shall also have the authority to commit the Contractor to all contractual aspects of the Contract. The Site Agent shall be appointed in writing in full accordance with the requirements of clause 4.12.2 of GCC 2010.

Senior personnel such as the Site Agent, Assistant Site Agent and/or General Foreman shall be on site at all times to control and supervise the site activities. No work may be undertaken without these senior personnel on the site and the Engineer shall close the site if these personnel are not present. No claim for additional time or cost will be allowed for such site closure due to the senior personnel not being present on site.

The Contractor shall provide the Engineer with the full names, qualifications, experience and contact details of his key personnel within seven (7) days of the commencement date of the contract.

C3.5.11 MANAGEMENT MEETINGS

Management meetings will be held monthly on site for the duration of the Contract on dates and at times to be agreed.

It is a requirement that the Site Agent attend the monthly management meetings.
Two days prior to each monthly meeting the Contractor shall provide an updated programme and progress report, cash flow, labour report and plant and equipment report.

C3.5.12 WORKING HOURS

Normal working hours shall be between 07:00 and 17:00 from Monday to Friday. Work may take place on Saturdays between 07:00 and 13:00. Saturdays will not be included in calculating days for completion of any extension of time granted.

C3.5.13 PERMITS

No special permits are required, however, should any be necessary the Engineer will timeously inform the Contractor. The Contractor shall then be responsible for obtaining the required permit(s), the cost of which shall be recoverable from the Employer.

C3.5.14 DEALING WITH TRAFFIC AND ACCESS

The Contractor shall liaise with all the relevant authorities/persons regarding construction where it affects public/private right of way on roads, access to properties etc. Where alternative arrangements cannot be made, roads shall be crossed in half widths to allow for safe passage of traffic.

All the relevant requirements regarding the latest edition of the South African Traffic Signs Manual shall be adhered to. Specific attention shall also be paid to the requirements of the Encgobo Local Municipality and Department of Transport regarding signs for road closures, deviations, warning signs, etc.

C3.5.1 TRAFFIC MANAGEMENT

To avoid the generation of congestion on public roads the Contractor shall avoid using access roads for the supply or removal of materials during peak traffic periods. The Contractor is to liaise with the Engcobo Local Municipality and the Department of Transport to determine which time periods of the day shall be avoided.

C3.5.2 MAINTENANCE OF ACCESS AND STREETS

The operation of vehicles on existing roads or streets shall be limited to traffic with an axle load not exceeding that allowed by the Road Traffic Ordinance of the authority concerned, or any amendment thereof.

All access roads used by the Contractor shall be maintained for the duration of the contract and shall be rehabilitated to their original condition on completion of the contract.

The Contractor must note that no additional payment will be made for construction, maintenance and rehabilitation of any access roads to the site.

C3.5.3 PROTECTING THE SITE

The Contractor shall be solely responsible for the protection of the Site against all damage to property, services, terrain, trees etc. If in the normal execution of this Contract, disturbance to the Site of the Works is necessary, the Contractor shall obtain the prior permission of the Engineer. After completion of this work, the Contractor shall reinstate the area concerned to its original condition at his own cost as covered under the relevant rates. The Engineer's ruling of what was the original condition of the Site or part thereof shall be final.

If the Contractor fails to reinstate the Site, the Employer shall do the reinstatement and the Engineer shall establish the extent of the work as well as its costs. The Engineer's ruling shall be final and payment for the work will be deducted from money owed to the Contractor.

The Contractor shall ensure that his actions do not cause any nuisance or safety hazards to the general public or the Employer's operational staff.

C3.5.4 NOISE CONTROL AND WORKING HOURS

The Contractor is to observe any plant operational restrictions imposed by OR Tambo District Municipality. Working hours for particularly noisy operations are to be kept to a minimum. Plant is to be kept well maintained with noise performance checks being carried out during regular maintenance schedules.

In addition to any operational restrictions that may be imposed by the O.R. Tambo District Municipality the Contractor shall not shall operate before 07:00 or after 17:00 Monday to Saturday. Should the Contractor wish to work outside this period or on Sunday, permission will have to be obtained from the Engineer. In addition, any local residents shall be given 72 hours' notice of the event.

C3.5.5 HEALTH AND SAFETY

C3.5.5.1 Health and Safety Requirements and Procedures

This clause shall be read in conjunction with the Health and Safety Specification, included in this document. Anything set out in connection with the Safety Act in this document is supplementary to and in no way replaces, alters or supersedes the provisions of the Occupational Health and Safety Act 1993 (Act 85 of 1993) and the Constructional Regulations 2014, which shall be complied with at all times.

A) in terms of the provisions of Section 37(2) of the *Occupational Health and Safety Amendment Act*, 1993 (Act 85 of 1993), hereinafter referred to as the Act, the following arrangements and procedures shall apply between the Contractor and the Employer to ensure compliance by the Contractor with the provisions of the Act:

(i) The Contractor undertakes to acquaint the appropriate officials and employees of the Contractor with all relevant provisions of the Act and the Regulations promulgated in terms of the Act.

(ii) The Contractor undertakes that all relevant duties, obligations and prohibitions imposed in terms of the Act and Regulations on the Contractor will be fully complied with.

(iii) The Contractor accepts sole liability for such due compliance with the relevant duties, obligations and prohibitions imposed by the Act and Regulations and expressly absolves the Employer from himself being obliged to comply with any of the aforesaid duties, obligations and prohibitions, with the exception of such duties, obligations and prohibitions expressly assigned to the Employer in terms of the Act and its associated Regulations.

(iv) The Contractor agrees that any duly authorised officials of the Employer shall be entitled, although not obliged, to take such steps as may be necessary to monitor that the Contractor has conformed to his undertakings as described in paragraphs (i) and (ii) above, which steps may include, but will not be limited to, the right to inspect any

appropriate site or premises occupied by the Contractor, or any appropriate records or safety plans held by the Contractor.

(v) The Contractor shall be obliged to report forthwith to the Employer and Engineer any investigation, complaint or criminal charge which may arise as a consequence of the provisions of the Act and Regulations, pursuant to work performed in terms of this Contract, and shall, on written demand, provide full details in writing, to the Employer and Engineer, of such investigation, complaint or criminal charge.

(vi) The Contractor shall furthermore, in compliance with Constructional Regulations 2014 to the Act acquaint himself with the requirements of the Employer's Health and Safety Specification as laid down in Regulation 4(1)(a) of the Construction Regulation 2014, and prepare a suitably and sufficiently documented health and safety plan as contemplated in Regulation 5(1) of the Construction Regulation 2014 for approval by the Employer or his assigned agent. The Contractor's Health and Safety Plan and Risk Assessment shall be submitted to the Employer for approval within fourteen (14) days of the Commencement Date and shall be implemented and maintained from the commencement of the works.

(vii) The Contractor shall at all times be responsible for full compliance with the approved plan as well as with the Construction Regulations and no extension of time will be considered for delays due to non-compliance with the abovementioned plan or regulations.

(viii) The Employer, or his assigned agent, reserves the right to conduct periodic audits, as contemplated in the Construction Regulations 2014, to monitor that the Contractor is compliant in respect of his obligations. Failure by the Contractor to comply with the requirements of these Regulations shall entitle the Engineer, at the request of the Employer or his agent, to suspend all or any part of the Works, with no recourse whatsoever by the Contractor for any damages incurred as a result of such suspension, until such time that the Employer or his agents are satisfied that the issues in which the Contractor has been in default have been rectified.

(ix) The proposed type of work, materials to be used and potential hazards likely to be encountered on this contract are detailed in Section C3.3: Construction, the Bill of Quantities, the Drawings, and in the Employers' Health and Safety Specification *(Regulation 4(1) of the Construction Regulations 2014).*

Payment items are included in the Bill of Quantities to cover the Contractor's cost for compliance with the OHS Act and the abovementioned regulations.

C3.5.5.2 Health and Safety Specifications and Plans to be Submitted at Tender Stage

C3.1.5.2.1 Employer's Health and Safety Specification

The Employer's Health and Safety Specification are included in the tender documents as part of the Scope of Works.

C3.1.5.2.2 Tenderer's Health and Safety Plan

The successful Tenderer shall, on receipt of notification that he has been awarded the contract, submit without delay his own documented Health and Safety Plan for the execution of the work under the contract. His Health and Safety Plan must at least cover the following:

(i) a proper risk assessment of the works, risk items, work methods and procedures in terms of Regulations 9;
(ii) pro-active identification of potential hazards and unsafe working conditions;
(iii) provision of a safe working environment and equipment;
(iv) statements of methods to ensure the health and safety of subcontractors, employees and visitors to the site, including safety training in hazards and risk areas (Regulation 7);
(v) monitoring health and safety on the site of works on a regular basis, and keeping of records and registers as provided for in the Construction Regulations;
(vi) details of the Construction Supervisor, the Construction Safety Officers and other competent persons he intends to appoint for the construction works in terms of Regulation 8 and other applicable regulations; and
(vii) details of methods to ensure that his Health and Safety Plan is carried out effectively in accordance with the Construction Regulations 2014.

The Contractor's Health and Safety Plan will be subject to approval by the Employer, or amendment if necessary, before commencement of construction work. The Contractor will not be allowed to commence work, or his work will be suspended if he had already commenced work, before he has obtained the Employer's written approval of his Health and Safety Plan.

Time lost due to delayed commencement or suspension of the work as a result of the Contractor's failure to obtain approval for his safety plan, shall not be used as a reason to claim for extension of time or standing time and related costs

C3.5.5.3 Cost of Compliance with the OHSA Construction Regulations

The rates and prices tendered by the Contractor shall be deemed to include all costs for conforming to the requirements of the Act, the Construction Regulations and the Employer's Health and Safety Specification as applicable to this contract. Should the Contractor fail to comply with the provisions of the Construction Regulations, he will be liable for penalties as provided in the Construction Regulations and in the Employer's Health and Safety Specification.

Items that may qualify for remuneration will be specified in the Safety Specifications included or in the Project specifications.

C3.5.5.4 Protection of the Public

The Contractor shall at all times ensure that his operations do not endanger any member of the public.
The Contractor shall take special precautions to prevent public access to any dangerous areas on the works, e.g. by temporary barricades and / or fencing.

C3.5.5.5 First Aid and Site Safety

The Contractor shall be the responsible party on Site to ensure that the Occupational Health and Safety Act 1993 (Act 85 of 1993) including the Constructional Regulations 2014 and any other statutory obligations on safety are strictly adhered to and administered. The Employer shall not be held liable for safety on Site or anywhere else where the Contractor is active. The Contractor shall complete a “Contractor’s Legal Delegation Statement” which is bound into this document.
The Contractor may be working in confined spaces and deep trenches and excavations and shall especially be required to observe those sections of the Act and Regulations which deal with working in such conditions. The Contractor shall ensure that the following list of personnel protective equipment is in general use as a minimum:

- Safety harnesses for working in confined spaces, near to water and at heights.
- Hard hats where required.
- Leather gloves for cut resistance.
- Ear muffs or ear plugs for noise from machines.
- Appropriate eye protection when any cutting, grinding or welding is undertaken, and in dusty conditions.
- Overalls for body protection.
- Reflective safety vests.
- Safety shoes for foot protection.

Ladders for access and escape from the trench shall be placed at the regulated minimum distances and shall be maintained in a good and safe state at all times.

Anything set out in connection with the Safety Act in this document is supplementary to and in no way replaces, alters or supersedes the provisions of the Occupational Health and Safety Act 1993 (Act 85 of 1993) and Constructional Regulations 2014, which shall be complied with at all times.

C3.5.5.6 Expected Health and Safety Risks

Listed below are, which may not be all, the expected health and safety related risks that may be encountered during the contract duration. The Contractor shall identify and prepare assessments for all risks he is likely to encounter in the execution of the contract before commencing with any work.

Further assessments shall be prepared as and when required for any other risks identified during the construction phase before work involving such risks is undertaken.

- Working in deep trenches and other excavations in potentially unstable and/or wet ground conditions;
- working in large ponds greater than 1.5m deep
- Working with cement and other hazardous materials;
- Water in excavations;
- Operating construction plant and equipment;
- Lifting, loading and placing of heavy materials and other weights;
- Excessive noise levels;
- Moving construction plant and vehicles on the Site;
- Potential of flooding should heavy rain occur;
- Venomous snakes and crocodiles , possibly including boomslangs, cobras and mambas, on the Site

C3.5.5.7 Barricades and Lighting

The Contractor shall comply in all aspects with the requirements of the Occupational Health and Safety Act (Act 85 of 1993) and the Constructional Regulations 2014.
The Contractor shall erect and maintain for the duration of the contract adequate barricades in the form of fencing, or other approved methods, to prevent unauthorised access to the Site, and in particular any excavations, by the general public.

Trench excavations for pipelines shall be barricaded on both sides along the entire length of open trench. Where trenches are excavated within road reserves and where it may be reasonably expected that vehicular traffic may be encountered in areas outside of road reserves, the Contractor shall provide, maintain and keep lit between sunset and sunrise, warning lamps placed at regular intervals not exceeding 50m along the length of open trench on the side facing the street or direction from which traffic may reasonably be expected.

The Contractor shall, in connection with the Works, provide and maintain all signs, signboards, lights, barriers, barricades, fencing and watching when and where:

(a) specified in or reasonably to be inferred from the Contract, or
(b) required by any competent statutory or other authority, or
(c) required by the Engineer for the protection of the Works or for the safety or convenience of the public or others.

C3.5.5.8 Health and Safety Plan

The Health and Safety Plan shall be based on the following principles:

- Proper risk assessments of the construction work;
- Pro-active identification of potential health hazards and unsafe working conditions;
- Informing and training of employees in hazards and risks;
- Provision of a safe working environment and safety equipment;
- Ensuring the health and safety of subcontractors through their health and safety plans;
- Monitoring the health and safety on the construction works on a continuous basis;
- Employing only competent, registered health and safety officials.

C3.5.5.9 Proof of Compliance with the Law

The Works shall be constructed in accordance with the relevant Government Acts and Regulations and in particular "The Occupational and Health and Safety (Act No. 85 of 1993) and the Construction Regulations 2014".

All apparatus and material supplied and all work carried out shall comply in all respects with the Act.

The Contractor must comply with the requirements of the Act and inform his employees and Sub-contractors regarding regulations, safety requirements, inspections, etc.

The specific health and safety conditions imposed by the Employer (refer the OHASA Agreement under "Forms to be completed after award of Tender" in Volume 1 of the Tender Document) also apply and take precedence where in conflict with the Occupational Health and Safety Act. This Agreement must be signed upon award of the Tender.
The Contractor exempts both the Employer and the Engineer for the safety of his work on the Site. The Contractor assumes the responsibility in terms of Section 16(1) of the Occupational Health and Safety Act. If the Contractor delegates any duty in terms of Section 16(2), a copy of each written delegation shall immediately be handed to the Engineer.

By accepting the Contract, the Contractor warrants that all his and his Sub-contractor's workmen are covered in terms of the Compensation for Occupational Injuries and Diseases Act (Act No. 130 of 1993), which cover shall remain in force whilst any workman is present on the Site.

C3.5.6 ENVIRONMENTAL MANAGEMENT

C3.5.6.1 Methods and Procedures

The following, together with the Construction Environmental Management Programme, shall be applied with regard to the operation and maintenance of the site:

- Before setting up any construction work camp or stockpile site for equipment, the Contractor (or sub-contractor) must liaise with the Engineer and the relevant landowner and reach agreement regarding the location, layout and demarcation of any camp to be established, including any compensation to be paid to the landowner;
- All equipment and materials, particularly potentially hazardous substances, shall be securely stored in lockable structures and all reasonable steps taken to prevent theft or use by unauthorized personnel;
- The site shall at all times be kept in a neat and tidy condition. Papers and packaging shall be binned and removed from site and waste stockpiles shall be properly demarcated and the waste removed at regular intervals and disposed of at a registered waste disposal site.
- Natural vegetation shall not be damaged unnecessarily and the working areas of the site be kept to the minimum reasonably possible for construction. An environmental awareness training programme for the construction staff should be

implemented by the Contractor/sub-contractor(s) and all workers made aware of the recommended mitigation measures to be implemented.

- No wild animals (birds, snakes, lizards, game, etc.), domestic stock or indigenous plants are to be disturbed unnecessarily in any way by the construction activities or by the construction staff.
- All topsoil (containing indigenous plant seeds, rootstock, etc.) removed – that may be required in future rehabilitation – should be carefully stockpiled for later rehabilitation.
- Measures need to be taken to ensure that contamination from the work camp and lay-down site does not pollute adjacent areas. This should include the diversion of natural run-off away from the works and the containment thereof in drainage retention areas, where applicable.
- Water from dewatering operations shall be disposed of so as not to return to the working area nor to cause damage or erosion to surrounding areas.
- Dust from stockpiles and access roads shall be controlled by watering.
- Precautions need to be taken against oil spillage from heavy equipment through the use of sand or sawdust drip trays. All material (including soil) contaminated with hydrocarbons should be disposed of as hazardous waste at a registered waste disposal site.
- Any object of historical interest that may be uncovered in the course of the works shall immediately be protected and reported to the Engineer for further action. There is a legal requirement to report any archaeological site of cultural significance to the National Monuments Council, according to the National Heritage Act (Act No. 25 of 1999).
- The Contractor shall check and supervise his own work and the work of his sub-contractors to ensure that all work is carried out in accordance with the EMP.
- Sources of imported material shall be listed and approved by the ECO and shall be free of weeds, seeds of alien plants, litter and contaminants;
- No hazardous substances may be disposed of on site;
- The storage of flammable liquids and substances should strictly comply with specifications;
- Adequate fire-fighting equipment must be readily available at the materials storage and dispensing areas;
- Adequate precautions shall be provided to prevent spillage during the filling of any tank with flammable and hazardous liquids and during the dispensing of the contents;
- The site shall at all times be kept in a neat and tidy condition – papers and packaging shall be disposed of into scavenger- and weatherproof bins and the waste removed at regular intervals;
- Wherever possible, materials used or generated by construction shall be recycled;
- Provision shall be made for employee facilities including shelter, toilets, washing and eating facilities;
- Sanitation facilities supplied by the Contractor for the workers shall be maintained in a hygienic state and serviced regularly;
- Contaminated water, run-off and/or effluent should be prevented from discharging into the groundwater, any water course, drain or sea and should be contained and disposed of at a site approved by the Engineer and Local Authority;
- Water from dewatering operations shall be disposed of so as not to return to the working area nor to cause damage or erosion to surrounding areas;
- Dust shall be minimized as far as reasonably possible and controlled by watering;

- Natural vegetation shall not be damaged unnecessarily and the working areas of the site and along the pipelines shall be kept to the minimum reasonable possible for construction;
- The Contractor should manage and minimize any noise generated on site so as not to disturb nearby residents;
- Final audit: On completion of the works, but before the construction site is handed back to the Employer, a thorough environmental inspection or audit impacted by the construction activities shall be carried out and any 'problematic' or damaged areas shall be made good or rehabilitated to the satisfaction of all parties.

C3.5.6.2 Environmental Management Plan

The Contractor shall comply fully with all provisions of the environmental plan. A basic EMP is included in this document as SPEC EMA. During the duration of the contract, the Contractor may be required to take specific measures not covered by the EMP to protect the environment. Reference must be made to SPEC EMA and SDEMA for further information.

C3.5.6.3 Fires and Burning of Vegetation

Under no circumstances whatsoever may fires be lit anywhere on the site of the Works.

C3.5.6.4 Preservation of Flora and Fauna and Soil Conservation

The Contractor shall:

a. take all precautions to prevent:
   i) any damage to trees, shrubs and the surrounding natural environment,
   ii) fires,
   iii) loss or injury to domestic or wild animals from any lands used or occupied by the Contractor
b. refrain from destroying, removing or clearing trees, timber and scrub to any extent greater than is absolutely necessary for the execution of the contract
c. ensure that no vegetation, trees or shrubs outside the site boundaries are disturbed, damaged or destroyed. A penalty of R1,000 per incident may be charged to the Contractor,
d. take care to cause the minimum disturbance to the fauna and flora,
e. take measures as to ensure that his employees are aware of and abide by all laws and restrictions governing the hunting, disturbing, capturing or destroying of animals and birds in the vicinity of the camp or the Works or the taking of fish from any water; and
f. prohibit all firearms from the site and temporary camps.

C3.5.6.5 Protection of Trees, Shrubs and Surrounding Environment

The Contractor shall ensure that no trees, shrubs or the surrounding natural environment outside the site boundaries are disturbed, damaged or destroyed.
A penalty of R1,000 per tree or shrub damaged or destroyed or for damage to the natural surrounding environment may be charged to the Contractor. The Engineer shall have the right to permanently exclude any person from the site who causes any damage to the natural environment.

C3.5.6.6 Prevention of Poaching

The Contractor shall ensure that none of his employees partake in any poaching activities of any nature during the duration of the contract.
Any person caught poaching shall be banned from the site of the Works and shall be prosecuted under the relevant laws.

The Contractor shall be liable for a fine of R5,000 for the first incidence of poaching committed by any of his employees, whether the employee is prosecuted or not. The fine shall double for each and every incident thereafter up to a maximum of R20,000 per incidence. Repeated incidents may be considered as cause for cancellation of the contract in terms of Clause 9.2.1.3.5 of the GCC 2010.

C3.5.7 LEGISLATION

C3.5.7.1 Changes in legislation

Reference in the General Conditions of Contract and in any other standard document forming part of this contract to legislation which has been amended or superseded by other legislation since the most recent publication of such standard document, shall be deemed to be a reference to the amended or replacement legislation.

Such amendment or replaced legislation shall be applicable during the Contract Period, provided the amendment or replacement occurred more than 28 days prior to the closing date for tenders, in terms of Clause 6.8.4 of the GCC2010, as amended in Part 1 of the Contract Data.

C3.5.7.2 The Occupational Health and Safety Act

The Contractor shall be required to comply with the Occupational Health and Safety Act, 1993, and the Construction Regulations 2014. Non-compliance with these regulations in any way whatsoever will be adequate reason for suspension of the Works.

The proposed type of work, materials to be used and hazards likely to be encountered on this Contract are detailed in the Scope of Work, Pricing Instructions and Drawings. The Employer's Health and Safety Specifications are included in the Annexure.

The Contractor shall, in terms of Sub-clause 5(1) provide a comprehensive health and safety plan, detailing his proposed compliance with the Regulations, for approval by the Employer.

C3.6 SPECIFICATION DATA

The Specification Data gives amendments and additions to the specifications that are listed in the List of Applicable Specifications. Clause headings are prefixed by the letters "PS" followed by alphabetic and numeric characters which identify the specification and main clause of the applicable specification. Where the Specification Data sub-clause is an addition and there is no appropriate clause in the applicable specification to which to link it, a new clause number is given following the last clause number used in the specification. New clauses are followed by an asterisk (*).

Should any requirement of the Specification Data conflict with any requirement of the specifications listed, the requirement of the Specification Data shall prevail.
Where the context requires, words importing the singular also include the plural and vice versa, and words importing the masculine gender also include the feminine and neuter.

C3.6.1 LIST OF APPLICABLE STANDARDIZED SPECIFICATIONS

SANS 1200 A	: General
SANS 1200 AB	: Engineer's Office
SANS 1200 C	: Site Clearance
SANS 1200 D	: Earthworks
SANS 1200 DB	: Earthworks (Pipe Trenches)
SANS 1200 DE	: Small Earth Dams
SANS 1200 DK	: Gabions and Pitching
SANS 1200 G	: Concrete (Structural)
SANS 1200 GA	: Concrete (Small Works)
SANS 1200 HA	: Structural Steelwork (Sundry Items)
SANS 1200 L	: Medium Pressure Pipelines
SANS 1200 LB	: Bedding
SANS 1200 LD	: Sewers

C3.6.2 LIST OF APPLICABLE VARIATIONS TO SANS 1200 SPECIFICATIONS

PSA	: General
PSAB	: Engineer's Office
PSC	: Site Clearance
PSD	: Earthworks
PSDB	: Earthworks (Pipe Trenches)
PSDE	: Small Earth Dams
PSDK	: Gabions and Pitching
PSG	: Concrete (Structural)
PSGA	: Concrete (Small Works)
PSHA	: Structural Steelwork (Sundry Items)
PSL	: Medium Pressure Pipelines
PSLB	: Bedding
PSLD	: Sewers

C3.6.3 LIST OF APPLICABLE PARTICULAR SPECIFICATIONS

PA : Geomembrane Sheeting Specification
PB : Security Fencing
PC : Fencing
PD : Environmental Specification
PE : Concrete Pavements
PF : Ground Steel Tank
PR : Pump Specifications
PS : Electrical Specifications

C3.7 OCCUPATIONAL HEALTH AND SAFETY SPECIFICATION

OCCUPATIONAL HEALTH AND SAFETY SPECIFICATION for PRINCIPAL CONTRACTORS AND CONTRACTORS

The Occupational Health and Safety Act, Number 85 of 1993, under Construction Regulations 2014 requires the development of the health and safety specification to be prepared by the client for the construction work project.

Following is the "Health and Safety Specification" prepared for the principal contractor to conduct construction, see details below:-

Project Name	**UPGRADING AND REFURBISHMENT OF BULK WATER SUPPLY AND SANITATION AT VARIOUS DEPARTMENT OF EDUCATION SCHOOLS IN THE EASTERN CAPE PROVINCE (ECDOE) – NYANGA SENIOR SECONDARY, CHDM, NGCOBO**
The Client	Amatola Water - Amanzi bringing water to life
Health & Safety Specification prepared by (On behalf of Client)	RMH
Principal Contractor	

ACCEPTANCE OF THE H&S SPECIFICATION BY THE PRINCIPAL CONTRACTOR (PC)

Principal Contractor	
Principal Contractor's representative (Name)	
Signature	

Section		Title
1		Introduction
2		Purpose
3		Application
4		Definitions
5		Compliance
6		Site rules for contractors
	6.1	Rules of conduct
7		Responsibilities of Contractors for construction work
	7.1	Notification of construction work
	7.2	Duties of Principal Contractors
	7.3	Contractor's responsibilities, including Sub-Contractors
	7.4	Legal appointments
8		Documentation and procedures
9		Application of COIDA and OHSA to construction work
	9.1	Compensation for Occupational Injuries and Diseases Act
	9.2	Occupational health and safety policy
	9.3	Health and Safety Training and competency
	9.4	Hazards and Potentially Hazardous Situations
	9.5	Health and Safety Reps
	9.6	Health and Safety Committee
	9.7	General Documents / Record Keeping
	9.8	Incident management and emergency plans
	9.9	Contractors and Suppliers
	9.10	PPE, Intoxication, Signage, Access Control
	9.12	Portable Electrical Equipment
	9.15	Environmental Rules
	9.16	Monitoring and Review
10		Application of the Construction Regulations, 2014
	10.1	Risk assessment for construction work (CR 9)
	10.2	Fall protection (CR 10)
	10.3	Structures (CR 11)
	10.4	Excavation (CR 13)
	10.5	Construction vehicles and mobile plant (CR 23)
	10.6	Use and temporary storage of flammable liquids on construction sites (CR 25)
	10.7	Housekeeping and general safeguarding on construction sites (CR 27)
	10.8	Stacking and storage on construction sites (CR 28)
	10.9	Fire precautions on construction sites (CR 29)
	10.10	Construction employee's facilities (CR 30)
11		Site-Specific and Design Risks
	11.1	Hazard Identification & Risk Assessment Methodology
	11.1.1	Baseline Risk Assessment
	11.1.2	Task Risk Assessment
12		Cost schedule

1. Introduction

This Health and Safety Specification has been prepared in terms of the Client's responsibility [Construction Regulation 5 (1) (b)] to provide the Principal Contractor and Contractors with a documented Specification of all Health and Safety requirements pertaining to the associated works on the proposed construction site/s, so as to ensure the Health and Safety of all persons affected by the construction activities. This Health and Safety Specification highlights, but in no way replaces, the legal requirements that the Principal Contractor and Contractors are bound to comply with in terms of the contract.

- The client has made provisions in the tender for the Principal Contractor to price for the **cost of Health and Safety Measures** before and during the construction process [Construction Regulation 5 (1)(g)]. The Principal Contractor, in turn, needs to make the same provision when Contractors (Sub-contractors) tender or quote on work [Construction Regulation 7 (1) (c) (ii)].

- The Principal Contractor and Contractors are required to prepare a Health and Safety Plan based on the Client's Health and Safety Specification including other legal requirements applicable to their business, which shall be applicable from the date of commencement of and for the duration of the work [Construction Regulation 7 (1)(a)]. This documented plan must be based on a Hazard Identification and Risk Assessment (HIRA) which will serve to identify the hazards, and their associated risks, anticipated for the scope of works [Construction Regulation 9].

> ***Principal Contractors tendering must provide the Client with an appropriate Preliminary Health and Safety Plan (including a Preliminary Hazard Identification and Risk Assessment) as in Construction Regulation 7 and 9. This Plan must be submitted with the tender.***

2. Purpose

The purpose of the Health & Safety Specification is to provide the Principal Contractor and Contractor's tendering for the proposed construction work, and/or appointed for the above mentioned construction work with the necessary detail of all the health and safety requirements pertaining to the associated scope of works, so as to enable the Principal Contractor and Contractors to develop their Health and Safety Plans to be implemented on site with a purpose of ensuring the health and safety of all persons, property, equipment and other persons that may be affected by construction activities.

3. Application

The H&S Specification contains clauses that are applicable to occupational health and safety in construction and the document is intended to impose pro-active controls associated with the activities, plant & machinery and other aspects of the proposed construction work that impact on health and safety of persons, by means of a documented H&S Plan prepared by the Principal Contractor and Contractors.

Compliance to the requirements of the OHSAct and relevant legislation is in addition to the requirements of the H&S Specification and forms part of the Principal Contractor's and Contractor's responsibility. The Client and Client's Agent will monitor the Principal Contractor to ensure that the Principal Contractor and Contractors comply with the requirements of the OHSAct & other legal

requirements, and will not prescribe to the Principal Contractor how such compliance is to be achieved.

4. Definitions

For the purpose of the General Health and Safety Specification, the abbreviations or definitions given hereunder shall apply:

"CR" refers to the Construction Regulations, 2014

"GHSS" refers to this document (the General Health & Safety Specification) including any project specific annexures that the engineers and designers could attach.

"OHSA" refers to the Occupational Health &Safety Act of 1993

"S" refers to a Section in the Occupational Health & Safety Act of 1993

"H&S" refers to Health and Safety

"Client" Amatola Water

Incident: means any unplanned event that causes, or has the potential to cause, an injury or illness and/or damage to equipment, buildings, plant or the natural environment. Incidents range from near-miss incidents to serious incidents and emergencies.

"Near Miss" means an incident which has the potential to cause an injury or illness or damage to company property.

"Regulations" means, specifically, the Construction Regulations, 2014 as issued on 7 February 2014,under the Occupational Health & Safety Act of 1993, but not excluding the other applicable regulations existing under the Act.

"Site" means the lands and other places, made available by the Municipality or the Client for the purposes of the Contract, on under over in or through which the construction work is to be executed or carried out.

"Principal Contractor" and "Contractor" shall be as defined in the Regulations.

Construction Work [CR 1]: Means any work in connection with –

a) The erection, maintenance, alteration, renovation, repair, demolition or dismantling of or an addition to a building or any similar structure;
b) The installation, erection, dismantling or maintenance of a fixed plant where such work includes the risk of a person falling;
c) The construction, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system or any similar civil engineering structure; or
d) The moving of earth, clearing of land or making of an excavation or work on any similar type of work.

Hazard Identification, Risk Assessment and Risk Control (HIRA)
Means a documented plan, which identifies hazards, assesses the risks and detailing the control measures and safe working procedures, which are to be used to mitigate and control the occurrence of hazards and risks during construction or operation phases.

Site
Means the area in the possession of the Contractor for the construction of the works. Where there is no demarcated boundary it will include all adjacent areas, which are reasonably required for the activities for the Contractor, and approved for such use by the client.

Hazard
Means a source of or exposure to danger (source which may cause injury or damage to persons or property)

Risk
Means the probability or likelihood that a hazard can result in injury or damage.

Construction Manager [CR 8(1)]
Means a full time, competent employee appointed in writing by the Contractor to supervise construction work. The appointment, as required by the OHSA, shall stipulate health and safety responsibilities, area of responsibility and the proposed duration of the project.

Hazardous Chemical Substance (HCS)
Means any toxic, harmful, corrosive, irritant or asphyxiant 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.

Construction Plant
Encompasses all types of plant including but not limiting to, cranes, piling frames, boring machines, excavators, dewatering equipment and road vehicles with or without lifting equipment.

Contractor [CR 1]
Means an employer [OHSA 1] who performs construction work and includes principal contractors and sub-contractors.

Health and Safety Plan (HSP) [CR 1]
Means a documented plan, which addresses hazards identified and includes safe work procedures to mitigate, reduce or control the hazards identified.
The plan shall be applied from the date of commencement of and for the duration of construction work [CR 5(1)]

Health and Safety File (HSF) [CR 1]
The file holding all documentation and records on health and safety for the project, which shall be available at all, times for evaluation, and a copy of which will be forwarded to the client upon completion of the project.

Disabling Injury Frequency Rate (DIFR)
The number of disabling injuries (DI's) multiplied by a constant (man hours relative to period worked) divided by total man hours worked over a rolling period (usually 12 months, but can be less)

Disabling Injury Severity Rate (DISR)
The number of days lost due to DI's multiplied by a constant (man hours relative to period worked) divided by total man hours worked over a rolling period (usually 12 months, but can be less)

Confined Space
An enclosed, restricted or limited space in which, because of its construction, location or contents, or any work carried on therein, a hazardous substance may accumulate or an oxygen deficient atmosphere may occur, and includes any chamber, tunnel, pipe, pit, sewer, container, valve, machinery or object in which a dangerous liquid or dangerous concentration of gas, vapour, dust or fumes may be present.

5. Compliance

5.1 The Principal Contractor and other contractors must establish, implement and maintain a system for identifying and accessing the legal and other health and safety requirements that are applicable to their organisation.

5.2 The Principal Contractor and other contractors shall ensure that these applicable legal and other requirements to which their organisation subscribes are complied with when establishing, implementing and maintaining their system, and when doing their construction activities. legal requirements referred to are legal requirements such as

a) Occupational Health and Safety Act, number 85 of 1993 and its regulations as amended,
b) Compensation for Occupational Diseases Act, number 61 of 1997
c) Including all legal and other requirements to which the organisation subscribes.

5.3 All information regarding legal and other requirements must be kept up to date all the time.

5.4 The Principal Contractor and other contractors must communicate relevant information on legal and other requirements to all stakeholders.

6. Site Rules for Contractors

The site rule for contractors is the minimum standard with regard to specifications for construction work on this site. Contractors may have existing standards for each specific trade, but where conflict may arise between the contractor's standards and these Site Rules for contractors, the more stringent shall apply.

6.1. Rules of Conduct

Contractors and all employees under their control, including any visitors brought onto site must adhere to the following Rules of Conduct on Site:

Conduct Not Permitted:-

- No persons shall partake of, possess or sell drugs or alcoholic beverages on Site. Any employee or visitor whose actions and demeanour show symptoms of possible narcosis or drunkenness shall be removed from site.
- Indulge in practical jokes, horseplay, fighting or gambling.
- Make use of water from fire hydrants
- Destroy or tamper with safety devices, symbolic signs or wilfully and unnecessarily discharge fire extinguishers.
- Bring onto site or have in your possession of a firearm, lethal weapon, camera, or any other recording device, unless authorised to do so.
- Assault, intimidate or abuse any other person.

- Operate construction equipment (vehicles or plant) without the necessary training/competency and authorisation.
- Display insubordination toward any supervisor, foreman or manager in respect to carrying out of properly issued instructions or orders for health and safety reasons.
- Enter into any areas where you have no business unless authorised to do so by the person in charge
- Negligently, carelessly or wilfully cause damage to property.
- Refuse to give evidence or deliberately make false statements during investigations
- Bring animals onto site.

Insubordination towards any foreman, supervisor or manager could lead to removal from site and/or dismissal and/or prosecution. Except insofar as the principles of common law, or conditions as determined by any relevant statutes are concerned, the decision of the Client or his Agent shall be final and binding in respect of any disputes that may arise from the interpretation of these rules.

7. Responsibilities of Contractors for Construction Work

7.1. Notification of Construction Work [CR 4]

Before construction work commences, the contractor shall notify the Provincial Director of the Department of Labour in writing if the construction work shall:-

- Include excavation work
- Include working at height
- Include demolition of a structure
- Include the use of explosives to perform construction work

The notification and submission to the local Department of Labour must be done on an Annexure **2** and a copy of the completed form kept in the health and safety file for inspection by an inspector, the client or an employee.

7.2. Duties of Principal Contractor's [CR 7]

1 *The contractor must:-*

7.2.1. *Compile a suitable, sufficient, and coherent site specific health and safety plan [CR 7(1a)*

7.2.2. *Keep on site a Health and Safety File with all required documents (CR 7 1b).*

7.2.3. *Ensure sub-contractors are appointed in writing, registered with COIDA and have necessary competences and resources to perform construction work safely.*

7.2.4. *Ensure all employees have valid medical certificate of fitness specific to the construction work performed and issued by an occupational health practitioner in a form of Annexure 3.*

2 *7.2.5. Ensure co-operation between all contractors [CR 7(4)] to comply with the Act.*

3 *7.2.6. Ensure compliance with the Act in terms of [CR 5(3)]*

a. *Provide relevant sections of these specifications to contractors as required*
b. *Appoint each contractor in writing and only appoint contractors who have the necessary competencies and resources may be appointed [CR 7(1) (v)]*
c. *Ensure each contractor's HSP is implemented and maintained throughout the duration of the project on site*
d. *Stop any contractor from work which is not in accordance with HSP / law or which pose a threat to health and safety of persons.*

e. *Sufficient information is provided to contractors where there are changes to design and construction.*
f. *Ensure every contractor is registered and in good standing with the Compensation Commissioner*
g. *Ensure potential contractors have made provision for the cost of health and safety measures*

7.2.7. Negotiate and approve the HSP of each contractor [CR 7(1) (vi)

7.2.8. All HSP's including the principal contractor's to be available on site [CR 7(1)]

7.2.9. All HSF's including the principal contractor's to be available on site [CR (7)]

7.2.10. A consolidated HSF to be handed over to the client on completion of construction including records of drawings, designs etc. [CR 7(1) (e)]

7.2.11. HSF to include updated list of all contractors, the agreements and their type of work [CR 7(1) (f)]

7.3. Contractor's Responsibilities [CR 7(2)] (including sub-contractors)

7.3.1. Provide their HSP to the principal contractor [CR 7(2)(a)]
7.3.2. Where a contractor appoints another contractor (sub-contractor) it is the responsibility of that contractor to apply sub regulation 1(b) to(g) of CR 7 as if he were the principal contractor [CR 7(3)]
7.3.3. No contractor to appoint another contractor (sub-contractor) unless the latter has the necessary competency and resources to perform the required work
7.3.4. To provide any information which affects the health and safety of any persons at work to the principal contractor [CR 7 (2) (e)]

7.4. Legal Appointments

The principal contractor shall ensure copies of the appointment letters of all responsible persons appointed on site will be kept in the HSF. All legal appointments shall be conducted in accordance with the requirements set out in the OHSA and as per this specification. The tables below set out the appointment protocols for CR and OHSA. It should be noted that these represent complete lists and not all these appointments may be required:

7.4.1. Construction Regulation Appointments

Reg.	Appointment	Appointee	Appointed by
CR 5 (1)(k)	Principal Contractor	16(2) for the company	Client
CR 7 (1)(v)	Contractor	Competent person	Principal Contractor
CR 8 (1)	Construction manager	Competent person	Principal Contractor
CR 8 (2)	Assistant Construction manager	Competent person	Principal Contractor
CR 8 (5)	Safety Officer	Competent person	Principal Contractor
CR 8 (7)	Construction Supervisor	Competent person	Principal Contractor
CR 8 (8)	Assistant Construction Supervisor	Competent person	Principal Contractor
CR 9(1)	Risk Assessor	Competent person	Principal Contractor
CR 11 (2a)	Structure Inspector	Competent person	Principal Contractor
CR 13 (1)	Excavation Work Inspector	Competent person	Principal Contractor
CR 21 (1k)	Construction Vehicle Inspector	Competent person	Principal Contractor
CR 28 (a)	Stacking and Storage Supervisor	Competent person	Principal Contractor
CR 29 (h)	Fire Equipment Inspector	Competent person	Principal Contractor
CR 29 (i)	Fire Team Members	Competent person	Principal Contractor

OHS Act Appointments and other relevant Regulations

Reg.	Appointment	Appointee	Appointed by
OHSA 16 (2)	16 (2)	Contract Manager	16(1)
OHSA 17 (1)	Health & Safety Rep	Elected / Nominated	16(1)
GAR 9 (2)	Incident Investigator	Competent person	Principal Contractor
GSR 3 (4)	First Aider	Competent person	Principal Contractor

The responsibilities of each appointment are detailed in the relevant form, which are signed by both the authorised person and the appointee and kept in the Health and Safety file.

8. Documentation and Procedures

All required HSE documentation for the construction work, shall be kept in the HSF, which shall be available on site. The Construction Supervisor shall be responsible for the file on site and the Project Manager shall ensure that documentation is valid and up to date. The procedures to be used for the project are to be in accordance with contractor policy and as per the outcome of the HIRA exercise.
It is required that the documentation is filed in an orderly fashion for easy access. The following sections are suggested:

- Policies, permits, notifications etc.
- Health & Safety plans, specifications
- Appointments
- Incident management
- Inspection checklists
- Risk assessments
- Training
- Safe Work Procedures
- Hazardous Chemical Substances
- Medicals
- Audit reports

9. Application of COIDA and OHSA to Construction Work [Items 8.11 to 8.15 only may not be applicable]

9.1. Compensation of Occupational Injuries and Diseases Act, Act No. 130 of 1993 (COIDA)

Every contractor shall provide proof of registration and a valid letter of good standing with the Compensation Commissioner.

9.2. Occupational Health and Safety Policy [OHSA 7]

The contractors must develop a Health and Safety Policy that:-

- Is appropriate to nature & scale of risks,
- Includes commitment to prevent injuries & ill health, and continual improvement of health and safety performance,
- Includes the commitment to comply with applicable legal and other requirements,
- Includes the setting of health and safety objectives and targets,
- Is documented, implemented and maintained,
- Is communicated to all stakeholders,
- Is reviewed periodically to ensure its relevant and appropriate to the construction company.

9.3. Health and Safety Training and Competency

A training needs analysis must be developed, and training provided for all persons requiring training. Proof of training / competency must be made available on file.

9.3.1. Induction Training

The principal contractor shall be responsible for the induction of all personnel entering the site including visitors, inspectors etc. Contractors doing specific construction work shall be responsible for the induction of their employees with respect to that specific work. Records to be kept on file for all personnel that undergo induction training.

9.3.2. Awareness Training

In addition, the client would favour awareness training to be carried out such as weekly Toolbox Talks on relevant topics e.g., manual lifting, wearing PPE, safe use of portable electric tools etc.

9.3.3. Competency and CV's

Where applicable, valid copies of certificates of competency of appointed personnel to be provided and kept in the HSF. Other training requirements such as those identified through the HRA process, to be completed and proof of that training also kept in the HSF. Where competency is achieved through experience, a brief CV will be required.

9.3.4. Specific OH&S Training

Valid certificates of training from registered service providers preferably accredited by the appropriate SETA are required for First Aiders, H&S reps, Fire Marshals (CR21 Fire Equipment Inspectors) etc.

9.3.5. Medical Fitness

All employees doing construction work on site must have a valid medical certificate of fitness specific to construction work to be performed and this must be issued by an occupational health practitioner in the form of Annexure 3.

9.4. Hazards and Potentially Hazardous Situations [OHSA 13]

The principal contractor is responsible to ensure that all contractors and any visitors are warned of any hazardous or potentially hazardous situations, which may affect them on site and shall put any additional measures in place to assist in mitigating the risk of these hazards.

9.5. Health and Safety Reps [OHSA 17 and 18]

The principal contractor shall be responsible to ensure compliance to this section of the OHSA as required and to ensure similar compliance of all contractors.
If a rep is not required, the appointed Safety Officer will be responsible for these functions.

9.6. Health and Safety Committee [OHSA 19 and 20]

The principal contractor shall be responsible to ensure compliance to this section of the OHSA as required. If a committee is not convened, health and safety matters will need to be tabled and discussed at site meetings.

9.7. General Documents / Record Keeping

The principal contractor shall ensure that all Health and Safety documents and records, required by OHSA and Regulations are kept on site for reference purposes and auditing.

9.7.1. Inspections

The principal contractor shall keep all records of inspections undertaken during the contract. An assessment will need to be made of what inspections are required and their frequency. The principal contractor is also responsible to ensure compliance to this requirement by all contractors.

9.7.2. Audits [CR 5 (0) and 7 (1c)(vii)]

The client's agent shall carry out regular audits on the principal contractor at least once per month. Similarly, principal contractors shall be responsible for carrying out regular audits on their contractors at least once per month. The results shall be tabled for action and discussed at the Health and Safety Committee meetings or the site meetings, as appropriate.

9.8. Incident management and emergency plans

The principal contractor shall create an Emergency Plan for the construction site. The plan shall be clearly laid out for all types of emergencies including responsibilities, evacuation routes, siren, emergency no.'s etc. The plan shall be fully explained to all personnel during the induction training. All contractors will become completely familiar with the requirements of the plan and will participate in any evacuation drills that may take place.

9.8.1. First Aid [GSR 3]

The principal contractor shall be responsible to ensure compliance to this regulation as required. In particular, a first aid box with the minimum stock as specified in the regulation will be located at the site office and there will be signage to indicate the location of the box. Attention is drawn to GSR 3(4) for the requirement of trained first aiders. It is also suggested that a trained first aider be made responsible for the box in terms of the following:

- Security – the box should not be left open but it must be accessible in case of emergency (spare key availability)
- Injuries - a record of first aid box injuries treated and the stock issued
- Stock – a regular inspection to maintain stock levels and check expiry dates

In addition, the first aid requirements should be noted for high-risk substances or hazardous chemical substances and if these are to be used, then it should be addressed in the HIRA, and the need for eye wash facilities assessed.

9.8.2. Incidents and Injuries – Investigation and Reporting

The Principal Contractor will ensure there is a management system to report and investigate all incidents. All incidents **including ALL near misses**, first aid box treatment, and all other serious incidents involving any form of disabling injury or fatality are to be reported to the Client and the **Clients H&S Agent telephonically immediately**. This shall be confirmed in writing as soon as possible after the incident. Failure to comply with these provisions will be considered a serious offence. "Recording and Investigation of Near Misses".

Incidents

The principal contractor shall provide evidence by means of a procedure or chart that he is fully aware of the "hierarchy" of incidents that can occur e.g. unsafe situations, near misses, first aid box injuries, medical cases, disabling injuries etc. He shall keep an incident register of all such incidents, investigate and implement corrective action where required. The client also reserves the right to request incident statistics from the principal contractor such as DI's, DIFR and DISR and it is advised that these are maintained.

Injuries

First aid box injuries have been addressed under 8.8.1 above. More serious injuries requiring transport of the injured person to the nearest hospital or doctor or the calling of an ambulance and paramedic personnel will be the responsibility of the principal contractor's appointed personnel such as the Construction Supervisor, First Aider and Safety Officer. It is advised that all required emergency numbers be on hand and prominently displayed.

As all contractors are registered and in Good Standing with the Compensation Commissioner, it will be the responsibility of the contractor whose employee has been injured, to make the necessary report and claims to the Commissioner.

9.8.3. Accident & Incident Reporting & Investigation [OHSA 24, GAR 8, 9 (1) & (2)]

Should an incident or accident investigation need to be conducted, a competent person shall be appointed to conduct the said investigation. The procedure to be followed will be in accordance with Annexure 1 of GAR 9 – "Recording and Investigation of incidents".

Particular attention is also drawn to OHSA 24, the reporting of certain incidents to an inspector of the department of labour.

The principal contractor shall ensure that the investigations are kept for record purposes and he shall ensure that the outcome of the investigation is communicated to all affected parties as required i.e. the Client, Clients H&S Agent and contractors.

The Client reserves the right to participate in all investigations into accidents or incidents and to conduct their own investigation if required.

9.9. Contractors and suppliers [OHSA 37(2)]

The client shall enter into an "Agreement with Mandatory" in terms of Section 37(2) of the Occupational Health and Safety Act, 85 of 1993, with all appointed principal contractors. Likewise all principal contractors shall enter into a similar agreement with all contractors, sub-contracted to them for any period of the contract. Please note that if contractors hire any construction vehicles or mobile plant, the companies from which the equipment is hired must provide any maintenance and test certification as required. In addition, if operators are hired with the equipment, proof of competence and medical certification must be provided.

A. The principal contractor shall ensure that all contractors are issued with this safety specification where reasonable. The principal contractor shall assist and ensure that contractors engaged comply with all of these requirements and adhere to the requirements set

out in the OHSA. Contractors will be stopped from working in the event of unsafe conditions and activities being observed**.**

B. All contractors shall be subject to the requirements specified in the HSP and will be issued with a copy of the plan. If the contractor is not able to comply with the requirements set out in the plan, he shall not be appointed as contractor.

9.10. Personal Protective Equipment, Intoxication, Signage and Access Control

9.10.1.1. Personal Protective Equipment (PPE) [GSR 2]

The principal contractor shall through the Risk Assessment process identify the specific PPE needs per activity. Contractors, as employers, will be responsible for the issue of the required PPE. Should PPE be lost or stolen, then the employee will be issued with new PPE. Should PPE be worn out or damaged, the user shall return the worn or damaged PPE and will be issued with a replacement. Training in the use of this shall be provided. Visitors shall be informed of PPE requirements prior to their visit so that they may enter the site.

9.10.2. **Intoxication [GSR 2A]**

The principal contractor shall ensure that no persons may enter or remain at the construction site if under or apparently under the influence of intoxicating liquor or drugs.

9.10.3. Display of signs [GSR 2B]

The principal contractor shall make use of signage to assist in enforcing compliance to any requirement specified in this document or as required by law. Standard symbolic signs are acceptable for conveying these requirements where applicable. Approved signs as per SABS standard approved colours must be used.

9.10.4. Access control [GSR 2C]

The principal contractor shall be responsible to ensure control of access to all persons entering the construction site. The reasons for this are as follows:

- The principal contractor is the ‘employer’ on the site and is responsible for section 8 of OHSA for employees and contractors and section 9 for any other person on site such as visitors and inspectors
- All persons entering the site must undergo induction training to inform them of the hazards present on the site. This includes contractors, visitors, inspectors etc.
- The construction supervisor will be aware of who is on site and their function
- The construction supervisor will be able to control tasks that may impact on other work being carried out on the site by a permit to work system
- The number of people and their purpose on the site must be known in case of emergency and evacuation
- Security reasons

The principal contractor shall post notices at the site informing all those entering the site of these requirements.

9.11. Portable Electrical Tools [EMR 9]

This regulation shall be complied with as a minimum requirement. Regular inspections of all Portable Electrical Tools such as drills, angle grinders etc., and shall be carried out. In particular:

- Only trained personnel shall operate such equipment.
- The Construction Supervisor shall ensure operation of the equipment is in accordance with the HIRA requirements and Safe Working Procedure (SWP).
- All users shall undergo regular awareness training (toolbox talk) to ensure compliance.
- The Construction Supervisor shall ensure the required PPE is provided and properly used.

9.12. ENVIRONMENTAL RULES

The Contractor shall give effect to and maintain all safeguards and standards and take such measures as may be necessary for the protection of the environment. Prevention of any type of pollution must be taken into consideration when performing all construction activities on site.

9.12.1 Clearing

The Contractor shall comply with the following conditions and requirements for clearing:

- Follow the Occupational Health and Safety Act, the Environmental Regulations for workplaces and Project EMP.
- Areas to be cleared will have boundaries clearly marked by tape, pegs or other means and will conform to limits on design drawings.
- Clearing will not commence until drainage control works are in place.
- Cleared vegetation should be windrowed along the contour to assist with erosion control.
- Any area which is not to be disturbed under requirements of the *Cultural Heritage Management Plan* will be clearly identified.
- Vegetation clearance will be restricted to that necessary for the works.
- The Engineer is to be notified immediately if contaminated soil is discovered.
- Traffic shall be confined to maintained tracks and roads.
- Particular care shall be taken to minimise disturbance to the bed and banks of watercourses.

9.12.2 Noise and Vibration

The Contractor shall ensure that the exposure of persons to noise is prevented by all means and where it is not possible to prevent it, to adequately control the noise. The noise-induced hearing loss regulations must be complied with.

Each of its mobile and fixed plant and that of its subcontractors' are fitted with appropriate noise suppression equipment to ensure that noise levels from such plant are contained within the

relevant limits prescribed by relevant industrial safety and environmental legislation, regulations and site standards. If there is a noise problem with electric power generating equipment, compressors, or other facilities under the control of the Contractor, additional noise suppression shall be erected by the Contractor at the Contractor's cost around the offending unit(s).

Any deviation from the above listed practices is to be rectified at the Contractor's cost.

9.12.3 Transport, Storage and Handling of Hazardous Substances and Dangerous Goods

The Contractor shall comply with the following conditions and requirements for storing and handling hazardous and dangerous goods:

- Comply with Hazardous Chemical Substance Regulations.
- Provide a list of hazardous substances and corresponding MSDS prior to bringing substances on Site.
- Substance register to be held at each storage facility.
- Corrosive materials to be stored and handled in accordance with HCS Regulations 14.
- Fuel, oils and substances in containers of 210 litres or more shall be stored in a bunded area with capacity of at least 110% of the total quantity of HCS.
- Fuel, oils and substances in less than 200 litre drums shall be stored as above or in a fenced and roofed compound.
- All fuel, oils and substances must be clearly labelled.
- Transfer of bulk fuel and handling of hazardous substances shall be conducted only by appropriately trained personnel.
- Spill clean-up kits including absorbent materials shall be kept at each storage facility.

9.12.4 Erosion and Oil Traps

The Contractor shall comply with the following conditions and requirements for erosion, sedimentation, silt and oil traps:

- Land disturbance will be restricted to that necessary for the works.
- Topsoil will be salvaged for use in rehabilitation.
- Storm water from upstream catchments will be diverted away from construction areas.
- Drains will be protected to prevent scouring if necessary.
- Sediment traps, silt fences or hay bales will be installed to control sediment where necessary and where directed by the Engineer.
- Sediment traps will be cleaned periodically.
- Hazardous materials will be bunded or stored such that contaminated run-off is not generated.
- Traffic will be confined to maintained tracks and roads.
- Particular care will be taken to minimise disturbance to the bed and banks of watercourses.
- Rehabilitation of disturbed areas will be carried out promptly.
- The Contractor shall maintain its specific work area so as to prevent erosion of adjacent soils by surface runoff. Temporary diversion drains shall be used to divert storm water away from the Contractor's work area, where necessary.

- The Contractor shall provide and maintain all silt traps and oil traps necessary for the execution of the work under the Contract and for the protection of the environment as required by the Specification and as directed by the Engineer.

9.12.5 Dust Prevention

The Contractor shall comply with the following conditions and requirements for air quality and dust:

- Dust generated by construction activities will be suppressed by water spraying, to levels that are safe for Site personnel.
- Speed limits on unsealed roads will be limited to a maximum speed consistent with the minimisation of dust generation.
- Earthworks Supervisors must pay particular attention to the management of topsoil stripping such that dust does not become a safety hazard or severe nuisance.
- All dust complaints will be investigated promptly and appropriate action initiated to reduce nuisance.

9.12.6 Waste Management

- The Contractor shall provide suitable rubbish receptacles at the Site and shall ensure that all litter is collected in them and properly disposed of off Site in accordance with the requirements of the relevant statutory requirements.
- The Contractor shall ensure proper collection and off-site disposal of all industrial wastes in accordance with relevant statutory requirements.
- The Contractor shall apply the principles of Waste Minimisation by reducing the amount of waste generated on Site by their operations and activities as much as possible. The Contractor shall provide for recycling of glass, metals, plastics and paper.

9.12.7 Weed Management

The Contractor shall comply with the following conditions and requirements for weed management:

- Contractors shall ensure that all machinery, equipment and vehicles are washed down at a wash facility before entering the Site and again when leaving the Site.
- Plants and soil shall not be removed from the Site without authorisation.
- Soil or other material shall not be brought onto Site if it has originated from an area known to contain environmental weeds or declared weeds under the Rural Lands Protection Act 1995.
- Areas disturbed or rehabilitated as part of a Contract will be inspected upon completion of the works. The Contractor shall eradicate any declared weeds found.
- Seed used in rehabilitation shall be free of declared weeds.
- Control measures (including use of herbicides) must be consistent with manufacture's recommendations, safe practice and recommendations in the Department of Natural Resources Pest Fact series.
- Include information on the importance of weed control in inductions.

9.12.8 Found Object

All fossils, coins, articles, minerals of commercial value and objects of antiquity and structures and other remains and things of archaeological interest discovered at the Project Site shall be deemed to be the absolute property of the Company. The Contractor shall take reasonable precautions to prevent the Contractor's employees, subcontractors and the employees of subcontractors and any other persons from removing and damaging any such article and thing and shall immediately upon discovery thereof, acquaint the Engineer of such discovery and carry out, at the expense of the Company and at the Engineer's direction, the protection and or disposal of same.

9.13 MONITORING, AUDIT AND REVIEW

- The Client's Agent shall have the right to conduct audits / inspections of the Contractor's operations, equipment and procedures at any time, and the Contractor shall fully co-operate with the Client's Agent during such audits / inspections.
- The Client's Agent rights under this clause shall not relieve the Contractor of its obligations to conduct audits and reviews of its own safety and health performance.
- Where such Client's Agent audits reveal deficiencies in the Contractor's procedures, equipment, training, drills, etc., the Contractor shall rectify such deficiencies as soon as practicable, and provide to the Client's Agent a status report on all outstanding corrective actions. Where such deficiencies include an unsafe practice or a breach of the Statutory or the Contract's requirements, the Client's Agent may in accordance with the General Conditions of Contract suspend the work associated with the unsafe practice or breach until the deficiency is rectified.

10. Application of the Construction Regulations, 2014

[**Please note: this is the complete list. Item 10.1 is compulsory and the rest are applicable if relevant to the work being carried out]**

10.1. Hazard Identification, Risk Assessment and Risk Control (HIRA) [CR 9]

The contractor shall prior to the commencement of any construction work perform a HIRA exercise, which will form part of the HSP and file for the project.
A copy of the HIRA shall be made available for viewing to the client's OHS agent and shall be kept in the Health and Safety File.
NB: The contractor shall ensure that the outcome of all HIRA exercises will be conveyed to all relevant employees with respect to the hazards and the related control measures before any work commences.

Below is a list of activities, which may be considered for HIRA if the activity is to be carried out on site. The list is not exhaustive but gives examples of activities for a construction site:

- Traffic Management– restrictions etc.
- Site security and access
- Existing services, overhead and underground
- Ground conditions
- Excavations
- Batching on site

- Activities that affect adjacent sites
- Excavations in particular those adjacent to roads or sidewalks
- Lifting operations such as offloading and moving equipment
- Stacking, storage of equipment and materials, and good housekeeping
- Use of hand tools
- Use of portable electrical equipment (power tools)
- Use and storage of flammable and hazardous chemicals such as petrol, diesel, etc.
- Waste management including removal of hazardous waste
- Environmental restraints such as effluents, boundary noise and dust
- Temporary site accommodation
- General hazards to site personnel such as noise and dust.

The control of several of these risks may be specified in the OHSA or the CR but this does not mean that the HIRA exercise does not have to be carried out.

10.2. Fall Protection [CR 10]

Regulation 10(1)(a) of this regulation states that a contractor shall designate a competent person, to be responsible for the preparation of a fall protection plan. The fall protection should include the prevention of person falling into trenches or uneven grounds due to trenches dug for poles supporting the fence.

10.3. Structures [CR 11]

The appointed contractor shall meet the requirements of this regulation. Attention is drawn to CR 11(2)(a) which requires the designer to inspect the structure at appropriate times when mandated by the Client and the record of these inspections to be available on site.

10.4. Excavations [CR13]

Section 1 of this regulation states that this work must be carried out under the supervision of a competent person, who has been appointed in writing. All the requirements of CR 13 shall be met. For inspection of excavations, attention is drawn to sub regulation 2(h), the records of which must be available on site.

10.5. Construction vehicles and mobile plant [CR 23]

It will be the responsibility of each contractor on site to ensure compliance of their construction vehicles and mobile plant to these regulations.
This includes vehicles to be used for transporting personnel to and from site, which will be subject to relevant requirements such as licensing and roadworthiness checks. In addition the following will apply:

- Safe transport for personnel working on the project to and from the workplace, which shall include proper seating, side restraints and cover.
- Road safety principles shall be adhered to on and off site.

10.6. Use and storage of flammable liquids [CR 25], and hazardous chemical substances [HCSR]

All the requirements of CR 25 shall be met in terms of HCSR, contractors shall ensure that all hazardous chemicals brought to site have a Material Safety Data Sheet (MSDS) and the users are made aware of the important sections of the MSDS such as:

- Hazards
- First aid measures
- Firefighting measures
- Accidental release measures
- Handling and storage
- Exposure control especially PPE
- Disposal

First Aiders shall be made aware of the MSDS and how to treat HCS incidents appropriately. Copies of MSDS's will be available on site and in the HSF.

10.7. Housekeeping [CR 27] including [ERW(6)]

All contractors shall ensure that housekeeping standards as per these regulations shall be maintained at all times.

10.8. Stacking of Materials [CR 26] including [GSR(8)]

All contractors shall ensure that materials are only stored in defined and allocated storage areas and that materials being stored are stacked in accordance with sound stacking principles as per these regulations.

10.9. Fire precautions [CR 29]

All contractors on site will comply fully with the requirements of this regulation. In particular, the principal contractor will be responsible for the evacuation plan (section (l)) the details of which will be imparted to contractors, visitors etc. through the site induction.

10.10. Construction welfare facilities [CR 30]

The principal contractor shall be responsible for implementing this regulation and shall ensure that adequate facilities are provided for the personnel on site in terms of the following:

- Change room facilities
- Adequate toilets.
- Hand wash facility.
- Potable water.

No food preparation shall be conducted on site. Eating and drinking will only be permitted in the designated eating areas, which must be provided with adequate seating.

Waste bins shall be strategically placed and cleared regularly.

11. Site Specific and Design Risks

[**Please note: this is not a complete or exhaustive list. The principal contractor is expected to assess all risks to which his employees may be exposed during the construction process, as well as the hazards identified and listed below.]**

11.1 Hazard Identification and Risk Assessment Methodology

11.1.1 Baseline Risk Assessment

A Baseline Hazard Identification and Risk Assessment must be carried out during the preliminary stages of the construction/demolition project for the purposes of attempting to reduce the possibility of accidents or ill health occurring.

Taking into account the constraints of time and resources, every effort must be made to identify the hazards and recommend possible solutions. It is not reasonably practicable to expect the baseline risk assessment to identify all hazards, which is why task risk assessments are carried out on site.

11.1.2. Task Risk Assessment

Once on site, every contractor shall perform task risk assessments, using the baseline risk assessment as a guide.

The Risk Assessment should be reviewed once on site and thereafter after any incident, change in design or every one-year period, whichever occurs first. Additional hazards highlighted or a change in the risk factor should have a separate risk assessment carried out and filed.
The Risk Assessment is based on the combination of the CONSEQUENCE and PROBABILITY associated with each hazard.

12. SCHEDULE OF OHS COSTS

Item	*Description*	*Quantity*	*Amount – Rands*
1.	**Site Establishment & Facilities**		
1.1	OHS File – Site Specific	1	
1.2	Temporary Site Office	1 per contractor	
1.3	Temporary Electrical Connection	1	
1.4	Temporary Water Connection	1	
1.5	Portable Chemical Toilets – Male/ Female	As per Risk Assmnt	
1.6	Change Room Facilities – Male/ Female	As per Risk Assmnt	
1.7	Eating area Facilities	1	
1.8	Notice Board	1	
1.9	Construction Site Signage Board	?	
1.10	Signage - PPE Required for Site	As per Risk Assmnt	
1.11	Hazardous Substance Store & Signage	1	
1.12	Fire Extinguisher 9kg DCP	As per Risk Assmnt	
1.13	Regulation 3 First Aid Box Complete	1	
1.14	Regulation 7 Blood Spill Kit	1	
1.15	Hazardous Substance Spill Kit	1	
1.16	Spare Protective Clothing – i.e. Hard Hats, hearing, respiratory, eye and hand protection and reflective vests.	As per risk assessment	
1.17	Perimeter hoarding/ shadecloth	All	
1.18	Waste Material Skips	As per Risk Assmnt	
2.	***Administration and Documentation***		
2.1	medical certificate/s of fitness	All	
2.2	Access Control – Security	As per Risk Assmnt	
2.3	Medicals	Number of employees	
2.4	First Aider/s	As per OHS Act	
2.5	Fire Marshalls	As per Risk Assmnt	
2.6	Safety Officer	1	
2.7	Safety Representatives	As per OHSAct	

C3.8 GENERAL SPECIFICATIONS

C3.8.1 EXISTING SERVICES

Items have been allowed in the Bills of Quantities for dealing with and protecting existing services where they are known.

The Contractor shall however ensure that prior to construction all the necessary Record Drawings and Way-leaves for all services have been obtained and verified on site by the relevant Service Providers in his presence. The Contractor must request in writing the relevant official(s) to indicate the said services within 5 working days prior to commencement of work, after which the responsibility rests with the Service Department if the services are not indicated to the Contractor as requested.

The Contractor shall take whatever extra precautions are required to protect all existing services from damage during the period of the Contract. The Contractor shall make use of hand excavation to expose services. Any damage to existing services indicated by the relevant service providers or other damage as a result thereof, shall be for the Contractor's account.

C3.8.2 SURVEY BEACONS AND BENCHMARKS

The Contractor shall be responsible for the preservation of all land survey, erf or other pegs, benchmarks and beacons. If damage or disturbance of any such pegs or beacons is caused by the operations of the Contractor or his subcontractors, the pegs are to be replaced by a Registered Land Surveyor at the cost of the Contractor. Benchmarks will be replaced by the Engineer at the Contractor's expense.

Information regarding the position of all such pegs will be made available to the Contractor by the Engineer on request.

The Contractor is to ensure that no spoil is placed over an erf peg or benchmarks and that these are adequately protected for the full duration of the Contract.

Where disturbances of boundary pegs is unavoidable due to excavation or other operations adjacent to the pegs, the Contractor shall advise the Engineer or his Representative immediately, and agreement is to be reached that the disturbance of the peg is unavoidable and a strict record of such disturbed pegs is to be kept. Such pegs are to be replaced by a Registered Land Surveyor as described above and the Contractor is to submit proof of the cost of replacement of pegs. The Contractor will be reimbursed on a basis pro-rata to the total cost of peg replacement determined on completion of the Works.

C3.8.3 FEATURES REQUIRING SPECIAL ATTENTION

The Contractor is referred to SANS 1921: 2004: Construction and Management Requirement for Works Contracts, Part 1: General Engineering and Construction Works. These specifications shall be applicable to the contract under consideration and the Contractor shall comply with all requirements relevant to the project.

C3.8.3.1 Work Within Demarcated Areas Only

The Contractor shall ensure that all his activities take place within the demarcated areas only. No work or activities may take place outside of the demarcated areas and any damage of whatsoever nature caused by the Contractor outside of the demarcated areas shall be the sole responsibility of the Contractor, who shall bear all and any associated costs.

A working width of 25m shall be allowed along the length of the pipeline routes, except where otherwise shown on the drawings. The Contractor shall confine all his activities to within this 25m width.

C3.8.4 GUARANTEES

The Contractor shall be liable for, and shall guarantee, all work undertaken by him under the terms of the Contract and for the period of Defects Liability.

The Contractor shall accept and have full responsibility for the adequacy and compatibility of all items of plant and equipment required under this contract.

C3.8.5 SECURITY

The Contractor shall provide security watchmen for the contract as he deems fit at no extra cost to the Employer. This will include for all materials, temporary works and barricading. The Contractor must ensure that all his employees as well as the employees of his subcontractors are able to identify themselves as members of the construction team. The Contractor's rates will be deemed to allow for all related activities and equipment.

C3.8.5.1 PLANT AND MATERIALS

C3.8.5.2 Plant and Materials Supplied by the Employer

The Employer shall not supply any plant for use on this contract. The Contractor shall provide all plant.

C3.8.5.3 Materials and Samples

Where material to be used in this contract is specified to comply with the requirements of a South African National Standard Specification and such material is available with the official SANS (SABS) mark or similar equivalent, the material shall bear the official mark.

The Contractor shall supply samples of sufficient size of proposed bedding and concrete materials, as applicable, to a SANS accredited laboratory for testing prior to any such materials being used. Only materials that comply with the specifications may be used. No separate payment shall be made for the testing of materials, the cost of which shall be deemed to be covered by the rate for the relevant items.

Copies of all test results shall be given to the Engineer for his approval.

C3.8.5.4 Equipment Provided by the Employer

It is envisaged that no equipment will be provided by the Employer. In the event that the Employer does provide equipment, the Contractor shall take full responsibility for the handling, storage, protection and installation of the equipment from the moment that the equipment is handed over to him, as if the Contractor had provided the equipment.

C3.8.5.5 Construction Equipment

All construction equipment used on this contract shall be in good working order, well maintained, of adequate size and fit for purpose. No machinery that leaks oil, fuel or hydraulic fluids may be used on site.

Any plant or equipment that, in the opinion of the Engineer, is not of adequate size or fit for use shall be removed from site and replaced with acceptable plant or equipment, all at the Contractor's cost.

C3.8.6 EXISTING SERVICES

C3.8.6.1 Known Services

Known services in the area are shown on the layout plans and long sections. The information regarding existing services is given in good faith without guarantee.

All known services in the area are indicated on the drawings and/or will be pointed out to the Contractor. There may be services which are unknown or have inadvertently been left out.

C3.8.6.2 Treatment of Existing Services

The relevant authority or other service provider, as applicable, shall be contacted to assist the Contractor in the location of all existing services that cross the Project area.

Immediately after establishing on Site, the Contractor must open up all known services, where they will be affected by construction, by hand and using special equipment where necessary, under strict supervision and with diligent care. An item to provide for this is included in the Schedule of Quantities.

The Engineer must be informed as the services are opened for inspection, to measure the depth and to verify the type, position and dimensions of the service. This must be done early during the contract period so that changes in design, which may become necessary, can be planned and arranged in good time. No extensions of time will be considered by

the Engineer arising from the failure of the Contractor to comply with this clause. Damage to existing services must be made good by the Contractor.

Services exposed in the excavations shall be protected from construction damage and vandalism by suitable wrapping or other protective measures.

C3.8.6.3 Damage to Services

Any known services damaged by the Contractor shall immediately be reported to the relevant service authority. The cost of repair of these services will be for the Contractor's account. Known services include those services shown on the drawings as well as services not shown on the drawings but the presence of which can be reasonably expected or determined on site.

Should the Contractor be responsible for repairs to be carried out by an outside organisation, such costs will be recovered from the Contractor. This will be recovered from a monthly Payment Certificate if necessary.

Any unmarked or unknown services that may be damaged shall immediately be reported to the relevant service authority. The repair cost for such services will not be the Contractors' responsibility.

In the event that the Contractor is requested to repair the damaged service, he shall submit the actual cost of repair with his next claim for payment and shall be paid the actual cost plus 10%.

Whenever it is necessary to disrupt essential services e.g. when excavating in the vicinity of a power line, the Contractor must liaise with all relevant authorities and the Engineer to obtain approval for proposed activities and their programming.

C3.8.6.4 Connection to Existing Services

Fourteen (14) days written notice shall be given to the Engineer and to the Employer of intention to connect to any existing service or structure. Such connection may only be undertaken once written approval is granted. The work to connect to existing services may have to be done outside of normal working hours to accommodate the requirements of the Employer. Allowance for this must be made in the tendered rates as no additional payments shall be made in this regard.

C3.8.7 SITE ESTABLISHMENT

C3.8.7.1 Service and Facilities Provided by the Employer

C3.8.7.1.1 Source of Water Supply

Water for construction is available from the existing reticulations and/or the project area. The Contractor shall make his own arrangements with the relevant authority and pay all installation and usage charges for a water supply for his needs. To this end the Contractor shall provide and make use of a metered connection at a position(s) and in a manner agreed with the relevant authority. The meter shall be read on a weekly basis and the usage recorded.

The Employer accepts no responsibility for the shortage of water due to any cause whatsoever, nor additional costs incurred by the Contractor as a result of such shortage.
The Contractor shall make himself thoroughly acquainted with the regulations relating to the use of water and shall take adequate measures to prevent the wastage of water.
The Contractor shall take note that no direct payment will be made for any costs incurred for the provision of a water supply point(s) nor for the cost of water drawn. Payment for the aforementioned shall be deemed to be covered by the rates and prices tendered and paid for the various items of work included under the Contract.

C3.8.7.1.2 Source of Power Supply

Electrical power is only available at the project area. The Contractor shall make his own arrangements with the relevant authority and pay all installation and usage charges for a metered electrical supply for his needs.

The Employer accepts no responsibility for the interruption of the power supply due to any cause whatsoever, nor additional costs incurred by the Contractor as a result of such interruption.

No direct payment, other than provided for under the preliminary and general items, shall be made for any costs incurred for the provision of a power supply. The cost of supplying electrical power will be deemed to be covered by the relevant items.

C3.8.7.1.3 Location of Camp and Materials Storage Area

An area for a campsite and materials storage area shall be agreed with the Employer. Employer will identify a site area near the project area and close to municipal borrow pit if possible.. The Contractor may erect his site offices and materials storage depot within the demarcated boundaries of the area. The Contractor shall confine his camp and storage of materials to the areas designated.

A suitable perimeter fence should be erected to prevent the entry of domestic stock, wild animals, or unauthorized entry and to ensure that the camp is adequately secured against theft.

The Contractor shall provide sufficient storage area for all tools, small equipment, and materials, and will be responsible for the safekeeping thereof.

The site and materials storage area shall at all times be kept in a clean, dry and tidy condition. Temporary buildings and fencing shall be neat and presentable and the surrounding area shall, at all times, be kept in a neat, clean and orderly condition.

Scavenger-proof litter containers to be provided on site and paper and plastic packaging shall be collected daily and binned so that they cannot be blown onto the surrounding property.

Precautions to be taken against hydrocarbon spillage from heavy equipment such as compressors and generators, e.g. through the use of sand or sawdust filled drip trays. If maintenance and refuelling activities take place in this area, adequate protection and clean-

up mechanisms in the event of a spill must be in place. All contaminated material (including soil) to be disposed of at a registered waste site.

All toxic materials (cement, oil, petrol, diesel, etc.) used at or stored in the construction camps should be very strictly controlled and secured against theft at all times.

The Contractor shall not cut down or damage trees without the prior written permission of the Engineer. If any vegetation is damaged or destroyed during the construction period, the damaged areas should be re-vegetated using indigenous plants that are native to this area.

On completion of the construction works, the area shall be re-instated to its original condition.

No persons, other than a night watchman, may overnight at the campsite.

C3.8.7.1.4 Housing

No housing is available and the Contractor shall make his own arrangements to house his employees and transport them to and from the site.

C3.8.7.1.5 Disposal Site

All material cleared on the site, rubble, spoil and refuse shall be disposed of at the regional general waste site approved by the engineer.

C3.8.8 SITE USAGE

The Contractor shall confine his activities to the site of the works and to the area allocated to him for his site offices and materials storage. The Contractor may not use or damage in any way any area that falls outside the boundaries of the site. Any area damaged by the Contractor outside the site boundaries shall be rehabilitated to the satisfaction of the Engineer at the Contractor's expense.

C3.8.9 SURVEY CONTROL AND SETTING OUT OF THE WORKS

Survey pegs and reference marks shall be pointed out to the Contractor. The Contractor is solely responsible for the setting out of the works from the pegs and reference marks. The Contractor is also solely responsible for the protection of the pegs and reference marks. The Contractor's attention is specifically drawn to the requirements of SANS 1200 A: General, Clause 5.1 Survey, in this regard.

The Contractor shall be responsible for the preservation of all land survey, erf or other pegs, benchmarks and beacons. If damage or disturbance of any such pegs or beacons is caused by the operations of the Contractor or his subcontractors, the pegs are to be replaced by a Registered Land Surveyor at the cost of the Contractor. Benchmarks will be replaced by the Engineer at the Contractor's expense.

Information regarding the position of all such pegs will be made available to the Contractor by the Engineer on request.

The Contractor is to ensure that no spoil is placed over any erf peg or benchmarks and that these are adequately protected for the full duration of the Contract.

Where disturbances of boundary pegs is unavoidable due to excavation or other operations adjacent to the pegs, the Contractor shall advise the Engineer or his Representative immediately, and agreement is to be reached that the disturbance of the peg is unavoidable and a strict record of such disturbed pegs is to be kept. Such pegs are to be replaced by a Registered Land Surveyor as described above and the Contractor is to submit proof of the cost of replacement of pegs. The Contractor will be reimbursed on a basis pro-rata to the total cost of peg replacement determined on completion of the Works.

C3.8.10 DEALING WITH TRAFFIC AND ACCESS

The Contractor shall liaise with all the relevant authorities/persons regarding construction where it affects public/private right of way on roads, access to properties etc. Where alternative arrangements cannot be made, roads shall be crossed in half widths to allow for safe passage of traffic.

All the relevant requirements regarding the latest edition of the South African Traffic Signs Manual shall be adhered to. Specific attention shall also be paid to the requirements of the OR Tambo District Municipality and the Department of Transport regarding signs for road closures, deviations, warning signs, etc.

C3.8.11 QUALITY CONTROL

An item for independent quality tests required by the Engineer is included in the Schedule of Quantities.

C3.8.12 ACCOMMODATION OF TRAFFIC, ACCESS TO PROPERTIES AND BORROW PITS

The tendered sum for the item ‘accommodation of traffic’ in the Preliminary and General section of the Schedule of Quantities shall cover all the Contractor’s costs of the supply, construction and maintenance of a gravel wearing course on detours, by-passes, existing gravelled roads and access roads to borrow pits required by the Contractor for his construction operations. The sum shall also include removal of all such temporary roads on completion of the Contract plus grassing of these areas and any necessary erosion control measures as determined by the Engineer. All the necessary authorities are to be given adequate advance notice if necessary.

The Contractor shall ensure that all roads adjacent to or crossing the Site and which are affected by the Works and/or Temporary Works and by the Contractor’s activities at the borrow area, are kept in a safe condition for pedestrians and vehicular traffic.

Accommodation of vehicular and pedestrian traffic shall be performed in accordance with Sections D and DB of SABS 1200. The Contractor shall organise his work so as to reduce the inconvenience to traffic to a minimum, and no public road shall be completely closed without prior approval by the Engineer. The Contractor shall provide and maintain in proper condition all necessary barricades, lights, warning signals and all direction signs necessary to enable traffic to follow the routes of diversion throughout their length. The Contractor shall provide flagmen at all deviations and/or obstructions.

All signs shall be in two languages as may be advised by the Employer and all traffic signs and control traffic shall be in accordance with the South African Road Traffic Signs Manual. The Contractor shall provide temporary bypasses where necessary to provide access for vehicular and pedestrian traffic.

It is a condition of this Contract that gravel on detours, bypasses and existing gravelled roads shall only become the subject of payment in terms of the Specifications when such gravel wearing courses are constructed to accommodate public traffic in accordance with a written order from the Engineer.

C3.8.13 DEALING WITH WATER ON THE WORKS

Ground water can be expected in the project area . The Contractor shall provide adequate measures in the form of well points, sumps, pumps, temporary pipework and all other necessary equipment and measures to remove water from the trenches to enable work to take place. Dewatering will most probably be required 24 hours per day until such time as backfilling has been completed in order to prevent the pipes from floating in the trenches.

Where necessary, the Contractor shall construct temporary drainage channels/berms to divert ground water from his excavation and excess water pumped out. No compensation for any variation of the actual conditions during construction from the data will be considered. Neither will additional compensation be considered for data omitted or inaccurately given. The rates tendered shall allow for the requirements of this clause and all incidentals.

C3.8.14 PROTECTION AGAINST FLOODING

The Contractor shall take the necessary temporary precautions to direct storm water away from his excavations.

See Sub-clause 1.3.11.1 of Section A of Part 3 and Sub-clause 3.2.4 of Section D of Part 2 of SANS 0120. The rates tendered shall allow for the requirements of this clause and all incidentals.

C3.8.15 TEMPORARY STOCKPILING AND SPOIL

The Contractor shall remove and stockpile the sandy/clayey soil upper layers (approximately 1 – 1,5m deep) for later reuse, if requested. Care shall be taken to ensure that this soil is not contaminated by any other material. If space is not available to stockpile the sandy/ clayey soil in the project area without danger of the material being contaminated, the soil shall be removed and stockpiled at remote locations approved by the Engineer in writing.

Any shortfall in the sandy soil material due to the stockpiles being contaminated shall be made up with approved imported material at the Contractor's expense.
The Contractor shall obtain the Engineer's written approval prior to the disposal of any surplus or unsuitable material prior to the temporary stockpiling of any selected material from excavation.
Material from excavation shall only be spoiled or temporarily stockpiled on sites approved by the Engineer in writing.

C3.8.16 DUST CONTROL

The Contractor shall apply water using a water tanker at regular intervals to access and construction roads where dust is causing a nuisance. The application rate should be sufficient to keep the routes dust free during the movement of construction equipment.

C3.8.17 FEATURES REQUIRING SPECIAL ATTENTION

C3.8.17.1 Safety Regulations

Both the "Factories, Machinery and Building Work Act (Act 22 of 1941)" and the "Machinery and Occupational Health and Safety Act (Act 6 of 1983)" must wherever they appear in the SABS 1200 standardized specifications, be substituted by the "Occupational Health and Safety Act (Act 85 of 1995)".

C3.8.17.2 Health and Safety

The Site of the Works is project area. Special care should be taken to instruct workers of the potential health and safety hazards likely to be encountered when working on such a Site.

Venomous snakes and crocodiles, including mambas, cobras and boomslangs, may found on the Site of the Works. Workers must be warned of the possibility of encountering these snakes and warned not to disturb them.

C3.8.18 RECORD DRAWINGS

As the work progresses, the Contractor shall keep full sets of records of all the true levels, sizes and positions of structures as well as all amendments to and deviations from the drawings issue by the Engineer from time to time. This information must be submitted monthly with the Contractor's claim for payment. A separate set of drawings will be issued to the Contractor for this purpose.

The completion certificate shall only be issued after the Engineer has received a properly completed set of "record" drawings from the Contractor. No separate payment shall be made for this service as all costs related thereto shall be deemed to be included in the rates for the relevant items.

C3.8.19 DAMAGE TO PRIVATE PROPERTY

Sections of the Site will be through private agricultural land (sugar cane fields)
The Contractor will be responsible for any damage to crops, fencing, structures, etc. caused by his activities on Site. The Contractor must obtain permission from land owners where necessary, for the removal of fences and must erect temporary fences or gates in these openings during the construction period. The permanent fencing must be replaced as soon as possible and must comply with at least the original product. It is essential that the least inconvenience to private property be caused during the construction period.

All such sites shall be left in the same condition as they were found initially, on completion of the construction work.

C3.8.20 FELLING OF TREES

There may be trees that are within the proposed site. The Contractor must ensure that all the necessary safety procedures are followed during the felling process. Some of the plants on site may be protected species. These will be identified by the Engineer and may have to be transplanted.

C3.8.21 OVERHAUL AND FREE HAUL

No payment will be made for overhaul on this contract unless provision is made therefore in specific items. All haul inside the boundaries of the site is regarded as free haul. Rates for importation of materials from commercial sources will be deemed to include cost for haulage.

C3.8.22 DISPOSAL OF SPOIL OR SURPLUS MATERIAL

The Contractor is responsible to arrange for the necessary permission and to spoil all surplus and unsuitable material, as well as other objectionable material at a legal site of his choice. He shall be responsible for all arrangements necessary to obtain such spoil sites.

C3.8.23 IMPORTATION OF BEDDING AND BACKFILL MATERIAL

The importation of suitable bedding and backfill material is the sole responsibility of the Contractor. All imported material shall be deemed to be from commercial sources and will be paid for in the rates tendered.

C3.8.24 EXCAVATION MEASUREMENTS

All excavations shall be measured nett. The rates tendered shall therefore include for any overbreak, additional haulage and disposal of overbreak, and filling of overbreak as specified.

C3.8.25 FINISHING AND TIDYING

On no account must rubble and spoil materials, other materials, equipment or unfinished operations be allowed to accumulate in such a manner as to unnecessarily impede the activities of other Contractors or Authorities.

Finishing and tidying must not simply be left until the end of the construction period. The Contractor may, subject to prior agreement with the Engineer and within reasonable limits, request that work in a particular area and/or work of a particular discipline, be inspected for partial completion. Partial completion shall not entitle the Contractor to Practical Completion of the partially completed work. A Certificate of Practical Completion shall only be issued once the entire Works have reached Practical Completion.

On completion of the Contract the Contractor shall ensure that all materials used in the construction of the temporary Site Office, workshop and storage yard are removed from Site. Waste material such as construction debris and soil contaminated with oil and fuel

are to be disposed of at a suitable appropriately licenced waste disposal site. Proof of disposal shall be given to the Engineer.

Prior to the Handover of the Site to the Employer, the Contractor and the Engineer will conduct a post construction audit to determine if any additional measures are to be taken. The Completion Certificate will only be issued after this stage.

C3.9 VARIATIONS AND ADDITIONS TO THE STANDARDIZED SPECIFICATIONS FOR THIS CONTRACT, AND PARTICULAR SPECIFICATIONS

The following variations and additions to the SANS 1200 Standardized Specifications referred to shall apply to this Contract. The prefix "PS" indicates an amendment to SANS 1200. The prefix "PSA" indicates an amendment to SANS 1200 A, "PSDB" to SANS 1200 DB and so on. The letters and numbers following these prefixes respectively indicate the relevant Standardized Specification and clause numbers in SANS 1200 to which the variation or addition thereto applies.

An asterisk (*) placed next to a PS Sub-clause number denotes the inclusion of an additional Sub-clause for which no equivalent appears in SANS 1200.

The term "project specifications" appearing in any of the SANS 1200 Standardized specifications must be replaced with the term "Scope of Work".

Further to the above it should be noted that where in a specific Standardized Specification reference is made to a Sub-clause in another Standardized Specification, any amendment or addition to the Sub-clause referred to, as provided for in the Specification, shall apply. The aforementioned shall also apply with respect to Clauses referred to in a Particular Specification.

PSA GENERAL

PSA 1 SCOPE

Replace the contents of Clause 1.1, including the notes, with the following:

"1.1 This specification covers requirements, principles and responsibilities of a general nature which are generally applicable to civil engineering construction and building works contracts, as well as the requirements for the Contractor's establishment on the Site."

PSA 2 INTERPRETATIONS

PSA 2.3 DEFINITIONS

In the opening phrase, insert the words: "the definitions given in the Conditions of Contract and" between the words "specification" and "the following".

a) General

Add the following definitions:
"General Conditions and Conditions of Contract. The General Conditions of Contract specified for use with this Contract as amended in the Contract Data.
Specified As specified in the Standardized Specifications, the Drawings or the Scope of Work. "Specifications" shall have the corresponding meaning."

c) Measurement and payment

Replace the definitions for "Fixed charge", "Time-related charge" and "Value-related charge" with the following:
"Fixed charge. A charge that is not subject to adjustment on account of variations in the value of the Contract Price or the time allowed in the Contract for the completion of the work.
Time-related charge. A charge, the amount of which varies in accordance with the Time for Completion of the Works, adjusted in accordance with the provisions of the Contract.
Value-related charge. A charge, the amount of which varies pro rata with the final value of the measured work executed and valued in accordance with the provisions of the Contract."

PSA 2.4 ABBREVIATIONS

a) Abbreviations relating to standard documents
Add the following abbreviation:
“CKS: SABS Co-ordinating Specification.”

PSA 3 MATERIALS

PSA 3.1 QUALITY

Where applicable, materials shall bear an official standardization mark.

Add the following:
"Where proprietary materials are specified it is to indicate the quality or type of materials or articles required, and where the terms “or similar approved” or “or approved equivalent” are used in connection with proprietary materials or articles, it is to be understood that the approval shall be at the sole discretion of the Employer’s Agent."

“PSA 3.3* ORDERING OF MATERIALS

The quantities set out in the Bill of Quantities have been carefully determined from calculations based on data available at the time of its compilation, but are to be considered as approximate quantities only. Before ordering materials of any kind the Contractor shall be solely responsible for determining, from the Drawings issued or approved by the Employer’s Agent for construction purposes, the actual quantities of materials required for the execution of the Works. No liability or responsibility whatsoever shall be attached to the Employer or the Employer’s Agent in respect of materials ordered by the Contractor except when ordered in accordance with the Drawings issued or approved by the Employer’s Agent for construction purposes.”

PSA 4 PLANT

PSA 4.1 SILENCING OF PLANT

Replace the contents of Clause 4.1 with the following:
“The Contractor’s attention is drawn to the applicable regulations pertaining to noise and hearing conservation, framed under the Occupational Health and Safety Act (Act No. 85 of 1993) as amended.

The Contractor shall at all times and at its own cost, be responsible for implementing all necessary steps to ensure full compliance with such regulations, including but not restricted to the provision and use of suitable and effective silencing devices for pneumatic tools and other Plant which would otherwise cause a noise level in excess of that specified in the said regulations.

Where appropriate, the Contractor shall further, by means of temporary barriers, effectively isolate the source of such noise in order to comply with the said regulations.”

PSA 4.2 CONTRACTOR'S OFFICES, STORES AND SERVICES

Add the following new paragraph before the existing paragraph in Clause 4.2:

"The Contractor's buildings, sheds and other facilities erected or utilised on the Site for the purposes of the Contract shall be fenced off and shall contain all offices, stores, workshops, testing laboratories, toilet facilities, etc. as may be required by the Contractor. The facilities shall always be kept in a neat and orderly condition.

No personnel may reside on the Site. Only night-watchmen may be on the Site after hours."
Delete “and first-aid services” in the second paragraph of Clause 4.2 and add the following:
"The Contractor shall provide on the Site and in close proximity to the actual locations where the work is being executed, one toilet per 15 workmen, which toilets shall be effectively screened from public view and their use enforced. Such toilets shall be relocated from time to time as the location of the work being executed changes, so as to ensure that easy access to the toilets is maintained.

The Contractor shall, where applicable, make all necessary arrangements and pay for the removal of night soil."

PSA 5 CONSTRUCTION

PSA 5.1 SURVEY

PSA 5.1.1 Setting out of the Works

The installed benchmarks shown on the Drawings shall be used by the Contractor for setting out the works.
Add the following paragraph:

"The Contractor shall be required to check and verify, prior to commencement of any construction work, all benchmarks and boundary reference pegs, as shown and detailed on the Drawings. Reference and benchmark pegs disturbed and/or removed during the construction period shall be replaced by a Professional Land Surveyor and the Contractor shall bear the cost of such replacement. Payment to check and verify the reference and benchmark pegs will be made in terms of PSA 8.8.5."

PSA 5.1.2 Preservation and replacement of survey beacons and pegs subject to the Land Survey Act

Delete from the second sentence "Before the commencement . . . . “to” . . . . apparently in their correct positions" and replace with the following:

"Immediately on taking over the site, the Contractor, in consultation and liaison with the Employer’s Agent, shall search for all pegs and the Contractor shall compile a list of pegs that are apparently in their correct position."
Replace the third sentence of Clause 5.1.2 with the following:

“At completion of the Contract, the Contractor shall expose and mark all pegs that were listed at the commencement of the construction as being in order and the Contractor shall arrange with a registered Land Surveyor the replacement of pegs that have become disturbed or damaged. The Contractor shall, as a precedent to the issue of the Certificate of Completion, provide to the Employer’s Agent, a certificate from the Registered Land Surveyor, certifying that all the pegs listed at the commencement of construction in accordance with the provisions of this Clause, have been checked and that those found to have been disturbed, damaged or destroyed have been replaced in their correct positions, all in accordance with the provisions of the said Act.

The costs of replacement and certification as aforesaid shall be entirely for the Contractor’s account, provided always that the Contractor shall not be held liable for the cost of replacement of pegs which:

(a) cannot reasonably be re-established in their original positions by reason of the finished dimensions of the Permanent Works ; and

(b) the Contractor can prove beyond reasonable doubt and to the satisfaction of the Employer’s Agent, were disturbed, damaged or destroyed by others beyond its control, and

(c) were in close proximity to the work and which would unavoidably be removed, subject to the Employer’s Agent approval being given to remove such pegs.”

PSA 5.2 WATCHING, BARRICADING AND LIGHTING AND TRAFFIC CROSSINGS

Add the following:
“The Contractor shall comply in all aspects with the requirements of the Occupational Health and Safety Act (Act 85 of 1993), refer also PSA 5.7, PSA 5.9 and PSA 5.10.”

PSA 5.3 PROTECTION OF STRUCTURES

Replace: ”Machinery and Occupational Safety Act, 1983, (Act No. 6 of 1983)” with: “Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), as amended,” and insert the following after “(Act No. 27 of 1956)”: “as amended”.

PSA 5.4 PROTECTION OF OVERHEAD AND UNDERGROUND SERVICES

Replace the heading and the contents of Clause 5.4 with the following:

"PSA 5.4 LOCATION AND PROTECTION OF EXISTING SERVICES

PSA 5.4.1 Location of existing services

Before commencing with any work in an area, the Contractor shall ascertain the presence and actual position of all services which can reasonably be expected by an experienced and competent Contractor to be present on, under, over or within the Site.

Without in any way limiting its liability in terms of the Conditions of Contract in relation to damage to property and interference with services, the Contractor shall, in collaboration with the Employer's Agent, obtain the most up-to-date plans as are available, showing the positions of services existing in the area where it intends to work.

Neither the Employer nor the Employer's Agent offer any warranty as to the accuracy or completeness of such plans and because services can often not be reliably located from plans, the Contractor shall ascertain the actual location of services depicted on such plans by means of careful inspection of the Site. No excavation may commence until the position of the service at the crossing point has been marked out and verified by an official of the responsible authority.

Thereafter, the Contractor shall, by the use of appropriate methodologies, carefully expose the services at such positions as are agreed to by the Employer's Agent, for the purposes of verifying the exact location and position of the services. Where the exposure of existing services involves excavation to expose underground services, the requirements of Clauses 4.4 and 5.1.2.2 of SANS 1200 D (as amended) shall also apply.

The aforesaid procedure shall also be followed in respect of services not shown on the plans but which may reasonably be anticipated by an experienced Contractor to be present or potentially present on the Site.

All services, the positions of which have been determined as aforesaid at critical points, shall henceforth be designated as "Known Services" and their positions shall be indicated by the Contractor on a separate set of Drawings, a copy of which shall be furnished to the Employer's Agent without delay.

As soon as any service which has not been identified and located as described above is encountered on, under, over or within the Site, it shall henceforth be deemed to be a "Known Service" and the aforesaid provisions pertaining to locating, verifying and recording its position on the balance of the Site shall apply. The Contractor shall notify the Employer's Agent immediately should any such service be encountered or discovered on the Site.

Whilst it is in possession of the Site, the Contractor shall be liable for all loss of or damage as may occur to:

(a) Known Services, anywhere along the entire lengths of their routes, as may reasonably be deduced from the actual locations at which their positions were verified as aforesaid, due cognisance being taken of such deviations in line and level which may reasonably be anticipated; and

(b) any other service which ought reasonably to have been a Known Service in accordance with the provisions of this Clause ;

as well as for consequential damage, whether caused directly by the Contractor's operations or by the lack of proper protection ; provided always that the Contractor will not be held liable in respect of damages occurring to services not being Known Services.

No separate payment will be made to the Contractor in respect of any costs incurred in preparing and submitting to the Employer's Agent, the Drawings as aforesaid and these costs shall be deemed included in the Contractor's other tendered rates and prices included in the Contract.

Payment to the Contractor's in respect of exposing services at the positions agreed by the Employer's Agent and as described above will be made under the payment items (if any) as may be provided therefore in the respective sections of the Specifications pertaining to the type of work involved.

PSA 5.4.2 Protection during construction

The Contractor shall take all reasonable precautions and arrange its operations in such a manner as to prevent damage occurring to all known services during the period which the Contractor has occupation and/or possession of the Site.

Services left exposed shall be suitably protected from damage and in such a manner as will eliminate any danger arising there from to the public and/or workmen, all in accordance with the requirements of the prevailing legislation and related regulations.

PSA 5.4.3 Alterations and repairs to existing services

Unless the contrary is clearly specified in the Contract or ordered by the Employer's Agent, the Contractor shall not carry out alterations to existing services. When any such alterations become necessary, the Contractor shall promptly inform the Employer's Agent, who will either make arrangements for such work to be executed by the owner of the service, or instruct the Contractor to make such arrangements himself.

Should damage occur to any existing services, the Contractor shall immediately inform the Employer's Agent, or when this is not possible, the relevant authority, and obtain instructions as to who should carry out repairs. In urgent cases, the Contractor shall take appropriate steps to minimise damage to and interruption of the service.

No repairs of telecommunication cables or electric power lines and cables shall be attempted by the Contractor, unless approved by the Employer's Agent.

The Employer will accept no liability for damages due to a delay in having alterations or repairs effected by the respective service owners. The Contractor shall provide all reasonable opportunity, access and assistance to persons carrying out alterations or repairs of existing services."

PSA 5.7 SAFETY

Replace the contents of sub-clause 5.7 with the following:

"Pursuant to the provisions of the Conditions of Contract, and without in any way limiting the Contractor's obligations there under, the Contractor shall at his own expense (except only where specific provision (if any) is made in the Contract for the reimbursement to the Contractor in respect of particular items), provide the following:

(a) Provide to its Employees on the site of the works, all safety materials, clothing and equipment necessary to ensure full compliance with the provisions of the Occupational Health and Safety Act (Act No 85 of 1993) and associated Regulations as amended (hereinafter referred to as the Act) at all times, and shall institute appropriate and effective measures to ensure the proper usage of such safety materials, clothing and equipment at all times; and
(b) Provide, install and maintain all barricades, safety signage and other measures to ensure the safety of workmen and all persons in, on and around the site, as well as the general public; and
(c) Implement on the site of the works, such procedures and systems and keep all records as may be required to ensure compliance with the requirements of the Act at all times; and
(d) Implement all necessary measures so as to ensure compliance with the Act by all subcontractors engaged by the Contractor and their employees engaged on the works; and
(e) Full compliance with all other requirements pertaining to safety as may be specified in the Contract.

The Employer shall in terms of the Regulations make such inspections on the site, as they shall deem appropriate, for the purpose of verifying the Contractor's compliance with the requirements of the Act. For this purpose, the Contractor shall grant full access to the site of all parts of the site and shall co-operate fully in such inspections and shall make available for inspection all such documents and records as the Employer's representative may reasonably require.

Where any such investigations reveal, or where it comes to the Employer's attention that the Contractor is in any way in breach of the requirements of the Act or is failing to comply with the provisions of this clause, the Employer's Agent shall, in accordance with the provisions of Clause 5.11.2 of the Conditions of Contract, be entitled to suspend progress on the works or any part thereof until such time as the Contractor has demonstrated to the satisfaction of the Employer, that such breach has been rectified.

The Contractor shall have no grounds for a claim against the Employer for extension of time and/or additional costs if the progress on the works or any part thereof is suspended by the Employer's Agent in terms of this clause, and the Contractor shall remain fully liable in respect of the payment of penalties for late completion in accordance with the provisions of Clause 5.13 of the Conditions of Contract should the Contractor fail to complete the Works on or before the specified due completion date in consequence of the suspension.

Persistent and repeated breach by the Contractor of the requirements of the Act and/or this clause shall constitute grounds for the Employer's Agent to act in terms of Clause 9.2 of the Conditions of Contract and for the Employer to terminate the Contract in accordance with the further provisions of the said Clause 9.2."

"PSA 5.9* MAINTAINING SERVICES IN USE

The Contractor shall take note that he shall not cut off any service in use without the prior approval of the Employer's Agent.

Failure on the part of the Contractor to comply with any of the above provisions will constitute sufficient reason for the Employer's Agent to stop the works until the situation has been remedied, or should he deem it necessary, arrange for the situation to be remedied at the Contractor's cost.

No direct payment will be made for the cost of maintaining services in use. Payment will be deemed to be covered by the rates and sums tendered and paid for the various items of work included under the Contract."

"PSA 5.10* DEALING WITH AND ACCOMMODATING TRAFFIC

The Contractor shall take note that the existing roads and tracks within and to the Sites, shall remain operational throughout the contract period. To this end the Contractor shall provide and maintain all temporary fences, security, barriers, kerb ramps, signs, markings, flagmen, drums, lighting, personnel and all other incidentals necessary to ensure safe and easy passage of all traffic.

Temporary traffic signs etc. as well as all necessary markings shall be erected and maintained by the Contractor and 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 / black border.

No direct payment will be made for the cost of dealing with and accommodating traffic. Payment will be deemed to be covered by the rates and sums tendered and paid for the various items of work included under the contract. Further, the provision of PSA 5.2 shall apply."

"PSA 5.11* SITE MEETINGS

The Contractor or its authorised agent will be required to attend regular site meetings, which shall normally be held once a month on dates and at times determined by the Employer's Agent, but in any case whenever reasonably required by the Employer's Agent. Unless otherwise indicated in the Contract or instructed by the Employer's Agent, such meetings shall be held at the Contractor's offices on the Site. At such monthly meetings, matters such as general progress on the Works, quality of work, problems, claims, payments, and safety etc., shall be discussed, but not matters concerning the day-to-day running of the Contract.

"PSA 5.12***** PROVIDING ACCESS TO ERVEN AND PROPERTIES

Access to erven and properties along the route of trenches and roads shall be provided by the Contractor at all times. To this end suitable crossings shall be constructed where required.

Temporary crossings shall be in the form of portable bridges, temporary backfill or other approved means and shall be capable of permitting the safe passage of all vehicles and pedestrians. The Contractor shall also be responsible for maintaining crossings and for removing same when they are no longer required.

If as a result of restricted road reserve widths and the nature of the Works the construction of bypasses is not feasible, construction shall be carried out under traffic in order to provide access to the properties.

The Contractor may, with the approval of the Employer's Agent, arrange with the occupiers of the affected properties to temporarily close off a portion of a road, footpath entrance, property access road or other access, provided that the Contractor shall give due notice of the intended closure and its probable duration to the occupiers and shall as punctually as possible re-open the route at the prescribed time. Where possible, roads shall be made safe and re-opened to traffic overnight. Any such closure shall be an arrangement between the Contractor and the occupiers and shall not absolve the Contractor from his obligations under the Contract to provide access at all times. Barricades, traffic signs and drums shall be provided by the Contractor to suit the specific conditions.

No direct payment will be made for the cost of providing access. Payment will be deemed to be covered by the rates and sums tendered and paid for the various items of work included under the Contract."

"PSA 5.14* PROTECTION OF LIVESTOCK

From the time of the occupancy of the Site until the date of the Completion Certificate the Contractor shall take all measures necessary for the protection and control of livestock on the sections of the properties affected by his operations. He shall provide gates in existing fences cut by him for the purpose of access and control, and where necessary, to store materials and plant and the Contractor shall ensure that all gates are kept closed during such time as they are not actually in use by his traffic.

Where the Contractor cannot make alternative arrangements, the Contractor shall erect temporary fencing where necessary to protect livestock exposed to straying through his operations. The fencing shall be maintained in good order during construction operations and on completion of the work it shall be removed from the Site and all surfaces restored to the satisfaction of the property owner.

Payment for the protection of livestock, including the erection of temporary fences and gates where required, shall be deemed to be covered by the rates and sums tendered and paid for the various items of work included under the Contract.

Claims by property owners for loss of or injury to livestock due to negligence on the part of the Contractor, shall be settled by the Contractor."

"PSA 5.15* ENVIRONMENTAL MANAGEMENT PLAN, RECORD OF DECISION AND SPECIFICATIONS

The Contractor shall be required to comply with the Environmental Management Plan (EMP), Record of Decision (ROD) and Specifications during the Contract period.

Non compliance with the specifications, ROD and EMP, in any way whatsoever, will be adequate reason for suspension of the Works.

The Contractor shall at all times be responsible for full compliance with the specifications, ROD and EMP and no extension of time will be considered for delays due to non-compliance with the abovementioned.

The applicable environmental documents are bound as Particular Specification PA.

No direct payment will be made for the cost of complying with the EMP or disruption experienced in attending to the aforementioned. Payment shall be deemed to be covered by the rates and sums tendered and paid for the various items of work included under the Contract."

"PSA 5.16* ATTENDANCE ON EE's

The Contractor shall closely manage and supervise all EE's and shall manage, guide and assist each EE in all aspects of management, execution and completion of his subcontract. This shall typically include assistance with planning his works, sourcing and ordering of materials, labour relations, monthly measurements and invoicing procedures, etc. The extent and level of such management, guidance and assistance, to be provided by the Contractor shall be commensurate with the expertise of relevant EE and shall be directed at enabling the EE's to achieve the successful execution and completion of the subcontract.

No direct payment will be made for the cost of attendance on EE's. Payment will be deemed to be covered by the rates and sums tendered and paid for the various items of work included under the contract."

PSA 6 TOLERANCES

"PSA 6.4* USE OF TOLERANCES

No guarantee is given that the full specified tolerances will be available independently of each other, and the Contractor is cautioned that the liberal or full use of any one or more of the tolerances may deprive him of the full or any use of tolerances relating to other aspects of the work.

Except where the contrary is specified, or when clearly not applicable, all quantities for measurement and payment shall be determined from the 'authorized' dimensions. These are specified dimensions or those shown on the Drawings or, if changed, as finally prescribed by the Employer's Agent, without any allowance for the specified tolerances. Except if otherwise specified, all measurements for determining quantities for payment will be based on the 'authorized' dimensions.

If the work is constructed in accordance with the 'authorised' dimensions plus or minus the tolerances allowed, the calculation of quantities will be based on the 'authorised' dimensions, regardless of the actual dimensions to which the work has been constructed.

When the work is not constructed in accordance with the 'authorised' dimensions plus or minus the tolerances allowed, the Employer's Agent may nevertheless, at his sole discretion, accept the work for payment. In such cases no payment shall be made for quantities of work or material in excess of those calculated for the 'authorised' dimensions, and where the actual dimensions are less than the 'authorised' dimensions minus the tolerance allowed, quantities for payment shall be calculated based on the actual dimensions as constructed."

PSA 7 TESTING

PSA 7.1 PRINCIPLES

PSA 7.1.2 <u>Standard of Finished Work Not to Specification</u>

Insert the words "or checks by an approved laboratory ..." after the words "Where the Employer's Agent checks ..."in the first line of Clause 7.1.2.

PSA 7.2 APPROVED LABORATORIES

Replace the contents of Clause 7.2 with the following:

"Unless otherwise specified in the relevant specification or elsewhere in the Scope of Work, the following shall be deemed to be approved laboratories in which design work, or testing required in terms of a specification for the purposes of acceptance by the Employer's Agent of the quality of materials used and/or workmanship achieved, may be carried out:

(a) any testing laboratory certified by the South African National Accreditation Systems (SANAS) in respect of the nature and type of testing to be undertaken for the purposes of the Contract;
(b) any testing laboratory owned, managed or operated by the Employer or the Employer's Agent;
(c) any testing laboratory established and operated on the Site by or on behalf of the Employer or the Employer's Agent;
(d) any testing laboratory designated by the Employer's Agent."

PSA 8 MEASUREMENT AND PAYMENT

PSA 8.1 MEASUREMENT

PSA 8.1.1 Method of measurement, all sections of the Schedule

Delete the words "and South West Africa".

PSA 8.1.2 Preliminary and General item or section

PSA 8.1.2.1 Contents

Replace the contents of item (c) with the following:
"The 'duration of construction' applicable to a time-related item shall be the tendered contract period for the total works assignment, plus as applicable, the Civil Engineering Industry Holiday (Dec / Jan) and all gazetted public holidays for the Civil Engineering Industry."

PSA 8.1.2.2 Tendered sums

Replace the contents of this Sub-clause with the following:
"Except only where specific provision is made in the Specifications and/or the Bill of Quantities for separate compensation for any of these items, the Contractor's tendered sums under items PSA 8.3 and PSA 8.4 shall collectively cover all charges for:

- risks, costs and obligations in terms of the Conditions of Contract and of this standardized specification; and
- head-office and site overheads and supervision; and
- profit and financing costs; and
- expenses of a general nature not specifically related to any item or items of the permanent or temporary work; and
- providing such facilities on site as may be required by the Contractor for the proper performance of the Contract and for its personnel, including, but without limitation, providing offices, storage facilities, workshops, ablutions, services such as water, electricity, sewage and rubbish disposal, access roads and all other facilities required, as well as for the maintenance and removal on completion of the works of these facilities and cleaning-up of the site of the Contractor's establishment and reinstatement to not less than its original condition, and
- providing the facilities for the Employer's Agent and his staff as specified in the Contract and their removal from the site on completion of the Contract.
- Completion of monthly reporting/monitoring of Emerging Enterprise Subcontract."

PSA 8.2 PAYMENT

PSA 8.2.2 Time-related items

Replace the contents of Clause 8.2.2 with the following:

"Subject to the provisions of sub clauses 8.2.3 and 8.2.4, payment under item 8.4.1 (time-related item) will be made monthly in equal amounts, calculated by dividing the sum tendered for the item by the tendered Contract period in months, 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.

Should the Employer's Agent grant an extension of time for the completion of the total works, the Contractor will be entitled to an increase in the sums tendered for time-related items, which increase shall be in the same proportion to the original tendered sums, as the extension of time is to the duration of construction as defined in PSA 8.1.2.1. The Contractor shall however note that the aforementioned will not apply to extensions of time granted in terms of PSA 8.4.6.

Payment of such increased sums will be taken to be as full compensation for all additional preliminary and general costs, either time-related costs or fixed costs that result from the circumstances pertaining to the extension of time granted."

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:

$$\text{Sum of Tendered amounts for Time Related Items} \times \frac{\text{Extension of Time authorised by Variation Order}}{\text{Tender Contract period}}$$

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."

PSA 8.3.1 & Contractual requirements

8.4.1

Add the following:

"The sum tendered shall cover all initial costs incurred in complying with the requirements of the Conditions of Contract and include for the cost of providing and maintaining the special risks insurance stipulated in the Conditions of Contract, if applicable."

PSA 8.3.2.1 Facilities for Employer's Agent

Replace the contents of this Clause with the following:

"(a) One Contract Nameboard Unit: Sum
The facilities provided shall comply with the applicable requirements of SANS 1200 AB and PSAB."

PSA 8.3.2.2 Facilities for Contractor

Notwithstanding the detail breakdown of items provided (items a to j), a single sum shall be tendered to cover all these items under the heading of "Facilities for Contractor".

PSA 8.4.1 Contractual requirements ..... Unit: Sum

Add the following:

"The sum shall further cover all the time-related establishment costs and be the full compensation to the Contractor for:

(i) The maintenance of his whole organisation as established for this Contract.
(ii) The maintenance of all insurances, indemnities and guarantees required in terms of the Conditions of Contract, where applicable.
(iii) Compliance with all general conditions and requirements which are not specifically measured elsewhere for payment in these Contract Documents.

Payment shall be made monthly in compliance with the method laid down in PSA 8.2.2.

The Contractor will not be paid Time-Related Preliminary and General Charges for any special Non-Working Days, as stipulated in the Conditions of Contract, which shall be deemed to have been allowed for in his rates.

The sum shall also include, where applicable, for the cost of providing and maintaining the special risks insurance stipulated in the Conditions of Contract."

PSA 8.4.2.1 Facilities for Employer's Agent

Replace the contents of this Clause with the following:

"(a) Two Contract Nameboard .... Unit: No.
(b) Survey labourers ..... Unit: Labourer Month

The facilities provided shall comply with the applicable requirements of SANS 1200 AB and PSAB.

Payment for the provision of survey labourers will be made pro-rata the period the labourers are provided."

PSA 8.4.2.2 Facilities for Contractor

Notwithstanding the detail breakdown of items provided (items a to j), a single sum shall be tendered to cover all these items under the heading of "Facilities for Contractor".

PSA 8.4.2.3 Replace the words "periods stated" in the second line of this Clause with the following: "duration of construction as defined in PSA 8.1.2.1".

"PSA 8.4.6* Compensation in terms of Sub-clause 5.12.2.4 and Clause 9.1.4 of the Conditions of Contract for delays incurred:
(a) Plant ..... Unit: Sum per working day
(b) Labour ..... Unit: Sum per working day
(c) Supervision..... Unit: Sum per working day
(d) Other services, facilities etc. not covered by (a), (b) and (c) ..... Unit: Sum per working day

The sum tendered for each item shall cover the full and final standing cost per day of delaying the specified resource or facility and no additional compensation shall apply, notwithstanding any provisions to the contrary in the contract documents, or in respect of any extension of time granted in relation to the circumstances described in Sub-clause 5.12.2.4, 9.1.1 and 9.1.2 of the Conditions of Contract.

For the purposes of calculating the total delay, a working week shall be held to consist of five working days and a working day 9 hours.

Payment for the partial standing of any of the scheduled resources for a day or part thereof, or the standing of a complete resource for a part day, will be made pro-rata in proportion to an appropriate factor assessed by the Employer's Agent.

The amount by which compensation for delays is adjusted shall be subject to the contract price adjustment formula as defined in the Conditions of Contract.

This payment item shall only apply to delays which in the opinion of the Employer's Agent are due to the circumstances described in Sub-clause 5.12.2.4, 9.1.1 and 9.1.2 of the Conditions of Contract. No Payment will be made for any salary related or other internally caused strikes. The cost of delays incurred for all other circumstances shall be treated as provided for in the Conditions of Contract.

The provision of this Clause shall in no way prejudice the right of either the Employer or the Contractor to determine the Contract in terms of the provisions of Clause 9 of the Conditions of Contract.

The Contractor shall take note that no payment will be considered for any additional cost incurred in protecting his plant and site establishment, as well as for costs incurred in respect of damage to constructional plant and equipment."

PSA 8.5 SUMS STATED PROVISIONALLY BY THE EMPLOYER'S AGENT

Replace the contents of Clause 8.5 with the following:

"PSA 8.5.1 Works Executed by the Contractor..... Unit: Prov Sum

The Contractor will be reimbursed in substitution of the Provisional Sums (if any) allowed in the Bill of Quantities for work to be executed by the Contractor, in the amounts determined in accordance with the provisions of Clause 6.6 of the Conditions of Contract.

PSA 8.5.2 Works Executed and performed by the Selected Subcontractors in Consultation with the Employer

(a) Work to be executed and performed by the Selected Subcontractor in Consultation with the Employer…….Unit: Prov Sum

(b) Overheads, charges and profit on item (a) above…….Unit: % or Sum

Sub-items (a) and (b) will be provided in the Bill of Quantities for each different Selected Subcontract included in the Contract.

The Contractor shall be reimbursed under sub-item (a), in substitution of the respective Provisional Sums (if any) allowed in the Bill of Quantities, the amounts actually paid or payable by the Contractor to the respective Selected Subcontractors, in accordance with the provisions of Clauses 4.4.3 and 6.6 of the Conditions of Contract.

The Contractor shall be paid under sub-item (b), either:

(a) where the unit of measurement for sub-item (b) was specified as being a percentage, the respective percentage, as stated by the Contractor in its Tender, of the amount certified by the Employer's Agent for payment under the related sub-item (a), all in accordance with the provisions of Clause 6.6.1.2.1 of the Conditions of Contract : or

(b) where the unit of measurement for sub-item (b) was specified as being a Lump Sum, an amount which is in the same proportion to the amount certified for payment under sub-item (a) and the tendered Lump Sum is to the amount of the Provisional Sum stated under sub-item (a) ;

provided always that where the Contractor has failed for any reason, to insert a percentage or Sum (as applicable) for sub-item (b) in its tender, or where no provision was made in the Tender Documents for tenderers to make any such entry, the Contractor will, in accordance with the provisions of Sub-clause 6.6.1.2.2, be paid an amount equal to SEVEN AND ONE HALF PERCENT (7½%) of the amount actually certified by the Employer's Agent for payment under sub-item (a).

The percentage or sum (as applicable) paid under sub-item (b) as aforesaid, shall be deemed to include for full and final compensation to the Contractor for all costs as may be incurred and all charges and profits associated with the engagement, supervision, administration and management of the Nominated Subcontractor and in fulfilling its obligations under the contract as the principal Contractor."

Replace Clause 8.6 with the following:

"PSA 8.6 PRIME COST ITEMS

PSA 8.6.1 Prime Cost Sums
(a) Description of Item to which Prime Cost Sum Applies ..... Unit: PC Sum
(b) Charge Required by Contractor on Sub-item (a) above ..... Unit: %

Sub-items (a) and (b) will be provided in the Bill of Quantities for each different item to which a Prime Cost Sum applies.

The Contractor shall be reimbursed under sub-item(s) (a) in substitution of the respective Prime Cost Sums included in the Contract, the actual price(s) paid or payable by him in respect of the goods, materials or services supplied, but excluding any charges for the Contractor's labour, profit, carriage, establishment or other charges related to such goods, services or materials.

The Contractor shall be paid under sub-item (b), the respective percentage, as stated by the Contractor in its Tender, of the amount certified by the Employer's Agent for payment under the related sub-item (a). The percentages tendered by the Contractor for each respective sub-item (b) included in the Bill of Quantities shall be deemed to in full and final compensation to the Contractor in respect of any charge by the Contractor for labour, carriage profit, establishment and for any other charges related to the goods, services or materials supplied under the related sub-item (a).

If the Contractor shall have omitted within its Tender to insert a tendered percentage under sub-item (b), or tendered a zero percentage, the Contractor's tendered rate for sub-item (b) shall be deemed to be zero and the Contractor shall not be entitled to any payment under sub-item (b)."

Note:
1. Only payments for successful test will be made under the Prime Cost Sum provided in the Bill of Quantities for "additional acceptance control testing by the Employer's Agent".
2. The Contractor is responsible for the cost of process control testing. Payment in terms of the above will only be made for acceptance control testing ordered by the Employer's Agent.

"PSA 8.7 DAYWORK

Add the following:

"To ensure that the plant is achieving a reasonable output of work, the Employer's Agent personnel will randomly monitor and measure work produced. Poor performance of any item of plant will be noted by the Employer's Agent and certain reductions in payment may be applied.

Furthermore, should the performance of a machine be poor, or persistently break down, the Employer's Agent may order that it be replaced, all at the cost of the Contractor."

PSA 8.8 TEMPORARY WORKS

PSA 8.8.4 Existing services

Replace the heading of paragraph (c) with the following:

"(c) Excavate by hand in soft material to expose existing services..... Unit: m^3

Add the following:

"The rate tendered for (c) shall further cover the cost of backfilling the excavation with excavated material compacted to 90% of modified AASHTO maximum density, loading, transporting and disposing of surplus material as directed, keeping the excavation safe, dealing with water, protecting the exposed services, and any other operation necessary to complete the work.

No distinction will be made between the various types of services to be exposed, or the depths to which excavations are taken.

Excavation in excess of that authorised will not be measured for payment."

”PSA 8.8.6 Dealing with water .....Unit: Sum

The sum shall cover the cost for the provision, operation, maintaining and removal of all plant and materials required to deal with any water anywhere on site as required in terms of Sub clause 5.1.3 of SANS 1200 D and Sub clause 5.1.2 of SANS 1200 DB. No additional payment will be made for “Special water hazards”.

The sum shall cover the cost of providing the necessary plant or materials, or both, fully erected and operative on the Site, the cost of operating and maintaining pumps, well points, sheeting, close timbering, and other equipment, as applicable, for 24 Hours a day, 7 days a week, throughout the period during which the facilities are required, and the cost of removing such goods and restoring the Site to its original condition on completion of that part of the project for which the temporary works were erected.

Two equal payments will be made, one with the first and the other with the last payment certificate.

“PSA 8.8.7* Compliance with the occupational health and safety act (Act 85 of 1993) and all relevant and applicable regulations, especially the construction regulations, 2014 as promulgated on 7 February 2014 under section 43 of the occupational health and safety act (Act 85 of 1993), as amended from time to time, for the duration of the contract

(a) Contractor Unit: Sum
(b) Subcontractors (own).....Unit: Sum

The tendered sums shall include full compensation to the Contractor for compliance with all the requirements of the OHS Act and the Construction Regulations 2014 at all times, as described in the Scope of Work and Employer's health and safety specification (Refer Particular Specification PB). The successful tenderer shall provide the Employer’s Agent with a complete breakdown of this tendered sum, if so required.

The Contractor shall note that all obligations contained in the Act, Regulations and Employers health and safety specification shall be included in this item. No additional claims will be considered; neither will an extension of time be considered for delays due to non-compliance with the Contractor's health and safety plan.
The sums will be paid to the Contractor in equal monthly amounts.”

”PSA 8.9* Installation of Benchmarks by Registered Surveyor .....Unit: No
The number tendered shall include full compensation for the installation of benchmarks to mSL, by a registered surveyor as required by the Employer’s Agent, during construction and shall include the protection during construction and marking the benchmark on completion of the Works.

NOTE: The cost to set out the Works in terms of 5.1.1 and PSA 5.1.1 shall be deemed to be covered by the sums tendered for other obligations under Sub-clauses 8.3.3 and 8.4.5.”

“PSA 8.10* Sanctions Unit: Prov Sum
The provisional sum shall cover any sanction or bonus due as specified in sub-clause C3.3.3. The provisional sum shall be expended in accordance with Clause 6.6 of the Conditions of Contract.”

“PSA 8.11* Allowance for EME Construction Manager (when required) ..... Unit: Month
The Employer will, for different work packages require that work be subcontracted to black owned companies registered in the Engcobo Local Municipality’s Supplier Data Base to expedite the objectives of the Integrated Development Plan and Black Economic Empowerment. The Contractor shall employ a Construction Manager who will manage the EME’s and report on progress to the EME Committee throughout the Contract.

The rate tendered shall cover full compensation to the Contractor to employ a EME Construction Manager on a full-time basis for the duration of the work package required. Refer PSA 5.17 and C3.3.2."

PSAB ENGINEER'S OFFICE

PSAB 3 MATERIALS

PSAB 3.1 NAMEBOARDS

Notwithstanding the provisions of this Sub-Clause, one Contract Nameboard shall be provided. The nameboard shall further comply with regards to size, painting, decorating and detail to Drawing number 110875-PIP14-NB-001.

PSAB 3.2 OFFICE BUILDING(S)

An on-site office for the Employer's Agent is not required. Contract meetings will be held in the Contractor's office or other suitable venue.

PSAB 4 PLANT

PSAB 4.1 TELEPHONE

A telephone will not be required for the Employer's Agent.

PSAB 5 CONSTRUCTION

PSAB 5.1 NAMEBOARDS

Replace the contents of this Clause with the following:

"The Contract Nameboards shall be erected within fourteen days of the Commencement Date and shall be placed where ordered. Any damage to this board shall be repaired within seven days of a written instruction issued by the Employer's Agent.

Further to the above the Contractor will not be allowed to erect more than two of his own nameboards in the area of the Works. The position of these shall be agreed to by the Employer's Agent. No payment will be made for the supply, erection or maintenance of the Contractor's nameboards and the Employer's Agent reserves the right to order the removal of the nameboards if not properly maintained.

All nameboards shall be removed within 7 days of the issue of the "Certificate of Completion".

PSAB 5.5 SURVEY ASSISTANTS

A survey assistant will be required from time to time to assist the Employer's Agent Representative.

PSAB 8 MEASUREMENT AND PAYMENT

Delete the contents of this Clause. The appropriate measurement and payment clauses have been included under Clause 8 of SANS 1200 A and PSA.

PSC SITE CLEARANCE

PSC 3 MATERIALS

PSC 3.1 DISPOSAL OF MATERIAL

Add the following:

"The Contractor shall obtain his own dumping sites for the disposal of material and all transport costs shall be included in the rates tendered for the various clearance items."

PSC 5 CONSTRUCTION

PSC 5.1 AREAS TO BE CLEARED AND GRUBBED

Add the following:

“Notwithstanding the above, the Employer’s Agent may, where particular areas are scarcely vegetated, order that the clearing and grubbing operation be totally or partially omitted, in which case no payment will be made under this section.

Payment will then only be made for excavation included under the relevant earthworks section.”

PSC 5.5 RECLEARING OF VEGETATION

Add the following:

“Except if otherwise agreed, where areas have to be re-cleared on the written instruction of the Employer’s Agent, such re-clearing shall be carried out at the Contractor’s own cost and the Contractor is advised therefore, not to clear areas at such an early stage that re-clearing may become necessary.”

PSC 5.6 CONSERVATION OF TOPSOIL

Add the following:

“Conservation of topsoil, together with grass, roots and chipped mulch shall be applicable. Stockpiling of topsoil will be allowed on Site in specific locations indicated by the Engineer. Topsoil shall not be stockpiled higher than 2,0m. Care shall be exercised to prevent the compaction of topsoil in any way especially by vehicles travelling over such material.”

PSC 8 MEASUREMENT AND PAYMENT

PSC 8.1 BASIC PRINCIPLES

Add the following:

"The thickness layer that will unavoidably be stripped during clearing of vegetation will be taken as 100mm. This implies that levels used in earthworks quantity calculations shall be 100mm lower than the original levels excluding stripping of topsoil to stockpile where applicable.”

Add the following:

"Levels to be used for earthworks quantity calculations will be surveyed once the clearing operations have been completed."

PSC 8.2 PAYMENT

PSC 8.2.1 Clear and grub

Replace the first line with the following:

"The areas designated by the Employer’s Agent to be cleared and grubbed will be measured in square metre or to the nearest square metre or,”

Delete "(except where 8.2.9 is applicable)" in the seventh line of this Clause.

Add the following:

"The tendered rate shall also cover the cost of loading, transporting and disposing of all rubble and other unwanted debris encountered in road reserves or along service routes."

Replace the heading of sub-clause 8.2.5 with the following:

"PSC 8.2.5 Take down and re-erect existing fences……..Unit: m

Add the following to sub-clause 8.2.5:

"The rate shall further cover the cost to reinstate the fences to their original status, as well as for all new material in so doing.

For security fencing, the rate shall include for the construction of a concrete beam (300mm x 500mm deep)."

PSC 8.2.8 Demolish and remove structures/buildings and dismantle steelwork, etc. .....Unit: Sum

Amend the second paragraph of clause 8.2.8 to read:

"The rate shall allow, where applicable, for all safety equipment, protective clothing, working in a confined space, hoisting equipment, access, communications including disposing."

PSC 8.2.9 Transport material and debris to unspecified sites and dump

Delete this sub-clause.

Notwithstanding the fact that a disposal site will not be designated by the Employer's Agent, the transportation of all material and debris generated by any clearing and grubbing operations, including the demolishing of structures, will not be measured for payment."

"PSC 8.2.10 Remove topsoil to nominal depth of 150 mm, stockpile and maintain .....Unit: m^3

Replace the heading and contents of sub-sub-clause 8.2.10 with the following:
The rate shall cover the cost of removing the topsoil where ordered, together with such vegetation and small roots as may occur within the specified depth, for loading, transporting to designated area on site, for stockpiling, for maintaining and wetting (dust control) the stockpile for the full duration of the Contract.

"PSC 8.2.11* Apply weed killer .....Unit : m^2

The unit of measurement shall be square metre of area ordered to be treated.

The rate tendered shall cover the cost of procuring a suitable weed killer, the cost of providing all equipment and labour necessary to apply the weed killer, as well as the cost of applying the weed killer in accordance with the requirements of the supplier."

PSD EARTHWORKS

PSD 2 INTERPRETATIONS

PSD 2.1 SUPPORTING SPECIFICATIONS

Replace sub-clause 2.1.2 with the following:

"PSD 2.1.2: Any of the other SANS 1200 Specifications may form part of the Contract Documents."

PSD 2.3 DEFINITIONS

Replace the word and the definition for "borrow" with the following:

"**Borrow material**: Material, other than material obtained from excavations required for the Works, obtained from sources such as borrow pits or the authorised widening of excavations. 'Borrow' shall have a corresponding meaning."

Replace the definition for "specified density" with the following:

"**Specified density**: The specified dry density expressed as a percentage of modified AASHTO dry density."

Replace the definition for "stockpile" with the following:

"**Stockpile** (verb): The process of selecting and, when necessary, loading, transporting and off-loading material in a designated area for later use for a specific purpose."
Add the following definitions*:*

"**Commercial Source**: A source of material provided by the Contractor, not the Employer, and including any borrow pit, provided by the Contractor.

Fill: An embankment or terrace constructed of material obtained from excavations or borrow pits.

Fill (material): Material used for the construction of an embankment or terrace.

Roadbed: The natural in situ material on which the fill, or in the absence of fill, the pavement layers, are constructed."

Selected Fill: Material that complies with the requirements of 3.2.3 of SANS 1200 D and PSD 3.2.3."

PSD 3 MATERIALS

PSD 3.1 CLASSIFICATION FOR EXCAVATION PURPOSES

PSD 3.1.1 Method of Classifying

Add the following:

"The classification of material other than 'soft excavation' shall be agreed upon before excavation may commence. The Contractor shall immediately inform the Employer's Agent if and when the nature of the material being excavated changes to such an extent that a new classification is warranted for further excavation. Failure on the part of the Contractor to advise the Employer's Agent in good time shall entitle the Employer's Agent to reclassify, at his discretion, such excavated material."

PSD 3.1.2 Classes of excavation

Notwithstanding the provisions of this sub-clause no distinction will be made between soft and intermediate excavation. All excavation, other than in hard rock excavation, shall for measurement and payment purposes be classified as soft excavation.

All materials encountered in any excavation for any purpose including restricted excavation will be classified as follows:

(a) Hard rock excavation

Hard rock excavation shall be excavation in material (including undecomposed boulders exceeding 0.17 cubic metres in individual volume) that cannot be efficiently removed without blasting, wedging and splitting, or hydraulic hammers.

This classification includes materials such as:

- solid unfractured rock occurring in bulk
- solid ledges thicker than 200mm
- igneous rock intrusions
- cemented sedimentary rocks.

(b) Soft excavation

Any material which can be removed by bulldozers or backhoes, shall be classified as soft excavation.
Soft excavation shall be material not falling into the category of hard rock excavation.

PSD 3.2.1 Material suitable for embankments and terraces

Add the following to paragraph (b):

Provided sufficient fines are mixed with the rock to ensure a dense compacted mass can be achieved.

PSD 3.2.3 Material Suitable for Backfill or Fill against Structures

Replace the contents of this sub-clause with the following:

"Material used for backfill behind structures shall generally be the material excavated, subject to the following conditions:

(a) The material shall not contain an excessive number of stones retained on a 50 mm sieve; and
(b) The material shall not contain large clay lumps that do not break up under the action of the compaction equipment; and
(c) The liquid limit of the material shall not exceed 40, neither shall the PI exceed 18.
(d) The minimum compaction shall be 93% of modified AASHTO maximum density."

PSD 3.3 SELECTION

PSD 3.3.1 General

Replace the second paragraph with the following:

"The Contractor shall deal selectively with materials from all excavations to ensure that no acceptable backfill or bedding material is contaminated by material unfit for use. No additional payment shall be made in this regard and all costs related to the above selection process shall be included in the applicable payment items. Should useful material be contaminated to such an extent that it is regarded as unfit for use the Contractor shall at his own cost dispose of this material and replace it with material of an equivalent standard to the acceptable in situ material."

PSD 3.3.2 Backfilling and embankments

With reference to the last line of this sub-clause the material to be used for backfill shall be either 15MPa/19 concrete or material complying with 3.2.2 compacted in 150mm layers to 90% of modified AASHTO maximum density, as ordered on site.

"PSD 3.3.3* Selection in Excavations and Borrow Pits

Approval of a borrow area for a certain purpose does not necessarily mean that all the material in that area is suitable for the specified purpose. It does mean that the borrow area contains some suitable material. The onus shall rest on the Contractor to ensure that only material that is indeed suitable is removed and used for the specified purpose.
When the Contractor has to select excavated material for a specific purpose, the above provisions relating to borrow areas shall apply *mutatis mutandis* to excavations.

The Contractor shall not waste or contaminate material that has been selected for a specific purpose."

PSD 4 PLANT

PSD 4.4 DETECTORS

Replace the contents of sub-clause 4.4 with the following:

“The Contractor shall, for the purposes of detecting and locating underground services in accordance with the provisions of Sub-clause 5.4 of SANS 1200 A and Sub-clause 5.1.2 of SANS 1200 D, at its own cost, provide and use detecting equipment which is suitable for the detection of underground cables and pipes.”

PSD 5 CONSTRUCTION

PSD 5.1 PRECAUTIONS

PSD 5.1.1 Safety

PSD 5.1.1.1 Barricading and lighting

Replace “Machinery and Occupational Safety Act, 1983 (Act 6 of 1983)” with “Occupational Health and Safety Act, 1993 (Act 85 of 1993) and Construction Regulations 2014”.

PSD 5.1.1.2 Safeguarding of excavations

Replace “Machinery and Occupational Safety Act” with“ Occupational Health and Safety Act, 1993 (Act 85 of 1993) and Construction Regulations 2003”.

Add the following to paragraph (b) (1):

"Payment for supporting the sides of excavations and trenches shall be deemed to be included in the rates tendered for excavations. No separate payment will be made in this regard and it will be the Contractor's responsibility to ensure the safety and stability of all excavations.

Where trenches have to be widened to accommodate manholes, junction boxes, etc., the cost of supporting the vertical sides of such additional excavations will be deemed to be included in the rates tendered for excavation."
Add the following to paragraph (b) (2):

"The slope of the sides of an excavation or trench may never be steeper than 60° to the horizontal and all costs incurred to slope the sides of an excavation or trench will, irrespective of the angle of the slope, be deemed to be included in the rates quoted for excavation."

PSD 5.1.1.3 Explosives

Replace the contents of this Clause with the following:

"The use of explosives is prohibited on this Contract."

PSD 5.1.2 Existing services

PSD 5.1.2.2 Detection, location and exposure

Replace the contents of sub-clause 5.1.2.2 with the following:

"The exposure by the Contractor of underground services, as required in terms of Sub-clause 5.4 of SANS 1200 A and PSA 5.4 shall be carried out by careful hand excavation at such positions and to such dimensions as are agreed to by the Employer's Agent.

Unless otherwise instructed or agreed by the Employer's Agent, no service shall be left exposed after its exact position has been determined and all excavations carried out for the purposes of exposing underground services shall be promptly backfilled and compacted to the following densities:

(a) In roadways : 95% Mod AASHTO density; and
(b) In all other areas : 93% Mod AASHTO density.

Where hand excavations to expose underground services have to be carried out in roadways, the Contractor shall reinstate the road layerworks in accordance with the provisions of Sub-clause 5.9 of SANS 1200DB.
Payment in respect of the exposing of the services by means of hand excavation as described above shall be deemed to be covered by the rates tendered under items PSA 8.8.4(c)."

Payment in respect of the reinstatement of layerworks in road ways will be made in accordance with PSDB 8.3.6.1 and sub-clause 8.3.6.1 of SANS 1200 DB."

PSD 5.1.2.3 Protection of cables

Replace Sub-clause 5.1.2.3 with the following:

"5.1.2.3 Protection during Construction

Further to the requirements of PSA 5.4.2 and Sub-clause 5.4.2 of SANS 1200A, major excavating equipment and other Plant shall not be operated dangerously close to Known Services. Where necessary, excavation in close proximity to Known Services shall be carefully carried out with suitable hand tools, excluding picks wherever their use could damage the services. No additional payment will apply to such more difficult work.

Should any service not being a Known Service be discovered or encountered during the course of the Contract, the Contractor shall, in addition to complying with the requirements of Sub-clause 5.4.2 of SANS 1200A (as amended), immediately notify the Employer's Agent thereof and implement such measures as will prevent damage of such service or, if it was damaged in the course of discovery, will prevent and minimise the occurrence of any further damage occurring."

Replace Sub-clause 5.1.2.4 with the following:

PSD 5.1.2.4 Negligence

The Contractor shall not repair any service damaged. Where the damage is the result of the Contractor's negligence he shall bear all costs of the repairs undertaken by the owner, as well as the costs of associated damages."

PSD 5.1.3 Stormwater and groundwater

Add the following:

"The Contractor shall, where applicable and at the earliest practicable opportunity, install the permanent drainage specified or shown on the Drawings and shall at his own cost provide the temporary drainage required to protect the Works."

PSD 5.1.6 Road traffic control

Delete the contents of Sub-clause 5.1.6 and replace with the following:

“The provisions of PSA 5.10 shall apply as applicable. Where the work affects the operation or safety of public road traffic, vehicular and/or pedestrians in addition, to complying with the requirements of 5.1.1.1, the Contractor shall provide, erect and maintain traffic signs, personnel and equipment that conform to the requirements, layout and guidelines of the “South African Road Traffic Signs Manual”, as well as the Site Manual entitled “Safety at Roadworks in Urban Areas” as published by the Department of Transport, in number and in layout, as shown in these manuals. Where necessary and as shown in these manuals, warning lights, an adequate number of flagmen and appropriate barricades, clearly visible to oncoming traffic at all times of the day and night shall be provided. If steel drums are used for this purpose, they shall be ballasted with soil, sand or stones and the outside shall be whitewashed and provided with retro-reflective material (in the case of tape, of minimum width 10mm), red on the left-hand side facing oncoming traffic and white on the right-hand side. The drums shall be maintained in a clean and effective condition and no stones shall be placed on them.

No direct payment will be made for the cost of providing and complying to the aforementioned. Payment will be deemed to be covered by the rates and sums tendered and paid for the various items of work included under the Contract.”

PSD 5.2 METHODS AND PROCEDURES

PSD 5.2.1 Site preparation

PSD 5.2.1.2 Conservation of topsoil

Add the following:

“Topsoil ordered to be stripped and conserved for later use shall be stockpiled in a manageable heap where designated by the Employer’s Agent. The material together with such vegetation and small roots as may occur within the specified depth shall be stripped, loaded, transported to stockpile within a freehaul distance of 0,5 km, maintained and wetted (dust control) for the full duration of the Contract or until use.”

PSD 5.2.2 Excavation

PSD 5.2.2.1 Excavation for General Earthworks and for Structures

Add the following to paragraph (b):

"When the nature of the material precludes the above procedure, additional excavations shall be carried out to provide working space for the erection of formwork. In general, payment will be made for excavating a working width of 600mm, but the Contractor may excavate a greater working width at no additional cost to the Employer."
Replace the first sentence of paragraph (e) with the following*:*

"Where excavations have been carried below the authorised levels, the Contractor shall backfill such excavations to the correct level with approved gravel material compacted to 98% of modified AASHTO density or to the density of the surrounding material, whichever is the higher density.

Where excavations for structures have been carried out in hard material, the Employer's Agent may direct that over-excavation be backfilled with weak concrete if there is a danger of settlement or differential settlement of the foundations.
Where the sides of excavations against which concrete is to be cast have been over-excavated or have collapsed partially, the Contractor shall retrim the excavations if necessary and, unless other remedial measures are agreed to by the Employer's Agent, shall cast the concrete for the structure, including the additional concrete that may be required as a result of the over-excavation or partial collapse. The cost of the additional concrete or remedial measures shall be for the Contractor's account."

PSD 5.2.2.3 Disposal

Replace the second sentence with the following:

"The Contractor shall, provide all necessary spoil sites for the spoiling of all surplus and unsuitable materials and shall make the necessary arrangements with the owner of the site where the material is disposed of, and pay all charges and levies as may be applicable for the use of such spoil sites.

Every spoil site provided by the Contractor shall be approved by the local authority in whose area it is located, and the spoiling shall comply with the applicable statutory and municipal regulations as well as the requirements of the owner of the spoil site.

Payment to the Contractor in respect of locating and making arrangements for suitable spoil sites and spoiling material at the such sites will be made in accordance with the provisions of Sub-clause PSD 8.3.15."

"PSD 5.2.2.4* Selection and Stockpiling

Approval or designation of the material in a particular borrow pit or excavation for a particular purpose does not imply that all the material in the borrow pit or excavation is suitable for the particular purpose for which the said approval or designation relates, nor that all material in the borrow pit or excavation should be used for the particular purpose. The Contractor shall select suitable material from that borrow pit or excavation, discard unsuitable material and reserve material for other purposes as necessary.

The Contractor shall organise and carry out its operations in such a manner as will prevent the contamination of suitable embankment, fill and backfill material with unsuitable materials. Any excavated material which becomes, in the Employer's Agent's opinion, unsuitable for use in embankments, fills or backfill as a result of contamination, shall be disposed of in a manner acceptable to the Employer's Agent and shall be replaced by the Contractor with materials acceptable to the Employer's Agent, all at the Contractor's cost.

When required, or when ordered by the Employer's Agent, material shall be temporary stockpiled at sites indicated by the Employer's Agent for later use. The additional costs of stockpiling material shall be paid to the Contractor in accordance with the provisions of Sub-clause PSD 8.3.14."

PSD 5.2.3 Placing and Compaction

PSD 5.2.3.1 Embankments

Omit "98% in the case of non-cohesive soil" and substitute with "100% in the case of non-cohesive soil".

"PSD 5.2.3.3* the material of each area of fill shall, unless otherwise approved, be deposited in layers of thickness, before compaction, not exceeding 150 mm. The material shall be spread to form a layer that is approximately uniform thickness, and graded over the whole area of the fill site.

Each layer shall be compacted at OMC to a density of at least 93% of modified AASHTO density in the case of cohesive soil or 100% in the case of non-cohesive soil. Should the material be too wet, owing to rain or any other cause, it shall be harrowed and allowed to dry out to the correct moisture content before compaction is undertaken.

The contractor shall ensure that stormwater will at all times be discharged uniformly over the full fill area or through

specially prepared and protected drainage ditches to prevent scouring of the slopes."

"PSD 5.2.3.4 Backfilling over-excavation and overbreak

The material to be used shall comply with 3.2.1, except that the maximum particle size shall not exceed $^{2}/_{3}$ of the thickness of the layer being placed, and shall be compacted to at least 93% of modified AASHTO maximum density.

PSD 5.2.4.3 Grass or other vegetation

Add the following Sub-clauses:

"Hydroseeding

The following materials shall be used in hydroseeding:

(a) Fertilizer

The type of fertilizer to be used shall be 2:3:2 (22 + 2N) and superphosphate.

(b) Grass seed

The following seed mixture at an application rate of not less than 45 kg of seed mixture per hectare, shall be used for tendering purposes, the final mix proportions shall be given to the successful Contractor:

10 kg	Cynodon dactylon
10 kg	Festuca rubra
6 kg	Lolium multiflorum
6 kg	Agrostis tenius
3 kg	Trifolium subterranean
4 kg	Dactylis glomerata
6 kg	Serredella
45 kg	Per hectare

Cellulose pulp shall be added to the hydroseeding mix at a rate of 25 kg of pulp per kilolitre of water used, except where otherwise instructed in respect of flat slopes.

Hydroseeding shall be carried out with an approved hydroseeding machine at a rate of application of not less than 45 kg of seed mixture per hectare, unless otherwise specified in the Project Specifications.

If the Contract starting time and program is such that the work cannot be executed within the Contract period, then the work shall be executed during the 12 month maintenance period.

Sods

(a) Grass sods

Grass sods shall be 100% Cynodon dactylon. It shall be vigorous, well rooted, healthy turf, free from disease, insect pests, weeds, other grasses, stones and other harmful matter.

(b) Cutting, lifting and handling of grass sods

(1) Prior to cutting and lifting, the sod shall be inspected and approved in its original location by the Landscape Architect. Under no circumstances shall any sodding work be done unless weather and soil conditions are suitable, as determined by the Landscape Architect.

(2) Sods shall be cut by an approved mechanical sod cutter and cut to a thickness of not more than 40 mm nor less than 25 mm. Sod pieces shall be cut to 0,5 m² in area. The width shall be 300 mm or 450 mm.

(3) Sod shall be rolled or folded prior to lifting. Handling of sods shall be done in such a manner that will prevent tearing, breaking, drying or any other damage. All damaged pieces of sod shall be rejected by the Landscape Architect.

(4) Sods shall be installed in place on the Site not more than 48 hours after cutting.

(c) Sodding procedures

(1) Rolling: Rolling shall be done in 2 (two) directions perpendicular to each other. The roller shall be a hand roller weighing not more than 90 kg or less than 70 kg. Roll in such a manner so as to eliminate the necessity of

walking on the finished grade.

(2) After rolling, check finished grading for depressions, lumps, or any other irregularities. Repair and re-roll all areas as directed by the Landscape Architect.

(3) Moisten soil surface immediately before sod laying, as directed by the Landscape Architect. Use a fine spray that will not cause a disturbance of the finished surface.

(4) Lay sod parallel to the direction of the slope and in a manner that will permit joints to alternate.

(5) Fit sod pieces together tightly so that no joint is visible, and tamp sod firmly and evenly by hand. Peg sod where slope is greater than 1:3.

(6) During sod laying operation, protect all sods as it is laid and finished, from depressions, lumps or any other irregularities in the finished surface.

(7) After sodding is complete and has been approved, roll in the same manner as described above and to the satisfaction of the Landscape Architect.

(8) Water all sodded areas immediately after final rolling with a fine spray to a depth of 100 mm.

(d) Scope of maintenance work

(1) Maintenance on the grassing shall begin when the planting commences and shall continue until Final Acceptance (three months after issue of Take-Over Certificate).

(2) Maintenance shall consist of mowing, watering, weeding, fertilising, disease and insect pest control, aerating, replacement of unacceptable material, topdressing, and any other procedure consistent with good horticultural practice.

(3) Maintenance personnel shall visit the Site on a minimum weekly basis during the three month maintenance period. A proposed maintenance schedule shall be submitted by the Contractor to the Landscape Architect for approval. Prior to any maintenance work commencing, all defects that may become apparent during this period shall be thoroughly investigated and rectified by the Contractor to the Landscape Architect's satisfaction.

(4) The Contractor shall be responsible for the use of all materials, labour and equipment, and any injury to plant material caused by such material, labour and equipment, shall be corrected and repaired by the Contractor at no additional expense to the Client.

(e) Establishment and maintenance of the grass

(1) All planted or sodded areas shall be adequately watered at frequent and regular intervals in order to ensure proper growth until the area has established an acceptable cover and, thereafter, until the beginning of the Maintenance Period. The amount and frequency of watering shall be subject to the Landscape Architect's approval.

(2) The Contractor shall mow the grass on all areas that have been grassed to maintain an average height of 30 mm or when instructed by the Landscape Architect, until the end of the Maintenance Period. All grass cuttings shall be collected and disposed of if so directed by the Landscape Architect. Weeds shall be controlled by means of pulling, cutting, or any other approved means.

(3) The Contractor shall top dress areas planted with sods once during the Maintenance Period with approved topsoil mix and fertilizer appropriate to negate any deficiency, according to the growth and colour of the grass.

(4) Any bare patches where the plant material has not taken, or where it has been damaged, shall be recultivated, planted or sodded at the Contractor's own expense.

(5) All plant areas shall have acceptable cover as defined below at the end of the Maintenance Period.

(6) An acceptable vegetation cover shall mean that no less than 75% of the area planted shall be covered and that there shall be no bare patches of more than 500 mm in maximum dimension.

(7) The Maintenance Period on the grassing shall last three (3) months.

(f) Weeding

Keep all planting areas free from weeds and undesirable grasses, by a method and materials approved by the Landscape Architect.

(g) Topdressing

All lawn areas shall be top dressed as necessary, to remove any minor depressions and visible joints in the grass sods. Topdressing shall be as previously specified."

"PSD 5.2.4.6* Finishing off of internal faces of pond walls

Where the internal faces of the pond walls and floors are unavoidably rough (e.g. where the face is in a rock cut), the Contractor shall spread moist screened material excavated from the site over these areas to a depth of at least 50mm, such that the tolerances specified will be met, and tamp the material down. The material shall be screened through a sieve with 10mm openings. Payment for this work will be made in terms of sub-clauses PSD 8.3.17 and PSD 8.3.18.

No payment will be made for preparing or rectifying the surface area of fills."

PSD 5.2.5 Transport for Earthworks

Replace the contents of Sub-clause 5.2.5 with the following:

"The transport and haul of all excavated materials, as well as material imported from commercial sources or borrow pits selected by the Contractor, irrespective of the distance and source, shall be deemed to be freehaul, the cost of which shall be included in the Contractor's tendered rates and prices for the excavation of the materials. No separate compensation shall apply for the transportation of excavated materials."

PSD 6 TOLERANCES

PSD 6.1 POSITIONS, DIMENSIONS, LEVELS, ETC.

Add the following:

"PSD 6.1(c) Bulk earthworks

The tolerances applicable to excavations for structural foundations (degree of accuracy II), as specified in Sub-clause 6.1(a) shall apply, provided no ponding areas or adverse grades result."

PSD 7 TESTING

PSD 7.2 TAKING AND TESTING OF SAMPLES

Replace the contents of this sub-clause with the following:

"The Contractor shall arrange with the approved independent laboratory engaged by the Contractor in terms of sub-clause C3.5.1.22, to carry out sufficient tests on a regular basis as agreed between it and the Employer's Agent to determine whether the degree of compaction, and, where applicable, the quality of materials used, comply with the Specifications and shall submit the results of these tests to the Employer's Agent in a form approved by him.
The compaction requirements for fills shall be deemed complied with when at least 75% of the dry-density tests on any lot show values equal to or above the specified density and when no single value is more than five percentage points below the specified value."

PSD 8 MEASUREMENT AND PAYMENT

PSD 8.3 SCHEDULED ITEMS

PSD 8.3.1 Site Preparation

Replace sub-clauses 8.3.1.1 and 8.3.1.2 with the following:

"Where Site preparation such as clearing, grubbing, the removal of large trees or the removal and stockpiling of topsoil or surface obstructions are required, the provisions and scheduled items of SANS 1200 C shall apply."

PSD 8.3.2 Bulk Excavation

Replace the contents of sub-clause 8.3.2 with the following:

"PSD 8.3.2.1 Excavate in all materials and use for embankment fills, berms, backfill or dispose, as ordered
Unit: m^3

The unit of measurement shall be the cubic metre measured in place in accordance with Sub-clause 8.2 of SANS 1200 D.

Separate items will be scheduled for each type of excavation or structure and for each type or manner of disposal of excavated material.

The tendered rates shall cover the cost of excavation in all material, complying with all the precautions required in terms of Sub-clause 5.1 of SANS 1200 D (as amended) in addition to the cost of excavation, for basic selection and keeping selected material separate, for loading, transporting within the applicable freehaul distance, off-loading at the spoil or stockpile site, maintaining and finishing the spoil site, spreading, backfilling, watering, compacting as specified on the Drawings, final grading, shaping and trimming, for complying with the requirements for tolerances, providing for testing, finishing and tidying, all in accordance with the specifications.

The rate shall further also provide for backfilling any over-excavation or overbreak in accordance with the requirements of PSD 5.2.3.3."

PSD 8.3.2.2 Extra-over Items PSD 8.3.2.1 for:

(a)	Hard rock excavation	Unit : m^3
(b)	Boulder excavation, Class A	Unit : m^3
(c)	Boulder excavation, Class B	Unit : m^3

The rate shall cover the additional cost of the operations enumerated in Sub-clauses 8.3.2.1 above for any portion of the excavation that is classified as hard rock, boulder excavation class A or boulder excavation class B as applicable.

NOTE:

The rates tendered for Sub-clauses 8.3.2.1 and 8.3.2.2 above shall also provide for backfilling any over-excavation or overbreak in accordance with the requirements of PSD 5.2.3.3."

PSD 8.3.3 Restricted excavation

Replace the heading of sub-clause 8.3.3 (a) and the contents of the first two paragraphs with the following:

"PSD 8.3.3(a) Excavate for restricted foundations, toe walls, footings and cut-off drains, as if in soft material, and use for fills, berms, backfill or dispose, as ordered .....Unit: m^3

Separate items will be scheduled for each category of excavation and for each class or manner of disposal of excavated material.

All restricted excavation shall be measured in cubic metre of material excavated, measured in accordance with Sub-clause 8.2 of SANS 1200D.

Replace "in 5.2.2.1 – 5.2.2.3 (inclusive)" at the end of sub-clause (a) with "in Clauses 5.2.2.1 to 5.2.2.4 (inclusive)."

Delete Clause 8.3.3(b) (1) as well as any reference to intermediate excavation in sub-clause (b). For the purposes of measurement and payment, excavation other than hard rock and boulder excavation will not be separately classified (refer PSD 3.1.2)."

Add the following sub-clauses at the end of clause 8.3.3:

"PSD 8.3.3(c)*Extra over 8.3.3(a) for hand excavation where ordered.....……Unit: m^3

This item shall apply to hand excavation ordered by the Employer's Agent or when the Employer's Agent considers that, owing to circumstances, excavation by mechanical excavators is not practicable. It shall not apply to hand excavation for trimming or finishing an excavation made by mechanical means.
The rate tendered shall cover the additional cost, extra over that provided for under 8.3.3(a), for carrying out restricted excavation by hand tools where ordered by the Employer's Agent.

The volume shall be computed from the dimensions specified, shown on the drawings, or ordered by the Employer's Agent.

Note:

Normal handwork required to clean and trim the sides and bottoms of mechanically completed restricted excavations will not qualify for payment in terms of this Clause."

"PSD 8.3.3(d)* Extra over 8.3.3(a) for soilcrete backfill where ordered ..... Unit: m³

The rate tendered shall cover the additional cost, extra over that provided under 8.3.3(a), for backfilling the working space volume with soilcrete consisting of 5% cement by mass and selected material, for all labour, plant, equipment, water, material, selection, mixing, placing, compaction and vibration, as well as for protecting the structure.

The volume shall be computed from the dimensions specified, shown on the drawings, or as ordered by the Employer's Agent.

Note:

Over excavation beyond that allowed for, will not qualify for payment.

PSD 8.3.4 Importing of Materials

Delete sub-clause 8.3.4(a) in totality.

PSD 8.3.6 Overhaul

Delete Sub-clause 8.3.6.

No overhaul will be paid on material for the purposes of this Contract and all costs for transporting material shall be included in the applicable tendered rates and amounts.

PSD 8.3.8 Existing services

PSD 8.3.8.1 Location

Replace item 8.3.8.1 with the following:

"8.3.8.1 Hand excavation for locating and exposing existing services:

(a) In roadways ..... Unit: m³
(b) In all other areas ..... Unit: m³

The unit of measurement shall be the cubic metre of material excavated, measured in place according to the authorised or actual dimensions of the excavation, whichever is the lesser.

The tendered rates shall cover the cost of excavating in all materials by means of hand tools within authorised dimensions and at locations approved by the Engineer in accordance with the requirements of sub-clause PSA 5.4.1 for all precautionary measures necessary to protect the services from damage during excavation and backfilling, and for subsequent backfilling and compacting. Compaction of material in all areas except in roadways shall be to 90% of the modified AASHTO density.

The tendered rate for hand excavation in roadways shall include compensation for compacting excavated or selected backfill material to 93% of modified AASHTO density. Reinstating layerworks and surfacing shall be measured and paid for in terms of SANS 1200 DB.

The tendered rates shall also include for keeping excavations safe, for dealing with surface and subsurface water, for

removing surplus excavated material from the site, for transporting all material, and for supplying adequate supervision during both excavation and backfilling operations."

PSD 8.3.10 Topsoiling

Change the unit to "m^3" and replace the contents of this item with the following:

"The unit of measurement shall be the cubic metre and the quantity shall be calculated from the authorised dimensions.

The tendered rate shall include loading of the topsoil from stockpiles, transporting it regardless of distance involved, and off-loading, spreading, shaping and lightly compacting the topsoil."

PSD 8.3.11 Grassing or other vegetation cover

Replace the entire contents with the following:

PSD 8.3.11.1 Planting of grass sods ..... Unit : m^2

The tendered rate shall include full compensation for planting and maintenance in accordance with the requirements of PSD 5.2.4.3.

PSD 8.3.11.2 Hydroseeding ..... Unit : m^2

The tendered rate shall include full compensation for the seed mixture, for furnishing cellulose pulp and mixing it with seed and water and applying the mixture, watering, weeding, re-hydroseeding bare patches, and for any other work except mowing, which may be necessary for establishing an acceptable cover and maintaining the grass for a period of three months after an acceptable cover has been established.

PSD 8.3.12 Road traffic signs and markings

Delete the contents of this Sub-Clause.

The provisions of PSA 5.10 shall apply.
Add the following new clauses:

"PSD 8.3.14* Extra over items 8.3.2.1 and PSD 8.3.3 for temporary stockpiling ..... Unit: m^3

The unit of measurement shall be the cubic metre of material from necessary excavations, temporarily stockpiled by the Contractor on the instructions of the Employer's Agent, before being used in embankments, fills or backfill. Measurements shall be taken in place in compacted embankment, fills or backfill as the case may be.

The tendered rate shall include for the costs, additional to those provided for in PSD 8.3.2.1and PSD 8.3.3 of off-loading, forming and maintaining the stockpile for as long as is required, reloading and transporting regardless of the distance involved from the stockpile.

Payments to the Contractor under this item will only be made in respect of that material stockpiled on the instructions of the Employer's Agent (which instruction shall state specifically that payments for such stockpiling will be paid for under this item) and no payments will be made to the Contractor under this item in respect of materials stockpiled by the Contractor on its own volition, nor for materials necessarily stockpiled by the Contractor in consequence of the sequence of operations adopted by it in the course of executing the Works, whether such stockpiling was avoidable or otherwise."

"PSD 8.3.15* Extra over items PSD 8.3.2 and PSD 8.3.3 for disposing of spoil material on a site provided by the Contractor ..... Unit: m^3

The unit of measurement shall be the cubic metre, measured in accordance with Sub-clause 8.2 of SANS 1200D, of surplus and/or unsuitable material disposed of, on the instruction of the Employer's Agent, at a spoil site or spoil sites provided by the Contractor.

The tendered rate shall include full compensation for the additional cost of providing a spoil site or other means of disposing of surplus spoil material, for transporting the material regardless of the distance involved, for acceptance charges for such material and for all other incidental costs to dispose of the spoil material."

"PSD 8.3.16* Excavate and dispose of unsuitable material from sides or bottom of restricted foundations, footings and trenches where ordered and replace with:

(a) Selected material complying with sub-clause 3.2.2 of SANS 1200 ME compacted to 90% of modified AASHTO maximum density Unit: m³
(b) 15MPa/19 concrete ..... Unit: m³

Separate items will be scheduled for each type of excavation, source of backfill material and manner of backfill.
The rates tendered shall cover the cost of excavating the unsuitable material to the extend ordered by the Employer's Agent, disposing of the material at a spoil site provided by the Contractor and subsequent backfilling of the excavation using selected material or concrete as ordered.

NOTE:

The work required to construct the selected layer beneath areas to be concrete lined will be measured for payment under (a) as applicable. The unit of measurement shall be the cubic metre of selected material placed and compacted. Any excavation required to accommodate the concrete lining will be deemed to be covered by sub-clause 8.3.4 of SANS 1200 DM."

"PSD 8.3.17* Trim and compact internal pond wall and floor surface areas to leave a smooth surface ..... Unit : m²

The rate tendered shall cover the cost of providing all labour, plant and equipment to trim and compact the surfaces of the internal wall faces and floor areas of the ponds to leave a smooth surface, free of all sharp projections and localised depressions all in accordance with the tolerances specified, as well as the cost of providing soil to fill depressions (excluding screened material measured under PSD 8.3.15) and watering of the surface as required."

"PSD 8.3.18* Extra over PSD 8.3.17 for screening and placing material over unavoidably rough surfaces in rock cuts Unit :m³

The quantity measured for payment shall be calculated using the area ordered to be covered multiplied by a nominal depth of 50mm.

The rate tendered shall cover the cost of locating and screening suitable material to comply with the requirements of PSD 5.2.4.6, loading, transporting, unloading, placing and spreading the material, as well as the cost of disposing of any excess or screened out oversize material."

PSDB EARTHWORKS (PIPE TRENCHES)

PSDB 3 MATERIALS

PSDB 3.1 CLASSES OF EXCAVATION

Delete the contents of Clause 3.1 and replace with the following:

"The classification shall be as described in PSD 3.1".

PSDB 3.5 BACKFILL MATERIAL

Delete the contents of Clause 3.5(b) and replace with the following:

“Materials used in the reinstatement of trenches beneath or within a new roadway, up to underside of the road layers, shall be sub base quality material conforming to SANS 1200 ME compacted in 150mm layers to 95% Modified AASHTO maximum density. The area subject to loads from road traffic shall be held to apply for a width of 150 mm beyond the back of kerb.”

Add the following paragraphs to sub-clause 3.5:

"(c) Cement-stabilised backfilling

Backfilling shall, where directed by the Engineer, be stabilised with 5% cement. The aggregate shall consist of approved soil or gravel containing stones not bigger than 38 mm and with a plasticity index not exceeding 10.
The soil or gravel shall be mixed with 5% cement and shall be compacted in layers of 100 mm thick to 90% of modified AASHTO density.

(d) Soilcrete backfilling

The aggregate for soilcrete shall be mixed with 5% cement and shall consist of approved soil or gravel, usually from excavated material, containing stones not bigger than 38 mm and with a plasticity index not exceeding 10.

The soil or gravel shall be mixed in a concrete mixer with the cement and enough water to acquire a consistency that allows the mixture to be placed with vibrators to fill all voids between the pipe and the sides of the trench. Shuttering shall be used where necessary."

PSDB 3.7 SELECTION

Replace the words “if he so wishes” in the first line of the second paragraph with the words “at his own cost”.
Add the following to sub-clause 3.7:

“Notwithstanding anything to the contrary stated in this sub-clause the Contractor shall, where so ordered, selectively stockpile topsoil, material complying with 3.5, as well as road materials for re-use in terms of 5.9.”

PSDB 5 CONSTRUCTION

PSDB 5.1.2.2 Special water hazards

The Contractor shall take note that no special water hazards are designated. The Contractor shall therefore deal with all water as specified in 5.1.2.1, including flow into trenches due to a high or perched water table and any overland flow.

PSDB 5.1.3 Accommodation of Traffic and Access to Properties

Replace the semi-colon and the word “and” at the end of Sub-clause 5.1.3(a) with a full stop and replace item (b) with the following:

“(b) Where necessary and to achieve compliance with his obligations in terms of the Scope of Work (Clause C3.4.9.5) to provide and maintain pedestrian and vehicular access to properties affected by the Works, the Contractor shall construct and maintain to the satisfaction of the Employer’s Agent, such temporary access roads around, and/or steel or timber bridges over excavations in roads, pavements, entrances or accesses to properties.
Temporary pedestrian access bridges shall be at least 1,2 m wide and temporary access bridges for vehicles shall be at least 3,6 m wide. All temporary access bridges shall be fitted with handrails as well as protective mesh fencing on both sides.

On completion of the work, the Contractor shall dismantle and remove all such temporary constructions and reinstate these areas to their former condition.

No direct payment will be made for the cost of accommodating traffic and providing access to erven and properties. Payment will be deemed to be covered by the various rates tendered and paid."

PSDB 5.2 MINIMUM BASE WIDTHS

Notwithstanding the provisions of this Sub-Clause, the minimum base widths for the various trenches shall be as shown on the Drawings.

PSDB 5.4 EXCAVATION

Add the following:

"Except where otherwise specified, trenches shall be of such a depth that the minimum cover over the pipes shall be 700mm, except at road-crossings, where the minimum cover shall be 1000 mm.

With respect to the length of trench permitted to be excavated, the Contractor shall take note that unless otherwise agreed by the Employer's Agent, not more than 1000m of trench shall be excavated in advance of trench backfill.

Further, no trench may be left open over the period 16 December to 8 January inclusive.

Where trenches have to be excavated under this Contract adjacent to live services / other services laid under other contracts, it may be necessary to shore trenches to prevent damage to the live services / other services. It will be the responsibility of the Contractor to ensure that services constructed under other contracts of live services are not damaged by his operations during the Contract."

PSDB 5.6 BACKFILL

PSDB 5.6.1 General

Replace the first sentence with the following:

"Backfilling of pipe trenches may only commence after the pipe has been laid, firmly bedded in the specified cradle, the blanket placed and compacted as specified and after the pipe has been tested in terms of Clause 7 of SANS 1200 L."

PSDB 5.6.2 Material for backfilling

Replace the last paragraph of this Clause "In areas……backfill" with the following:

"The material for backfilling in areas subject to road traffic loads shall comply with PSDB 3.5."

PSDB 5.6.3 Disposal of soft excavation material

Replace the words "unless otherwise required in the project specification." at the end of this Sub-clause with:
"or to spoil in accordance with the requirements of PSD 5.2.2.3 and Sub-clause 5.2.2.3 of SANS 1200 D, as instructed by the Employer's Agent."

PSDB 5.6.6 Completion of backfilling

Add the following:

"If in the opinion of the Employer's Agent insufficient progress is being made with the backfilling of trenches, the Employer's Agent will be entitled to order than no further excavation takes place until the backfilling operation has caught up."

PSDB 5.7 COMPACTION

PSDB 5.7.1 Areas not subject to Traffic Loads

Add the following sentence:

"All non-cohesive material shall be compacted to 100% MOD AASHTO density."

PSDB 5.7.2 Areas Subject to Traffic Loads:

Delete “98%” in the last sentence and replace with "100%".

Add the following:

"All pipe trenches that fall within the road reserves shall be regarded as areas subject to traffic loads."

“PSDB 5.9.7* Safety

During the time period between pouring the trenchfill into the trench, and the setting of this material, it is imperative that no person or animal be allowed to gain access to the trench. Suitable barricades shall be provided around the trench and a guard placed on duty at the trench until the material sets.

Should the trenchfill not be set by nightfall, safety lamps shall be placed on the barricades. The responsibility for public safety lies with the organisation carrying out the excavation and backfill operations.

PSDB 8 MEASUREMENT AND PAYMENT

PSDB 8.1.1 Replace “along the route of the pipeline” in the third line of Clause 8.1.1 with “as specified in PSDB 5.6.3”.

Replace the contents of sub-clause 8.2.4 with the following:

"No separate items will be measured for shoring. Refer to Item PSD 5.1.1.2 in this regard."

“PSDB 8.2.5* If payment in terms of PSA 8.8.4 has been made to expose an existing service and the excavation involved falls within a proposed trench, the quantity measured for trench excavation shall be reduced accordingly.”

PSDB 8.3 SCHEDULED ITEMS

PSDB 8.3.2 Excavation

(a) Excavate in all materials for trenches, backfill, compact and dispose of surplus material
Unit: m or m^3

Replace the first sentence with the following:

“Items will be provided for various trenches widths as specified and detailed on the Drawings and various depths in increments as specified in the Bill of Quantities.”

Add the following to Clause (a):

“The rate tendered shall also cover the cost of complying with PSDB 3.5, as well as the cost of any disruption or delay in complying with PSDB 5.4 and PSL 5.1.4.

Delete Clause 8.3.2 (b)(1) as well as any reference to intermediate excavation in Clause (b). For the purpose of measurement and payment, excavation other than hard rock excavation will not be separately classified (refer PSDB 3.1).

Add the following new sub-items in 8.3.2 (b):

"(3) Hand excavation where ordered ..... Unit: m³

The rate tendered shall cover the additional cost, extra over that provided for under 8.3.2(a), for carrying out, where ordered by the Employer's Agent and up to a depth of 1,0metre, trench excavation by hand as well as for any inconveniences related to the continuation with machines across and over hand-excavated trenches.

The volume shall be computed from the dimensions specified, shown on the Drawings or ordered by the Employer's Agent.

Normal handwork required to clean and trim the sides and bottoms or mechanically excavated trenches will not qualify for payment in terms of this clause.

(4) Hand backfilling machine excavated trenches where ordered ..... Unit: m³

The rate tendered shall cover the additional cost, extra over that provided for under 8.3.2(a) to, except for compaction which shall be carried out by machine, hand backfill machine excavated trenches where ordered by the Employer's Agent.

The volume shall be computed from the dimensions specified, shown on the Drawings or ordered by the Employer's Agent.

(5) Selective stockpiling of topsoil where ordered..... Unit: m³

The rate tendered shall cover the additional cost, extra over that provided for under 8.3.2 (a), to selectively stockpile topsoil where ordered by the Employer's Agent, including of off-loading, forming and maintaining the stockpile for as long as is required, reloading and transporting within the applicable freehaul distance from the stockpile. The volume shall be computed from the dimensions ordered by the Employer's Agent."

(6) Extra over 8.3.2a. and PSDB 8.3.2a for disposing of spoil material on a site provided by the Contractor.... Unit: m³

The unit of measurement shall be the cubic metre, measured in accordance with Sub-clause 8.2 of SANS 1200D, of surplus and/or unsuitable material disposed of, on the instruction of the Employer's Agent, at a spoil site or spoil sites provided by the Contractor.

The tendered rate shall include full compensation for the additional cost of providing a spoil site or other means of disposing of surplus spoil material, for transporting the material regardless of the distance involved, for acceptance charges for such material and for all other incidental costs to dispose of the spoil material."
Add the following sub-clauses after sub-clause 8.3.2(c):

"(d) Excavate in all materials for valve chambers and the like as detailed on the Drawings, irrespective of depth and backfill around structures:..... Unit: m³

The unit of measurement shall be the cubic metre of material excavated, measured in place according to the authorised dimensions, and excluding the volume of material excavated and paid for under sub-item (a).
The tendered rate shall include for the costs of excavating in all materials, backfilling, compacting, trimming and tidying of the final surface around the structure, disposing of surplus and unsuitable materials within the freehaul distance and where applicable, selecting and keeping separate, excavated material suitable for use as backfill.

(e) Excavate open drains in all materials..... Unit : m³

The tendered rates shall include full compensation for excavating in all materials within the dimensions specified or authorised by the Employer's Agent and to the specified lines and profiles, for the disposal of surplus and unsuitable excavated material where applicable, and in the case of item (d), for backfilling with suitable approved material compacted to 90% of modified AASHTO density around the structures.

(f) Extra-over sub-items (d) and (e) for hard rock excavation ..... Unit: m^3

Measurement and payment shall be in accordance with the provisions of 8.3.2(b) of SANS 1200D (as amended)."

PSDB 8.3.3 Excavation ancillaries:

PSDB 8.3.3.1 Make up deficiency in backfill material

Add the following to sub-clause 8.3.3.1(c):

The rate shall also include for compaction of sub base quality backfill as per PSDB 3.5

PSDB 8.3.3.3 Compaction in road reserves

Replace the contents of this Clause with the following:
"This item shall only apply to the compaction of materials in areas subject to road traffic loads as defined in PSDB 3.5.

The volume will be computed from the length of trench falling within the defined area, the width as shown on the Drawings and the depth from the top of the bedding to the designated level of the underside of the required selected layer, finished verge level etc. as scheduled on the Drawings. The rate tendered shall cover the cost of the additional compactive effort as specified.

Payment for this work will be additional to that covered by 8.3.2(a)."

PSDB 8.3.3.4 Overhaul

Replace the contents of this sub-clause with the following:

"Measurement and payment shall be in accordance with sub-clause PSD 5.2.5."

PSDB 8.3.6.1 Reinstate road surfaces

Replace from "a) Gravel on shoulders …." through to "….Etceteras……Unit: m²" with the following:

(a) Gravel on shoulders and driveways .....m^2
(b) Hot asphalt type IVA (min thickness 40mm) .....m^2
(c) Concrete paving (25/19 MPa) to indicated surfaces 100mm thick .....m^2

Add the following to this Clause:

"For all items the rate tendered shall cover the cost of the supply and placing of the material as specified on the drawings, documented in the specification and called for by the Employer's Agent to reinstate the affected area to at least its original condition. The rate shall further cover the cost of saw-cutting the bituminous surfacing where trenches cross bituminous roads, as well as the cost of repairing any kerbing."

PSDB 8.3.7 Accommodation of Traffic

Delete Sub-clause 8.3.7. The provisions of PSA 5.10 shall apply.

PSDK GABIONS AND PITCHING

PSDK 3 MATERIALS

PSDK 3.1.2 Gabion cages

Replace the last sentence with the following:
"Steel wire used to manufacture the mesh, lacing, bracing and selvedge shall be heavily Galfan coated to Class A according to EN 10244-2 Table 2 and the wire shall further be PVC coated to a nominal thickness of 0, 5 mm.

The properties and tolerances of the steel wire shall further, as a minimum, comply with the following:

Wire for mattresses				
Use	**Units**	**For lacing**	**For mesh**	**For selvedge**
Galvan + PVC	Ø mm	2,2 / 3,2	2,2 / 3,2	2,7 / 3,7
Wire tolerance *	Ø mm	±0,08	±0,08	±0,08
Quantity of Galfan **	g/m²	230	230	245
Tensile strength ***	N/mm²	350 – 575		
* To SANS 675 / ** To EN 102442-2, Table 2, Class A / *** To SANS 1580 and SANS 675				

Wire for boxes				
Use	**Units**	**For lacing**	**For mesh**	**For selvedge**
Galvan + PVC	Ø mm	2,2 / 3,2	2,7 / 3,7	3,4 / 4,4
Wire tolerance *	Ø mm	±0,08	±0,08	±0,1
Quantity of Galfan **	g/m²	230	245	265
Tensile strength ***	N/mm²	350 – 575		
* To SANS 675 / ** To EN 102442-2, Table 2, Class A / *** To SANS 1580 and SANS 675				

PSDK 3.1.3 Geotextile

Replace the last sentence with the following:

"The make and grade of the geotextile shall, as a minimum, comply with that specified on the drawings and in the Bill of Quantities."

PSDK 3.2.1 Stone

Replace the contents of Table 2 with the following:

TABLE 2: SIZE AND MASS OF INDIVIDUAL STONES FOR PITCHING			
1	2	3	4
Size/mass of pitching	Thickness of pitching mm, min	Least dimension mm, min	Mass kg, min
Extra heavy	600	300	180
Heavy	400	190	50
Medium	300	150	27
Light	200	110	11

PSDK 5 CONSTRUCTION

PSDK 5.2 GABIONS WALLS AND APRONS

"PSDK 5.2.8* General

In addition to the above, gabion mattresses and boxes shall be installed strictly in accordance with the approved manufacturer's installation guidelines and the Contractor shall ensure that sufficient pliers, nippers, Spenax tools as well as closing tools are available for use by his labour force."

PSDK 5.3 PITCHING

"PSDK 5.3.1 General

Notwithstanding the provisions of this Clause the excavation footing trench shall be backfilled with class 20/19 concrete to the proposed top level of the pitching.

PSDK 5.3.3 Grouted Pitching

Replace the words"(Table 4)"in the second line of the first paragraph with "(Table 2)".

Add the following:

"The exposed stone surfaces shall be cleaned of excess mortar within 1 day of being grouted."

PSDK 6 TOLERANCES

Notwithstanding the provisions of this Clause, the materials and the finish of the work applicable to all gabion work shall be to Degree of Accuracy I and the permissible deviations shall be within the limits given for a Degree of Accuracy I.

PSDK 8 MEASUREMENT AND PAYMENT

PSDK 8.2 SCHEDULED ITEMS

Replace the heading and contents of Clause 8.2.1 with the following:

"PSDK 8.2.1 Surface preparation for bedding of gabions..... Unit: m³

The rate tendered shall cover the cost of all labour, plant and equipment required to effect minor shaping as well as compact any loose material to leave a firm surface, ready for bedding the gabion cages, mattresses and pitching."

PSDK 8.2.5 Pitching

Notwithstanding the provisions of this Clause the excavation and backfill of footing trenches will be measured for payment under PSDK 8.2.8.

"PSDK 8.2.8* Excavation and concrete backfill of footing trenches for pitching..... Unit: m³

The rates tendered shall cover the cost of excavating footing trenches over the lengths, widths and depths ordered as if in soft material, trimming trenches, compacting inverts, class 20/19 concrete backfill, as well as the cost of loading, transporting within a free haul distance of 0,5km and disposal of excavation material as directed.
The volume will be computed from the dimensions ordered. No payment will be made for over-excavation or resultant additional concrete backfill.

"PSDK 8.2.9* Cutting and adjusting mattress to fit around stormwater pipe ..... Unit : No

The rate shall cover the cost of cutting the cages, adjusting the wires and securing all around the storm water pipe."

"PSDK 8.2.10* Mortar filling of voids between rocks in gabion cages and mattresses .....Unit : m³

The volume measured for payment will be calculated from the overall width, length and depth of strip called for on the drawings, or ordered, to be mortar filled.

The rate tendered shall cover the cost of all labour, plant and materials required to manufacture and place the mortar as specified, over the width, length and depth called for on the drawings, irrespective of the method used to place the mortar."

PSDM EARTHWORKS (ROADS, SUBGRADE)

PSDM 2 INTERPRETATIONS

PSDM 2.3 DEFINITIONS AND ABBREVIATIONS

Notwithstanding the definition of roadbed given under Clause 2.2 of SANS 1200 M, all in-situ surfaces requiring compaction as indicated on the drawings, shall be classified as roadbed.

PSDM 3 MATERIALS

PSDM 3.1 CLASSIFICATION FOR EXCAVATION PURPOSES

Notwithstanding the provisions of this Sub-clause the excavation of material will, for purposes of measurement and payment, be classified as specified in PSD 3.1.2.

PSDM 3.2.2 Fill

Notwithstanding the requirements of this Clause, material from commercial sources or borrow pits located by the Contractor, to be used in the fill, shall comply with the requirements of Clause 3.2.3 and PSDM 3.2.3.

PSDM 3.2.3 Selected layer

Replace the contents of this Clause with the following:

"The following requirements shall apply in respect of the selected layer:

a) Maximum particle size: 60% of compacted layer thickness
b) Unstabilised selected layer
   (i) Upper selected layer

Minimum CBR at 93% of modified AASHTO density: 15
Maximum PI: 12 (the Employer's Agent has the right to alter this requirement to 3 x the grading modulus + 10)

Note:

The requirements for the upper selected layer also apply where only one selected layer is specified.

(ii) Lower selected layer

Minimum CBR at 93% of modified AASHTO density: 7

Maximum PI: 12 (the Employer's Agent has the right to alter this requirement to 3 x the grading modulus + 10)

PSDM 3.3 SELECTION

Notwithstanding the provisions of this Clause, the Contractor shall note that the excavation from the cutting shall be utilized for the construction of the lower layers of fills.

PSDM 5 CONSTRUCTION

PSDM 5.1.2 Accommodation of traffic

The requirements of Clauses PSA 5.10 and PSD 5.1.6 shall apply regarding the control and temporary accommodation of traffic.

Payment for the aforementioned will be effected in terms of PSD 8.3.12.

PSDM 5.2.2.2 Dimensions of cuts

Delete “suitable material …….7” in the fifth line and replace with “material complying with 3.2.3 and PSDM 3.2.3.”

Add after "drawings" in the second line of this Sub-clause:

"which shall include for road side channels and channel cross drains within the road reserve.”

PSDM 5.2.2.3 Use of material

Add after "borrow pits" in the second last line of Sub-clause (a): "or commercial sources".

Add the following after sub-clause (d):

“(e) Commercial sources

The provisions of sub-clause PSD 5.2.2.5 of SANS 1200 D as amended shall apply.”

PSDM 5.2.2.5 Disposal of surplus or unsuitable material

Add after "directed" in the second line of this Sub-clause "(refer PSD 5.2.2.3)".

PSDM 5.2.2.6 Catchwater mounds and channels and mitre banks and channels

Add the following sentence:

"Catchwater mounds, berms and mitre banks shall be compacted to a minimum of 90% of modified AASHTO maximum density."

PSDM 5.2.3 Treatment of roadbed

PSDM 5.2.3.2 Removal of unsuitable ground

Replace the second sentence of paragraph (a) with the following:

"The excavated spaces shall then be backfilled with approved imported material compacted to the required density."

Add the following sentence to paragraph (b):

"Unsuitable excavated material will be paid for as cut to spoil."

PSDM 5.2.3.3 Treatment of roadbed

Add the following to Sub-clause (a):

"The depth of compaction shall be 150mm."

Add the following paragraphs:

"(c) Three-pass roller compaction

Any portion of the roadbed that is shown on the Drawings or is specified or is directed by the Employer’s Agent to be given three-pass roller compaction because of its inadequate natural density, shall be prepared by shaping where necessary and compacting with a roller, complying with the requirements specified below.

Compaction shall comprise three complete coverages by the wheels of the specified roller over every portion of the area that is being compacted. While it is not the intention that the Contractor should apply water to the roadbed for

this type of compaction, and while no rigid moisture control will be exercised during compaction, the Contractor shall nevertheless satisfy the Employer's Agent that everything is being done to take full advantage of favourable soil moisture conditions during the rainy season, and that such compaction is as far as possible carried out when the roadbed is neither excessively dry nor excessively wet.

The Employer's Agent has the authority to decide when conditions are favourable for compaction and where such compaction is to be carried out at any particular time, and he has the right to instruct the Contractor to water the roadbed at the Contractor's expense when, in the opinion of the Employer's Agent, the Contractor failed, neglected or refused to comply with these requirements.

The rollers to be used for roller-pass compaction shall conform to the following requirements:

Grid roller: The grid roller shall have a mass of not less than 13,5 t when ballasted, shall be loaded to this mass if required, and shall be moved at a speed of not less than 12 km/h.

Vibratory roller: The vibratory roller shall be capable of exerting a combined static and dynamic force of not less than 120 kN/m width for every metre of loose-layer thickness at an operating frequency not exceeding 25 Hz and shall move at a speed not exceeding 4 km/h."

PSDM 5.2.4 Fill

PSDM 5.2.4.3 Finishing

Notwithstanding the provisions of this Clause the requirements of PSDM 5.2.9 shall as applicable apply to the finishing off of verges.

PSDM 5.2.5 Selected layer

Replace the contents of this Clause with the following:

"Except with regard to density, the requirements of Clause 5.2.4 shall apply. The degree of compaction shall be:

Upper selected / Selected	:	95% of modified AASHTO maximum density.
Lower selected	:	93% of modified AASHTO maximum density."

PSDM 5.2.8 Transport

Replace the contents of this Sub-clause with the following:

"The provisions of Sub-clause PSD 5.2.5 of SANS 1200 D, as amended, shall apply."

"PSDM 5.2.9* Trimming and grading of verges

During the initial earthworks the verge width shall be cut or filled to approximately the final level and shall be kept trimmed and tidy during construction of the works. After completion of the road layers, including the premix surface, and after construction of the necessary kerbs, including the satisfactory backfilling behind the kerb, the verge shall be finished off to the lines and levels shown on the drawings or as specified.

The verge material shall consist of that material which would normally be occurring at that position or depth when in cut and shall not be contaminated by foreign materials such as bricks, basecourse material, horticulturally inferior materials from trench excavation, etc. Verges in fill conditions are to consist of the material as specified for the fills and similarly not be contaminated with foreign materials.

Over those sections of verge where grass is to be planted in which case the Contractor shall load, transport and spread as ordered by the Employer's Agent. In the case of topsoil provided and imported by the Contractor the quality of the topsoil shall be approved of by the Employer's Agent beforehand.

The Contractor shall be responsible for taking the necessary precautions and measures to control the dust nuisance which may arise due to his operations on the verge, whether from the natural ground surface or topsoil layer, until the verge is accepted by the Employer's Agent."

"PSDM 5.2.10* Dimension and Level Control and Process Control

The Contractor shall submit to the Employer's Agent records of dimension and level control and/or process control prior to requesting the Employer's Agent to carry out any routine tests and/or inspections.

A sample form can be obtained from the Employer's Agent."

"PSDM 5.2.11* Requesting of Tests

Tests and Inspections of the works will only be carried out by the Employer's Agent once the appropriate test/inspection request forms have been fully completed. Test/inspection request forms can be obtained from the Employer's Agent."

PSDM 6 TOLERANCES

"PSDM 6.5* DIMENSION AND LEVEL CONTROL

The requirements of PSM 6.4 shall apply."

PSDM 7 TESTING

PSDM 7.3 ROUTINE INSPECTION AND TESTING

Replace table 2 and the contents of Sub-clause 7.3.2 with the following:

"PSDM 7.3.2 The dry density requirements for a particular lot of selected layer or wearing course shall be deemed to be satisfied if the average density and the results of individual tests meet the requirements specified in table 2 below. Refer to Sub-clause PSD 7.2 for the requirements for fill.

TABLE 2 – DENSITIES

1	2	3	4	5
Layer	Specified density (% of modified AASHTO density)	Number of tests per lot	Average density %	Minimum density for any single test, %
Gravel wearing course	95	3 and 4 5 6	95,1 95,4 95,6	91,4 91,2 91,0
Lower selected layer	93	3 and 4 5 6	93,1 93,4 93,6	89,4 89,2 89,0

"PSDM 7.4* INSPECTION AND TESTING BY EMPLOYER'S AGENT

The requirements of PSM 7.1 and PSM 7.3 shall apply."

PSDM 8 MEASUREMENT AND PAYMENT

PSDM 8.1 BASIC PRINCIPLES

Add the following:

"The requirements of PSM 8.2 shall apply. The Contractor shall further make provision in the various rates for the construction of the roadbed, fill and selected layer for the cost of his own process control testing and the cost of complying with PSDM 6.5 and PSDM 7.4."

PSDM 8.2 COMPUTATION OF QUANTITIES

Replace Sub-clauses 8.2.1 to 8.2.3 (inclusive) with the following:

"PSDM 8.2.1 The provisions of Sub-clause 8.2.1 of SANS 1200 D shall apply.
PSDM 8.2.2 The provisions of Sub-clause 8.2.2 of SANS 1200 D shall apply.
PSDM 8.2.3 The provisions of Sub-clause 8.2.2 of SANS 1200 D shall apply."
PSDM 8.2.5 Verifying quantities

Replace the first sentence with the following:

"Before any earthworks are commenced but after completion of any site preparation, the Employer's Agent will, upon a written request from the Contractor, provide cross-sections for the purpose of measurement of earthworks quantities."

"PSDM 8.2.7* Cut to accommodate road side channels and channel cross drains within the road reserve

The volume of material excavated to form road side channels and channel cross drains (including cut to accommodate concrete lining) within the road reserve, will be measured for payment as cut to fill, cut to spoil, or cut to selected layer, as the case may be."

PSDM 8.3 SCHEDULED ITEMS

PSDM 8.3.3 Treatment of roadbed

(a) Roadbed preparation and compaction of material to

Add the following to Clause 8.3.3(a) :

"(4) Minimum of 95% of modified AASHTO maximum density ..... Unit : m³

Add the following paragraph to the end of Clause 8.3.3(a):

"The unit of measurement shall be the cubic metre of material re-compacted as specified and the volume shall be determined from levelled cross-sections on which are superimposed the levels to which the roadbed is to be constructed. When material is imported to make up the required volume, such material will be paid for as cut or borrow to fill as relevant.

Note :

No additional payment will be made for difficult work or hand operations in confined areas."

Replace the heading of sub-clause (b) with the following:

"(b) In-place treatment of road-bed in hard rock material by"

Add the following:

"(c) Three-pass roller compaction:

(i) Grid roller Unit: m²
(ii) Vibratory roller ..... Unit: m²

The units of measurement shall be the square metre of roadbed compacted as specified in sub-clause

PSDM 5.2.3.3(c) for the areas designated by the Employer's Agent.

The tendered rates shall include full compensation for shaping the areas, providing the rollers and compacting the roadbed by means of three roller passes over the entire area."

PSDM 8.3.4 Cut to fill, borrow to fill

Replace the contents of this Clause with the following:

"(a) Cut to fill compacted to 93% of modified AASHTO maximum density ..... Unit : m³

The rate tendered shall cover the cost of excavating from the site as if in soft material, transporting, preparing, processing, shaping, watering, mixing, compacting to percentage of modified AASHTO maximum density specified, trimming and testing the fill.

(b) Borrow to fill from commercial or off site sources located by the Contractor compacted to 93% of modified AASHTO maximum density..... Unit : m³

The rate tendered shall cover the cost of acquiring the material from commercial or off site sources located by the Contractor, any excavation and selection required, loading, transporting to the point of use irrespective of distance, temporary stockpiling if necessary, placing, watering, compacting to percentage of modified AASHTO maximum density specified, trimming and testing the fill.

No additional payment will be made for difficult work or hand operations in confined areas.

Replace the heading and contents of Clause 8.3.5 with the following:

PSDM 8.3.5 Selected layer compacted to 93% of modified AASHTO maximum density

(a) Selected layers using material cut from the site and compacted to:
i) 93% of modified AASHTO maximum density ..... Unit : m³
ii) 95% of modified AASHTO maximum density ..... Unit : m³

The rate tendered shall cover the cost of excavating as if in soft material, selecting, loading, transporting, placing, watering, compacting to percentage of modified AASHTO maximum density specified, trimming and testing the selected layer.

(b) Selected layers using material from commercial or off site sources located by the Contractor, compacted to:
i) 93% of modified AASHTO maximum density ..... Unit : m³
ii) 95% of modified AASHTO maximum density ..... Unit : m³

The rate tendered shall cover the cost of acquiring the material from commercial or off site sources located by the Contractor, any excavation and selection required, loading, transporting to the point of use irrespective of distance, temporary stockpiling if necessary, placing, watering, compacting to percentage of modified AASHTO maximum density specified, trimming and testing the selected layer.

Note :

No additional payment will be made for difficult work or hand operations in confined areas."

PSDM 8.3.6 Extra over items 8.3.4, 8.3.5 and 8.3.16 for excavating and breaking down material in"

Replace the words "items 8.3.4 and 8.3.5" with the words "items 8.3.4, 8.3.5 and 8.3.16".

PSDM 8.3.7 Cut to spoil or stockpile from

Delete paragraph (b). In terms of PSDM 3.1 intermediate excavation will not be separately measured for payment. Add the following:

"Separate items will be scheduled for cut to spoil and cut to stockpile. The rate tendered shall further cover the cost of complying with the requirements of Clause 5.2.3.2 irrespective of the depth or extent of the material ordered to be removed, or whether the order to remove unsuitable material is given after the completion of any initial cut operation. The tendered rate shall further, in the case of cut to spoil, include full compensation for transporting the material regardless of the distance involved and for all other incidental cost to dispose of the spoil material. (Refer also PSD 5.2.2.3, PSD 5.2.5 and PSDM 8.3.12)."

PSDM 8.3.11 Extra over 8.3.2, 8.3.4 or 8.3.5 for temporary stockpiling of material

Add the following:

"The temporary stockpiling of material from commercial sources or borrow pits located by the Contractor will not be measured for payment."

PSDM 8.3.12 Overhaul

Delete this item as no overhaul will be paid on material for the purposes of this Contract and all the costs for transporting material shall be included in the applicable tendered rates and amounts.

PSDM 8.3.13* Surface finishes

"(a) Topsoiling .....Unit: m²

Measurement shall be the surface area of the topsoiling reinstated in accordance with the requirements of PSDM 5.2.9. The rate tendered shall cover the cost of all things necessary to reinstate the topsoil as specified, including the acquisition of material to make up for material lost due to weather or other reasons."

(b) Grassing or other vegetation cover.....Unit: m²

The rate shall cover the costs of finishing off areas to be landscaped. The rate tendered shall cover the cost of all things necessary to reinstate proposed landscaped areas as specified."

Add the following new sub-clauses:

"(c)* Trim, shape and roll verge.....Unit: m²

Measurement shall be the surface area of the verge prepared in accordance with the requirements of PSDM 5.2.9. The rate tendered shall cover the cost of all things necessary to finish off the verge as specified, including the incorporation of material to make up for material lost due to weather or other reasons. (Cut and fill to bring verge to level payment under 8.3.4)."

(d)* Finishing of Cut and Fill slopes, medians and interchange areas .....Unit: m²

The rate shall cover the costs of finishing of cut and fill slopes, in terms of sub-clause 5.2.4.3 of SANS 1200 D."

PSDM 8.3.17* Variations in the number of roller passes (applicable to sub-sub item 8.3.3(c)):

(a) Vibratory rollers .....Unit: m²-pass
(b) Oscillatory rollers .....Unit: m²-pass
(c) Grid rollers .....Unit: m²-pass
(d) Tamping rollers .....Unit: m²-pass
(e) Impact rollers .....Unit: m²-pass

(f) Pneumatic-tyred rollers.....Unit: m²-pass

The unit of measurement shall be the square-metre coverage, and shall be computed by multiplying the number of square metres to which the changed pass efforts apply by the increased or decreased number of roller passes. Where a change in the compaction effort is requested, the Contractor will be compensated at the tendered rates for the above items in respect of the increased number of square-metre roller passes of each type of roller required over and above that specified in the relevant standard effort. His compensation will be decreased simultaneously, at the applicable rates, by the number of square-metre roller passes of each type of roller which is either decreased or completely left out.

The tendered rate for each additional square metre-pass ordered by the Employer's Agent over and above the specified number of passes, shall include full compensation for all supervision, labour, plant, equipment, fuel, materials, work and incidentals necessary for completing the work. The same rates shall be accepted by the Contractor during computation of a decrease in his compensation where the number of roller passes for each specific type of roller is decreased."

PSG CONCRETE (STRUCTURAL)

PSG 2 INTERPRETATIONS

PSG 2.4.3 Joints

Notwithstanding Sub-clause 2.4.3, "designated joints" will only be joints that are shown on the drawings. Any other joints that are required by the Contractor as a result of his construction constraints or for any other reason, whether approved by the Employer's Agent or not, will not be considered to be designated joints as defined in Sub-clause 2.4.3, i.e. they will be considered to be "non-designated" joints.

PSG 3 MATERIALS

PSG 3.2 CEMENT

PSG 3.2.2 Alternative types of cement

Replace the contents of this sub-clause with the following:

"Only CEM-1 42.5 according to SANS ENV 197-1 may be used.
If the Contractor wishes to use any other type of cement, he shall obtain the Employer's Agent's prior written approval (see 8.1.3.2 and 8.1.3.3). The tendered rates, however, shall be based on the use of OPC only."

PSG 3.2.3 Storage of cement

Add the following:

"Cement shall be used in the order in which it is received. Cement shall not be stored for longer than 8 weeks without the Employer's Agent's permission.

Any cement that contains lumps that cannot easily be crumbled to powder between the fingers, may not be used."

PSG 3.3 Water

Replace the contents of this sub-clause with the following:

"Only potable quality water from an approved source may be used for mixing concrete. Water from a river or stream may however be used for curing."

PSG 3.4 AGGREGATES

PSG 3.4.3 Storage of aggregates

Add the following:

"When aggregates of different chloride content are stored on the Site, their use in the various classes of concrete shall be strictly controlled."

“PSG 3.4.4* Concrete using Reactive Aggregates

The Contractor shall provide the Employer’s Agent with sufficient data to enable him to assess the degree of alkali-aggregate reactivity of the aggregates to be used for concrete.
Where reactive aggregates such as Malmesbury Group aggregates, and certain Table Mountain Formation and other quartzitic aggregates are used for concrete, the Contractor shall, in order to ensure that the concrete is not subject to alkali-aggregate reaction, design his mixes and/or use cement with a sufficiently low alkali content such that the total equivalent sodium oxide content of the concrete is less than 2,8 kg/m³.

(NOTE: The equivalent sodium oxide content (alkali content) is measured as (Na20 + 0,658 K20). For cement it is expressed as a percentage by mass, for concrete it is expressed in kg/m³).

In the case of other aggregates that are less reactive the Employer’s Agent will determine the type and degree of precautionary measures to be adopted.

“PSG 3.4.5* Fine Aggregate

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.”

“PSG 3.4.6* Dolomitic aggregate

Aggregates for structural concrete shall be of dolomitic origin. The quantity of insoluble matter ins respect of concrete made with aggregates of dolomitic origin, determined according to the method described in SANS 677, Appendix C, shall not be more than 15%.”

“PSG 3.4.7* Aggregates for grouting

Notwithstanding the requirements of Sub-clause 3.4.1, the grading of the fine aggregate (sand) and coarse aggregate (stone or pea gravel) to be used for grouting shall conform to the grading given in Tables 1 and 2 respectively, below.

TABLE 1 – SAND	
Test sieve nominal aperture size, mm	**% Passing (by mass)**
9,5	100
4,75	95 - 100
1,18	45 - 65
0,3	5 - 15
0,15	0 - 5

TABLE 2 - STONE OR PEA GRAVEL	
Test sieve nominal aperture size, mm	**% Passing (by mass)**
9,5	100
4,74	95 - 100
2,36	0 - 5

“PSG 3.4.8* Samples

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 3.9* MATERIALS FOR BUILDING WORK

PSG 3.9.1* Cement

The requirements stipulated for sub-clause 3.2.2 and PSG 3.2.2 shall apply.

PSG 3.9.2* Sand

Sand for mortar shall comply with SANS 1090.

PSG 3.9.3* Bricks

Brickwork shall be built in stretcher bond. The walls shall be built to the dimensions shown on the drawings or ordered. All bricks shall be well soaked in water immediately before being laid and the previous course of bricks shall be well wetted before the laying of the following course.

Walls shall be carried up regularly so that no brickwork is more than 1m higher than adjoining brickwork.

All bricks shall comply with SANS 227 and shall be NFX burnt clay masonry units free of stones, cracks and other defects. The bricks shall be obtained from an approved manufacturer and samples of the bricks shall be submitted to the Employer's Agent for approval.

PSG 3.9.4* Mortar

Mortar shall comprise of the cement, lime and sand mixed in the proportions given below:
Cement: 50 kg
Lime: 0 – 40L
Sand: 130L (measured loose and damp)"

"PSG 3.10* CURING COMPOUND

Curing compound shall be white pigmented natural resin based liquid curing compound complying with ASTM 309-74."

"PSG 3.11* WATERSTOPS

PVC waterstops shall comply with the requirements of CKS 389."

SikaSwell waterstops to be as specified on the drawings.

"PSG 3.12* PROTECTIVE COATING

The internal surface of the pump sump and inlet chamber shall be coated and treated as scheduled below and strictly in accordance with manufacturer's instructions:

Coat	Product	Nominal DFT (µm)
1 (Primer)	Sikafloor 156	100
2	Sikagard 63 N (Green)	200
3	Sikagard 63 N (Grey)	200
TOTAL DFT		500

All coats shall be in contrasting colours and no DFT reading may be less than nor more than the minimum and maximum values specified by the manufacturer. The overall average DFT shall not be less than the nominal DFT specified.

The concrete surface to be coated shall be cleaned and prepared as specified by the manufacturer.

Where ordered by the Employer's Agent a moisture barrier Sika Epochem 720 shall be applied if the moisture in the concrete is above the required specifications of the manufacturer before applying the above coatings (the primer coat will then be omitted)."

"PSG 3.13* GRANOLITHIC SCREED

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."

"PSG 3.14* JOINT MATERIALS

PSG 3.14.1 Filler

Flexothane G" joint filler (or equal approved) will be acceptable. Impregnated softboard will not be acceptable."

"PSG 3.15* CLASSIFICATION OF NO-FINES CONCRETE

No-fines concrete shall be type NF19, the prefix denoting the size of the aggregate, namely 19mm.

Each size of aggregate shall be a single size aggregate graded in accordance with SANS 1083.

The volume of aggregate per 50kg of cement shall be 0,3m³."

"PSG 3.16* ALKALI-AGGREGATE REACTION

Malmesbury hornfels (shale) shall not be used in conjunction with a high alkali cement in concrete in any part of the Works for the purposes of this clause, a high alkali cement is one in which the alkali content (Na_2O equivalent) exceeds 0,60% by mass of cement.

In order to ensure that the above requirement is met, the Contractor may elect to use an aggregate, other than Malmesbury hornfels, that complies with the requirements of SANS 1083. Alternatively, if the Contractor chooses to use Malmesbury hornfels, he shall comply with the following requirements regarding the cement:

(a) Before commencing any particular section of the structure, the Contractor shall ensure that he has enough cement that is not a high alkali cement to complete the section.

(b) Certificates stating the alkali content of each delivery of cement to the Site shall be supplied by the Contractor. These certificates shall be based on tests carried out at a laboratory approved by the Employer's Agent. The cost of testing, including sampling, transporting of samples, and issuing of certificates, shall be borne by the Contractor.

(c) The Contractor shall be entitled to use an approved brand of cement as a means for ensuring that the permissible alkali content is not exceeded. The Contractor shall make allowance for the higher price of such brand, if he chooses to use this method.
High alkali cement delivered to the Site shall be rejected, and the cost of its removal and replacement with cement with an acceptable alkali content shall be borne by the Contractor."

"PSG 3.17* STAINLESS STEEL

The following grades of stainless steel must be used:
316L for welded applications,
316 for not-welded applications."

PSG 4 PLANT

PSG 4.1 GENERAL

Add the following sub-clause:

"PSG 4.1.1 Minimum Plant

The Contractor shall have the following minimum Plant available and in sound working order:

(a) Two concrete mixers, each of sufficient capacity to complete a section of the wall between horizontal construction joints within 4 hours and without interruption.
(b) Two weigh-batchers to supply the mixers.
(c) Four concrete vibrators, at least one of which shall be powered by an internal combustion engine.
(d) One air compressor.
(e) Suitable and adequate Plant to transport and raise concrete and other material and equipment from ground level to the top of the structure at all stages of construction.
(f) Elevated storage tanks of adequate capacity to ensure that sufficient water will be available before commencement of every major concrete-placing operation.

If the Plant used for placing concrete for the structure is electrically or mechanically powered, the Contractor shall also provide some other approved, non-electrically-powered standby means for placing concrete at an adequate rate in the event of a power or mechanical failure of the main Plant.

When the Contractor elects to place a crane inside the walls of the structure during the construction period, he shall communicate with the Employer's Agent in good time to ensure that the design and layout of the panels that form the roof slab and floor allow for such positioning of the crane. When sections of the roof and floor have to be redesigned to accommodate the crane, the redesign cost shall be borne by the Contractor."

PSG 4.5 FORMWORK

PSG 4.5.1 Design

Add the following:

"All formwork or scaffolding required for any part of the Works shall be designed by the Contractor, and before commencing with the erection of any formwork or scaffolding, the Contractor shall submit the methods he proposes to use to the Employer's Agent for approval. The Employer's Agent has the authority to order alterations to the design or the sizes of any part of the formwork or scaffolding. The Contractor shall check the safety and suitability of all such alterations. The fact that the Employer's Agent has approved or altered any part of the formwork of scaffolding shall not be construed as relieving the Contractor of his responsibility with regard to the strength and stability of the formwork or scaffolding."

PSG 4.5.2 Finish

Add the following:

"The finish to all exposed concrete shall be smooth, and that to buried or backfilled surfaces rough."

PSG 4.5.3 Ties

Add the following:

"No plugs, bolts, ties or clamps of any description used to hold the formwork will be allowed to project into or through the concrete unless expressly approved by the Employer's Agent.

Only approved tie-rods consisting of solid rods (that remain embedded in the concrete) and with removable ends shall be used to hold the formwork of the walls. The removable tie-rod ends shall facilitate removal without damage to the concrete, and no permanently embedded parts of such tie-rods shall have less than 50 mm of cover to the finished concrete surface.

The cavities left in the concrete when the tie-rod end cones are removed shall be soundly caulked with a cement mortar to which an approved shrinkage-reducing agent has been added, and shall be neatly finished to a smooth surface uniform with that of the surrounding concrete.

The cost of supplying special tie-rods as well as the filling of cavities left by the tie-rod cones shall be included in the rates tendered for formwork under the appropriate pay items.

On no account shall formwork be secured to reinforcing bars."

PSG 5 CONSTRUCTION

PSG 5.1 REINFORCEMENT

PSG 5.1.2 Fixing

Add the following:

"The Employer's Agent will inspect the reinforcing after it has been fixed in place, the formwork has been cleaned, cover blocks have been positioned, and before concreting commences.
Welding of reinforcing steel will not be permitted."

PSG 5.1.3 Cover

Add the following:

"The distance between pipes in the concrete and the reinforcing steel shall nowhere be less than:

(a) 40 mm or
(b) 5 mm plus the maximum size of the coarse aggregate, whichever is the largest.
(c) the cover specified on the Drawings."

PSG 5.2 FORMWORK

PSG 5.2.1 Classification of finishes

(c) Special

Add the following:

"This finish is obtained by first giving the surface a smooth finish with the joints between formwork panels forming an approved regular pattern suitable for the appearance of the structure. All projections shall then be removed, irregularities repaired and the surface rubbed or otherwise treated until it is smooth with an even texture, appearance and colour.

If the finish of exposed surfaces does not comply with the requirements for uniformity of the texture and appearance, the Contractor shall, when instructed to do so by the Employer's Agent, rub down the exposed surfaces of the entire structure or any part thereof as specified below, entirely at his own cost. All repairs must be completed before the rubbing commences.

The surface shall be saturated with water for at least one hour. The initial rubbing of the face shall be carried out with a medium coarse carborundum stone together with a small amount of mortar of the same cement/sand ratio as the concrete being repaired. Rubbing shall continue until all form marks, projections and irregularities have been removed and a uniform surface has been obtained. The paste produced by the rubbing shall be kept in place. The final rubbing shall be carried out with a fine carborundum stone and water. This rubbing shall continue until the entire surface has a smooth, even texture and is uniform in colour. The surface shall subsequently be washed with a brush to remove surplus paste and powder."

PSG 5.2.2 Preparation of formwork

Add the following:

"Construction joints shall be positioned as shown on the Drawings."

PSG 5.2.5 Removal of formwork

PSG 5.2.5.6* The Contractor shall make provision for the continued support of beams and slabs while the formwork is being removed and/or for back propping of beams and slabs."

PSG 5.3 HOLES, CHASES AND FIXING BLOCKS

Add the following:

"Cover blocks for reinforcing and fixtures may be placed into the concrete provided that neither the strength nor any other desirable characteristic (such as the appearance) of the concrete section is affected or impaired in the opinion of the Employer's Agent."

PSG 5.4 PIPES AND CONDUITS

Add the following:

"All pipes passing through concrete floors, walls or slabs shall be cast into a concrete member simultaneously with the casting of the member. Openings for pipes shall only be left in concrete members when so directed by the Employer's Agent or when shown on the Drawings. Pipes shall be installed in such openings according to the details shown on the Drawings.

If water tightness is a requirement where pipes are cast into walls, floors and slabs, the Contractor shall ensure watertightness where smooth-surfaced pipes are used by using an approved method such as tape wrapping the pipes prior to casting in. The cost of such method will be deemed to be included in the rates tendered for item PSG 8.11."

PSG 5.5 CONCRETE

PSG 5.5.1 Quality

PSG 5.5.1.1 General

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.

No concrete shall be cast until the mix designs have been approved by the Employer's Agent. 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 not less than 325 kg cement per cubic metre of concrete and the proportions of the various aggregates shall be such as to produce a density of at least 2 400 kg/m^3.

In order to facilitate increasing the workability of concrete in the fresh/plastic state, to ensure water- tightness 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. The slump shall be between 30 and 40 mm.

PSG 5.5.1.5 Durability

The exposure conditions of the reservoir concrete are classified as "severe".

PSG 5.5.1.6 Prescribed mix concrete

Notwithstanding the requirements of 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 Sub-clause 3.4.1, for the production of prescribed mix concrete.

Unless otherwise directed by the Employer's Agent in writing, prescribed mix concrete shall be mixed in the following proportions:

Grade	**By mass**			**By volume**		
	Cement	**Sand**	**Stone**	**Cement**	**Sand+**	**Stone**
25	1	2,5	3,2	1 bag*	0,09 m^3	0,11 m^3
20	1	2,9	3,6	1 bag	0,11 m^3	0,13 m^3
15	1	3,6	4,2	1 bag	0,14 m^3	0,15 m^3
10	1	4,5	5,0	1 bag	0,17 m^3	0,17 m^3

+ Assuming 5% moisture in sand

* Bag = 50 kg

PSG 5.5.1.7 Strength concrete

Add the following:

"With the exception of mixes weaker than 15 MPa, all concrete for structural units/the Works shall be considered to be strength concrete in terms of Sub-clause 5.5.1.7.

Unless otherwise specified on the drawings or in the Schedule of Quantities, all structural concrete shall be Grade 30 MPa."

PSG 5.5.2 Batching

Notwithstanding the requirements of this sub-clause, the method of batching shall be subject to approval. If volume batching is allowed, only full standard 50kg bags of cement may be used to make up a batch.

PSG 5.5.3 Mixing

PSG 5.5.3.2 Ready-mixed concrete

Add the following:

"Concrete from a central concrete production facility other than on the construction site will be permitted and, apart from test results in terms of 7.3.1, 7.3.2 or 7.3.3, test results obtained by a recognised private laboratory (i.e. P.C.I) will be accepted for evaluation in terms of Sub-clause 7.3.4, or is specified on the drawings."

PSG 5.5.5 Placing

Add the following:

"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, or is specified on the drawings.
Concrete used in pipe trenches for encasement may be cast directly against the side of the excavation. Concrete for thrust/anchor blocks shall be cast directly against the side of the excavation."

PSG 5.5.6 Compaction

Delete "or (if approved)…. by spading, rodding or forking" in the first sentence of sub-clause 5.5.6.3.

PSG 5.5.7 Construction joints

Add the following:

"Construction joints shall be limited to the minimum.

Horizontal construction joints are permitted in the structure walls in positions indicated on the Drawings or approved by the Employer's Agent. Vertical construction joints in the walls are subject to the written approval of the Employer's Agent and the cost of all such vertical or horizontal construction joints will be deemed to be included in the rates for cast-in-situ concrete.

The construction joints in water-retaining structures shall be made strictly in accordance with the details shown on the Drawings. The joints between screeds and concrete floors shall be regarded as construction joints and the surface of the floor shall be prepared as described for construction joints.

Should the Contractor's method of construction necessitate the placing of a construction or other joint in a position not shown on the Drawings, such method of construction and position of the joint shall be approved by the Employer's Agent in writing. The cost of such joint shall be included in the tendered rates and shall include scabbling or the concrete where steel reinforcement is continuous.

The wall shall be cast in lifts of a height that permits each lift to be poured without interruption in one continuous operation during normal working hours.

It is the Contractor's responsibility to ensure that construction joints are watertight. The Contractor's proposed method for ensuring the watertightness of such joints shall be submitted to the Employer's Agent for his approval.

For construction joints at kickers all additional costs for concrete, preparation, etc. will be deemed to be included in the rates tendered for concrete in walls or sides and kicker joints or construction joints will not be measured separately."

"PSG 5.5.7.4* Formed Joints (Generally vertical or near vertical)

Formed joints will be considered to be designated joints as defined in Sub-clause 2.4.3. (The forming of a straight edge to a joint as specified in SDG5-4.1 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 similar joint filler, dowel bars and their PVC tubes, etc. as indicated.

The greatest care shall be taken to ensure that waterstops are fully bedded in the surrounding concrete and that they are maintained in the correct position and alignment while concrete is being placed. Waterstops which are displaced during concreting operations or damaged thereafter shall be cut out and reset to the satisfaction of the Employer's Agent."

"PSG 5.5.7.5* Non-Designated Joints

Any non-designated joints shall be identical to designated joints, as shown on the drawings, which would be used in similar positions and perform the same function."

"PSG 5.5.7.6* Joints between Floors and Walls and Pillars

Construction joints between foundations or footings and walls, or piers standing on them, shall not be made flush with the supporting surface, but shall be made at a distance above the floor or footing shown on the drawings or approved by the Employer's Agent. The "kicker" (starter stub) shall be cast as an integral part of the bottom, floor or footing."

PSG 5.5.8 Curing and protection

Add the following:

"The curing methods of retaining for formwork in place, covering with a waterproof membrane and use of a curing compound of the type specified in PSG 3.10 are strongly recommended. Concrete will not be paid for unless properly cured and proof of curing is continuously visible on site."

PSG 5.5.9 Adverse Weather Conditions

Add the following under sub-clause 5.5.9.2:

"No placing of concrete shall take place if the ambient temperature exceeds 32ºC, or is likely to rise to above 32ºC 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 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."

PSG 5.5.10 Concrete surfaces

Replace the contents of this sub-clause 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 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 PSG5.5.10.2 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* Power Float Finish

Where power floating is specified or scheduled the surface shall be treated as specified in PSG 5.5.10.2 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 power floated to produce a dense, smooth and uniform surface free of all trowel marks. In corners and areas of restricted access the concrete surface shall be finished by steel floating in accordance in PSG 5.5.10.3.

The timing of power-floating is critical to its success. Power-floating steel shall not commence until the concrete can support the weight of a man without indentation and until the moisture sheen has disappeared. Thus several hours will have to elapse after concreting has been completed before this operation can commence. Night work may therefore be required.”

“PSG 5.5.10.5* Granolithic screeds

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 Sub-clause 5-5.8(b) 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.

The Contractor shall make good any damage to the mechanical equipment resulting from his personnel not following the supplier's instructions. Any spillage on the equipment shall be cleaned off immediately.”

"PSG 5.5.10.6* Floor slabs and screeds

(a) Surface of floor slab below screed

The top surface of the floor slab is to have a finish which is rough enough for bonding of the screed. This finish and the preparation thereof is to be discussed with the Employer's Agent before the floor slab is cast.

All laitance on the surface of the slab must be removed completely to expose the course aggregate by means of scrabblers, abrasive blaster, hard brooms or a high pressure water jet, immediately after concrete has set.

All joints shall be sealed in the manner shown on the Drawings. All dust, debris, etc. must be removed immediately prior to the application of the bonding agent and screed.

(b) Materials

Only ordinary Portland cement shall be used.

Coarse aggregate maximum size: 10mm

28-day cube strength: 30 MPa

A plasticizer approved by the Employer's Agent shall be used to reduce the water content of the mix to an absolute workable minimum.

The mix design shall be submitted to the Employer's Agent for approval.

(c) Placing of screed

All surface water shall be removed after which Fosroc Nitobond EP slowest bonding agent or similar approved shall be applied strictly according to the manufacturer's specifications. The screed shall be placed according to the recommendations and/or specifications of the manufacturer of the bonding agent.

The screed shall be placed, spread and compacted in one layer and care shall be taken to obtain maximum compaction. After the screed has been compacted and before the surface is power floated, angle irons fixed to the mechanical equipment shall be used to finish off the screed to the correct levels.

Power floating shall not commence until such time as the screed surface has lost it sheen and barely shows footprints. All laitance on the surface of the screed resulting from compaction shall be struck off prior to power floating. Too much floating causing excessive cement-water past to surface, shall be avoided.

Curing shall commence as soon as finishing operations have been completed and shall be continued for at least 7 days. The method of curing shall be by means of a peripheral pipe directly next to the inside face of the wall with water running down the slope of the floor to the centre cone. This shall be discussed with the Employer's Agent. Any alternative curing method must be submitted to the Employer's Agent for approval.

(d) Joints

The joints in screeds shall be constructed according to the details shown on the Drawings and must in all cases be aligned with the joints in the floor slab below.

(e) Surface finish of screeds

The finishing-off of the screed shall be done in conjunction with the mechanical contractor to ensure that the surface fits the mechanical equipment. The maximum allowable deviation of the floor from the design level is ±3 mm."

PSG 5.5.11 Watertight concrete

Add the following:

"The minimum cement content for ordinary Portland cement in water-retaining structures shall be 325 kg/m^3, and the maximum cement content shall be 400 kg/m^3 in reinforced concrete, or 500 kg/m^3 in prestressed concrete. Where ordinary Portland cement blended with pulverised fuel ash is permitted, the maximum cement content shall be 450 kg/m^3 for reinforced concrete, and 550 kg/m^3 for prestressed concrete.

The maximum water: cement ratio for water-retaining structures shall be 0,55 for ordinary Portland cement and 0,50 for ordinary Portland cement blended with pulverised fuel ash, when this is allowed."

“PSG 5.5.14.3 Casting pipes and specials in concrete

Where the pipe or special is supplied by others 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 others or by the Contractor.

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 alterations 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 in Sub-clause 5.5.7.3.

Immediately prior to concreting being carried out by 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* Soilcrete

Where soilcrete is specified for filling under floor slabs, the soilcrete shall comply with the requirements of sub-clause PSDB 3.5 (c) of section 1200 DB as amended and shall be placed as specified in the sub-clause.”

“PSG 5.5.17* Brickwork

Brickwork shall be built in stretcher bond to the dimensions shown on the drawings. All bricks shall be well soaked in water immediately before being laid and the previous course of bricks shall be well wetted before the laying of the following course.”

“PSG 5.5.18* Plasterwork

Plasterwork shall consist of a single coat, comprising one application of a 1:6 cement : sand mixture with a woodfloat finish. The thickness of the plaster shall be between 13 and 20 mm. All plaster shall be finished smooth, shall be plumb and corners shall be rounded and square.”

"PSG 5.5.19* No-fines concrete

PSG 5.5.19.1*Batching and mixing

Cement shall be measured by mass or full bags of 50kg each and aggregate shall be measured by volume in approved measuring boxes or barrows.

The quantity of water added shall be just sufficient to form a smooth grout that will adhere to and completely coat each and every particle of aggregate and that is just wet enough to ensure that at points of contact of the aggregate the grout will run together to form a small fillet to bond the aggregate together. The mix shall contain no more than 20 ℓ of water per 50kg of cement.

Mixing shall be carried out in an approved batch-type mechanical mixer, but small quantities may be hand mixed.

PSG 5.5.19.2*Placing

No-fines concrete shall be placed in accordance with the procedure approved by the Employer's Agent. It shall be placed in its final position within 15 minutes of having been mixed.

The concrete shall be worked sufficiently to ensure that it will completely fill the space to be concreted and that adjacent aggregate particles are in contact with one another. Excessive tamping or ramming shall be avoided and under no circumstances shall the concrete be vibrated.

PSG 5.5.19.3*Protection

All no-fines concrete shall be protected from the elements and loss of moisture. Protection against loss of moisture shall be accomplished by one or more of the following methods:

(a) Retaining formwork in place
(b) Covering exposed surfaces with sacking or other approved material kept continuously wet
(c) Covering exposed surfaces with plastic sheeting

No-fines concrete placed during cold weather shall be adequately protected against frost for at least 3 days."

"PSG 5.5.20* Casting in and Grouting of Equipment, Structural Steel Columns and Door Frames

All holding-down bolts and other details necessary for the construction of the holding-down bolt pockets or the fixing of the bolts, (including templates) will be provided by the structural steel contractor. The Contractor shall cast in the bolts, as ordered. No bolts shall be actually cast into the concrete until set up by the Contractor and approved by the Employer's Agent.

After the structural columns and door frames have been erected, aligned and levelled by the structural steel contractor, the Contractor shall grout up the baseplates solidly with "Prostruct 5 Star" non-shrink grout, mixed and placed in accordance with the manufacturer's instructions."

PSG 6 TOLERANCES

PSG 6.1 BASIS OF MEASUREMENT

PSG 6.1.1 General

Unless stated otherwise on the drawings, degree of accuracy II shall apply except that abrupt changes in a continuous surface shall not be more than 3 mm.

PSG 6.2 PERMISSIBLE DEVIATIONS

PSG 6.2.3 Specified permissible deviations

Add the following:

"Degree-of-accuracy II is applicable.

Every specified permissible deviation is binding in itself. The cumulative effect of permissible deviations will not be considered. The maximum permissible vertical deviation is subject to the other permissible deviations."
Replace Clause 6.2.3(d)(5) with the following:

	Permissible deviation		
	Degree of accuracy		
	III	II	I
	mm	mm	mm
"Vertically, per metre of height	5	3	2
subject to a maximum of	50	30	10

Add the following:

“(h) Floors

The maximum permissible deviation from a 3 m long straight line connecting two points on the surface of the finished floor is ± 3 mm.

PSG 7 TESTS

PSG 7.1 FACILITIES AND FREQUENCY OF SAMPLING

PSG 7.1.1 Facilities

Add the following:

"The Contractor shall provide sufficient storage capacity for the concrete cubes and shall arrange to have them tested by an approved laboratory.

The cost of all testing, including the cost of sampling, storage and transport of samples shall be included in the rates tendered for concrete work."

PSG 7.1.2 Frequency of sampling

Notwithstanding the requirements of this sub-clause, the Contractor shall take note that he is responsible for taking an adequate number of tests to ensure that the concrete being used complies with the specification. The Employer’s Agent will only carry out such control testing as he requires.

One sample shall consist of six concrete test cubes. The cubes to be tested, three at seven days and three at 28 days.

For each sample taken the position in the structure shall be recorded where the batch represented by that sample is placed.

Sampling of concrete of a particular grade shall be as specified in Sub-clause 7.1.2 with the following frequency of sampling referred to in Sub-clause 7.1.2.2 being amended to read as follows:

"A minimum of 1 sample per 20 m^3, or part thereof, of each grade of concrete placed or 6 samples for pours in excess of 100 m^3 shall be taken."

PSG 7.3 ACCEPTANCE CRITERIA FOR STRENGTH CONCRETE

Add the following:

"Test results obtained from the supplier of ready-mixed concrete will not be accepted for evaluation in terms of Sub-clause 7.3, but samples for testing shall be taken of such concrete at the point of placing."

“PSG 7.3.6* Testing the watertightness

Water for testing shall be provided by the Contractor and he shall be responsible for providing all necessary equipment that may be required for filling the structures.

The structure shall be filled with water at a uniform rate not exceeding 2,0 m in 24 hours until the top water level has been reached. The water level will then be carefully noted and recorded by the Employer’s Agent in relation to a fixed bench mark, and shall be maintained by the addition of further water for a stabilizing period to permit complete absorption of water by the concrete.

The stabilizing period may be 7 days for a maximum design-crack width of 0,1 mm or 21 days for 0,2 mm or greater. After the stabilizing period, the level of the liquid surface shall be recorded at 24-hour intervals for a test period of 7 days. During this 7-day test period the total permissible drop in level, after allowing for evaporation, shall not exceed $1/500^{th}$ of the average water depth of the full tank, or 10 mm.

The evaporation shall be measure by the mean drop in level caused by the evaporation of the water in three flat containers floating in the water being recorded.

In the event of appreciable leakage 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, until a satisfactory test is obtained, which shall prove to the Employer’s Agent that a sufficient degree of watertightness has been obtained.

The costs of emptying a water-retaining structure which cannot be drained shall be borne by the Contractor. The water shall be discharged in a manner approved by the Employer’s Agent and shall be such that the Employer can utilise the water if he so desires.

The water shall not be used as a medium for additives to effect remedial work or to stop leaks.

The costs of retesting the structure for watertightness shall be borne by the Contractor.”

PSG 8 MEASUREMENT AND PAYMENT

PSG 8.1 MEASUREMENT AND RATES

PSG 8.1.1 Formwork

Delete “or splays over 20 mm x 20 mm” from the first line of paragraph 8.1.1.2.

Add the following to paragraph 8.1.1.2:

“Splays up to and including 25 mm x 25 mm will not be measured separately and will be deemed to be included in the formwork costs.”

Add the following paragraphs:

“8.1.1.7 For construction joints at kickers, all additional costs for formwork to edges up to 300 mm high will be deemed to be included in the rates tendered for vertical formwork to sides of walls and will not be measured separately in narrow widths.

8.1.1.8 No formwork will be measured to edges of blinding layers under structures, and the cost thereof (if needed) will be deemed to be included in the rates tendered for concrete in blinding layers.

8.1.1.9 Back-shuttering or formwork to top revealed surfaces of sloping or conical formwork will only be measured to surfaces of over 40° and up to 85° to the horizontal.

Formwork to horizontal surfaces in pumpstations, valve chambers, manholes or sumps can either be removed through the manhole cover opening or the Contractor may use permanent formwork at his own cost as no claims in this regard will be considered.”

PSG 8.1.2 Reinforcement

Replace the contents of this Clause with the following:

"The unit of measurement for steel bars shall be the ton of reinforcement in place, in accordance with the Drawings or as authorised by the Employer’s Agent.

The unit of measurement for welded steel fabric shall be the kilogram of fabric reinforcement in place, and the quantity shall be calculated from the net area covered by the mesh, excluding overlaps.

Clips, ties, separators, stools and other steel used for positioning reinforcement will not be measured, unless these are shown on the bending schedules.

The tendered rate shall include full compensation for the supply, delivery, cutting, bending, welding, placing and fixing of the steel reinforcement, including all tying wire, stools, supports and waste."

PSG 8.1.3 Concrete

Add the following to PSG 8.1.3.1(d):

“Strip foundations and encasement of pipes shall be cast directly against the sides and bottoms of excavations. No payment shall be made for additional concrete in overbreak.”

Delete “, or the plan size of the excavation where additional excavation is provided to facilitate erection of forms” from the second line of paragraph 8.1.3.1(c).

Add the following to PSG 8.1.3.3(a):

Add after “mixing, testing” in the second line of sub-clause 8.1.3.3(a) “including transport to an approved laboratory”.

PSG 8.2.6 Box out holes / Form voids

Replace the contents of Item (d) with the following:

“Large other than circular, of area over 0,1m² up and including 5m².”

PSG 8.4 SCHEDULED CONCRETE ITEMS

PSG 8.4.3 Strength concrete

Add the following after the last sentence:

In the case of structural floor screeds, the unit of measurement shall be the square metre and the average thickness and proportions will be stated."

"PSG 8.4.7* Curing of concrete ……Unit: m²

The rate tendered shall cover the costs for supplying and applying the curing compound in accordance with manufacturer's specifications.

(i) Vertical surfaces…….....Unit: m²
(ii) Horizontal surfaces……. Unit: m²"

"PSG 8.4.8* Inserts (type of description stated) …….. .....Unit: No

The tendered rate shall cover the cost of all labour, equipment, materials and incidentals required to build in the stated items as detailed on the drawings. The provision of the items to be built in will, except if otherwise stated, be measured for payment elsewhere."

PSG 8.5 JOINTS

Replace "Unit : m" with "Unit : m or m²".

Only designated joints as shown on the drawings will be measured for payment according to the length of each type of joint constructed (see PSG 2.2). 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 Sub-clause 5.5.7.3, 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.

"PSG 8.9* MISCELLANEOUS WORK OTHER THAN METAL WORK.....Unit : as scheduled

Separate items will be scheduled for each type of miscellaneous work.

The tendered rates shall include full compensation for providing all labour, materials and equipment required to carry out the work, for all preparatory work, for constructing the work scheduled in a workmanlike manner and for finishing-off and cleaning up when the work has been completed."

"PSG 8.10* Items Cast in Concrete…… …… .....Unit: No or m

Items cast in concrete will be measured by number or linear metre separately for each type of item."

"PSG 8.11* SCREEDS

(a) Floor screeds (1:3) with falls including V-joints to form panels and a smooth steel-trowelled finish/power float finish to top:

(i) Description of application and thickness..... Unit: m²
(ii) Etc for other applications and thicknesses

The unit of measurement shall be the square metre of screeds constructed.

The tendered rate shall include full compensation for constructing the screeds as specified including supplying of all materials, preparing the concrete surface to receive the screeds and for all else that may be necessary to complete the work."

"PSG 8.12* EPOXY-BASED BONDING AGENT AND PRIMER TO PREPARED CONCRETE SURFACES TO RECEIVE SCREEDING (FOSROC NITOBOND EP SLOWSET OR EQUIVALENT, APPROVED) Unit: m²

The unit of measurement shall be the square metre bonding agent applied.
The tendered rate shall include full compensation for preparing the concrete surface and for applying the agent both in strict accordance with the manufacturer's specification."

"PSG 8.13* PREPARATION OF CONCRETE SURFACE AND APPLICATION OF COATING SPECIFIED IN PSG 3.11 TO CONCRETE AND PLASTER LINING OF PUMP STATION SUMP…… ..... Unit: m²

The unit of measurement shall be the area of lining ordered to be treated and coated in accordance with the specifications

The rate tendered shall cover the cost of the supply of all labour, equipment and materials to complete the preparation and coating of the concrete lining as specified."

"PSG 8.14* WATERPROOFING (DERBIGUM TORCH-ON) ..... Unit: m²

The unit of measurement shall be the square metre waterproofing applied.

The tendered rate shall include full compensation for preparing the screed surface and for applying the waterproofing in strict accordance with the manufacturer's specification."

"PSG 8.15* CORROSION PROTECTION BY:

(a) Vinyl anti-fouling paint and undercoats to form an algae-resistant coating on:
  (i) (Description of structural element stated) .....Unit: m²
  (ii) Etc for other structural elements
(b) Solvent-free abrasion-resistant coating and primer to a minimum thickness of 3 mm on:
  (i) (Description of structural element stated) ..... Unit: m²
  (ii) Etc for other structural elements

The unit of measurement shall be the square metre of surface protected against corrosion.

The tendered rates shall include full compensation for surface preparation for supplying and applying the materials as specified, for all labour, equipment and appurtenant materials necessary to carry out the work and for all waste and cleaning up after the work has been completed."

"PSG 8.16* PREPARATION OF CONCRETE SURFACE AND APPLICATION OF JOINT SEALER AND COATING SPECIFIED IN PSG 3.11 TO CONCRETE OF SEPTIC TANK…….....Unit: m²

The unit of measurement shall be the area of lining ordered to be treated and coated in accordance with the specifications

The rate tendered shall cover the cost of the supply of all labour, equipment and materials to complete the preparation and coating of the concrete lining as specified."

"PSG 8.17* CONSTRUCT OVERFLOW WEIR STRUCTURES COMPLETE ..... Unit : Sum

Separate items will be scheduled for the various weir structures.

The rate tendered shall cover the cost of all excavation, backfill and disposal of surplus material, as well as the cost of providing all labour, plant and materials, including sulphate resistant cement, required to construct the weir structures complete as detailed on the drawings."

"PSG 8.18* TESTING FOR WATERTIGHTNESS:

(a) (Structure stated) ..... Unit: sum

The unit of measurement shall be the number of each structure successfully passing the specified watertightness tests to the satisfaction of the Employer's Agent.
The sums tendered shall include full compensation for the provision of all labour, plant and materials necessary for carrying out the test for watertightness as specified."

"PSG 8.19* SUPPLY AND INSTALLATION OF TERRAFORCE BLOCKS……Unit: m²

The rate tendered shall cover the cost of all transport, labour, equipment and materials necessary to supply and install the specified Terraforce blocks as indicated on the drawings. The Terraforce blocks to be installed strictly in accordance with the manufacturer's specifications.

The rate shall further include the cost for filling the retaining blocks with garden soil lightly tamped as the work proceeds."

PSGA CONCRETE (SMALL WORKS)

PSGA 1 SCOPE

Add the following to sub-clause 1.1

"This specification shall also cover brickwork for the construction of the valve chamber at the pump station."

PSGA 2 INTERPRETATIONS

PSGA 2.1 Supporting specifications

Add the following :

"(c) SANS 0400"

PSGA 3 MATERIALS

PSGA 3.2.1 Applicable specifications

Notwithstanding the provisions of this sub-clause, only ordinary or sulphate-resisting (where specified) Portland cement complying with SANS 471 shall be used.

PSGA 3.2.2 Storage of cement

Add the following:

"Cement shall not be stored on site for longer than 12 weeks."

"PSGA 3.8* Curing compound

Curing compound shall be white pigmented natural resin based liquid curing compound complying with ASTM C 309-74."

"PSGA 3.9* Materials for building work

PSGA 3.9.1* Cement

The requirements stipulated for sub-clause 3.2.1 and PSGA 3.2.1 shall apply.

PSGA 3.9.2* Sand

Sand for mortar shall comply with SANS 1090.

PSGA 3.9.3* Bricks

All bricks shall comply with SANS 227 and shall be hard burnt clay bricks (face bricks) free of stones, cracks and other defects. The bricks shall be obtained from an approved manufacturer and samples of bricks shall be submitted to the Employer's Agent.

PSGA 3.9.4* Mortar

Mortar shall comprise of the cement, lime and sand mixed in the proportions given below:

Cement	:	50kg
Lime	:	0 - 40ℓ
Sand	:	130ℓ (measured loose and damp)

PSGA 3.9.5* Precast concrete sections

Dolomitic aggregate shall be used in the manufacture of precast concrete sections.

"PSGA 3.10* Fibreglass Gratings

The fibreglass gratings to comply with BS4592. The fibreglass grating to be square mesh and moulded. Gratings to have maximum deflection limited to SPAN/200. Square mesh to be 50mm with a span of 500mm and depth of 50mm. To be provided either in grey or yellow colour unless otherwise approved by the Employer's Agent in writing."

PSGA 4 PLANT

PSGA 4.4.2 Finish

The finish to all exposed concrete shall be smooth and that to buried or backfilled surfaces, rough.

PSGA 5 CONSTRUCTION

PSGA 5.4.1.5 Strength concrete

Add the following:

"The Contractor shall when requesting approval of a mix design, submit the constituent proportions of the proposed mix together with the results of compressive strength tests carried out."

PSGA 5.4.2 Batching

Notwithstanding the requirements of this sub-clause, the method of batching shall be subject to approval.

PSGA 5.4.7 Curing and protection

Notwithstanding the provisions of this sub-clause, all cast in situ concrete shall, except where otherwise authorised, be cured in accordance with the requirements of sub-clause (c) using curing compound of the type specified in PSGA 3.8.

PSGA 5.4.8 Concrete surfaces

All unformed concrete surfaces shall, except where otherwise ordered, be given a wood float finish.

"PSGA 5.4.11* Concrete coatings

The internal surface of the pump sump shall be treated with a coat of "Sigmaguard HS Green" or similar approved, followed by a coat of "Sigmaguard HS Grey" or similar approved. Both coats shall have a nominal thickness of 125µm and shall be applied strictly in accordance with the manufacturer's instructions. The concrete surface to be coated shall also be cleaned and prepared as required by the manufacturer of the coating used."

"PSGA 5.5* Brickwork

Brickwork shall be built in stretched bond to the dimensions shown on the drawings. All bricks shall be well soaked in water immediately before being laid and the previous course of bricks shall be well wetted before the laying of the following course.

Walls shall be carried up regularly so that no brickwork is more than 1m higher than adjoining brickwork.
Mortar joints shall not exceed 10mm in thickness and shall be pointed. The mortar used shall be mixed in small quantities and used within 2 hours of mixing.

PSGA 6 TOLERANCES

PSGA 6.4 Permissible deviations

Add the following:

"Notwithstanding the tolerances specified for the construction of the embankment, the following tolerances shall apply to the construction of the apron slab:

Position in plan	:	Within 100mm of its designated position, provided that over any length of 30m, the deviation from a straight line joining the extremities of the 30m section, shall not exceed 25mm.
Thickness	:	Not less than 95mm.
Width	:	± 25mm provided the requirements with respect to alignment are met.
Level	:	± 10mm provided the requirement with respect to thickness is met and that the distance between the surface and a 3m straight edge placed on the apron slab is nowhere more than 5mm.

PSGA 7 TESTS

PSGA 7.1.2 Frequency and sampling

Notwithstanding the requirements of this sub-clause, the Contractor shall take note that he is responsible for taking an adequate number of tests to ensure that the concrete being used complies with the specification. The Employer's Agent will only carry out such check testing as he requires.

PSGA 8 MEASUREMENT AND PAYMENT

PSGA 8.1.2 Reinforcement

Replace the contents of this clause with the following:

"The unit of measurement for steel bars shall be the ton of reinforcement in place in accordance with the drawings or as authorised by the Employer's Agent.

The unit of measurement for welded steel fabric shall be the square metre of fabric reinforcement in place and the quantity shall be calculated from the nett area covered by the mesh, excluding laps.

Clips, ties, separators, stools and other steel used for positioning reinforcement shall not be measured unless shown on the bending schedules.

The rate tendered shall cover the cost of the supply, delivery, cutting, bending, placing and fixing of the steel reinforcement, including all tying wire, stools, supports and waste."

PSGA 8.1.3 Concrete

Delete all references to "intermediate excavation" throughout this sub-clause.

Notwithstanding the provisions of sub-clause 8.1.3.1 (b) and (d) concrete required to replace overbreak or over-excavation will not be measured for payment (refer PSD 3.2.2, PSD 5.1.1.3 and PSD 5.2.2.1).

Add after "testing" in the second line of sub-clause 8.1.3.3(a) "including transport to an appr laboratory."

PSGA 8.5 Joints

Replace the unit of measurement "m" with "Number".

"PSGA 8.9* Construct overflow weir structures complete ..... Unit : Sum

Separate items will be scheduled for the various weir structures.

The rate tendered shall cover the cost of all excavation, backfill and disposal of surplus material, as well as the cost of providing all labour, plant and materials, including sulphate resistant cement, required to construct the weir structures complete as detailed on the drawings."

"PSGA 8.10* Construct apron slab and anchor beam complete.....Unit : m

The unit of measurement shall be the metre run of apron slab and anchor beam constructed complete, measured along the outside edge of the apron slab.

The rate tendered shall cover the cost of all excavation, backfill and disposal of surplus material, as well as the cost of providing all labour, plant and materials required to construct the apron slab and anchor beam complete as detailed on the drawings, including reinforcement and construction joints, but excluding expansion joints which will be measured separately, and the cost of complying with the tolerances specified."

"PSGA 8.11* Fibreglass Gratings……Unit: m²

The supply, delivery and installation of fibreglass gratings will be measured as the net area of the face of the grating. The unit rate for fibreglass grating shall cover the cost of the supply, cutting and placing of the grating and the cost of all waste associated."

PSHA STRUCTURAL STEELWORK (SMALL WORKS)

PSHA 3 MATERIALS

PSHA 3.1 Structural steel

Replace the first sentence of this Sub-Clause with the following:

"Unless otherwise specified on the drawings, steel shall be grade 300W complying with the requirements of SANS 1431."

Add the following:

"Stainless steel shall be Grade 316 (18/8/3) A.1.S.1"

PSHA 5 CONSTRUCTION

"PSHA 5.2.11* Prevention of Corrosion

The Contractor shall review all designs in order to achieve acceptable corrosion protection.
All items shall be designed to minimise corrosion in the environment in which they will be exposed.
Mastics, sealants, insertion rubber or suitable gasket material shall be used to seal unavoidable crevices such as bolted connections.

The design shall ensure that all surfaces to be coated shall be accessible for fettling, blast cleaning, painting and for maintenance of these surfaces. Stainless steel surfaces shall be accessible for pickling and passivation. The use of back-to-back angles, partially open box sections or inaccessible stiffeners shall be avoided. Inaccessible surfaces which cannot be avoided shall be welded closed.

Particular attention shall be paid to the fabrication and inspection requirements for **internal weld surfaces** in pipework.

All applications associated with wastewater shall be regarded as corrosive and materials of construction shall be selected to suit."

PSHA 8 MEASUREMENT AND PAYMENT

Add the following new clause:

"PSHA 8.4* MISCELLANEOUS ITEMS……..... Unit: as scheduled

Separate items will be scheduled for each type of miscellaneous work.
The tendered rates shall include full compensation for providing all labour, materials and equipment required to carry out the work, for all preparatory work, for constructing the work scheduled in a workmanlike manner and for finishing-off and cleaning up when the work has been completed."

PSL MEDIUM PRESSURE PIPELINES

PSL 2 INTERPRETATIONS

''PSL 2.1.3* Drawings

Drawings numbered L1, L2 and L3 referred to in this standardized specification have been superseded by the Employer's Agents' Drawings. Wherever the aforementioned drawings are referred to, the appropriate of the details shown on the Employer's Agent's Drawings shall apply."

PSL 2.4 ABBREVIATIONS

Add the following:

“uPVC: Unplastisized polyvinyl chloride.

HDPE: High Density Polyethylene.”

PSL 3 MATERIALS

PSL 3.1 GENERAL

Add the following paragraphs:

"Each type of pipe delivered to the Site shall have a standard length corresponding with the standard lengths offered by the pipe manufacturer in his catalogue, with a maximum permissible variation in length of ± 2%.

A pipe that is a shorter or longer than the defined standard will be rejected by the Employer’s Agent, except when such non-standard lengths are required in terms of the Contract and have been specifically manufactured or cut as such by the pipe manufacturer or supplier."

PSL 3.3 CI PIPES, FITTINGS AND SPECIALS

Add the following:

“CI fittings and specials for use with uPVC pipes shall be class 16, Rillsan coated.”

PSL 3.4.2 Pipes of nominal bore up to 150mm

Add the following:

Notwithstanding the requirements of this Sub-Clause, pipes of normal bore up to 150mm shall be, except where otherwise shown on the Drawings or authorised, be flanged.

PSL 3.4.3 Pipes of nominal bore over 150mm

The pipes shall be stainless steel grade 316.

Add the following:

“Stainless steel pipes shall be Electrical Resistance Welded pipes manufactured from grade 316 stainless steel with a minimum pipe wall thickness of 4,5 mm. All welds shall be professionally pickled and passivated.
The welding integrity of all stainless steel shall be inspected by an Authorised Inspection Authority.”
Delete paragraph (b).

PSL 3.4.4 Fittings and Specials

Add the following:

“Stainless steel pipes shall be Electrical Resistance Welded pipes manufactured from grade 316 stainless steel with a minimum pipe wall thickness of 4, 5 mm. All welds shall be professionally pickled and passivated.
The welding integrity of all stainless steel shall be inspected by an Authorised Inspection Authority.”

Replace the heading of sub-clause 3.7.3 with:

PSL 3.7.2 Polyethylene pipes

Add the following:

"Polyethylene pipes shall be black HDPE pipes complying with SANS ISO 4427, manufactured from PE 80 or PE 100 material with a nominal pressure rating (PN) of 12.5 bar. Compression fittings shall be used with HDPE pipes and shall be "Plasson", “Alprene” or approved equivalent with a nominal pressure rating of 16 bar (PN16)”.

“PSL 3.7.3 uPVC pipes

Replace the heading of sub-clause 3.7.3 with: “uPVC Pipes and Fittings.”

Replace the contents with the following”

“uPVC pipes and fittings shall be provided with spigot and socket rubber ring joints and shall comply with SANS 966-1. Solvent welded fabricated fittings will not be acceptable.”

PSL 3.8.3 Flanges and accessories

Add after “insertion piece” in the second line “consisting of a full face gasket”.

Notwithstanding the provisions of this clause, all flanges shall be drilled to SANS 1123/1600/3 and all bolts, nuts and washers shall be stainless steel grade 316 and shall comply with EN ISO 3506-44, as applicable.

PSL 3.8.4 Loose flanges

Bolts and nuts shall comply as stated in PSL 3.8.3.

PSL 3.9.1 CI pipes

Notwithstanding the provisions of this sub-clause, all CI pipes, fittings, specials, valves, meters and hydrants shall be coated internally and externally using “Rillsan”. The coating shall be 250 – 300 microns thick and shall be applied by an approved applicator. Fusion bonded epoxy (FBE) coating applied internally and externally to SANS 1217 or DIN 30677 will also be accepted.

PSL 3.9.2 Steel pipes

Notwithstanding the provisions of this Sub-Clause, all steel pipes and specials to be installed shall be heavy duty hot dipped galvanized complying with the requirements of SANS ISO 1461 and shall **not** be passivated.

After the galvanizing process, all steel pipes and specials shall be cleaned, scrubbed and washed down firstly with a suitable solvent and then with clean water. Immediately thereafter, the pipes and specials shall be internally and externally coated as scheduled below, all in accordance with the manufacturer’s instructions.

Coat	Product	DFT (µm)		
		Min	Nominal	Max
1	Holding Primer Sigmacover or approved equivalent	45	50	75
2	Sigma TCN 300 (Brown) or approved equivalent	125	150	175
3	Sigma TCN 300 (Black) or approved equivalent	125	150	175
Total DFT		295	350	425

All coats shall be in contrasting colours and no DFT reading may be less than nor more than the minimum and maximum values specified. The overall average DFT shall not be less than the nominal DFT specified.

Application shall be by airless or conventional pressure pot spray systems and thinners shall be used strictly in accordance with the manufacturer's instructions. All critical areas like edges and welds shall be given an extra stripe coat.

Note :

The drilling patterns for flanges shall be SANS 1123/NP1600/3 and all pipes, specials and fittings shall be supplied complete with all necessary stainless steel bolts, washers and nuts as well as appropriate insertion pieces applicable to diameter and material.

PSL 3.9.6 Corrosive soil

Replace the contents with the following:

"All buried flanged joints, together with their bolts, shall be protected by means of "Denso" paste and then wrapped to give a covering of at least three layers of "Denso" impregnated tape, or other means of inhibiting corrosion approved of by the Employer's Agent. Denso tape must be carefully moulded over the paste and fitting in order to expel all voids."

PSL 3.10 VALVES

Replace the contents of this Clause with the following:

PSL 3.10.1 Gate Valves

Gate valves shall be Wedge Gate type and shall conform to the requirements of SANS 664. All valves shall have a working pressure of 16 bar and shall be anti-clockwise opening with a rising spindle and handwheel, unless otherwise specified.

The wedge shall be fully encapsulated with NBR rubber internally and externally. The wedge nut shall be of the "fixed nut" concept allowing no movement and manufactured from dezinctification resistant high tensile navy brass. The primary seal for stern sealing shall be a NBR rubber hydraulic U seal (Manchette type) and the secondary seal shall consist of at least two NBR O rings inside and two outside of a Nylon Bush. The body of the valve shall further bear the SABS mark, trade name, as well as the size and class of valve.

PSL 3.10.2 Air Valves

Sewer Rising Mains – Air valves shall be DN 50 Ari combination air valves Model D 025 sewage valves, PN 16, with flanged ends, or similar approved."

PSL 3.10.3 Check Valves

Check valves shall be JV 9720 or similar approved ball check valves. It shall be externally and internally coated with epoxy coating to DIN 30677. The valve shall further be pressure rated to 16 bar."

"PSL 3.9.7* Corrosion protection of Valves

All gate valves shall be fusion-bonded epoxy coated internally and externally to SANS 1217 or DIN 30677."

PSL 3.11.1 Bricks

All bricks to be used on this Contract shall be NFX burnt clay masonry units complying with SANS 227.

PSL 3.11.5 Manhole covers and frames

The requirements of the sub-clause shall apply, except that the type of cover and frame to be used shall be as detailed as called for on the Drawings.

PSL 3.11.6 Surface Boxes

All surface boxes shall be as specified and detailed on the Drawings.

PSL 5 CONSTRUCTION

PSL5.1.1 GENERAL

Add the following to Clause 5.1.1:

“PVC pipes shall be laid, cut and jointed strictly in accordance with the manufacturer’s instructions. A pipeline shall further be laid continuously; the leaving of gaps for fittings will not be permitted.”

PSL 5.1.4 Depths and cover

Notwithstanding the requirements of this Sub-clause, the pipeline shall be laid to the levels shown on the Drawings or as ordered by the Employer’s Agent.

“PSL 5.1.4.6* The top of the spindle of a gate valve shall not be less than 75mm nor more than 600mm below the level at which the soffit of the valve box is to be set. To ensure the aforementioned, valve spindle extension pieces shall be fitted by the Contractor, complete with stabilisers, where required.”

PSL 5.6 VALVE AND HYDRANT CHAMBERS

Notwithstanding the requirements of sub-clause 5.6.1 and 5.6.2, all chambers shall be constructed in accordance with the details shown on the Drawings.

PSL 5.11 MARKER BLOCKS FOR VALVES AND PIPELINES

Marker blocks shall be as detailed on the Drawings and positioned and erected as indicated by the Employer’s Agent.

PSL 6 TOLERANCES

PSL 6.2 CONTROL POINTS

Add the following:

“Valves shall be located as indicated on the drawings and to within a longitudinal tolerance of 100mm.”

PSL 6.3 ALIGNMENT (PLAN AND LEVEL)

Add the following to last sentence:“, provided it does not result in a reversal of the grade of the pipeline."

PSL 7 TESTING

PSL 7.1 GENERAL

Add the following after the first sentence:

“Pipelines shall be tested after the pipes have been laid and bedded, prior to the completion of the main backfill, and the Contractor shall ensure that all joints and fittings are left open for inspection during the test procedure (see PSL 5.1.1).”

PSL 7.3.1 Test pressure and time of test

Add to following to sub-clause 7.3.1.1:

“The Contractor's test equipment shall be connected directly to the flange of a hydrant tee and not through the hydrant's screwed outlet, or through a specially adapted end cap or a short, discardable pipe. Alterations may have to be made to the Contractor's test equipment to allow the placing of a Water Division's "in-line" check pressure gauge.

If necessary, this will be requested by the Employer’s Agent prior to the start of a leakage test. Upon the successful conclusion of a leakage test, the removal of the Contractor's equipment from the tee and the fitting of the hydrant (supplied by Contractor) will be done by the Water Division when connecting the new reticulation."

With reference to sub-clause 7.3.1.2 the maximum working pressure shall be the pressure rating of the pipe.

Replace the last line of Clause 7.3.1.3 “less than ….. these points” with the following:

“less than 1,25 nor more than 1,5 times the specified maximum working pressure.”

Delete sub-clause 7.3.1.4.

Add the following to sub-clause 7.3.1.5;

"Water used by the Contractor to fill the reticulation and during testing shall be water drawn from the Municipal mains and transported in a clean container. A metered connection may be installed by the Water Division upon the request of the Contractor and upon the payment of the prescribed fee. The bleeding off of air trapped within the reticulation shall only be carried out via the hydrants, erf connections or at the prescribed connection points to the existing reticulation by:

(1) a bleeder system fitted to the end caps, or
(2) a bleeder system fitted to a short length, say 500mm, of a pipe included at the end of the new reticulation.

The Water Division will remove and return the end caps and short length of pipe to the Contractor once the new reticulation is connected.”

“PSL 7.3.5* Removal of Test Equipment

Upon the successful completion of the leakage test the new reticulation will be deemed to be Municipal property and the Contractor shall not carry out any work on the pipes apart from the disconnection of his pump (but not his flange and pipe system from the hydrant tee), the completion of the backfilling to the pipeline and construction of the hydrant and valve chambers. The Water Division will connect in the new reticulation as soon as possible and the Contractor shall supply such materials, pipes and specials as detailed by the Employer’s Agent. The completion of backfill at the connection points and the surface restoration/reinstatement shall be carried out by the Contractor.”

“PSL 7.3.6* Defects Liability Period

Should leaks or defects develop during the Defects Liability Period they shall be rectified by the Municipality at the Contractor's expense. This will include the cost of re-testing and subsequent sterilization. During the Defects Liability Period the Municipality may carry out further pressure tests on the whole or part of the new reticulation and any necessary remedial work shall be carried out at the Contractor's expense.”

PSL 8 MEASUREMENT AND PAYMENT

PSL 8.1 GENERAL

Replace the second sentence of this Clause with the following:

"No payment will be made for depths of excavation in excess of those specified unless ordered in writing by the Employer's Agent."

PSL 8.2.1 Supply, lay and bed pipes complete with couplings……Unit: m

Add the following:

"The rate tendered shall further cover the cost of the work provided for under 8.2.4, for the supply and installation of all stainless steel bolts, nuts, washers, insertion pieces, for corrosion protection as specified, and with respect to testing, for the supply and installation of all equipment, fittings and specials required, as well as the cost of water drawn and the disposal of the sterilisation solution. The measured quantity of pipe length will not, except for the payment of materials on site, be measured for payment until the length under consideration has been accepted in terms of sub-clause 7.3, PSL 7.3.1 and PSL 7.3.3.

PSL 8.2.2 Extra over 8.2.1 for the supplying, laying and bedding of specials complete with couplings .....Unit: No

Add the following:

"The rate tendered shall also as applicable cover the cost of the provision of corrosion protection as specified as well as the supply and installation of all stainless steel bolts, nuts, washers, insertion pieces, as required."

PSL 8.2.3 Extra over 8.2.1 for the supplying, fixing and bedding of valves ..... Unit: No

Add the following:

"The rate tendered shall also as applicable cover the cost of the provision of corrosion protection as specified as well as the supply and installation of all stainless steel bolts, nuts, washers, insertion pieces, as required."

PSL 8.2.4 Extra over 8.2.1 for the cutting of the pipe and the supplying and fixing of the extra coupling

Delete this Clause:

Provision has been made under PSL 8.2.1 for the measurement and payment of work included under this Sub-Clause.

PSL 8.2.10 Temporary valves etc

Delete this Clause:

Provision has been made under PSL 8.2.1 for the measurement and payment of work included under this Sub-Clause.

Replace the heading and contents of sub-clause 8.2.13 with the following:

"PSL 8.2.13 Chambers

a) Valve Chambers, etc. ....Unit: No

Valve chambers, etc., will be measured as complete units for which separate items will be scheduled for each type of chamber of overall depth not exceeding 1,5m from soffit of roof to floor level complete as detailed on the Drawings.

The tendered rate shall cover all materials, plant and labour necessary for the complete construction of the chambers, including ladders, doors, manhole covers and frames, handrails, the lifting davit as well as the compaction of the bottom of the chamber excavation to 90% of modified AASHTO maximum density as well as for building in of the pipes through the wall, for frames and concrete pedestals, as and when required.

b) Extra over for chambers of depth exceeding 1,5m ..... Unit: No

Additional depths of chambers in excess of 1,5m will be measured in increments of 0,5m depth for each type of chamber.

The rate tendered shall cover the cost of the complete construction of each extra 0,5m additional depth as well as for additional step irons, brickwork and uPVC pipe as required."

PSL 8.2.15 Special Wrapping in Corrosive Soil

Delete this sub-clause. Provision has been made under PSL 8.2.1 for the measurement and payment of work included under this Sub-Clause.

"PSL 8.2.16* Connection to existing mains Unit: No

The rate tendered shall cover the cost of isolating the main, cutting into the main to accommodate the connecting fittings, dewatering the excavation, taking steps to prevent the ingress of ground, stones and other material into the main, as well as for any required liaison with others and for making good any damage to the existing main.

The excavation to expose the main, the supply, laying, bedding coupling up and testing of valves and specials used in the connection, as well as the provision of bedding, will be measured for payment under the appropriate items provided for this in the schedule."

"PSL 8.2.17* Supply and install marker blocks Unit: No

The tendered rate shall cover the cost of the supply of markers blocks complying with the details shown on the Drawings, as well as for all labour and equipment required to install the markers as specified in PSL 5.11, or as directed."

PSLB BEDDING (PIPES)

PSLB 2.3 DEFINITIONS

Flexible pipe

Add the following:

"uPVC, HDPE and steel pipes shall all be classified as flexible pipes."

PSLB 3 MATERIALS

PSLB 3.1 SELECTED GRANULAR MATERIAL

Replace the contents of Clause 3.1 with the following:

"Selected granular material shall be an aggregate, sand or granular material, all being a non-cohesive material that is free of vegetation, the grading analysis of which shows 100% passing a 13,2mm sieve and not more than 5% passing a 0.075mm sieve and has a compactability factor not exceeding 0,4."

PSLB 3.3 BEDDING

Add the following:

"For the purposes of this clause uPVC and steel pipes shall be classified as flexible pipes."

PSLB 3.4.1 Suitable material available from trench excavation

Replace the words "(but is not required") in the fifth line with the words "(at his own cost)."

"PSLB 3.5* BEDDING IN WATERLOGGED CONDITIONS

Where ordered by the Employer's Agent a bedding cradle of the specified thickness, comprising of 6,7mm concrete stone complying with SANS 1083, shall be used in waterlogged conditions."

PSLB 5 CONSTRUCTION

PSLB 5.1.1.2 Bottom

Add the following:

"Where expansive clay is encountered in the trench bottom, the selected fill blanket shall comprise of selected granular material."

PSLB 5.1.2 Details of bedding

Notwithstanding the provisions of this sub-clause, pipes shall be bedded and protected in accordance with the details shown on the Drawings, which shall supersede, as applicable, drawings LB 1 through to LB 5.

PSLB 5.3 PLACING AND COMPACTING OF FLEXIBLE PIPES

Notwithstanding the provisions of this sub-clause, the bedding for flexible pipes shall be constructed to the dimensions shown on the Drawings and by using the bedding material specified (refer also PSLB 5.1.2).

PSLB 8 MEASUREMENT AND PAYMENT

PSLB 8.1.3 Volume of bedding materials

Notwithstanding the provisions of this sub-clause, the volume of bedding will be computed from the dimensions shown on the Drawings.

Replace the last sentence with the following:

"No allowance will be made for bulking of material or any additional volume of bedding material required due to over break or any other cause.

Further, the volume of bedding displaced by the pipeline will not be measured for payment."

PSLB 8.1.5 Disposal of displaced material

Replace the contents of this Clause with the following:

"Material displaced by the pipeline and by imported material from sources other than trench excavation, shall be disposed of at an approved site furnished by the Contractor. No haulage shall be payable for such material."

PSLB 8.1.6 Free-haul

Delete the words “of 0,5km” in the first line of this Clause.

PSLB 8.2.2.3 From commercial sources

(c)*6,7mm concrete stone to SANS 1083 ....Unit: m³

Add the following to the end of this Clause:

“Commercial sources shall include off-site sources located by the Contractor.”

“PSLB 8.2.2.4* Extra over for hand placing of bedding material using local labour..... Unit : m³

The rate tendered shall cover the additional cost, extra over that provided for under 8.2.2.1, 8.2.2.2 and 8.2.2.3 to hand place the bedding material using local labour from the immediate area. The bedding material shall be off-loaded along the trench at a spacing determined by the Contractor for the effective placing of the material in the trench by hand only. The rate shall include for any wastage and the slow rate of placing using labour only.

The volume shall be computed from the dimensions specified, shown on the drawings or ordered by the Employer’s Agent."

PSLB 8.2.5 Overhaul of Material for Bedding … etc.

Delete this sub-clause.

PSLD SEWERS

PSLD 1 SCOPE

Add to sub-clause 1.1: “Drawings Numbered LD2 to LD8 has been replaced by the Employer’s Agent’s drawings. Whenever the aforementioned drawings are referred to, the appropriate of the details reflected on the Employer’s Agent’s drawings shall apply.”

PSLD 2 INTERPRETATION

PSLD 2.4 ADDITIONAL ABBREVIATIONS

Add the following abbreviation to sub-clause 2.4:

“FC : Fibre cement”

PSLD 3 MATERIALS

Replace the heading and contents of Sub-clause 3.1.5 with the following:

“PSLD 3.1.5 Pipes and fittings

PSLD 3.1.5.1 uPVC structured wall pipes

uPVC structured wall pipes shall comply with SANS 1601 – type 1 with a pipe stiffness of 400 kPa and smooth inner and outer walls, complete with integral sockets, joints and rubber seal rings.
PSLD 3.1.5.2 uPVC solid wall pipes

uPVC solid wall pipes shall comply with the requirement of SANS 791.

PSLD 3.1.5.3 Fittings

Fittings for structured wall and solid wall pipes shall comply with the requirements of SANS 791.

PSLD 3.1.5.4 Above ground pipes and fittings

The above ground pipes and fittings shall comply with SANS 967."

PSLD 3.1.8* Channel sections for manholes

Channel sections for manholes shall comprise of FC channel bends.

PSLD 3.5.2 Precast concrete sections

Dolomitic aggregate shall be used in the manufacture of precast concrete sections.

PSLD 3.5.3 Prefabricated FC manholes

Prefabricated FC manholes will not be permitted.

PSLD 3.5.4 Concrete

The use of dolomitic aggregate will not be required for cast in situ concrete.

PSLD 3.5.5 Sand

The use of dolomitic sand will not be required for cast in situ concrete.

PSLD 3.5.7 Step irons

Step irons in manholes will not be required.

PSLD 3.5.8 Manhole covers and frames

Replace the contents of this Sub-clause with the following:

"PSLD 3.5.8.1Precast concrete elements

Precast concrete roof slabs and covers shall comply with the applicable requirements of SANS 1294 and the strength requirements specified on the drawings. The elements shall be manufactured in accordance with the details shown on the drawings using concrete consisting of dolomitic aggregate.

Precast concrete roof slabs and covers shall be used throughout the works except in roadways, or where otherwise ordered by the Employer's Agent.

PSLD 3.5.8.2 Cast iron manhole covers and frames

Type 2A heavy duty cast iron manhole covers and frames complying with SANS 558 shall be installed where ordered by the Employer's Agent, in accordance with the details shown on the drawings."

PSLD 5 CONSTRUCTION

PSLD 5.2.2 Alignment

Add after "SANS 1200 LB" in the first sentence, the following:

"and the details shown on the drawings."

Replace the last sentence with the following:

"Pipes that have any deviation from straightness shall be so laid that preference is given to level over line."

"PSLD 5.2.6* Jointing

Jointing shall be carried out strictly in accordance with the manufacturer's instructions."

"PSLD 5.2.7* Depth of cover beneath roadways and vehicular trafficked areas during construction

The minimum depth of cover during construction shall be 750mm."

PSLD 5.4 CONNECTIONS TO MANHOLES

Replace the contents of this Sub-clause with the following:

"The sewer shall be jointed to the pipes built into the manholes as shown on the drawings."

PSLD 5.6 MANHOLES, INSPECTION CHAMBERS, ETC.

PSLD 5.6.1 General

Delete in Sub-clauses (a) and (b) the word "brick" and replace by "pre-cast concrete".

PSLD 5.6.2 Benching

PSLD 5.6.2.1 Notwithstanding the requirements of this sub-clause, pipes shall be prepared and built into manholes as shown on the drawings.

PSLD 5.6.2.3 Replace "1:3 cement mortar" in the first line with "concrete topping consisting of 1 part cement, 2 parts sand and 3 parts 7mm concrete stone, by mass. The sand proportion may be varied between 1 ½ and 2 ½ to obtain ideal workability."

PSLD 5.6.5 Precast concrete manholes

Replace the contents of this Sub-clause with the following:

"Precast concrete manholes shall be constructed in accordance with the details shown on the drawings. Joints between chamber sections shall be caulked from the inside with 3:1 sand cement mortar or other sealing method approved by the Employer's Agent."

PSLD 5.6.6 The laying and jointing of channels in manholes

Add the following:

"Any bitumen or other coating applied to the exterior of channels shall be removed before they are laid."

"PSLD 5.6.7* Finished cover level

Unless otherwise shown on the drawings or ordered, the level of the top surface of the cover shall be:

- for manholes within carriageways; flush with the final surface of the roadway.
- for manholes within road reserves; 50mmabove finished ground level.
- for manholes within midblock; 250mm above finished ground level.
- for manholes within open spaces; 500mm above the finished ground level."

"PSLD 5.6.8* Rectification of water infiltration

Any infiltration visible in the manhole channels, pipe ends or benching shall be rectified by demolishing the base and rebuilding.

Rectification of infiltration through the walls and/or joints may be attempted only by externally applied measures, failing which the manhole shall be demolished and re-constructed."

PSLD 5.9 CONNECTING SEWERS

PSLD 5.9.2 Marker posts

Marker posts are not required.

PSLD 5.9.3 Recording Location

Add: "The information required under this clause shall be shown on the appropriate form obtainable from the Employer's Agent's Representative.

"PSLD 5.9.4* As-built information

The Contractor shall after completion of a section of pipeline submit the following as-built information:

- Invert levels at manholes
- Distances between manholes

"5.11* Connections of new to existing reticulation

The connection between the new sewer system and the existing collector main shall be effected by the Contractor once the system upstream is complete, tested to specification and accepted by the Employer's Agent.

PSLD 6 TOLERANCES

PSLD 6.2 OVERALL CENTRE-LINE CONTROL AND MANHOLE LOCATIONS

Replace "±300mm" in the second line of this Sub-clause with "±100mm"

Replace "plus or minus half a pipe length" in the last line of this Sub-clause with "±200mm".

Add the following:

"The Contractor shall note that the positions in plan of manholes are critical. No deviation in excess of the tolerances specified will be accepted without the prior authorization of the Employer's Agent."

PSLD 7 TESTING

PSLD 7.1 GENERAL

Add to Sub-clause 7.1.6 (a):

"In addition to the stated requirements, a torch and mirror test as described in PSLD 7.2.7 shall be carried out on all sections of the sewer, in both directions."

PSLD 7.2.1 Air test

Add the following:

"After the completion of a successful air test the pipes shall be flushed out to remove all dirt, grit and the like."

PSLD 7.2.3 Rejection

Add in before "AC" in the first line "uPVC structured wall or solid wall"

PSLD 7.2.6 Watertightness of manholes

Especially in areas where the water table is low a test, as detailed hereafter, to verify the watertightness of any manhole may be requested by the Employer's Agent's Representative.

Infiltration: The excavation surrounding the manhole shall be flooded to approximately the top of wall level and this depth of water maintained for at least 48 hours. The manhole will have satisfied the test requirements provided there is no sign of infiltration of water.

Exfiltration: The manhole shall be filled with water to the top of its wall level and this depth maintained for at least 24 hours. Water may be added to maintain this level.

At the end of the subsequent 24 hour period the drop in water level is to be measured. The manhole will have satisfied the test requirement provided the drop is less than 75mm per metre in depth of the manhole measured from channel invert to the original height of the water. At the discretion of the Employer's Agent's Representative a shorter testing time, minimum 3 hours, will be allowed in which case a "drop in level" pro rata to the time tested, shall be used.

"PSLD 7.2.7* Torch and mirror test

The equipment for the test shall comprise of the following:

- A torch capable of emitting a strong beam of light.
- A mirror
- A wooden plug covered on one side with suitable reflector material. The diameter of the plug shall suit the diameter of the pipe being tested.

The test shall be carried out by plugging one end of the pipe with the plug reflector and reflecting the torch beam off the mirror down the pipe from the other end. For the pipeline to be acceptable at least 50% of the plug's reflected area shall be visible."

"PSLD 7.2.8* Acceptance criteria

The acceptance of the pipe length or manhole shall depend upon whether it satisfies the criteria set out in SANS 1200 LD clauses 6,7 and the PS clauses above.

Only tests carried out on the pipelines after completion of the backfilling to ground level (excluding surface restoration) and construction of manholes to roof height and benching will be considered for acceptance purposes.

PSLD 8 MEASUREMENT AND PAYMENT

PSLD 8.2.1 Supply, lay, joint, bed and test pipeline

Add the following:

"The rate tendered shall further cover the cost of providing the water and for flushing out the pipeline as called for in terms of PSLD 7.2.1, as well as for the disposal of the water.

The measured quantity of completed pipe length will only be included in the payment certificate when pipeline has satisfied the test after the completion of the backfill to ground level – see PSLD 7.2.8. Prior to this, payment will be made as materials on site."

PSLD 8.2.2 Extra over item 8.2.1 for specials

All specials shall include for the provision of couplings as required.

PSLD 8.2.3 Manholes

Add the following:

"Separate items will be scheduled for the different types of manholes in depth increments of 0,5m, the depth being measured from the invert of the channel in the centre of the manhole to the top level of the cover.

The rate shall cover the cost of dealing with any excavation (as if in soft excavation including disposal of surplus) that is additional to that measured under the item for pipe trench excavation, constructing the manholes complete as detailed on drawings, the provision of materials and the laying and jointing of channels as for "straight through manholes", benching, as well as building in the short pipe specials measured under 8.2.2".

Manholes will not be measured for payment until they have been accepted in terms of PSLD 7.2.6."

PSLD 8.2.7 Encasing of pipes in concrete

Notwithstanding the provisions of the payment Clause, provision shall be made for forming joints at positions that suit the pipe lengths used, as well as for complying with the requirements of 5.7.

PSLD 8.2.11 Connection into Existing Sewer .....Unit : No

Replace the contents of this Sub-clause with the following:

"The rate tendered shall cover the cost of breaking into the manhole, cutting the new pipes to suit the connection, building in the proposed pipe, any additional benching and channelling associated with the connection, cutting the new pipes to suit the connection, extra couplings, dealing with the existing flow, preventing foreign material entering the sewer, making the manhole structure watertight and making good any work disturbed such as benching, plastering, brickwork, manhole wall, covers and frame."

Add the following new clause:

"PSLD 8.2.13* Testing of Water tightness of Manholes .....Unit : No

The rate tendered shall cover the cost of providing all equipment and materials necessary to complete the test in accordance with the requirements of PSLD 7.2.6, irrespective of the depth of manhole.

Payment will only be made for a successful test."

PSM ROADS (GENERAL)

PSM 6 TOLERANCES

"PSM 6.4* DIMENSION AND LEVEL CONTROL

The Contractor shall submit to the Employer's Agent a record of the surface levels of the section of layer under consideration, prior to requesting inspection and acceptance control testing. The levels shall be taken at meterage and co-ordinate intervals that coincide with those given on the drawings, in accordance with the requirements of 6.3."

PSM 7 TESTING

PSM 7.1 GENERAL

Notwithstanding the provisions of this Clause, the Contractor shall note that the random sampling method of TMH 5 for the spotting of positions for field density testing will not necessarily be applied by the Employer's Agent. Testing shall be carried out where in his opinion the density is suspect.

The Contractor shall further present the full width of the layer between the stated linear stake values for acceptance - only in exceptional cases may partial widths be presented.

PSM 7.2 PROCESS CONTROL

Add the following:

"Process control to be carried out by the Contractor shall be executed by an independent testing laboratory approved by the Employer's Agent."

PSM 7.3 ROUTINE INSPECTION AND TESTING

Add the following to Clause 7.3.1:

"All requests for acceptance control testing shall be submitted in writing to the Employer's Agent. Each request shall clearly specify the location of the section and the description of the layer, and shall be accompanied by the dimension and level control data for the section under consideration (refer PSM 6.4), as well as the results of the Contractor's process control testing (refer 7.2). On receipt of the aforementioned the Employer's Agent will undertake, or arrange as the case may be, for the necessary inspection and acceptance control tests to be carried out to satisfy himself that the layer complies with the specification.

Testing will be carried out as expeditiously as possible and the results of tests made available within 48 hours from the time the request was made, plus the normal time required doing the test.

The written approval of the submitted section of a layer shall be obtained from the Employer's Agent before the Contractor may proceed with the placing of material for the following layer. The Contractor shall also, before proceeding with the placing of the material for the following layer, make good any test holes left in the layer using material complying with the specification for that layer and compacting it to the specified density for that layer, concrete shall not be used."

SUBSTITUTE PSM 7.3.3 WITH THE FOLLOWING:

"Statistical evaluation of test results shall not be allowed and all tests shall meet the specified minimum requirements."

PSM 8 MEASUREMENT AND PAYMENT

PSM 8.2* ACCEPTANCE CONTROL TESTING

Should the layer submitted for acceptance control testing fail to comply with the specification, the Contractor shall, in the case where the tests arranged for by the Employer's Agent were carried out by a designated laboratory (refer PSA 7.2), bear the invoiced cost of the tests. Conversely if the layer is found to comply with the specification the cost of the acceptance control tests will be borne by the Employer. The cost of refilling and compacting the test holes shall be covered by the rate tendered for the construction of that layer.

PSME SUBBASE

PSME 1 SCOPE

Add the following

"All the requirements as specified for the construction of subbase shall, except where otherwise stated or ordered, apply to the construction of the gravel wearing course."

PSME 3 MATERIALS

PSME 3.2 PHYSICAL PROPERTIES

PSME 3.2.1 Subbase material

Replace the contents of paragraph (a) with the following:

"(a) The maximum particle dimension of the gravel shall not exceed 63 mm."

Replace the contents of paragraph (d) and (e) with the following:

"(d) The CBR at specified density shall be 45 for unstabilised as well as for stabilised material prior to stabilisation or as directed by the Employer's Agent.

The UCS at 7 days of each cement-stabilized material shall at 100% modified AASHTO maximum density be as follows:

- For C3 cemented natural gravel : 1,50 MPa minimum and 3,00 MPa maximum
- For C4 cemented natural gravel : 0,75 MPa minimum and 1,50 MPa maximum"

(e) The ITS (Indirect Tensile Strength) for cement-stabilised material shall at 100% modified AASHTO maximum density be as follows:

- For C3 cemented natural gravel : 250 kPa minimum
- For C4 cemented natural gravel : 200 kPa minimum"

PSME 3.2.2 Gravel shoulder and gravel wearing course material

Replace the contents of this Sub-clause with the following:

"The material used for gravel shoulder and gravel wearing course shall comply with the following parameters as defined in TRH 20:

Maximum size : 63mm
Oversize index : 0
Shrinkage product : 100 – 240
Grading coefficient : 16 – 34
CBR at 95% of modified AASHTO maximum density : 30."

PSME 3.3.1 General

Add the following to this sub-clause:

"Where reference is made in this specification or the Standard Specifications to the cement specifications, e.g. SANS 471: Portland cement and rapid hardening Portland cement, it shall be replaced with the new specification:

SANS ENV 197-1: Cement-composition, specifications and conformity criteria.

Part 1: Common cements.

Furthermore, where reference is made in this specification or the Standard Specifications to different cement types, the following new names shall be used as a guide but must be confirmed by the Employer's Agent.

Cement Grade	Cement Type	Approximate old product name	New Alpha	New Blue Circle	New NPC	New PPC	New Slagment
52.5	CEM I	Rapid hardening	Rapid Hard	Duracast	Eagle Super		-
42.5R	CEM I	Rapid hardening	-	-	-		-
42.5	CEM I	OPC*	Portland Cement	Duratech	-	OPC	-
	CEM I	LASRC	-	-	-	LASRC	-
	CEM II A-S	PC15SL	-	-	Eagle Plus	-	-
	CEM II B-S	RH30SL		-	Eagle Plus	-	-
32.5R	-	-	-	-	-	-	-
32.5	CEM II A-V	PC15FA	All – purpose cement	-	-	Surebuild	-
	CEM II A-W	PC15FA	-	-	-	Surebuild	-
	CEM II A-L	-	All purpose cement	-	-	Surebuild	-
	CEM II B-V OR W	PC25FA/PFAC**	-	Structcrete	-	Surecrete	-
	CEM II B-V OR W	PC25FA/PFAC**	-	Duracrete	-	Surecrete	-
	CEM III A	PBFC	-	BFC	Eagle Pro	-	PBFG
	CEM III A	RHSL	-	-	-	-	RHSL
22.5	MC 22.5X	PFAC***	Multi-purpose cement	Durabuild	-	-	-
	MC 22.5X	PFAC***	-	Buildcrete	-	-	-
12.5	MC 12.5	Walcrete	Mortar cement	Walcrete	-	Masonry	-
	MC 12.5	Mortacem	-	-	-	-	-

PSME 5 CONSTRUCTION

PSME 5.1 PRECAUTIONS

Add the following to this sub-clause:

"No stabilization shall be carried out during falling temperatures when the ambient air temperature falls below 7ºC or during rising temperatures when the ambient air temperature is below 3ºC.

The surface temperature of a compacted stabilized layer shall not be allowed to fall below 1ºC during the first three (3) days after stabilization. The Contractor shall be responsible for taking the necessary measures in this connection, and especially to refrain from stabilizing when such temperatures become probable.

When a sudden unforeseen temperature drop to a level below this limit occurs, the stabilized layer shall be covered with the material required for the next layer to be constructed.

All stabilized layers damaged by frost or by the formation of ice in the layer shall be removed and replaced by the Contractor at his own expense.

The Contractor shall make allowance for these requirements in his construction programme, and no claims in this connection will be considered.

The Contractor shall at all times supply all workers exposed to chemical stabilizing agents with approved protective apparel, eyewear and masks, and no person without such apparel, eyewear and masks shall be permitted to work with or be exposed to the chemical agents. Precautionary measure shall also be taken to ensure that any livestock and the public will not be exposed to the chemical agents blown by the wind or under similar circumstances"

PSME 5.2 EXCAVATION

PSME 5.2.2 Borrow pits

Insert the words "designated by the Employer's Agent and" between the words "pits" and "established" in the first line.

PSME 5.4.1 Placing

The compacted thickness of the subbase for the various areas shall be that shown on the drawings.

PSME 5.4.4 Compaction

Notwithstanding the requirements of Sub-clause 5.4.4.2 the gravel wearing course shall be compacted to at least 95% of modified AASHTO maximum density.

PSME 6 TOLERANCES

PSME 6.1 DIMENSIONS, LEVELS, ETC.

PSME 6.1.1 General

Add the following to sub-clause 6.1.1:

"For layers, constructed of subbase quality material, on which the bituminous surface will be placed, the tolerance for dimensions and level shall be as set out in SANS 1200 MF Sub-clauses 6.1.2 to 6.1.6 inclusive."

PSME 6.3 STABILIZATION

Add the following:

"The coefficient of variation shall not exceed 0,3 (30%) for mixing in place and 0,2 (20%) for plant mixed material, calculated as follows :

$$\frac{Sn}{Xn} \times 100$$

Where:
Xn is the average and
Sn is the standard deviation of stabilizing content per lot"

"PSME 6.4* DIMENSION AND LEVEL CONTROL
The requirements of PSM 6.4 shall apply."

PSME 7 TESTING

PSME 7.3.3 Strength tests for stabilized material

Amend the contents of this clause to read as follows:

“The Contractor shall carry out tests on the stabilized material at the frequency specified in 7.2.1 and 7.2.2 and check that the material complies with PSME 3.2.1 (d) and (e).

PSME 8 MEASUREMENT AND PAYMENT

PSME 8.1 BASIC PRINCIPLES

Insert a semi-colon in the first line of paragraph (b) after the words "will be paid for once only" and delete the rest of the paragraph.

Add the following to Sub-clause (d):

"A commercial source shall be held to include any off site sources or borrow pits located by the Contractor. Further that no additional payment will be made for the temporary stockpiling of material from commercial sources, class of excavation, method of processing (except stabilizing), or for overhaul.”

"(e)* The requirements of PSM 8.2 shall apply. The Contractor shall further make provision in the rates tendered for the construction of the gravel wearing course, for the cost of his own process control testing and the cost of complying with PSME 6.4."

PSME 8.3 SCHEDULED ITEMS

Replace the heading and contents of Clause 8.3.2 with the following:

“8.3.2 Construct subbase using material from stockpile..... Unit: m^3

The rate tendered shall cover the cost of basic selection, loading from stockpiles, transporting, spreading, watering, compacting, final grading, complying with the tolerances, and testing.

No additional payment will be made for difficult work or hand operations in confined areas.”

Replace the heading of clause 8.3.3 with the following:

"PSME 8.3.3 Construct the subbase course/shoulders/gravel wearing course with material from commercial sources" ..... Unit: m^3

Add the following paragraph:

“The rate tendered for subbase shall further differentiate between subbase beneath vehicular trafficked areas and subbase beneath pedestrian trafficked areas.

No additional payment will be made for difficult work or hand operations in confined areas.”

PSME 8.3.9 Overhaul (haul exceeding 2 km):

Replace the contents with the following:

"No haul will be paid."

PARTICULAR SPECIFICATION: PA

PA GEOMEMBRANE SHEETING

PA1 SCOPE

This specification covers the provision, installation and testing of geomembrane sheeting.

PA 2 INTERPRETATIONS

PA 2.1 SUPPORTING SPECIFICATIONS

The following specifications shall inter alia be read in conjunction with this specification

SANS 1200 A
SANS 1200 C
SANS 1200 D

PA 3 MATERIALS

PA 3.1 GEOMEMBRANE SHEETING

PA 3.1.1 Sheeting

The high density polyethylene sheeting to be used shall have a nominal thickness of 1,5mm and shall comply with SANS 1526-2003. Only virgin raw materials shall be used in the manufacture of the sheeting and all the material for a particular pond shall originate from a single manufacturer. The sheeting shall further be manufactured by an approved manufacturer.

The sheeting used shall further comply with all physical, thermal, mechanical and ageing properties specified by the manufacturer and shall be homogenous, free from blisters, bubbles, pinholes, embedded adventitious contaminants and ragged edges.

PA 3.1.2 Chemical resistance

The sheeting shall be chemically resistant to the effluent to be stored in the ponds under the climatic circumstances that will prevail at the site of the pond.

PA 3.1.3 Storage

The rolls of geomembrane sheeting shall be stored on a smooth, dry and level surface in a protected area.

PA 3.1.4 Quality control

Quality control certificates shall be provided for all rolls delivered to site.

PA 3.2 MATERIALS FOR UNDERLINING TO GEOMEMBRANE SHEETING

The materials to be used for the underlining to the geomembrane sheeting shall be "Geotextiles Africa" 400g/m² liner backing or similar approved.

PA 4 PLANT

Only the plant and equipment specified by the manufacturer shall be used to lay, cut and weld sheets.

PA 5 CONSTRUCTION

PA 5.1 SITE CLEARANCE

The areas to be lined shall be cleared and cleaned in accordance with the requirements of SANS 1200C and PSC and any vegetated areas shall be treated with an approved weed killer. The weed killer shall further have no detrimental effect on the sheeting.

PA 5.2 EARTHWORKS

The earthworks shall be completed in accordance with the requirements of SANS 1200 D and PSD and the completed surfaces of the ponds that are to be lined, shall be smooth, free from all sharp projections, stones and vegetation that can damage the sheeting.

PA 5.3 CONSTRUCTION OF UNDERLINING OT GEOMEMBRANE SHEETING

The geofabric underlining shall be cut and laid to cover the entire area of the walls and floors of the ponds. The overlap at joints shall be at least 200mm.

After laying the underlining it shall be fixed in position using a method approved by the Employer's Agent. Not more than one day shall elapse between laying the underlining and laying the geomembrane sheeting. The Contractor shall further take special care to protect the underlining and any material damaged shall be replaced at the Contractor's cost.

PA 5.4 GEOMEMBRANE PLACEMENT

PA 5.4.1 General

The geomembrane shall be installed strictly in accordance with the requirements of SANS 10409-2005 and by an approved geomembrane installation company. The geomembrane installation company shall be ISO 9001 accredited.

Prior to placing the geomembrane sheeting the Contractor shall provide the Employer's Agent with a proposed panel layout and placing modus operandi, for each pond. The Contractor shall not deviate from this layout without the approval of the Employer's Agent.

PA 5.4.2 Placing of geomembrane sheeting

The Contractor shall ensure the following when placing the geomembrane sheeting:

- The equipment used to place the geomembrane carries the approval of the manufacturer. Further that, when unrolling the panels, no scratches or crimps in the geomembrane result, or damage is caused to the supporting soil.
  Geomembrane shall not be allowed to roll freely down a slope.
- Differential wrinkles between adjacent panels are minimised.
- Sufficient compensation in the geomembrane is provided for. Geomembrane shall not be placed under tension, unless approved by the Employer's Agent.
- Personnel working on the geomembrane sheeting do not smoke, wear hard soled shoes, or operate equipment that can damage the sheeting.
- That adequate temporary loading and /or anchoring, that cannot damage the sheeting, is provided to prevent uplift by wind.

No sheeting may be placed during periods of rain or excessive winds, or in ponded water.

The traffic over laid sheeting shall also be minimised. Sheeting shall therefore not be rolled out too far in advance of seaming.

The Contractor shall further ensure that the sheeting complies with the specification prior to seaming. Any section not complying shall be removed and the repairs effected in accordance with the requirements of PA 5.4.4.

PA 5.4.3 Seaming of sheeting

The approved method for field seaming is double wedge welding. Only equipment approved by the manufacturer shall be used to effect this and the seam produced shall result in totally homogeneously bonded areas which will be at least as resistant to the effects of the stored liquid and at least as resistant to the effects of climatic degradation, as the adjacent geomembrane sheets. The Contractor shall also provide appropriate measuring equipment to ensure the required temperatures are being achieved.

In general, seams should be oriented up and down, not across, a slope. The number of seams in corners and other geometrically complex locations shall be minimized. No base seam or tee seam shall be less than 0,5m from the toe of a slope or in areas of potential stress concentrations, unless otherwise authorised by the Employer's Agent.

The Contractor shall further ensure that:

- A sufficient number of serviceable seaming machines are on site.
- The largest possible size of sheeting is used to minimise seaming.
- Electric generators are not placed on the geomembrane.
- A smooth insulating plate or fabric is placed beneath the hot seaming apparatus after usage.
- The geomembrane is protected from damage in heavily-trafficked areas.

The Contractor shall also verify that :

- Prior to seaming, the seam area is clean and free of moisture, dust, dirt, debris or other foreign material.
- If grinding is required, the process is completed in accordance with the manufacturer's instructions, but within 15 minutes of the seaming operation.
- The abrading does not remove more than 10 percent of the thickness of the geomembrane, and the resulting abrasion marks do not project more than 5mm beyond the edge of the extrudate.
- Any visible abrasion marks, after seaming, are perpendicular to the direction of the seam.
- The abrading does not introduce damaging gouges in the geomembrane.
- Seams/panels are aligned with a minimum of wrinkles and "fishmouths".
- The panels of geomembrane have an overlap of approximately 100mm, sufficient to allow a peel test to be performed on the inner track of the seam.
- There is a free flap at the edge of the top geomembrane, approximately 10mm wide, to allow a peel test to be performed on the outer track of the seam.
- No solvent or adhesive is used unless the product is approved by the Employer's Agent.
- Any procedure used to temporarily bond adjacent panels together does not damage the geomembrane. "Damage" includes a loss in durability.
- Temporary bonds do not interfere with the ability to perform shear and peel tests on the seam produced.

If protective layers of geomembrane are placed on the geomembrane for any purpose, they shall not be tack or spot welded to the layer, but shall be fully welded along the complete periphery of the protective layer, or they shall not be welded at all.

Trial seams shall be made by each machine/operator combination on strips of geomembrane to verify that seaming can be successfully performed. Such trial seams shall be made under the same conditions as production seams will be made.

Each seam shall be labelled on plan with the seaming machine number, the operator's initials, machine temperature and speed settings, date and time.

Only where double wedge welding cannot be carried out will extrusion welding be allowed. The Contractor shall further obtain the approval of the Employer's Agent prior to undertaking any extrusion welding.

PA 5.4.4 Defects and repairs

All seams and non-seam areas of the geomembrane shall be examined by the Contractor and the Employer's Agent for identification of defects, protruding and penetrating objects, lack of subgrade support, overheating, overgrinding, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. To facilitate the examination the Contractor shall keep the geomembrane surface clean.

Any portion of the geomembrane exhibiting a flaw, or failing a destructive or non-destructive test, shall be repaired.

The following provisions shall apply:

- The surfaces of the geomembrane which are to be repaired shall be abraded no more than 15 minutes prior to repairing.
- All surfaces shall be clean, free of all particulate matter, and dry at the time of the repair.
- The decision as to the appropriate repair procedure to be used shall be agreed upon between the Contractor and Employer's Agent.
- Patches and caps shall extend at least 150mm beyond the edge of the defect, and all corners of patches shall be rounded with a radius exceeding 75mm.
- The geomembrane below large caps shall be appropriately cut to avoid fluid entrapment between the two sheets and resultant pressure increases, as the liner is covered.
- Sharp ends of slits and cuts in the geomembrane shall be rounded before patches are placed over them.

Each repair shall be non-destructively tested. Repairs which pass the non-destructive test will be considered acceptable. Large caps may, at the discretion of the Employer's Agent, require destructive testing. Failed tests will require the repair to be redone and retested until a passing test results.

The Employer's Agent may require that excessive wrinkles be cut out and reseamed. The seam thus produced shall be tested.

Bridging or trampolining of the geomembrane under any ambient condition, at any location, at any time, is not acceptable. Compensating material shall be installed at these locations.

PA 5.4.5 Anchor trenches

The anchor trenches shall be excavated and backfilled in accordance with the details shown on the drawings. The backfilling of the trenches shall however only be carried out once the ponds have been filled with water to a depth of 300mm, air entrapped under the geomembrane has been vented out and the sheeting has settled.

The edge of the trench over which the geomembrane enters shall be rounded to avoid sharp bends in the geomembrane. No loose soil will be allowed to underlie the geomembrane in the trenches and the trenches shall be kept dry.

All welds shall further extend a minimum of 150mm over the edge of the anchor trench.

PA 5.4.6 Appurtenances

All appurtenances shall be installed in accordance with the specifications and as detailed on the drawings.
Extreme care shall be taken while seaming around appurtenances, since neither non-destructive nor destructive testing may be feasible in these areas.

PA 6 TOLERANCES

The manufacturing tolerances shall be that specified by the manufacturer. Full details of these shall be submitted with the tender.

Further to the above, seam widths shall be not less than that specified.

PA 7 TESTING

Seams shall be confirmed as continuous and fully integrated by undertaking non-destructive and destructive tests as specified below :

(a) Non-destructive tests

Non-destructive tests shall comprise of air tests which shall be carried out in accordance with current acceptable practise. The testing equipment used shall be calibrated, or the Contractor shall otherwise demonstrate that all gauges and the like are in a satisfactory working condition.

The minimum air channel test pressure shall be 150kPa, the maximum pressure shall be that determined by the Employer's Agent on site.

The test shall be considered successful if after a 5 minute stabilization period, the pressure drop is less than 10%. Any seam that cannot be non-destructively tested after installation shall be impact tested, vacuum box tested or visually inspected, as ordered by the Employer's Agent.

(b) Destructive tests

Destructive seam tests shall be performed at locations selected by the Employer's Agent. The purpose of these tests is to evaluate seam bond strength and the effects of seaming on the adjacent geomembrane. Seam strength testing will be done as the seaming work progresses, not at the completion of seaming.

The test locations will be established as follows:

- A minimum frequency of one sample, for every 150m of seam made by each seaming machine/operator combination, each day.
- Where the Employer's Agent suspects overheating, contamination, offset seams, or any other appearance of imperfect seaming.
- One sample from the last seam made by each seaming machine at the end of each day.

The Contractor will not be informed of the locations where the seam samples will be taken.

Test frequencies may be increased or decreased at the Employer's Agent's discretion, depending on the consistency of the test results.

The size of samples taken will be agreed upon by the Employer's Agent and the Contractor prior to testing, but shall allow sufficient material for the Contractor's quality assurance testing, the Employer's Agent's quality acceptance testing and any archiving purposes.

The following criteria must be met for peel and shear tests.

PEEL TEST	CRITERIA
Peel Strength	> 70% (fusion seam), > 65% (extrusion seam) minimum specified geomembrane yield strength
Seam Separation	< 10% of originally bonded area
SHEAR TEST	CRITERIA
Shear Strength	> 95% minimum specified geomembrane yield strength
Location of Failure	Outside the weld

PA 8 MEASUREMENT AND PAYMENT

PA 8.1 GEOTEXTILE LINER BACKING .....Unit : m²

The geofabric will be measured in place after installation.

The rate tendered shall cover the cost of procuring, supplying, cutting, overlapping, placing, fixing in position and protecting the geofabric as specified, as well as for wastage."

PA 8.2 GEOMEMBRANE SHEETING ..... Unit : m²

(Material type and location to be stated)

The unit of measurement shall be the square metre of sheeting in position. No additional area will be measured for overlaps.

The rate tendered shall cover the cost of procuring and furnishing the sheeting specified, all labour and equipment required to place, including that in anchor trenches, seam and test the sheeting, all in accordance with the specifications and details shown on the drawings, as well as all incidentals required to complete the installation.

PA 8.3 EXTRA OVER PA 8.2 FOR INSTALLATION OF LINING AROUND PENETRATIONS .....Unit : m

The unit of measurement shall be the meter length of the perimeter of the penetration, measured along the centreline of the steel batten.

The rate tendered shall cover the cost of procuring and supplying all materials required, including rubber gaskets, stainless steel battens and bolts, as well as the cost of completing the installation of the lining around a penetration, all as detailed on the drawings.

PA 8.4 VENTS ..... Unit : No

The rate tendered shall cover the cost of all extra material, drilling holes and welding required to construct the vents as detailed on the drawings.

PA 8.5 Filling ponds with river water to a depth of 300mm .....Unit : m³

The rate tendered shall cover the cost of providing all labour and equipment required to pump water from the river into each pond, to a depth of 300mm, once the sheeting has been placed and seamed.

PARTICULAR SPECIFICATION: PB

PB SECURITY FENCING

PB 1 SCOPE

This specification covers the requirements for the supply, delivery and erection of 2.3m high security fencing.

PB 2 INTERPRETATIONS

PB 2.1 SUPPORTING SPECIFICATIONS

The following supporting specifications apply:
- SANS 1200 A
- SANS 1200 C
- SANS 1200 G
- SANS 1200 GA

PB 2.2 DEFINITIONS

For the purposes of this specification the following definitions shall apply:

Straining post

A member of the fence that withstands the pull of the straining wires and, where relevant, forms a corner post or supports a gate, with appropriate directional stays.

Intermediate post

A fencing member that supports the straining wires.

Stay

A member connected to a straining post and so embedded in the ground at an angle to assist the straining post in withstanding the pull of the straining wires.

Dropper

A member of the fence not buried but could rest on the ground, installed at a specified spacing between Intermediate posts which assist in keeping straining wires at the specified vertical spacing.

Straining Wire

This is the horizontally installed 2.5mmØ high strain wire strand(s) of 1600MPa tensile strength, galvanised in accordance with SANS 675 / SANS 935 class A standard, Installed at extended lengths around the full perimeter of the fence providing the support for the Flat Wrap and Razor Mesh installation.

Flat Wrap

Galvanised Razor Wire comprising a continuous flat role comprising the actual security component of the fence.

Razor mesh

Galvanised Razor Mesh comprising of metal strips with sharp edges.

PB 3 MATERIALS AND GENERAL NOTES

PB 3.1 POSTS AND STAYS

Posts and stays shall be pre-stressed concrete fencing post members that comply with the requirements of SANS specification CKS 451.

PB 3.2 EXPOSED STEEL CONNECTING PARTS

Exposed steel connecting parts shall be galvanised.

PB 3.3 DROPPERS

Droppers shall be 0,56kg/m ridgeback pattern droppers.

PB 3.4 HIGH STRAIN FENCING WIRE

2.5mmØ high strain wire strand(s) of 1600MPa tensile strength, galvanised in accordance with SANS 675 / SANS 935 class A standard.

PB 3.5 BINDING WIRE

Binding wire shall be mild steel wire with a minimum diameter of 2,5mm.

PB 3.6 GALVANISED RAZOR WIRE

The galvanised razor wire shall be of the flat wrap form.

PB 3.7 GALVANISED RAZOR MESH

The galvanised razor mesh shall be of the diamond form.

PB 3.8 CORROSION PROTECTION

All wire used in the construction of fencing and gates shall be Class A zinc coated according to SANS 675.

PB 3.9 ANCHOR PEGS

Anchor pegs, where these may become necessary shall comprise of 10mm diameter mild steel rods, 400mm long and of acceptable design.

PB 3.10 GATES

Gates shall be manufactured in accordance with the details shown on the Drawings and shall be complete in every respect including hinges, washers, bolts and nuts.

PB 3.11 CLEAR VIEW GATES

Gate shall be a 6m wide clear view sliding gate installed in accordance with the manufacturer's specifications.

PB 4 PLANT

The plant and equipment shall be that generally accepted by the industry as standard plant and equipment for use in the construction of fencing.

All plant and equipment shall be in good working order.

PB 5 CONSTRUCTION

PB 5.1 CLEARING OF FENCE LINE

The fence line shall be cleared over a width of not less than 0.5m on either side of the centre line of the fence. Grading of ground surface irregularities so that the fence will conform to the general contours of the ground must first be confirmed with the Employer's Agent. Clearing shall include the removal of all trees, shrubs, rocks and other obstructions, which will interfere with the proper construction of the fence. Stumps within the cleared space shall be removed. All excavation shall be backfilled with G5 gravel material to ground level in layers of 150mm compacted thickness.
All material removed shall be disposed of as directed by the Employer's Agent.

PB 5.2 INSTALLING POSTS

Corner posts shall be erected at all corners and bends in the line of the fence. Straining posts shall not be spaced further apart than that shown on the Drawings.

The lengths of all posts above ground level shall be such that the correct clearance between the lowest wire and the ground, and the spacing between the wires can be maintained.

All posts and stays shall be set in dug holes and be provided with 15 Mpa concrete bases.

Unless otherwise directed by the Employer's Agent, the horizontal dimensions and depth of concrete bases shall be as indicated on the Drawings. Excavations for concrete bases shall be accurate and the whole excavation shall be refilled with concrete.

All holes for posts and stays shall be dug to the full specified depth, even in rock where blasting may prove necessary to obtain the required depth.

Corner, gate and straining posts shall be braced by means of stays or anchors as shown on the Drawings. Pipe stays shall be bolted to the posts. Gate posts shall not be used as straining posts, but at each gate post a straining post shall be placed as shown on the Drawings and stayed by means of a 6 - cord straining wire.

Intermediate posts shall be firmly planted into the ground at the spacing shown on the Drawings. The spacing of intermediate posts between any two straining posts shall be uniform and not greater than that shown on the Drawings. Care shall be exercised when driving standards to prevent buckling or damaging them.

All posts and shall be accurately aligned and set plumb. After the posts have firmly set in accordance with the foregoing requirements, the fence wire shall be attached thereto at the spacing shown on the Drawings.

The fence wire shall be attached to the outer side of the posts.

PB 5.3 INSTALLING THE FENCING WIRES

All fencing wire shall be properly attached to the sides of standards or posts so as to prevent the wires from being displaced or becoming loose. The wire shall be carefully stretched and hung without sag and with true alignment, care being exercised not to stretch the wire so that it will break, or that corner, straining, or gate posts will be pulled up. The maximum force in fencing wire after it has been secured to the straining posts shall be 0,9kN. A fencing wire on horizontal terrain having a sag of 1,2m when the ends are fixed 200m apart will be subject to a force of approximately 0,9kN.

Each strand of fencing wire shall be securely fastened in the correct position to each standard with soft galvanised binding wire. The binding wire for each horizontal fence wire shall pass through a hole or notch in the standard to prevent slipping off the fence wire in a vertical direction, while the ends of the wire shall be wound at least six times around the fencing wire to prevent it moving in a vertical direction.

At corner, straining and gate posts the fencing wire shall be securely wrapped twice around the post and secured against slipping by tying the end tightly around the wire by means of at least eight snug tight twists.

Splices in the fencing wire shall be permitted if made in the following manner using a splice tool: The end of each wire at the splice shall be carried at least 75mm past the splice tool and wrapped snugly around the other wire for not less than 6 complete turns, the two separate wire ends being turned in opposite directions. After the splice tool has been removed, the space left by it in the spliced wire shall be closed by pulling the wire ends together. The unused ends of wire shall be cut loose of the main wire so as to leave a neat splice.
Droppers shall be tied to each fence wire with soft binding wire in the required position as specified for standards to prevent slipping in a vertical direction. The spacing of droppers between any two straining posts shall be uniform.

PB 5.4 INSTALLING THE FLAT WRAP GALVANISED RAZOR WIRE

The Flat Wrap shall, after being suitably stretched to prevent bulging, be attached by binding wire to the straining wires at distances not exceeding a staggered 1.0m interval on top, middle and bottom of the loops. In addition, the Flat Wrap shall be attached to each post by means of binding wire taken around the post at each touching point of the loop to the post. At Gate Posts the Flat Wrap must be taken to the “far side” of the post and similarly tied. All jointing ends of the Flat Wrap must overlap by 100mm and the two ends tied with double wrapped binding wire at all overlaps of the main loops.

PB 5.5 INSTALLING THE RAZOR MESH

The Razor Mesh shall be stretched against the fence and properly tied to the straining wires. The razor mesh shall be secured with binding wire as described in PB 3.5 at 1.2m centres along the top and bottom straining wires and at 3m centres along each of the other fencing wires, unless otherwise shown on the Drawings.

The Razor Mesh shall be prevented from creeping under the fence by embedding the lower 150mm of Razor Mesh in the ground and thoroughly compacting the earth around it on both sides, to secure the netting.

PB 5.5 INSTALLING GATES

Gates shall be installed as ordered by the Employer’s Agent. Gates shall be so erected as to swing in a horizontal plane at right angles to the gate posts, clear of the ground in all positions. The top of the gate shall be level with the top of the fence. Double swing gates shall not leave a gap of more than 25mm between them when closed and other gates shall not be further than 25mm from the gate post when closed.

PB 5.6 CLOSING OPENINGS UNDER FENCES

At ditches, streams, drainage channels or other hollows where it is not possible to erect the fence so that it follows the general contour of the ground, the Contractor shall close the opening under the fence by means of hanging horizontal stretches of the fence on 25mm class 9 HDPE pipes attached vertically to the main.

PB 5.7 FINISHING

After erection and inspection of fences, all rusty patches, un-galvanised or damaged zinc-coated surface areas shall be treated as follows:

(i) Preparing and cleaning: To SANS 064
(ii) Treatment against rust: Treat with an approved rust neutraliser
(iii) Prime coat: Treat with an approved primer
(iv) Finishing coats: Two coats of aluminium paint to SANS 682 Grade 2

PB 6 TOLERANCES

The completed fence shall be plumb, taught, true to line and ground contour, with all posts and stays firmly set. The height of the lower fencing wire above the ground at posts shall not vary by more than 25mm. Other fencing wires shall not vary by more than 10mm from their prescribed relative vertical positions.

Any length of fence line shall not deviate by more than 50mm from an imaginary straight line drawn between the corner posts at each end of the said fence line.
Gates shall have no noticeable twist or sag and when closed the closing stiles shall be parallel. They shall move freely on their hinges.

PB 7 TESTING

Sub-Clause PSA 3.1 of SANS 1200 A shall apply.

PB 8 MEASUREMENT AND PAYMENT

PB 8.1 CLEAR 1m WIDE STRIP FOR FENCE LINE ……Unit: m

The unit of measurement for clearing the fence line shall be the metre length measured along the fence line.

The rate tendered shall cover the cost of removing and disposing of all shrubs, rocks, trees, tree stumps and other obstructions, as well as the cost of any excavation, backfill and compaction required.

PB 8.2 SUPPLY DELIVERY AND INSTALLATION OF NEW SECURITY FENCE

PB 8.2.1 2.5mm diameter strain fencing wire, single strand as per drawings…… Unit: m

The unit of measurement shall be the metre length of strain fencing wire measured along the line of the fence.

PB 8.2.1.1 (i) Supply

The tendered rate shall include full compensation for the purchase cost of all of the strain fencing wire.

The Contractor shall provide a cession letter from the suppliers as proof that ownership of the material has been reverted to the Employer. Payment of the material will only be made once the session letter has been approved by the Employer's Agent.

PB 8.2.1.2 (ii) Install

The tendered rate shall include full compensation for the delivery, labour and equipment required to install the strain fencing wire along the line of fence complete as shown on the Drawings.

PB 8.2.2 Pre-stressed Posts embedded in 15Mpa concrete base

(a) 100x100mm Pre-stressed concrete gate posts 2400mm long with 500mm over hang set in 500x500x800mm concrete base……..Unit: No
(b) 100x100mm Pre-stressed concrete corner posts 2400mm long with 500mm over hang set in 450x450x700mm concrete base……..……Unit: No
(c) 100x100mm Pre-stressed concrete straining posts 2400mm long with 500mm over hang set in 450x450x700mm concrete base……..Unit: No
(d) 80x80mm Pre-stressed concrete stay posts 2200mm long set in 400x700x400mm concrete base…….....Unit: No
(e) 100x100mm Pre-stressed concrete intermediate posts 2400mm long with overhang set in 450x750x700mm concrete base…….…….....Unit: No

The unit of measurement shall be the number of each post including concrete bases.

PB 8.2.2.1 (i) Supply

The tendered rate shall include full compensation for the purchase cost of all of the posts including the purchase cost of the materials for the concrete (stone, cement and sand) for the concrete bases. The Contractor shall provide a cession letter from the suppliers as proof that ownership of the material has been reverted to the Employer. Payment of the material will only be made once the session letter has been approved by the Employer's Agent.

PB 8.2.2.2 (ii) Install

The tendered rate shall include full compensation for the delivery, labour and equipment required to install each post including concrete bases complete as shown on the Drawings.

Additional straining posts installed as the result of the posts being spaced at distances less than that specified will not be measured for payment, **unless the reduced spacing was authorized by the Employer's Agent**.

PB 8.2.3 1800mm high ridgeback droppers……..……Unit: No

The unit of measurement shall be the number of droppers erected in accordance with the maximum specified spacing or such lesser spacing as authorised by the Employer's Agent.

PB 8.2.3.1 (i) Supply

The tendered rate shall include full compensation for the purchase cost of all of the droppers.
The Contractor shall provide a cession letter from the suppliers as proof that ownership of the material has been reverted to the Employer. Payment of the material will only be made once the session letter has been approved by the Employer's Agent.

PB 8.2.3.2 (ii) Install

The tendered rate shall include full compensation for the delivery, labour and equipment required to install each post complete as shown on the Drawings.

Additional posts installed as the result of the posts being spaced at distances less than that specified will not be measured for payment, **unless the reduced spacing was authorized by the Employer's Agent**.

PB 8.2.4 500mm Flat Wrap razor wire with 3 strands of binding wire……..Unit: m

The unit of measurement shall be the metre length of Flat Wrap and the quantity shall be calculated using the prescribed height and the length measured along the line of the fence, or the length of strips for covering openings under fences. Flat Wrap used for covering gates shall be included in the lineal length of Flat Wrap.

PB 8.2.4.1 (i) Supply

The tendered rate shall include full compensation for the purchase cost of all of the Flat Wrap razor wire including binding wire.

The Contractor shall provide a cession letter from the suppliers as proof that ownership of the material has been reverted to the Employer. Payment of the material will only be made once the session letter has been approved by the Employer's Agent.

PB 8.2.4.2 (ii) Install

The tendered rate shall include full compensation for the delivery, labour and equipment required to install the Flat Wrap razor wire along the line of fence including binding wire complete as shown on the Drawings.

PB 8.2.5 1800x300x150x0.3mm Standard density Razor Mesh fixed to straining wires…….Unit: m^2

The unit of measurement shall be the square metre of Razor Mesh and the quantity shall be calculated using the prescribed area along the line of the fence.

PB 8.2.5.1 (i) Supply

The tendered rate shall include full compensation for the purchase cost of all of the Razor Mesh including binding wire.

The Contractor shall provide a cession letter from the suppliers as proof that ownership of the material has been reverted to the Employer. Payment of the material will only be made once the session letter has been approved by the Employer's Agent.

PB 8.2.5.2 (ii) Install

The tendered rate shall include full compensation for the delivery, labour and equipment required to install the Razor Mesh along the line of fence including binding wire complete as shown on the Drawings.

PB 8.2.6 6 meter wide sliding gate……Unit: No

The unit of measurement shall be the number of each type and size of gate. A pair of gates shall be measured as one.

PB 8.2.6.1 (i) Supply

The tendered rate shall include full compensation for the purchase cost of all of the gates and fittings.

The Contractor shall provide a cession letter from the suppliers as proof that ownership of the material has been reverted to the Employer. Payment of the material will only be made once the session letter has been approved by the Employer's Agent.

PB 8.2.6.2 (ii) Install

The tendered rate shall include full compensation for the delivery, labour and equipment required for the installation of each gate complete as detailed on the Drawings, including for mesh covering, locking chains, corrosion protection, concrete base, track, casters and all other necessary fittings.

PB 8.2.7 6 meter wide clear view sliding gate……Unit: No

The unit of measurement shall be the number of each type and size of gate. A pair of gates shall be measured as one.

PB 8.2.7.1 (i) Supply

The tendered rate shall include full compensation for the purchase cost of all of the gates, posts and fittings.

The Contractor shall provide a cession letter from the suppliers as proof that ownership of the material has been reverted to the Employer. Payment of the material will only be made once the session letter has been approved by the Employer's Agent.

PB 8.2.7.2 (ii) Install

The tendered rate shall include full compensation for the delivery, labour and equipment required for the installation of each gate and posts complete as per the manufacturer's specifications as well as the connection into the existing clear view fencing.

PB 8.2.8 Signage……Unit: No

The unit of measurement shall be the number of each type of signage.

PB 8.2.8.1 (i) Supply

The tendered rate shall include full compensation for the purchase cost of signs.
The Contractor shall provide a cession letter from the suppliers as proof that ownership of the material has been reverted to the Employer. Payment of the material will only be made once the session letter has been approved by the Employer's Agent.

PB 8.2.8.2 (ii) Install

The tendered rate shall include full compensation for the delivery, labour and equipment required for the installation of each sign complete as detailed on the Drawings.

PARTICULAR SPECIFICATION: PC

PC FENCING

PC1 SCOPE

This is a Particular Specification and covers the erection of new fences.
SUPPORTING SPECIFICATIONS

The following supporting specifications apply:

- SANS 1200 A
- SANS 1200 C
- SANS 1200 G
- SANS 1200 GA

PC 2 **TYPE OF FENCE**

The fence shall be a security fence with a vandal resistant wire panel and post system with advanced anti-corrosion properties and shall be erected in accordance with the specification and instructions of the manufacturer in order to maintain and achieve a 10 year guarantee against corrosion.

PC 3 **MATERIALS**

PC 3.1 POSTS, STAYS AND STANDARDS

Posts, stays and standards shall be of the type and size indicated on the Drawings. Posts shall include gate posts, straining posts and corner posts.

Metal posts, stays and standards shall comply with the requirements of CKS 82 and SANS 280. "Acceptable" in CKS 82 means "acceptable to the Employer's Agent".

Tubular posts, standards and stays shall be galvanized in accordance with SANS ISO 1461:1999 Table 1 for type B articles. All rail and Y-sections shall be provided with a protective coating of tar or other approved material.

Corner, gate and straining posts shall be suitably pre-drilled for stay bolts or gate fittings as indicated on the Drawings.

Posts shall be Hot dipped Galvanised in accordance with ISO-1461, and then coated with a Fusion Bonded Epoxy (FBE) coating of minimum DFT of 350 microns. Posts shall be pre-drilled with holes for fixing panels to posts. Panels should be fixed to posts with either stainless steel countersunk flushlock bolts and shear nuts, or by means of double and single bolt comb clams using anti-vandal bolts.

PC 3.2 BOLTS FOR STAYS

Bolts shall be of stainless steel. The length and diameter of the bolts shall be as shown on the Drawings. All the necessary bolts, together with nuts and washers, shall be supplied with each post.

WIRE

PC 3.3 All wire shall conform to the requirements of SANS 675 and shall be class B galvanized, except where otherwise specified below.

PC 3.4 WIRE PANELS

Wire Diameter: Minimum 3mm
Apertures: 76.2mm x 12.7mm (centre to centre)
Standard widths: 2500mm to 3500mm
Height: Minimum 2400mm
Coating: Galvanized 30g/m² with Zincalu coating – Zincalu coating = 95% Zinc and 5% Aluminium according to SANS 10244-2: 2004, plus Fusion Bonded Epoxy coated to minimum DFT of 350 microns.
Tensile Strength of wire: 650 – 750 N/mm²
Solidity: 35%
Weld Strength 60 – 80%
Weight 10.61 kg/m²
10 year guarantee against corrosion

Panels shall be reinforced with 4 x 50mm deep 'V' formation horizontal recessed bands for rigidity

PC 3.5 SECURITY SPIKES

A 100mm high toughened steel spike shall be affixed to the top of the panel edges, internally at 150mm intervals using countersunk flushlock bolts and shear nuts, or by means of anti-vandal bolts.

PC 3.6 GATES

Gates shall comply with the requirements of CKS 146 and shall be manufactured to the dimensions shown on the Drawings.

Gates shall be complete in every respect, and shall include hinges, washers, bolts and the locking mechanism shown on the Drawings.

The required width of the gates, as specified on the drawings, shall mean the actual required clearance.

PC 3.7 CONCRETE

Concrete used for fencing shall comply with the requirements of SANS 1200 G.

PC 4 CLEARING FENCE LINE

Strip clearing for the fence shall be carried out in accordance with SANS 1200 C and will be measured and paid for under Section 1200 C of the Schedule of Quantities.

PC 5 INSTALLING POSTS AND STANDARDS

Posts shall be accurately set in holes and, where indicated, shall be provided with concrete bases to the dimensions shown on the Drawings.

Holes shall be dug to the full specified depth. Where, due to the presence of rock, the holes cannot be excavated by hand or by pneumatic tools and the Contractor has to resort to the use of explosives, he will be paid separately for the drilling and blasting operations required.

Standards shall be firmly planted in the ground at the spacing shown on the Drawings or as directed by the Employer's Agent. The spacing of standards between any two straining posts shall be uniform. In rock or hard material standards shall either be driven or set in holes drilled into the rock. The size of drilled holes shall be such that a tight fit is obtained. Care shall be taken not to buckle or damage the standards when driven. Where indicated, standards shall be provided with concrete bases to the dimensions shown on the Drawings.

All posts and standards shall be accurately aligned and set plumb and shall be planted with the overhang as shown on the Drawings and at right angles to the direction of the fence. After posts and standards have been firmly set in accordance with the aforegoing requirements, the fencing wire shall be attached thereto as described below.

Installation to be done all according to the manufacturer's instructions and specifications to achieve and maintain a 10 year guarantee against corrosion.

PC 6 **INSTALLING OF ANTI-DIG**

A 300mm deep, 300mm wide soilcrete anti-dig barrier is to be constructed between fence posts.

PC 7 **INSTALLING WIRE PANELS**

Installation to be done all according to the manufacturer's instructions and specifications to achieve and maintain a 10 year guarantee against corrosion.

PC 8 **INSTALLING GATES**

Gates shall be installed at the positions indicated on the Drawings or pointed out on Site. The gates shall be hung on gate fittings in accordance with the details shown on the Drawings. Gates shall be so erected that they swing in a horizontal plane at right angles to the gate posts and clear of the ground in all positions. Double swing gates shall close to have a gap of not more than 25 mm between them, and other gates shall close to be not further than 25 mm from the gate post.

PC 9 GENERAL REQUIREMENTS AND TOLERANCES

The completed fences shall be plumb, taut, true to line and to the ground contour, and with all posts, standards and stays firmly set.

The height of the lower fencing wire above the ground at posts and standards shall not vary by more than 25 mm from that shown on the Drawings. Other fencing wires shall not vary by more than 10 mm from their prescribed relative vertical positions.

Anchoring of a fence to structures shall be done as shown on the Drawings.

The Contractor shall, on completion of each section of fence, remove all cut-offs and other loose wire or mesh so as to leave the fence with a neat and finished appearance.

PARTICULAR SPECIFICATION: PD

PD 1 ENVIRONMENTAL MANAGEMENT (COMPREHENSIVE)

PD 1 SCOPE

This Specification covers the requirements for controlling the impact of construction activities on the environment. It contains clauses that are generally applicable to the undertaking of civil engineering works in areas where it is necessary to impose pro-active controls on the extent to which the construction activities impact on the environment.

All construction activities shall observe any relevant environmental legislation and in so doing shall be undertaken in such a manner as to minimise impacts on the natural and social environment.

PD 2 NORMATIVE REFERENCES

PD 2.1 SUPPORTING REFERENCES

Where this Specification is required for a project the following specifications shall, inter alia, form part of the Contract Document.

a) Scope of Work;

b) Construction Regulations, 2014, and

c) Health and Safety Specification

PD 3 DEFINITIONS

For the purposes of this Specification the definitions and abbreviations given in the applicable specifications listed in 2.1 and the following definitions shall apply:

Environment:

The surroundings within which humans exist and that are made up of:

i) the land, water and atmosphere of the earth;

ii) micro-organisms, plant and animal life;

iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and

iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Potentially hazardous Substance:

A substance that, in the reasonable opinion of the Employer's Agent, can have a deleterious effect on the environment.

Method Statement:

A written submission by the Contractor to the Employer's Agent in response to the Specification or a request by the Employer's Agent, setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the Employer's Agent when requesting the Method Statement, in such detail that the Employer's Agent is enabled to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications.

The Method Statement shall cover applicable details with regard to: construction procedures, materials and equipment to be used, transportation of equipment/materials to and from site, movement of equipment/material on site, storage of materials on site, containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur, timing and location of activities, areas of non-compliance with the Specifications, and any other information deemed necessary by the Employer's Agent.

Reasonable :

Unless the context indicates otherwise, reasonable in the opinion of the Employer's Agent after he has consulted with a person, not an employee of the Employer, suitably experienced in "environmental implementation plans" and "environmental management plans" (both as defined in Act No107,1998).

Solid waste:

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).

Contaminated water:

Water contaminated by the Contractor's activities, e.g. concrete water and runoff from plant/ personnel wash areas.

Top material :

The top 150 mm of soil (topsoil) and root material of cleared vegetation.

PD 4 REQUIREMENTS

PD 4.1 MATERIALS

PD 4.1.1 Materials handling, use and storage

The Contractor shall ensure that any delivery drivers are informed of all procedures and restrictions (including "no go" areas) required to comply with the Specifications. The Contractor shall ensure that these delivery drivers are supervised during off loading, by someone with an adequate understanding of the requirements of the Specifications.

Materials shall be appropriately secured to ensure safe passage between destinations. Loads including, but not limited to sand, stone chips, fine vegetation, refuse, paper and cement, shall have appropriate cover to prevent them spilling from the vehicle during transit. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.

PD 4.1.2 Hazardous substances

Procedures detailed in the Material Safety Data Sheets (MSDSs) shall be followed in the event of an emergency situation.

Petroleum, chemicals, harmful and hazardous waste shall be stored in an enclosed and bunded area. This area shall be subject to the approval of the Employer's Agent. The waste shall be disposed of at a hazardous waste disposal site as approved by the Employer's Agent.

PD 4.1.2.1 Shutter oil and curing compound

Shutter oil and curing compound pose a risk of causing water and soil contamination and accordingly are regarded as potential hazardous substances. The Contractor shall ensure that shutter oil and curing compound containers in use are stored within the fuel bund. The remaining containers shall be inspected regularly to ensure that no leakage occurs. When shutter oil or curing compound is dispensed, the proper dispensing equipment shall be used, and the storage container shall not be tipped in order to dispense the oil/compound. The dispensing mechanism of the shutter oil/curing compound storage container shall be stored in a waterproof container when not in use.

Shutter oil and curing shall be used in moderation and shall be applied under controlled conditions using appropriate equipment. The Contractor shall take all reasonable precautions to prevent accidental and incidental spillage during the application of these compounds.

In the event of a shutter oil or curing compound spill, the source of the spillage shall be isolated, and the spillage contained. The Contractor shall clean up the spill, either by removing the contaminated soil or by the application of absorbent material in the event of a larger spill. Treatment and remediation of the spill area shall be undertaken to the reasonable satisfaction of the Employer's Agent.

PD 4.1.2.2 Bitumen

The Employer's Agent shall be advised of the area that the Contractor intends using for the storage of bitumen drums/ products. The storage area shall have a smooth impermeable (concrete or 250 µm plastic covered in sand) floor. The floor shall be bunded and sloped towards a sump to contain any spillages of substances. The bund shall be inspected and emptied daily, and serviced when necessary. The bund shall be closely monitored during rain events to ensure that it does not overflow.

PD 4.2 PLANT

PD 4.2.1 Ablution facilities

The Contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are properly stored and removed from Site. Discharge of waste from toilets into the environment and burial of waste is strictly prohibited. The Contractor shall prevent any littering on site and ensure that staff disposes of all litter (including leftover foodstuff) in the bins provided.

Washing, whether of the person or of personal effects and acts of excretion and urination are strictly prohibited other than at the facilities provided.

PD 4.2.2 Solid waste management

The Contractor shall provide sufficient bins with lids on Site to store the solid waste produced on a daily basis. Solid, non-hazardous waste shall be disposed of in the bins provided and no on-site burying, dumping or burning of any waste materials, vegetation, litter or refuse shall occur. Bins shall not be allowed to become overfull and shall be emptied a minimum of once daily. The waste may be temporarily stored on Site in a central waste area that is weatherproof and scavenger-proof, and which the Employer's Agent has approved.

All solid waste shall be disposed of offsite at an approved landfill site. The Contractor shall supply the Employer's Agent with a certificate of disposal.

PD 4.2.3 Contaminated water

The Contractor shall set up a contaminated water management system, which shall include collection facilities to be used to prevent pollution, as well as suitable methods of disposal of contaminated water. The Contractor shall prevent the discharge of water contaminated with any pollutants, such as soaps, detergent, cements, concrete, lime, chemicals, glues, solvents, paints and fuels, into the environment.

The Contractor shall notify the Employer's Agent immediately of any pollution incidents on Site. The Employer's Agent approval is required prior to the discharge of contaminated water to the Municipal sewer system.

PD 4.2.4 Site structures

All site establishment components (as well as equipment) shall be positioned to limit visual intrusion on neighbours and the size of area disturbed. The type and colour of roofing and cladding materials to the Contractor's temporary structures shall be selected to reduce reflection.

PD 4.2.5 Noise control

The applicable regulations framed under the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), and the provisions of SANS 1200 A Sub-clause 4.1 regarding "built-up areas" shall apply to all areas within audible distance of residents whether in urban, peri-urban or rural areas.

Appropriate directional and intensity settings are to be maintained on all hooters and sirens, and the Contractor shall provide and use suitable and effective silencing devices for pneumatic tools and other plant such that the noise level in inhabited areas and dwellings adjacent to the work areas will not increase by more than 7 dB(A)Leq 60 above residual background sound levels. Similarly in habituated areas adjacent to access roads maximum noise levels shall not exceed 60 dB(A)Leq 60 and maximum sound pressure level of 70 dB(A).

Where excess noise generation is unavoidable, the Contractor shall, by means of barriers, effectively isolate the source of any such noise in order to comply with the said regulations. The Contractor shall restrict any of his operations that may result in undue noise disturbance to those communities and dwellings abutting the Site to the hours of 08:00 to 17:00 on weekdays and Saturdays. No work will be permitted on Sundays unless otherwise agreed to with the Employer's Agent.

No amplified music shall be allowed on Site. The use of radios, tape recorders, compact disc players, television sets etc. shall not be permitted unless the volume is kept sufficiently low as to avoid any intrusion on members of the public within range. The Contractor shall not use sound amplification equipment on Site unless in emergency situations.

PD 4.2.6 Lights

The Contractor shall ensure that any lighting installed on the site for his activities does not interfere with road traffic or cause a reasonably avoidable disturbance to the surrounding community or other users of the area.

PD 4.2.7 Fuel (petrol and diesel) and oil

Unless otherwise specified in the Specification Data, fuel may be stored on site in an area approved by the Employer's Agent. The Contractor shall ensure that all liquid fuels (petrol and diesel) are stored in tanks with lids, which are kept firmly shut or in bowsers. The tanks/bowsers shall be situated on a smooth impermeable surface (concrete or 250 µm plastic) with an earth bund (plastic must have a 5 cm layer of sand on top to prevent damage and perishing). The impermeable lining shall extend to the crest of the bund and the volume inside the bund shall be 130% of the total capacity of all the storage tanks/ bowsers. The bunded area shall be covered to protect it from rain. Provision shall be made for refuelling at the fuel storage area, by protecting the soil with 250 µm plastic covered with a minimum of a 5 cm layer of sand.

If fuel is dispensed from 200 litre drums, only empty externally clean drums may be stored on the bare ground. All empty externally dirty drums shall be stored on an area where the ground has been protected. The proper dispensing equipment shall be used, and the drum shall not be tipped in order to dispense fuel. The dispensing mechanism of the fuel storage drum shall be stored in a waterproof container when not in use.

The Contractor shall prevent unauthorised access into the fuel storage area. No smoking shall be allowed within the vicinity of the fuel storage area. The Contractor shall ensure that there is adequate fire-fighting equipment at the fuel stores.

Where reasonably practical, plant shall be refuelled at the fuel storage area or at the workshop as applicable. If it is not reasonably practical then the surface under the refuelling area shall be protected against pollution to the reasonable satisfaction of the Employer's Agent prior to any refuelling activities. The Contractor shall ensure that there is always a supply of absorbent material readily available to absorb/ breakdown and where possible be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 200 ℓ of hydrocarbon liquid spill. The Contractor shall obtain the Employer's Agent prior approval for any refuelling or maintenance activities.

PD 4.2.8 Workshop, equipment maintenance and storage

Leaking equipment shall be repaired immediately or removed from the Site. Where practical, all maintenance of equipment and vehicles on Site shall be performed off Site or in the workshop. If it is necessary to do maintenance outside of the workshop area, the Contractor shall obtain the approval of the Employer's Agent prior to commencing activities. The Contractor shall ensure that in his workshop and other plant maintenance facilities, including those areas where, after obtaining the Employer's Agent approval, the Contractor carries out emergency plant maintenance, there is no contamination of the soil or vegetation. The workshop shall have a smooth impermeable (concrete or 250 µm plastic

covered with sand) floor. The floor shall be bunded and sloped towards an oil trap or sump to contain any spillages of substances (e.g. oil).

When servicing equipment on site, drip trays shall be used to collect the waste oil and other lubricants. Drip trays shall also be provided in construction areas for stationary plant (such as compressors) and for "parked" plant (such as scrapers, loaders, vehicles). Drip trays shall be inspected and emptied daily. Drip trays shall be closely monitored during rain events to ensure that they do not overflow. Where practical, the Contractor shall ensure that equipment is covered so that rainwater is excluded from the drip trays.

The washing of equipment shall be restricted to urgent or preventative maintenance requirements only. All washing shall be undertaken off Site or in the workshop. The use of detergents for washing shall be restricted to low phosphate and nitrate containing, low sudsing-type detergents.

PD 4.2.9 Dust

The Contractor shall take all reasonable measures to minimise the generation of dust as a result of construction activities to the satisfaction of the Employer's Agent. The Contractor's dust management planning shall, as a minimum, take cognisance of the following:

- Schedule of spraying water on unpaved roads paying due attention to control of runoff.
- Speed limits for vehicles on unpaved roads and minimisation of haul distances.
- Measures to ensure that material loads are properly covered during transportation.
- Schedule for wheel cleaning and measures to clean up public roads that may be soiled by construction vehicles.
- Minimisation of the areas disturbed at any one time and protection of exposed soil against wind erosion, e.g. by dampening with water or covering with straw
- Location and treatment of material stockpiles taking into consideration prevailing wind directions and location of sensitive receptors.
- Controlled blasting techniques to minimise dust and fly rock during blasting.
- Adherence to the dust loads and protective gear stipulated in the Occupational Health and Safety Act.
- Reporting mechanism and action plan in case of excessive wind and dust conditions.

During summer, a water tanker shall be permanently available for the control of dust generation, and the Contractor shall ensure that the sprays do not generate excess run off. During winter, provision shall be made for a tanker, as required by the Employer's Agent.

During high wind conditions, the Contractor shall comply with the Employer's Agent instructions regarding dust-damping measures. The Employer's Agent may request the temporary cessation of all construction activities where wind speeds are unacceptably high, and until such time as wind speeds return to acceptable levels.

Vehicle speeds should not exceed 20km/h on dirt roads or when traversing unconsolidated or non-vegetated areas. Contractors shall develop and implement a programme for the monitoring of dust fallout in areas where dust generation may be expected.

PD 4.3 METHODS AND PROCEDURES

PD 4.3.1 Method Statements

Any Method Statement required by this Specification, the Specification Data or the Employer's Agent shall be produced within such reasonable time as is required by this Specification, the Specification Data or the Employer's Agent. The Contractor shall not commence the activity until the Method Statement has been approved. Except in the case of emergency activities, the Contractor shall allow a period of two weeks for approval of the Method Statement by the Employer's Agent. Such approval shall not unreasonably be withheld.

Method Statements in respect of environment management that shall be provided by the Contractor within 14 days of receipt of the letter of acceptance and prior to the activity covered by the Method Statement being undertaken, include:

1) Location and structure of the fuel storage site, including the type and volume of storage container and the design and capacity of the bund.

3) Contaminated water management system, including an indication of the source and volume of contaminated water and how this would be disposed of.

4) Dust control, including methods to prevent dust generation and methods to reduce dust where its generation is unavoidable.

5) Location and layout of the construction camp in the form of a plan showing offices, stores for fuels and explosives, vehicle parking, access point, equipment cleaning areas and staff toilet placement.

6) Location of proposed site access routes and proposed traffic safety measures.

7) Emergency procedures for fire, and accidental leaks and spillages of hazardous materials.

8) Location, layout and preparation of cement/ concrete batching facilities including the methods employed for the mixing of concrete and the management of runoff water from such areas. An indication shall be given of how concrete spoil will be minimised and cleared.

9) Method of undertaking earthworks, including spoil management, erosion, dust and noise controls.

10) Motivation and method for undertaking any construction related activities within a “no-go” area, including requisite emergency procedures. Unless need clearly motivated and proposed methodology exhibits clear focus on environmentally sensitive construction practice, no activity will be permitted within the defined “no-go” areas.

PD 4.3.2 Environmental awareness training

Within seven days of the Commencement Date, the Contractor's site staff including foremen and site management staff shall attend an environmental awareness training course, of approximately one-hour duration. The Contractor shall liaise with the Employer’s Agent prior to the Commencement Date to fix a date and venue for the course. The Contractor shall provide a suitable venue with facilities as required by the Specification Data, and ensure that the specified employees attend the course.

No more than 20 people shall attend each course and the Contractor shall allow for sufficient sessions to train all personnel. Subsequent sessions shall be run for any new personnel coming onto site.

The environmental awareness training course shall be held in the morning during normal working hours. Any new employees coming on to site after the initial training course and the Contractor’s suppliers and subcontractors shall also attend the course. Provision should also be made for quarterly refreshers courses to be undertaken during the course of the Contract. The Contractor shall ensure that all attendees sign an attendance register, and shall provide the Employer’s Agent with a copy of the attendance register the day after each course.

PD 4.3.3 Construction personnel information posters

The Contractor shall erect and maintain information posters for the information of his employees depicting actions to be taken to ensure compliance with aspects of the Specifications. Such posters will be supplied by the Employer’s Agent and shall be erected at a location specified by the Employer’s Agent.

PD 4.3.4 Site clearance

The Contractor shall ensure that the clearance of vegetation is restricted to that required to facilitate the execution of the Works. Site clearance shall occur in a planned manner, and cleared areas shall be stabilised as soon as possible. The detail of vegetation clearing shall be to the Employer’s Agent approval. All cleared vegetation shall either be mulched and mixed into the topsoil stockpiles or disposed of at an approved disposal site. The disposal of vegetation by burying or burning is prohibited without the requisite permit from the local authority.

The Contractor shall strip the Top material within the working areas. The Top material shall be stockpiled separately from subsoil and used for subsequent rehabilitation and revegetation. Top material stockpiles shall not be compacted.

Should fauna be encountered during site clearance, earthworks shall cease until fauna have been safely relocated.

PD 4.3.5 Site division

The Employer's Agent shall be advised of the area that the Contractor intends using for his site establishment. The Contractor's camp shall occupy as small an area as possible, and no site establishment shall be allowed within 50 m of any watercourse unless otherwise approved by the Employer's Agent.

The Contractor shall inform the Employer's Agent of the intended actions and programme for site establishment. The site layout shall be planned to facilitate ready access for deliveries, facilitate future works and to curtail any disturbance or security implications for neighbours.

PD 4.3.6 Site demarcation

As required by the Specification Data, the Contractor shall erect and maintain permanent and/or temporary fences of the type and in the locations directed by the Employer's Agent. Such fences shall, if so specified, be erected before undertaking designated activities.

PD 4.3.7 "No go" areas

If so required by the Specification Data, certain areas shall be considered "no go" areas. The Contractor shall ensure that, insofar as he has the authority, no unauthorised entry, stockpiling, dumping or storage of equipment or materials shall be allowed within the demarcated "no go" areas.

"No go" areas shall be demarcated with fencing consisting of wooden or metal posts at 3 m centres with 1 plain wire strand tensioned horizontally at 900 mm from ground level. Commercially available danger tape shall be wrapped around the wire strand. The Contractor shall maintain the fence for the duration of construction and ensure that the danger tape does not become dislodged.

PD 4.3.8 Protection of natural features

The Contractor shall not deface, paint, damage or mark any natural features (e.g. rock formations) situated in or around the Site for survey or other purposes unless agreed beforehand with the Employer's

Agent. Any features affected by the Contractor in contravention of this clause shall be restored/ rehabilitated to the satisfaction of the Employer's Agent.

The Contractor shall not permit his employees to make use of any natural water sources (e.g. springs, streams, open water bodies) for the purposes of swimming, personal washing and the washing of machinery or clothes.

PD 4.3.9 Protection of flora and fauna

Except to the extent necessary for the carrying out of the Works, flora shall not be removed, damaged or disturbed nor shall any vegetation be planted without authorisation.

Trapping, poisoning and/ or shooting of animals is strictly forbidden. No domestic pets or livestock are permitted on Site.

Where the use of herbicides, pesticides and other poisonous substances has been specified, they shall be stored, handled and applied with due regard to their potential harmful effects.

PD 4.3.10 Protection of archaeological and paleontological remains

The Contractor shall take reasonable precautions to prevent any person from removing or damaging any fossils, coins, articles of value or antiquity and structures and other remains of archaeological interest discovered on the Site, immediately upon discovery thereof and before removal. The Contractor shall inform the Employer's Agent immediately of such a discovery and carry out the Employer's Agent instructions for dealing therewith. All construction within the vicinity of the discovery shall cease immediately and the area shall be cordoned off until such time as the Employer's Agent authorises resumption of construction in writing.

The Employer's Agent will contact the relevant heritage authority.

PD 4.3.11 Access routes/ haul roads

Access to the Construction camp and working areas shall utilise existing roads or tracks. Entry/exit points onto public roads shall take cognisance of traffic safety. Traffic safety measures shall include appropriate signage and signalmen where relevant.

On the Site, and, if so required by the Specification Data, within such distance of the Site as may be stated, the Contractor shall control the movement of all vehicles and plant including that of his suppliers so that they remain on designated routes, are distributed so as not to cause an undue concentration of

traffic and that all relevant laws are complied with. In addition such vehicles and plant shall be so routed and operated as to minimise disruption to regular users of the routes not on the Site. On gravel or earth roads on Site and within 500 m of the Site, the vehicles of the Contractor and his suppliers shall not exceed a speed of 20 km/h.

Mud and sand deposited onto public roads by construction activities shall be cleared on a daily basis.

PD 4.3.12 Cement and concrete batching

Where applicable, the location of the batching plant (including the location of cement stores, sand and aggregate stockpiles) shall be as approved by the Employer's Agent. The concrete/cement batching plant shall be kept neat and clean at all times.

No batching activities shall occur directly on unprotected ground. The batching plant shall be located on a smooth impermeable surface (concrete or 250 µm plastic covered with 5 cm of sand). The area shall be bunded and sloped towards a sump to contain spillages of substances. All wastewater resulting from batching of concrete shall be disposed of via the contaminated water management system and shall not be discharged into the environment. Contaminated water storage areas shall not be allowed to overflow and appropriate protection from rain and flooding shall be implemented

Empty cement bags shall be stored in weatherproof containers to prevent windblown cement dust and water contamination. Empty cement bags shall be disposed of on a regular basis via the solid waste management system, and shall not be used for any other purpose. Unused cement bags shall be stored so as not to be affected by rain or runoff events. In this regard, closed steel containers shall be used for the storage of cement powder and any additives. The Contractor shall ensure that sand, aggregate, cement or additives used during the mixing process are contained and covered to prevent contamination of the surrounding environment.

The Contractor shall take all reasonable measures to prevent the spillage of cement/ concrete during batching and construction operations. During pouring, the soil surface shall be protected using plastic and all visible remains of concrete shall be physically removed on completion of the cement/ concrete pour and appropriately disposed of. All spoiled and excess aggregate/ cement/ concrete shall be removed and disposed of via the solid waste management system.

Where "readymix" concrete is used, the Contractor shall ensure that the delivery vehicles do not wash their chutes directly onto the ground. Any spillage resulting from the "readymix" delivery shall be immediately cleared and disposed of via the solid waste management system.

PD 4.3.13 Earthworks

All earthworks shall be undertaken in such a manner so as to minimise the extent of any impacts caused by such activities, particularly with regards to erosion and dust generation. No equipment associated with earthworks shall be allowed outside of the Site and defined access routes unless expressly permitted by the Employer's Agent.

PD 4.3.14 Pumping

Pumps shall be placed over a drip tray in order to contain fuel spills and leaks. The Contractor shall take all reasonable precautions to prevent spillage during the refuelling of these pumps.

The Contractor shall ensure that none of the water pumped during any dewatering activities, including well points, is released into the environment without the Employer's Agent approval. The Employer's Agent approval is required prior to the discharge of this water into the Municipal sewer system.

PD 4.3.15 Bitumen

Over spray of bitumen products outside of the road surface and onto roadside vegetation or the surrounding environment shall be prevented using a method approved by the Employer's Agent.

When heating bitumen products, the Contractor shall take cognisance of appropriate fire risk controls. Heating of bitumen products shall only be undertaken using LPG or similar zero emission fuels and appropriate firefighting equipment shall be readily available.

Stone chip/gravel excess shall not be left on road / paved area verges. This shall be swept / raked into piles and removed to an area approved by the Employer's Agent.

Water quality from runoff from new/ fresh bitumen surfaces will be monitored visually by the Employer's Agent and remedial actions taken where necessary by the Contractor.

PD 4.3.16 Fire control

No fires may be lit on site. Any fires that occur shall be reported to the Employer's Agent immediately. Smoking shall not be permitted in those areas where it is a fire hazard. Such areas shall include the workshop and fuel storage areas and any areas where the vegetation or other material is such as to make liable the rapid spread of an initial flame. In terms of the Atmospheric Pollution Prevention Act (No. 45 of 1965), burning is not permitted as a disposal method.

The Contractor shall ensure that there is basic fire-fighting equipment available on Site at all times. This shall include at least rubber beaters when working in urban open spaces and fynbos areas, and at least one fire extinguisher of the appropriate type when welding or other "hot" activities are undertaken.

PD 4.3.17 Emergency procedures

The Contractor's procedures for the following emergencies shall include:

i) Fire

The Contractor shall advise the relevant authority of a fire as soon as one starts and shall not wait until he can no longer control it. The Contractor shall ensure that his employees are aware of the procedure to be followed in the event of a fire.

ii) Accidental leaks and spillages

The Contractor shall ensure that his employees are aware of the emergency procedure(s) to be followed for dealing with spills and leaks, which shall include notifying the Employer's Agent and the relevant authorities. The Contractor shall ensure that the necessary materials and equipment for dealing with spills and leaks is available on Site at all times. Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the Employer's Agent.

In the event of a hydrocarbon spill, the source of the spillage shall be isolated, and the spillage contained. The area shall be cordoned off and secured. The Contractor shall ensure that there is always a supply of absorbent material readily available to absorb/ breakdown and where possible be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 200 ℓ of hydrocarbon liquid spill.

PD 4.3.18 Community relations

The Contractor shall erect and maintain information boards in the position, quantity, design and dimensions specified. Such boards shall include contact details for complaints by members of the public in accordance with details provided by the Employer's Agent.

The Contractor shall keep a "Complaints Register" on Site. The Register shall contain all contact details of the person who made the complaint, and information regarding the complaint itself. The Contractor shall erect and maintain an information board at the access gate to the Site Office.

PD 4.3.19 Erosion and sedimentation control

The Contractor shall take all reasonable measures to limit erosion and sedimentation due to the construction activities. Where erosion and/or sedimentation, whether on or off the Site, occurs despite the Contractor complying with the foregoing, rectification shall be carried out in accordance with details specified by the Employer's Agent. Where erosion and/or sedimentation occur due to the fault of the Contractor, rectification shall be carried out to the reasonable requirements of the Employer's Agent.

Any runnels or erosion channels developed during construction or during the defects liability period shall be backfilled and compacted. Stabilisation of cleared areas to prevent and control erosion shall be actively managed. Consideration and provision shall be made for various methods, namely, brushcut packing, mulch or chip cover, straw stabilising (at a rate of one bale/ 20 m² and rotovated into the top 100 mm of the completed earthworks), watering, soil binders and anti-erosion compounds, mechanical cover or packing structures (e.g. Hessian cover).

Traffic and movement over stabilised areas shall be restricted and controlled, and damage to stabilised area shall be repaired and maintained to the satisfaction of the Employer's Agent.

PD 4.3.20 Aesthetics

The Contractor shall take reasonable measures to ensure that construction activities do not have an unreasonable impact on the aesthetics of the area.

PD 4.3.21 Recreation

If so required by the Specification Data, the Contractor shall take measures to reduce disruption to recreational users of the area abutting the Site.

PD 4.3.22 Access to site

The Contractor shall ensure that access to the Site and associated infrastructure and equipment is off-limits to the public at all times during construction. If so required, as directed by the Employer's Agent, the Contractor shall fence the site to ensure effective control of access to the site. This fence shall be a diamond mesh fence or similar with a minimum height of 1.8 m, and it shall be erected around the site and shall be maintained for the duration of construction.

PD 4.3.23 Crane operations

Drive plants shall be well maintained and drip trays shall be positioned at potential leak areas. Over-greasing of crane cables shall be avoided.

Movement and lifting of hazardous materials shall be undertaken such that they do not cause a pollution, spillage or safety risk (in particular were concrete buckets are in use).

PD 4.3.24 Trenching

Trenching for services shall be undertaken in accordance with the engineering specifications with the following environmental amplifications, where applicable:

a) Soil shall be excavated and used for refilling trenches i.e. soil from the first trench shall be excavated and stockpiled, thereafter soil from the second excavated trench length shall be used to backfill the trench behind it once the services have been laid. The last trench shall be filled using the soil stockpiled from the first trench.

b) Trench lengths shall be kept as short as practically possible before backfilling and compacting.

c) Trenches shall be re-filled to the same level as (or slightly higher to allow for settlement) the surrounding land surface to minimise erosion.

PD 4.3.25 Demolition

Hazardous and non-hazardous materials shall be separated at site and disposed of in a manner approved by the Employer's Agent.

All buildings older than 60 years require a permit from South African Heritage Resources Agency in terms of the National Heritage Resources Act (no. 25 of 1999). A demolition permit is also required from the local authority in terms of the National Building Regulations.

PD 4.3.26 Drilling and jack hammering

The Contractor shall take all reasonable measures to limit dust generation and noise as a result of drilling operations. The Contractor shall ensure that no pollution results from drilling operations, either as a result of oil and fuel drips, or from drilling fluid.

Any areas or structures damaged by the drilling and associated activities shall be rehabilitated by the Contractor to the satisfaction of the Employer's Agent.

PD 4.3.27 Stockpiling

The Employer's Agent will identify suitable sites for stockpiling. Stockpiles shall be convex in shape, shall be no higher than 2 m and shall be located so as to cause minimal disturbance. Stockpiles shall

be so placed to occupy minimum width compatible with the natural angle of repose of material, and measures shall be taken to prevent the material from being spread over too wide a surface. Where required, appropriate precautions shall be taken to prevent the erosion and limit the compaction of the stockpiles. The Contractor shall ensure that all stockpiles do not cause the damming of water or run off, or is itself washed away.

Topmaterial stockpiles shall not be covered with any material (e.g. plastic) that may kill seeds or cause it to compost. If the stockpiles start to erode significantly or cause dust problems, they shall be covered with hessian. Where practical, Topmaterial shall not be left for longer than six to eight months before being used for rehabilitation. If stored for longer than six months, the Topmaterial shall be analysed and, if necessary, upgraded before placement.

PD 4.3.28 Site closure and rehabilitation

Any areas that the Employer's Agent believes may have been impacted upon or disturbed, shall be rehabilitated to the satisfaction of the Employer's Agent, which includes all areas where Topmaterial has been stripped. Once construction is complete the Contractor shall clear everything from the Site not forming part of the Permanent Works. The area to be rehabilitated shall first be landscaped to match the topography of the surrounding area as it was prior to construction. The composition of vegetation to be used for any rehabilitation shall be as specified in the Specification Data.

The Contractor may not use herbicides, pesticides, fertilisers or other poisonous substances for the rehabilitation process unless otherwise agreed with the Employer's Agent.

All rehabilitated areas shall be considered "no go" areas and the Contractor shall ensure that none of his staff or equipment enters these areas.

The Contractor shall undertake to remove all alien vegetation re-establishing on the area and shall implement the necessary temporary or permanent measures to combat soil erosion.

PD 4.3.29 Temporary revegetation of the areas disturbed by construction.

Where there is likely to be a delay of greater than two weeks in the landscaping and revegetation of a disturbed area or where that site is likely to be the subject of further construction activities at a later stage, the Contractor shall ensure that the area is temporarily revegetated to combat dust generation and prevent erosion. This revegetation shall occur incrementally immediately upon completion of the construction activities at the subject location.

Prior to revegetation structures and material not forming part of the Permanent Works, including remnants of building materials, concrete foundations, timber and other foreign debris, shall be removed and disposed of via the solid waste management system. The area shall be revegetated as follows:

a) The surface shall be levelled by hand or machine as far as practically possible.

b) Alien vegetation shall be cleared by cutting the plants off at ground level, and painting the stump with 0.5% Garlon in diesel.

c) For areas with a slope of greater than 1:3, straw shall be utilised as a binding material to stabilise the soil during revegetation and rehabilitation of the site. Straw shall consist of natural, dried fibres of hay or chaff of various lengths between 50 mm and 400 mm, delivered to Site in bales and shall be applied evenly by hand or machine at a rate of 1 bale per 20 m² over the area to be revegetated. It shall then immediately be rotovated into the upper 100 mm layer of soil.

d) The prepared area shall be hydro- or hand-seeded at a rate of 40 kg/ha using Rye grass (Loliummultiflorum). In the event of hand-seeding, the seed mixture as specified shall be mixed with two parts per volume of clean dry plaster sand, then divided in half and applied evenly in two successive applications, one after the other, by means of an approved hand seeding machine (known colloquially as a "tefsaaier"). On completion of the seeding the surface shall be lightly raked to cover the seed with no more than 5 mm of soil.

e) Water used for the irrigation of vegetated areas shall be free of pollutants that will have a detrimental effect on the plants. The vegetated area shall only be watered once, immediately following seeding. Watering should be carried out from a tanker, using a fine nozzle spray to avoid erosion and disturbance of the vegetation. Water for irrigation purposes may not be drawn from any water body.

No construction equipment, vehicles or unauthorised personnel shall be allowed onto areas that have been vegetated. Only persons or equipment required for the preparation of areas, application of fertiliser and maintenance of revegetated area shall be allowed to operate on these areas.

PD 4.3.30 Temporary site closure

If the site is closed for a period exceeding one week, the Contractor, in consultation with the Employer's Agent shall carry out the following checklist procedure.

Hazardous materials stores

Outlet secure/ locked

Bund empty (where applicable)

Fire extinguishers serviced and accessible

Secure area from accidental damage e.g. vehicle collision

Emergency and contact details displayed

Adequate ventilation

Safety

All trenches and manholes secured

Fencing and barriers in place as per the Occupational Health and Safety Act (No 85 of 1193)

Emergency and management contact details displayed

Pipe stockpile wedged/ secured

Erosion

Wind and dust mitigation in place

Slopes and stockpiles at stable angle

Revegetated areas watering schedules and supply secured

Water contamination and pollution

Cement and materials stores secured

Toilets empty and secured

Refuse bins empty and secured

Drip trays empty and secure (where possible)

Structures vulnerable to high winds secure

PD 5 COMPLIANCE WITH REQUIREMENTS AND PENALTIES

PD 5.1 COMPLIANCE

Environmental management is concerned not only with the final results of the Contractor's operations to carry out the Works but also with the control of how those operations are carried out. Tolerance with respect to environmental matters applies not only to the finished product but also to the standard of the day-to-day operations required to complete the Works.

It is thus required that the Contractor shall comply with the environmental requirements on an ongoing basis and any failure on his part to do so will entitle the Employer's Agent to certify the imposition of a penalty as detailed below.

PD 5.2 Penalties

Penalties will be issued for certain transgressions. Penalties may be issued per incident at the discretion of the Employer's Agent. Such penalties will be issued in addition to any remedial costs incurred as a result of non-compliance with this Specification. The Employer's Agent will inform the

Contractor of the contravention and the amount of the penalty, and shall be entitled to deduct the amount from monies due under the Contract.

Penalties will be issued for the transgressions listed below. Penalties may be issued per incident at the discretion of the Employer's Agent. Such penalties will be issued in addition to any remedial costs incurred as a result of non-compliance with the environmental specifications. The Employer's Agent will inform the Contractor of the contravention and the amount of the fine, and will deduct the amount from monies due under the Contract.

Penalties for the activities detailed below, will be imposed by the Employer's Agent on the Contractor.

a)	Any employees, vehicles, plant, or thing related to the Contractor's operations operating within the designated boundaries of a "no-go" area.	R 2 000
b)	Persistent and un-repaired oil leaks from machinery.	R 1 000
c)	Persistent failure to monitor and empty drip trays timeously.	R 1 000
d)	The use of inappropriate methods for refuelling.	R 1 000
e)	Litter on site associated with construction activities.	R 500
f)	Deliberate lighting of fires on site.	R 5 000
g)	Failure to implement specified noise controls, particularly during blasting	R 1 000
h)	Failure to empty waste bins on a regular basis.	R 1 000
i)	Inadequate dust control.	R 2 500
j)	Employees urinating or defecating anywhere on site other than the site ablution facilities.	R 500
k)	A spillage, pollution, fire or any damage to any water course or surrounding environment resulting from negligence on the part of the Contractor or his staff.	R 5 000

For each subsequent similar offence the fine will be doubled in value to a maximum value of R 30 000.

The Employer's Agent shall be the judge as to what constitutes a transgression in terms of this clause, subject to the provisions of Clause 10.2.1 of the General Conditions of Contract. In the event that transgressions continue the Contractor's attention is drawn to the provisions of Sub-clauses 4.11 and 9.2.1 of the General Conditions of Contract under which the Employer's Agent may remove an individual from site or terminate the Contract.

PD 5.3 Removal from site and suspension of Works

The Employer's Agent may instruct the Contractor to remove from Site any person(s) who in their opinion is guilty of misconduct, or is incompetent, negligent or constitutes an undesirable presence on Site. Sub-clause 4.1.9 of this Specification requires that all Plant be in good working order, and accordingly the Employer's Agent may order that any Plant not complying with the Specifications be removed from Site. Where the Employer's Agent deems the Contractor to be in breach of any of the requirements of this Specification, he may order the Contractor to suspend the progress of the Works or any part thereof.

PD 6 TOLERANCES

Not applicable.

PD 7 TESTING/QUALITY CONTROL

Not applicable.

PD 8 MEASUREMENT AND PAYMENT

PD 8.1 BASIC PRINCIPLES

PD 8.1.1 General

Except as specified below, or as billed, no separate measurement and payment will be made to cover the costs of complying with the provisions of this Specification and such costs shall be deemed to be covered by the rates tendered for the items in the Bill of Quantities completed by the Contractor when submitting his tender.

PD 8.1.2 All requirements of the environmental management specification

All work not measured elsewhere, associated with complying with any requirement of this Environmental Management specification will be measured and paid as a sum.

The tendered sum shall cover the cost of with complying with the environmental management specification and shall include for all materials, labour and plant required to execute and complete the Works as specified, described in the Bill of Quantities or shown on the Drawing(s).

PD 8.1.3 Work "required by the Specification Data"

Where a clause in this Specification includes a requirement as "required by the Specification Data", measurement and payment for compliance with that requirement shall be in accordance with the relevant measurement and payment clause of the Specification Data.

PD 8.2 BILLED ITEMS

PD 8.2.1 Method Statements: Additional work……..Unit: Sum

No separate measurement and payment will be made for the provision of Method Statements but, where the Employer's Agent requires a change on the basis of his opinion that the proposal may result in, or carries a greater than warranted risk of damage to the environment in excess of that warranted by the Specifications, then any additional work required, provided it could not reasonably have been foreseen by an experienced contractor, shall be valued in accordance with the Clause in the General Conditions of Contract dealing with Provisional Sums.

A stated sum is provided in the Bill of Quantities to cover payment for such additional work.

PD 8.2.2 All requirements of the environmental management specification……..Unit: Sum

All other work not measured elsewhere, associated with complying with any requirement of the environmental management specification shall be measured as a sum.

The tendered rate shall cover any cost associated with complying with the environmental management specification and shall include for all materials, labour and plant required to execute and complete the work as specified, described in the Bill of Quantities or shown on the drawing(s).

PARTICULAR SPECIFICATION: PE

PE CONCRETE PAVEMENTS

PE 1 SCOPE

This Particular Specification covers all the work in connection with the construction of cast in situ concrete pavements, applicable to the required work and for constructing the concrete pavement layer for Phases 1 to 5, where concrete is placed by hand and where side forms are used.

PE 2 MATERIALS

PE 2.1 CEMENT

Cement used for concrete shall be a CEM I 42.5 complying to SANS 50 197:2000. The compatibility and reactivity with the admixtures shall be checked at intervals of 500m3 concrete poured. Fly ash and Silica Fume shall comply with SANS 1491 Part 2 and Part 3 respectively. If concrete is mixed on site, the delivery of cement must be in bulk. Cementitious materials containing less than 15% extenders shall only be considered if the contractor can prove by mix design that required fresh and hardened properties have been met.

PE 2.2 WATER

Water shall be clean and free from harmful concentrations of acids, alkalis, salts, sugar or other organic or chemical substances. If the water used is not obtained from a public drinking-water main, the Employer's Agent may require the Contractor to have the suitability of the water proved by tests made by an approved laboratory. The costs of these tests or any subsequent tests ordered by the Employer's Agent shall be borne by the Contractor.

For reinforced concrete the chloride content of the mixing water shall not exceed 500 mg/l when tested in accordance with SANS method 202.

PE 2.3 AGGREGATE FOR CONCRETE

Aggregates shall comply with the requirements of SANS 1083 but subject to the following:

(i) The drying shrinkage of concrete samples made from each of the required three concrete mixtures for preparing the compressive-strength and flexural-strength samples in accordance with clause PE 5.2 shall not exceed 0,040%. Drying-shrinkage tests shall be conducted in accordance with SANS method 1085.

Where the drying shrinkage exceeds the specified maximum value, either alternative aggregates shall be used, or further investigations shall be made, or evidence shall be produced with a view to confirming the suitability of the aggregates proposed for use. The historical behaviour of the aggregate in concrete may serve as a recommendation in such cases.

(ii) Coarse aggregate shall have a 10% FACT value (dry) greater than 210kN.

In addition, the aggregates shall comply with the following requirements:

1) The fine aggregate shall be either crusher produced sand or natural silica sand, or a blend of both as approved by the Employer's Agent.

2) The fineness modulus of the fine aggregate (or mixtures thereof) shall not deviate from the approved fine aggregate (or mixtures thereof) by more than 0,20.

3) Aggregates shall not contain any deleterious quantities of organic material, particularly pieces of timber, which will cause unacceptable surface defects when they float to the top of fresh concrete during vibration.

4) A nominal particle size of 6.7 mm shall be used as coarse aggregate.

5) The flakiness index of the coarse aggregate, as determined by the TMH1 method B3T, shall not exceed 35.

6) The history of the proposed aggregate source(s) must be studied/scrutinized for alkali-aggregate reactivity. Where there is any danger of a particular combination of aggregate and cement giving rise to a harmful alkali-aggregate reaction, the particular combination shall be tested and interpreted in accordance with the testing method as described in Clause PE 2.3(iv), and, where the result points to such reaction, the aggregate and or cement shall be replaced so that an acceptable combination may be obtained.

(iii) The fine aggregate needs to have a constant grading with all particles smaller than 2.36 mm and the fraction smaller than 150 micrometer limited to less than 3%.

(iv) Accelerated-test method for determining the potential alkali reactivity of aggregates:

1) The method

Three mortal prisms shall be prepared in accordance with the requirements of ASTM C 227-90. The prisms are removed from the mould after 24 hours and immersed in water in a closed container, placed in an oven and kept at a constant temperature of 80° C. After 24 hours in the oven, the prisms are taken to a room with a temperature of 23º C, where their lengths are measured with a vertical comparator (an indicator type of deformation meter) accurately to 2µm before any significant cooling-down takes place.

This reading will be taken as a nil reading. After the initial reading has been taken, the prisms are immersed in a 1N NaOH solution kept at 80º C. This solution is kept in a plastic container which seals tightly and is large enough for the prisms to be completely immersed. Plastic is used, as a caustic solution corrodes glass and metal. The prisms are measured every working day for a period of 14 days at a room temperature of 23º C, and their linear expansion is calculated. The average expansion of the three prisms for each day is then calculated. Where none of the values deviate by more than 15% from the average, the repeatability is regarded as being satisfactory. The average expansion after 10 or 12 days is taken to be the reference value for determining the potential alkali reactivity.

2) Criteria

The criteria proposed provisionally for the accelerated mortar-prism testing method shall be as follows:

(a) Percentage of linear expansion after 10 days:

< 0,08	The alkali reactivity of the aggregate is not harmful
≥ 0,08 But< 0,20	The alkali reactivity of the aggregate is harmful and the aggregate is expanding slowly
≥ 0,20	The alkali reactivity of the aggregate is harmful and the aggregate is expanding rapidly

(b) Percentage of linear expansion after 12 days:

< 0,10	The alkali reactivity of the aggregate is not harmful
≥ 0,10 But< 0,25	The alkali reactivity of the aggregate is harmful and the aggregate is expanding slowly

≥ 0,25	The alkali reactivity of the aggregate is harmful and the aggregate is expanding rapidly

3) Interpretation

For aggregates falling in the slowly expanding group, the alkalinity per m^3 of concrete shall not exceed 2,80 kg of an Na_2O equivalent.

For aggregates falling in the rapidly expanding group, the alkalinity per m^3 of concrete shall not exceed a value of 2,10 kg of an Na_2O equivalent per m^3, depending on the reactivity.

The dilution and palliative effect of extenders in the cementitious binders, such as slagment (where permitted in structural concrete) and fly ash, shall be taken into account the interpretation of the results.

PE 2.4 ADMIXTURES TO CONCRETE

Admixtures shall not be used in concrete without the written approval of the Employer's Agent, who may require that tests be made before they are used to prove their suitability.

Admixtures, if allowed, shall comply with the following requirements:

(a) Admixtures shall be used only in liquid form and shall be batched in solution in the mixing water by means of a mechanical batcher capable of dispensing the agent in quantities accurate to within 5% of the required amount.

(b) Admixtures shall comply with the requirements of ASTM C-494 or AASHTO M-154 and shall be an approved brand and type.

(c) Air-entraining agents shall comply with the requirements of ASTM C-260 or AASHTO M-194.

(d) Admixtures containing calcium chloride shall not be used

PE 2.5 REINFORCING, TIE BARS AND DOWEL BARS

Reinforcing shall comply with the relevant requirements of SANS 1200 G and SANS 920.

Reinforcing steel and tie-bars shall be deformed high-yield steel and dowels shall be hot-rolled deformed mild-steel bars. The dimensions of the reinforced steel, tie-bars or dowel bars will be shown on the drawings and allowed for in clause PE13: Measurement and Payment.

PE 2.6 CURING COMPOUND

The curing compound used shall be a white-pigmented, resin-based curing compound which complies with the requirements of AASHTO M-148, except that the water loss as determined by the water-retention test shall not exceed 0,040 g/cm^2.

A valid certificate from an approved testing laboratory shall be submitted, to certify that the curing compound complies with the specifications and that further testing shall be carried out at regular intervals.

The curing compound shall be capable of being sprayed onto a wet surface without loss of stability or performance. This characteristic shall also be certified by the approved testing laboratory.

PE 2.7 JOINT SEALERS

(i) Silicone sealant

The silicone sealant shall be a one-component material with low-modulus properties which comply with the following requirements:

1) Tensile stress at 150% expansion determined in accordance with ASTM D 412 (Matrix C) after seven days' curing at 23°C ± 2°C: 0,31 MPa max

2) Extrusion rate, tested with a pneumatic caulking gun with a 3,18 mm nozzle at a pressure of 0,62 MPa: Material temperature - 18°C min 75 g/min; Material temperature 38°C max 250 g/min

3) Relative density determined in accordance with ASTM D 794 Method A: 1,01 to 1,515

4) Durometer hardness determined in accordance with ASTM D 2240 at -18°C after 7 days' curing at 23°C ± 2°C and relative humidity 50% ± 5%: 8 - 20 Shore A

5) Shelf life of at least 6 months after manufacture

6) Ozone and UV resistance determined in accordance with ASTM D 793-75: no pulverisation, cracking or loss of bond after 5 000 hours

7) Adhesion to cement-mortar briquettes determined in accordance with sub-clause PE 2.7(iv): 0,34 MPa min

8) Non-adhesion period determined in accordance with sub-clause PE 2.7(iv): max 90 min

9) Deformation capability and adhesion in accordance with sub-clause PE 2.7(iv): no adhesion or cohesion after 10 cycles at -18°C

10) Colour: Grey

Cold-poured liquid sealants used in joints and cracks shall be a self-levelling silicone-rubber (Dow Corning 890 SL or similar for widths less than 30 mm and Dow Corning 902 RC or similar for widths greater than 30 mm).

The application of the liquid sealant shall not be undertaken when the air temperature is 5º C and falling or as specified by the supplier. All joints shall be clean and dry before applying the sealant and the Employer's Agent shall be afforded the opportunity to inspect them.

The contractor shall submit a certificate, less than six months old, from an approved testing laboratory, certifying that the sealant conforms to all the specified requirements.

(ii) Additional materials for silicone sealant

The sealant shall be supported by a bond breaker backing strip, and, unless otherwise recommended by the manufacturer and approved by the Employer's Agent, the faces of the joint groove shall first be treated with a primer.

Supporting and priming materials shall be compatible with adjacent materials or surfaces in contact with the materials and shall be in accordance with the recommendations by the manufacturer and subject to approval by the Employer's Agent. Any primer used shall form a barrier layer between the silicone and the concrete.

The back-up material (joint former) installed in the joints and cracks shall be of the closed-cell polyethylene foam type with a minimum density of 30 kg/m^3 and shall be an approved brand subject to approval by the Employer's Agent.

(iii) Materials for cleaning, repairing and resealing existing joints and repairing cracks

Materials used for cleaning existing joints and for repairing and sealing or resealing joints and cracks shall comply with the provisions of the project specifications. Cleaning agents shall be such that they will not stain the concrete or cause the existing bituminous or other material to soak into the concrete.

(iv) Tests on silicon sealants

The following tests on silicon sealants shall apply as determined in sub-clause PE2.7(i):

(a) Bond to cement mortar: Three briquettes, shaped in accordance with AASHTO T-132 and moisture-cured for at least 28 days, are sawn in half, cleaned and dried to a constant mass in an oven at a temperature of $110^0C \pm 5^oC$. After having cooled off, they are bonded with approximately 0.25 mm of silicon sealant and tested with clamps which comply with AASHTO T-132. They are tested under stress at a loading rate of 7.62 mm/min.

(b) Non adhesive period: Prepare the specimens in a mould with an area exceeding that of the brass weight described below, and which is 6.35 mm thick. Place a 30g brass weight with dimensions of 41.28 mm x 25.4 mm x 3.18 mm on a polyethylene strip applied to the sample after the specified curing period. After the weight has been removed, the polyethylene strip is removed by pulling it off at an angle of 90 degrees to the mix and at a rate of 25.4 mm in 5 seconds. No material may adhere to the polyethylene while it is non-adhesive.

(c) Deformability and adhesion: Prepare concrete blocks of 25.4 mm x 25.4 mm x 76.2 mm in accordance with ASTM C-719. A sawn surface is used as the bonding surface. Seal 50.8 mm of the block and leave 12.7 mm at each end of the specimen unsealed. The sealant shall be 9.5 mm thick and 12.7 mm wide. Cure the specimen for 7 days in air at $25^0C \pm 1.7^oC$ and for 7 days in water at $25^0C \pm 1.7^oC$. Subject the sealant to deformation in accordance with ASTM C-719. The ductility or compressive rate shall be 3.18 mm per hour. One cycle is defined as extension to a width of 25.4 mm and returning to the initial width of 12.7 mm.

PE 2.8 TIE BARS AND DOWELS

(a) Tie bars

Tie bars shall consist of deformed hot-rolled mild steel or deformed hot-rolled, high-yield-stress steel which comply with the requirements of SANS 920, except that any tie bars to be bent and later restraightened shall be of mild steel.

Tie bars of the required dimensions and spacing shall be placed at right angles to the joints. The tie bars shall be free of paint, grease or other coatings that may affect bonding with the concrete.

At the construction joints, one half of the tie bar shall be supported by suitable stools placed on the subbase, while the other half shall project into the adjacent panel. Alternatively tie bars at longitudinal joints may be bent parallel to the edge of the first panel constructed and shall be straightened into their final positions before the concrete of the adjacent panel is placed, provided that the method of fixing and support is approved by the Employer's Agent.

(b) Dowels

Dowel bars shall consist of plain, round mild-steel bars which comply with the requirements of SANS 920. The dimensions and spacing of dowel bars shall be as shown on the Drawings.

Dowel bars shall be straight, free from burred edges or other irregularities and with bevelled sliding ends. The free or unbonded end of the dowel shall be coated with a bond-breaking compound which consists of 200 penetration-grade bitumen blended hot with 14% light creosote oil and later, when cold, brought to the consistency of paint by the addition of 20% solvent naphtha.

Dowels shall be held rigidly in horizontal and vertical alignment by an approved dowel-supporting frame. The dowel shall not be tack-welded to the supporting frame but shall be held in position by soft binding wire.

A tolerance of not more than 2 mm in 300 mm (1 in 150) from the correct alignment, either vertical or horizontal, will be permitted prior to concreting. After concreting, the tolerance for dowels shall remain within 4 mm in 300 mm.

PE 3 PREPARATION OF UNDERLYING LAYERS

PE 3.1 GENERAL

The underlying layers shall be constructed in accordance with these specifications up to the level of the underside of the concrete pavement.

The Contractor shall note that the specified construction tolerances for any underlying layers shall not relieve him of his responsibility to construct the concrete pavement to the requirements for thickness, grade, cross-section and smoothness specified in Clause PE 11.

As the Contractor has to work to stricter tolerances on the concrete pavement than those obtained or specified for the underlying layers, the costs of any additional work involved with a view to complying with the requirements specified for the concrete pavement shall be included in the tendered prices for the concrete pavement. Similarly, the costs of any additional thickness of concrete which may be required to provide the thickness of pavement slab within the specified tolerances shall be borne by the Contractor, irrespective of any tolerances specified for the construction of the subbase.

PE 3.2 WETTING OF THE SUBBASE

The surface of the subbase shall be kept continuously wet for a period of at least one hour before the concrete is placed. Immediately before the concrete is placed, the excess water shall be broomed off to ensure that the subbase is still damp but without puddles of water or pockets of mud when the concrete is placed. The wetting is of particular importance during hot, dry weather, and no concrete shall be placed on a subbase that has not been wetted or that has dried out.

PE 4 SIDE FORMS

PE 4.1 GENERAL

Side forms shall be L-shaped and of steel. The thickness of the steel used shall not be less than 5 mm. Forms 250 mm or more in height shall be at least 250 mm wide at the base; forms less than 250 mm in height shall have a base width at least as wide as the height. Flange braces shall extend outwards on the base for at least two thirds of the height of the form. The forms shall be free from warps, bends or kinks. The top face of the form shall not vary from a true plane by more than 3 mm in 3 m. The inside face of the upstanding leg shall not vary from a true plane by more than 6 mm in 3 m.

Side forms shall be of sufficient rigidity, both in the form and in the interlocking connection with the adjoining forms, so that deflection and springing will not occur under the weight of the wet concrete which is placed in the pavement.

PE 4.2 SETTING OF FORMS

The forms shall be supported over their entire length. They shall be set to the correct height by means of steel shims and wedges or by other approved methods, and over the full length of the forms the space between the forms and the supporting layer shall be caulked with a 1:3 cement:sand mortar. The mortar bed shall be trimmed flush with the inside face of the forms.

The side forms shall be set to line and secured with not less than three pins over each 3 m of length, and one pin shall be fixed at each side of a joint. The top surfaces of the forms at all joints shall be flush.

The side forms shall be so set and supported that the finished slab surface will comply with the requirements specified in Clause PE 11; the slab edge shall nowhere be out by more than 3 mm of the vertical alignment.

The forms shall be cleaned and oiled immediately before each use.

The forms shall be fixed in position within a reasonable time for the Employer's Agent to inspect them prior to casting.

PE 4.3 REMOVAL OF FORMS

The side forms shall be removed before any sawing of construction joints and saw cut joints can be commenced.

The concrete and projecting dowel bars shall not be damaged in any way during the removal of the forms.

PE 5 CONCRETE WORK

PE 5.1 REQUIREMENTS OF CONCRETE

(a) General

The specifications for materials to be used for the concrete shall not limit the Contractor's responsibility to manufacture concrete which complies with the requirements of SANS 1200 G.

(b) Minimum cement: water ratio

The cement: water ratio of the mix shall not be less than 1,9.

(c) Minimum cement content

The cement content of the mix shall not be less than 320 kg/m^3.

(d) Specified strength

The specified strength shall be a 28-day compressive strength which corresponds to a 28-day design flexural strength of 4,2 MPa.

(e) The workability of concrete

The mix proportions and consistency shall be such that, with the equipment in use, the concrete can be fully compacted without the materials segregating or the occurrence of excessive bleeding.

The mix proportions and consistence of the concrete mix shall be such that, with the equipment in use, the concrete can be fully compacted without bleeding or segregation of the components. The concrete consistence shall be suited to the type of paving equipment used, the haul, the weather and the site conditions. The consistence of each batch of concrete shall be measured and recorded by conducting a slump test on the concrete immediately before the steel fibres are added to the mixture. The material used for the slump test must be returned to the mixture after the test has been completed and mixing should continue until the fibres are uniformly distributed through all the concrete, including the material that was used for the slump test.

PE 5.2 DETERMINING MIX PROPORTIONS

(a) General

The preliminary proportions of cement and aggregate required to produce concrete which complies with the requirements of these Specifications shall be determined by way of laboratory tests on concrete which is manufactured from the cement, coarse and fine aggregates, air-entraining agent (if any) and water as proposed for use in the Works.

(b) Preliminary tests

At least 30 days prior to the construction of the trial pavement, as specified in Clause PE 9, the Contractor shall submit for approval samples of the materials he proposes to use and a report from an approved testing laboratory which shows the proportions proposed for the paving concrete. The report shall also show:

(i) The results of tests on the specified properties of all components,

(ii) The relationship between the 28-day compressive and flexural strengths for at least three cement: water ratios.

(iii) The effect of the particular admixture (if any) proposed by the contractor in regard to variations in admixtures,

(iv) The effect of at least three water contents on concrete consistence.

The tests for determining the relationship between the compressive and flexural strength shall be based on not less than six compressive strength specimens and not less than twelve flexural strength specimens for each cement: water ratio. All strength tests shall be made in accordance with SANS method 5864 (beams for flexural strength testing) and TMH1 method D1 (cubes).

(c) Changes in proportions or materials

(i) If, during the progress of the work, the requirements set out in Sub-clause PE 5.1 are not being met by the concrete being manufactured, the Contractor shall immediately stop the production of such concrete and shall make such changes as may be necessary in the mix proportions and/or the materials in order to meet these requirements.

(ii) If, during the progress of the work, the Contractor wishes to use materials or mix proportions other than those originally approved, or if the materials from the sources originally approved change in regard to properties, he shall before proceeding with further work, submit adequate evidence to the Employer's Agent that the new materials or combination of materials will produce concrete which complies with the requirements of Sub-clause PE 5.1 and will not bring about detrimental changes in the properties of the concrete.

(iii) Any changes made shall be at the Contractor's expense and no extra payment will be allowed on the grounds of such change.

(d) Changes in requirements

The Employer's Agent shall have the right, at any time during the progress of the work, to amend the requirements set out in Sub-clause PE 5.1. In such case the Contractor shall be compensated in accordance with the terms of the Contract for the additional costs of materials or additional handling and placing or for other costs, if any, entailed by such changes.

PE 5.3 BATCHING, MIXING AND TRANSPORTING OF CONCRETE

(a) Storing the materials

Aggregates shall be stockpiled and handled in such a manner that the various sizes of aggregate will not be mixed and that the coarse and fine fractions of each size of aggregates will not segregate.

Cement, additives and binder shall be stored in a silo or in a dry weatherproof shed with a raised wooden floor, and each consignment shall be stacked separately. Cement, additives and binder shall be used in the order in which it has been delivered at the site.

It shall be protected against rain, heat, direct sunlight and/or evaporation by means of covers on all open vehicles. No additional water may be added in transit or where delivered.

(b) Proportioning the components

All components shall be accurately proportioned in approved automatic proportioning devices to within the following tolerances, and supplied separately at the mixing drums.

Cement: ± 2% of the prescribed mass of cement.

Additives: ± 2% of the prescribed mass of additives

Aggregate: Each fraction within ± 2% of the prescribed mass of the fraction in question.

Water: ± 2% of the prescribed volume or mass.

Fibres: ± 2% of the prescribed mass.

(c) Mixing the concrete

(i) Batch mixing

All concrete shall be mixed in mechanically operated batch mixers. The Contractor shall ensure that the mixer used is capable to mixing concrete as specified.

The production capacity of the mixing plant shall be in accordance with the capacity of the paver or laying operation used. Where the mixing plant is supplied with more than one drum, the same unit shall be used for proportioning the components.

The drums shall always be kept clean, and all build-up shall be removed. The total period between the time that the cement is placed in the drums until mixing starts shall not exceed 15 minutes.

(ii) Transit-mixing

The contractor will be permitted to use appropriate truck mixers which agitate previously mixed concrete in transit.

(d) Transporting the concrete

Concrete shall be so transported to its final position that segregation or loss of any of the ingredients, or contamination will be prevented and that the mix is of the required workability at the point and time of placing.

It shall be protected against rain, heat, direct sunlight and/or evaporation by means of covers on all open vehicles. No additional water may be added in transit or where delivered.

The time lapse from the moment when the cement and aggregate are intermingled up to the time of placing and compacting the concrete shall not exceed 30 minutes.

PE 5.4 PLACING AND COMPACTION

The concrete shall be fully compacted by means of approved equipment and shall be free from honeycombing and planes of weakness. Over-vibration resulting in segregation, surface laitance, or leakage (or any combination of these) will not be acceptable.

No paving in the downhill direction will be allowed if tearing of the concrete occurs. The contractor shall take the necessary measures to the satisfaction of the Employer's Agent to prevent tearing of the concrete for example by carrying out the paving in the uphill direction.

(a) Time for placing and compaction

The placing, compacting and finishing of the concrete shall be carried out as rapidly as possible and the operations shall be so arranged that, in any transverse vertical section of the slab, the concrete shall be fully compacted and finished within 2½ hours of mixing. This time shall be reduced by half an hour for every 5 ºC by which the concrete temperature is above 20 ºC at the time of placing, unless otherwise permitted by the Employer's Agent.

Unless adequate lighting facilities approved by the Employer's Agent are provided by the Contractor, the placing of concrete pavement shall cease at a time when the finishing operations can still be completed during daylight hours.

(b) Adverse weather conditions

(i) Protection against rain and hail

No concrete shall be placed during rainy weather. For the concrete to be properly protected against the effects of rain and hail until it has hardened sufficiently, the Contractor shall at all times have frame-mounted waterproof covers available for the protection of the surface of the unhardened concrete. When rain appears to be imminent, all paving operations shall cease and all personnel shall take the necessary steps for affording complete protection to the unhardened concrete.

(ii) Paving in cold weather

All reasonable precautions shall be taken to ensure that the temperature of the pavement concrete will not fall below 5ºC during the first 48 hours after casting. When prevailing temperatures are low or when cold weather is forecast and there is danger of the temperature of the freshly cast pavement concrete falling below the prescribed limits, the Contractor shall either cease concreting operations or he may be permitted to carry on, provided that the Employer's Agent is satisfied that adequate protective measures are available and will be taken.

(iii) Paving in hot weather

Hot weather is defined as any combination of high air temperature, low relative humidity and a wind velocity which is liable to cause cracking in the pavement and/or the impairment of the quality of fresh or hardened concrete, or which will otherwise result in abnormal properties.

When paving during hot weather and when the temperature of the fresh concrete can be expected to exceed 24ºC, the Contractor shall implement appropriate precautionary measures to maintain the concrete at the coolest temperature as may be practicable.

Paving shall cease when the concrete temperature, while being discharged from the mixer, exceeds 32 ºC.

(c) Responsibility for protection

The Contractor shall be responsible for the quality and strength of the concrete placed and for its protection, and any concrete damaged by adverse weather conditions shall be removed and replaced at the Contractor's expense.

(d) Maintaining the continuity of placing

The Contractor shall make adequate advance arrangements to prevent a delay in the delivery and placing of the concrete. An interval of more than 30 minutes between the placing of any two consecutive batches or loads of concrete shall constitute a cause for stopping any paving operations, and the Contractor shall, at his own expense make a

construction joint in the concrete already placed, at the location and of the type as may be directed by the Employer's Agent. Paving shall be continuous, and the rate of paving shall be adjusted to suit the supplying of concrete.

(e) Width of placing

The width of concrete pavement to be placed in a single operation shall be as shown on the Drawings.

(f) Placing and spreading

The concrete shall be placed and spread to a surcharge of about one-fifth of the pavement thickness and shall thereafter be compacted, struck off and finished to the level of the side forms.

(g) Compaction and finishing

The concrete shall be compacted with poker vibrators which are followed by a steel-shod hardwood compacting beam not less than 75 mm wide and 225 mm deep. The beams shall be provided with mounted vibrators with an energy input of not less than 0,25 kW per metre length of beam. Alternatively, a vibrating twin-beam compactor of an equivalent power may be used.

The beam shall be lifted and moved forward by increments which do not exceed the beam width. After every 2 m the beam shall be taken back 2 m and then drawn slowly forward whilst vibrating over the compacted surface to provide a smooth finish. The surface shall then be regulated by at least two passes of a scraping straight-edge with a blade length of not less than 2 m. If the surface is torn by the straight-edge on account of irregularities in the surface, a further pass of the vibratory beam shall be made, followed by a further pass of the straight-edge.

Poker vibrators shall not be permitted to come in contact with joint assemblies, the underlying layer or side forms.

A final surface finish of the concrete shall be obtained by means of hand-operated floats.

If necessary, more than one set of equipment consisting of a vibratory beam, a straight-edge and floats, shall be used to keep up with the concrete produced by the mixer.

PE 6 REINFORCED PAVEMENT

PE 6.1 GENERAL

In this context the term "reinforced pavement" shall mean isolated reinforced slabs incorporated within pavement which is generally unreinforced.

PE 6.2 REINFORCEMENT

Reinforcement shall comply with SANS 1200 G. The type, size, spacing and position of reinforcement in the slab shall be as shown on the Drawings or as directed by the Employer's Agent.

Reinforcement shall be supported on prefabricated metal stools or supports, or in any other manner approved by the Employer's Agent. The method of support for reinforcement shall maintain the reinforcement in the position and at the depth shown on the Drawings.

PE 7 SURFACE TEXTURE, CURING AND PROTECTION

PE 7.1 SURFACE TEXTURE

(a) General

After the concrete has been placed, spread, compacted, finished and completed and before the curing membrane is applied, the surface of the concrete shall be provided with a surface texture as specified for in these specifications.

The surface texture shall be applied and completed before the concrete is so hard that the surface will be torn and coarse aggregate and steel fibres unduly loosened during texturing.

(b) Equipment

The required texturing shall be effected by means of a machine which spans the full width of the concrete slab(s) under construction, and which is guided in regard to both level and direction by the rails in the case of sideform construction or by the paver guide wires in the case of slipform construction. In the case of hand operated equipment the texturing shall be effected by purpose made combs with handles long enough such that the finishing can be completed in one continuous movement across the surface of the pavement when being operated from one side of the pavement. In order to ensure straight texturing during hand operation the combs shall be operated against a straight-edge placed at right angles to the pavement centre line.

(i) Tining Device (Tinning comb)

The pavement shall be tined by means of a metal tine grooving device. The tines shall be made from flat spring steel approximately 0,6 mm in thickness and 3 mm in width, and spaced at either a 13 mm or 25 mm average random spacing. The 13mm random tine spacing shall have the following tine pattern (in millimetres): 10/14/16/11/10/13/15/16/11/10/21/13/10. The 26mm random tine spacing shall have the following tine pattern (in millimetres): 24/27/23/31/21/34.

The length of the tines shall be such that the required groove depth is achieved without coarse aggregates and/or steel fibres being unduly loosened. The optimum length and average random spacing shall be determined during the trial pavement operation. The Employer's Agent may, however, require a different random pattern or equal spacing of the tines during the course of the work, and provision shall be made to supply different sets of combs as required. No additional payment will be made for the first two changes in the spacing of the tines.

The combs for applying the texturing shall be at least 3,0 m wide in the case of machine operated equipment, and at least 1,0m in the case of hand operated equipment. For machine operated equipment it must also be possible to adjust the combs to a lower position in order to compensate for wear.

(ii) Broom Finishing Device

The pavement shall be textured by means of a stiff broom device. The bristles of the broom shall be stiff enough to ensure a texture depth of at least 1 mm without dislodging coarse aggregate and/or steel fibres being unduly loosened from the fresh concrete. The broom for applying the texturing shall be at least 1.5 m wide for machine operated equipment and 0,6m in case of hand operated equipment. For machine operated equipment it must also be possible to adjust the broom to a lower position in order to compensate for wear

(c) Surface Texturing

The surface texture to be applied shall be determined by whether the concrete will be overlaid with a bituminous layer during the construction process or not.

The surface texture shall be obtained by transversely tining (at right angles to the longitudinal axis of the pavement) the finished concrete surface with a tinning comb as soon as possible after placement. After the concrete has hardened, all loose particles generated by the tinning shall be broomed off the surface with stiff hand brooms or mechanically-operated rotary brooms.

When measured with the sand patch testing method, the texture depth shall be not less than 1 mm and not more than 2 mm in depth.

PE 7.2 CURING

The exposed surfaces of the concrete pavement, including the sides of the slab, shall be treated immediately after the texturing of the surface and after removal of the side forms with a white-pigmented curing compound, as specified in Sub-clause PE 2.6.

The curing compound shall be sprayed onto the surface at a rate of 0,30 litre/m^2, or as directed by the Employer's Agent, by hand-spraying equipment which produces a fine fog-type of spray which will not damage the surface of the concrete. The curing compound shall be applied in two applications and coverage shall be uniform on all surfaces.

Care must be taken to control the spray rate of the curing compound, as a too thick application may cause difficulties when the compound has to be removed from areas which have to be painted with road-marking paint.

During spraying operations, the curing compound shall be continuously agitated or stirred to keep the pigmentation in suspension.

The curing membrane shall be maintained intact for seven days after the concrete has been placed. Any damage to the curing membrane on account of the Contractor's activities on the pavement shall be made good by the affected areas being resprayed.

In the case of cold weather conditions the in-place concrete shall be protected by either by covering the plastic sheeting with 50 mm thick sand or by placing 20 mm rigid polystyrene below the plastic sheeting. The concrete shall be protected against frost for at least 5 full days or until a 5 MPa field strength has been attained.

PE 7.3 PROTECTION OF PAVEMENT

No vehicles with an axle load exceeding 20 kN shall be run on the finished surface of a concrete pavement within a period of twenty-one days of its completion, unless the Employer's Agent permits a reduction of this period to fourteen days when the pavement has been constructed during generally warm weather conditions. Rubber-tyred vehicles with an axle load of less than 20 kN which travel at speeds not exceeding 25 km/h may be permitted after a period of seven days from the completion of the concrete pavement.

No vehicle with an axle load in excess of 80 kN shall be run on the completed surface during any stage of the Contract.

PE 8 JOINTS

PE 8.1 GENERAL

Joints in concrete pavement shall be constructed at the positions and spacings indicated on the Drawings or ordered by the Employer's Agent.

The faces of all joints shall be at right angles to the surface of the pavement.

Should the joints not comply with the requirements of the specifications in every respect, it shall be sufficient reason for the Employer's Agent to stop the concreting operations until the Contractor can satisfy the Employer's Agent that he will be able to perform the work in accordance with the Specifications.

The upper edges of the pavement shall be rounded off or chamfered for all expansion, construction and isolation joints as shown on the drawings

PE 8.2 CONSTRUCTION JOINTS

Construction joints are to be provided where the pavement is constructed in partial widths as shown on the Drawings. Construction joints are also made at the end of the day's work or where concreting has to be suspended on account of breakdowns or for other reasons.

As indicated on the plans as well as where instructed by the Employer's Agent, all joints shall be sealed with the specified sealant as indicated on the drawings. Joints shall be sawn or reamed out to the dimensions as indicated on the drawings. When joints are to be sealed, the top portion of these joints shall be sawn to a nominal width and depth shown on the Drawings, but not before seven days after construction of the pavement. The sealant shall fill the complete void of the reamed joint.

Tie bars shall comply with Sub-clause PE 2.8 as relevant and shall have the dimensions and spacings indicated on the Drawings. Tie bars shall be at right angles to the face of the concrete pavement.

PE 8.3 SAW CUT JOINTS

Saw cut joints shall be formed by reducing the concrete thickness at the joint by sawing a groove in the hardened concrete. Sawing shall be carried out as specified in sub-clause PE 8.5. The joints shall consist of planes of weakness created by the sawing of grooves in the surface of the pavement at the spacings shown on the Drawings.

The joints shall be sawn to the depth as shown on the drawings within 24 hours of the placing of the concrete. The correct time shall be determined by the Contractor, who must bear in mind the risk of cracking of the pavement and the risk of spalling when green concrete is sawn.

All joints shall initially be sawn not more than 4 mm wide. In sealed joints the top portion of the groove shall subsequently be reamed to the specified final width and depth not before four days after the initial sawing.

Joints shall be sealed with the silicon joint sealant as specified in Sub-clause PE 2.7.

PE 8.4 EXPANSION/ISOLATION JOINTS

Expansion/Isolation joints shall be constructed with vertical preformed joint filler. Expansion/Isolation joints shall be provided at the positions as shown on the drawings.

The joint filler shall comply with the requirements of Sub-clause PE 2.7. The filler for each joint shall be furnished in a single piece over the full depth and width required for the joint, unless otherwise authorized by the Employer's Agent. When the use of more than one piece is authorized for a joint, the abutting ends shall be fastened securely and held accurately to shape by stapling or by any other suitable means of fastening which the Employer's Agent regards as being satisfactory.

The joint filler, together with the sealing groove, shall completely separate adjacent slabs, or fixed structures such as walls, manholes, kerbing etc. and any loose-fitting dowel bars and spaces between the subbase and the filler shall be packed with joint filler material after assembly of the joint.

The sealing groove in the upper portion of the joints shall be sealed with a silicon sealant.

PE 8.5 SAWING OF JOINTS

The joints in the pavement slab shall be sawn by experienced personnel only.

Excessive spalling of the arises will not be allowed and the Contractor shall use the type of blade and equipment best suited to the hardness of the concrete being sawn.

Sufficient standby power saws shall be kept available on the Site by the Contractor ready for use at all times when concrete is being placed in the pavement.

Where spalling exceeds 5 mm in depth at any point measured from the top surface of the pavement, joints shall be repaired with an epoxy-resin mortar as specified in Clause PE 10.

Immediately after sawing, the joint grooves shall be clean with compressed air to remove all fine material and the joints shall be sealed temporarily with an approved paper rope.

No traffic of any kind shall be allowed on the pavement until all joints have been temporarily sealed.

PE 8.6 JOINT SEALING

(i) Materials

The silicone sealant and appurtenant materials shall be as specified in sub-clause PE 2.7. The dimensions and positions of the sealant and appurtenant materials shall be as shown on the drawings or as approved by the Employer's Agent.

(ii) Installation

Just prior to sealing the joint grooves shall be sandblasted and shall then be cleaned by means of a high pressure jet of water over the full depth of the joints to remove all fine matter and to produce dust-free joint grooves. Immediately before the supporting material is supplied, the grooves shall be dried by means of oil-free compressed air at a pressure of 700 kPa. Compressors shall be equipped with an apparatus which removes water and oil from the compressed air. Where a primer is required, it shall be applied before the supporting materials are installed.

The procedure(s) to be followed by the contractor to prevent the sealant from being spilt onto the concrete pavement shall be subject to approval by the Employer's Agent.

The silicone sealant shall be pumped continuously directly into the joints with a suitable pneumatically driven pump. Sealing shall be done from the upper surface of the supporting material. Immediately after installation and before a skin appears, the surface of the sealant shall be worked to compact the sealant and to press it against the sides of the joint so as to ensure that the prescribed clearance under the road surface is obtained. As an alternative to separate installation and finishing of the sealant, an approved injection nozzle

incorporating a finishing apparatus may be used, in which case only closed-cell polyethylene may be used as supporting material. Further directions supplied by the manufacturer shall be strictly complied with, particularly with regard to temperatures for application, opening to traffic, and safety aspects. No traffic shall be permitted to pass over a sealed joint before the sealant is able to withstand the penetration of foreign matter.

The top surface of the sealant shall not be less than 5 mm and not more than 7 mm below the paved surface.

All surplus sealant and other foreign matter shall be removed from the concrete pavement surface in accordance with the directions of the manufacturer of the sealant.

PE 9 TRIAL PAVEMENT

PE 9.1 GENERAL

Prior to the commencement of full-scale paving, the Contractor shall construct a section of trial pavement, which is laid as part of the permanent pavement, to demonstrate his capability of constructing the pavement in accordance with the specifications. The Contractor shall also demonstrate the methods he proposes to use for the application of the required surface texture, the construction of joints and for the placement of dowel bars, etc.

The size of the trial section of pavement for roads and parking areas shall in each case depend on the dimensions of the panels and shall be determined by the Employer's Agent on the Site.

PE 9.2 PROCEEDING WITH FULL-SCALE PAVING AND FURTHER TRIAL PAVEMENTS

Unless he has been advised of any deficiencies in the trial pavement, the Contractor may proceed with full-scale paving ten days after the completion of the trial pavement or at such earlier time as the Employer's Agent may allow. In the event of deficiencies occurring in the trial pavement, the Employer's Agent may order the Contractor to break up and reconstruct the trial pavement after repairing any damage to the underlying layers, or he may allow the Contractor to effect repairs, all as set out in Clause PE 10 and at his own cost.

PE 10 REMEDIAL WORK

PE 10.1 REMOVAL OF CONCRETE

Where any section of the pavement which does not comply with the specified requirements shall be removed and reconstructed. The portion to be removed and to be reconstructed shall be the entire portion of the same casted slab.

PE 10.2 REMOVAL OF HIGH SPOTS

Wherever the Employer's Agent so permits, high spots may be removed with approved power cutters or surface planers. Generally this shall apply to spots not exceeding 10 mm in height. No hand-operated grinding wheels or chisels shall be used. After individual high spots have been removed, the Contractor shall, if required, grind the surface to the nearest construction joint so that all the ground areas are neat rectangular areas with a uniform texture.

On all portions of the pavement where the surface texture has been destroyed or reduced by grinding, surface texture shall be restored by grooves being cut into the concrete surface. The grooves shall be approximately 3 mm deep and 10 mm apart.

PE 10.3 REPAIRING OF JOINTS

Joints along which spalls occur that exceed 5 mm in depth at any point measured from the top surface of the pavement, or any other joints which in the opinion of the Employer's Agent are not acceptable, shall be repaired with an approved epoxy-resin mortar. Some epoxy binder shall be used to prime the surface being repaired prior to placement of the mortar mix. The mix shall be shaped to the original proper joint configuration.

PE 10.4 REPAIRING OF CRACKS

The Contractor shall be responsible for constructing a pavement that will not show any cracks.

Where cracks occur in the pavement which, in the opinion of the Employer's Agent, do not warrant the removal and reconstruction of the pavement, the Contractor shall repair such cracks as specified hereafter.

The cost of repairing cracks or of breaking up, removing and replacing existing slabs shall be borne by the Contractor if the first cracks in any slab section between joints occur within 30 days of the casting. If the first cracks in any slab section between joints occur more than 30 days after casting, the Contractor will be paid for repairing the cracks or replacing the slab section.

All cracks, except as otherwise provided, shall be repaired by epoxy being injected over the entire length of the cracks under pressure. Cracks which do not require injection with epoxy shall be limited to single continuous cracks without branch or connecting cracks that -

(a) either begin or end at a joint or an edge of the pavement and, at any point along the length of crack, are not within 1,5 m of a joint or other crack that has not been injected with epoxy; or

(b) do not begin or end at a joint or edge of pavement and, at any point along the length of crack -

(i) are not within 1,5 m of any joint, or

(ii) are not within 300 mm of any edge of pavement or other crack that has not been injected with epoxy.

Where cracks cross or partly coincide with sawn joints, adequate protective measures shall be taken to prevent the entry of epoxy into saw cuts which will reduce the groove depth, or, at the option of the Contractor, accumulations of epoxy in saw cuts shall be removed by resawing to the specified depth prior to opening the pavement to any traffic, but not later than 72 hours after the epoxy has been injected.

Epoxy injection shall be completed within 90 working days after the pavement has been placed.

In making epoxy-injection repairs, a surface seal shall be applied to prevent the escape of epoxy, and entry ports shall be placed at sufficiently close intervals to allow the entire length of the crack to be filled. Surface seal materials and injection procedures shall be such that damage to the texture and appearance of the pavement surface will be prevented after the pavement has been opened to public traffic. Epoxy shall be injected with in-line mixing equipment. Pressure pots shall not be used. The epoxy shall conform to California State Specification 731-80-27, but other epoxy adhesives and injection methods will be considered if their use can be supported by conclusive proof of satisfactory performance in concrete roads.

The Contractor shall provide cores of epoxied cracks at the rate of five relatively evenly spaced cores for each 50 m of epoxied crack. If the total length of cracks to be epoxied exceeds 50 m, the rate of coring may be reduced to one core for each additional 30 m of epoxied crack, provided that the Contractor's methods and equipment are producing satisfactory results. Cores shall extend through the entire depth of pavement and shall include the full depth of crack. The locations of cores will be determined by the Employer's Agent. Cracks where epoxy has penetrated to less than 80% of the crack depth shall have additional epoxy injected until a minimum of 80% of the crack depth has been filled. Such cracks may require additional cores for verification as determined by the Employer's Agent.

All holes which result from coring shall be completely filled with concrete of the same quality as that used for constructing the pavement, but with a maximum coarse aggregate size of 13,2 mm.

Volunteer cracks which do not require epoxy injection shall be routed out and sealed with an approved silicon sealant which complies with these specifications. The sealant shape factor shall be taken into account for the dimensions of the sealant groove which dimensions shall be approved by the Employer's Agent. Prior to sealing, the surfaces of the joint shall be cleaned of all traces of dust, laitance and other foreign material by wire brushing, followed by a blowing out with clean, dry compressed air. The joint faces shall be primed with primer recommended by the sealant manufacturer, if required. The sealant shall be supported by an approved bond-breaking tape to prevent the underside of the sealant from adhering to the concrete.

PE 11 CONSTRUCTION TOLERANCES

The work described in this section shall be constructed to the dimensional tolerances given below.

PE 11.1 LEVEL AND GRADE

The lot shall be deemed to comply with the requirements specified for surface levels if at least 90% of all surface levels are within ± 15 mm of the level specified before any level corrections are made.

Individual spots where the surface level deviates by more than ± 20 mm of the level specified shall be repaired to bring them to within the ± 15 mm tolerance.

Deviations from the specified longitudinal grade for roads on account of deviations from the specified levels shall not exceed those given below.

Length of grade measured (m)	Maximum variation from specified grade (%)
2	0,34
5	0,27
10	0,21
20	0,13
30	0,08

PE 11.2 WIDTH OF PAVEMENT AND THE POSITION OF PAVEMENT EDGES

The width of the pavement shall be at least the specified width and the edge of the pavement shall not deviate by more than 25 mm from the specified position.

PE 11.3 JOINTS

Joints shall not deviate by more than 10 mm from their designated positions in the pavement or by more than 10 mm from the edge of a 3 m long straight-edge placed to touch the line of the joint. There shall be no discontinuities in the line of joints.

The tolerance for the groove width of sawn joints shall be as follows:

Longitudinal hinge joints: ± 0.5 mm.

PE 11.4 THICKNESS

The layer shall be deemed to comply with the requirements specified for layer thickness if at least 90% of all thickness measurements taken are equal to or thicker than the specified thickness minus 21 mm before any thickness corrections are made, and the average layer thickness for the lot is not less than the layer thickness specified minus 5 mm.

Individual spots where the actual thickness is less than the thickness specified minus 27 mm shall be locally repaired to bring them to within the 21 mm tolerance.

The thickness of the slab shall be determined by accurate levelling in the same position at predetermined random points before and after construction of the slab, and also by measuring cores drilled from the slab (an average of three measurements per core).

PE 11.5 CROSS-SECTION

When tested with a 3 m straight-edge laid at right angles to the construction joints, the surface shall not deviate by more than 6 mm from the bottom of the straight-edge.

PE 11.6 SURFACE REGULARITY

When tested with a rolling straight-edge as described in Sub-clause PE 11.7, the number of surface irregularities in excess of 4 mm shall not exceed the following:

(a) Average number of surface irregularities per 100 m taken over

300 m - 600 m lengths 5

(b) Number of surface irregularities taken over 100 m at a time 8

The maximum value of any individual irregularity when measured with the rolling straight-edge or with a 3 m straight-edge laid parallel to the construction joints shall not exceed 7 mm.

PE 11.7 THE USE OF A ROLLING STRAIGHT-EDGE FOR MEASURING SURFACE IRREGULARITIES

The rolling straight-edge to be used shall be the type designed by the Transport and Road Research Laboratory of Great Britain (TRRL) and manufactured by Messrs Farnel and Company, or any other type approved by the Employer's Agent.

The machine shall be calibrated on a purpose-made calibrating bed and the bell set to register exactly at the required deflection. During measuring care shall be taken to move the machine at a suitably slow speed and not so fast that it will register incorrectly as a result of vibrations, sway or other effects induced by movement over an irregular surface.

The number of irregularities exceeding the specified limit and the distance traversed shall be recorded, and the number of irregularities per 100 m shall be calculated for each run.

Further recommendations regarding the operation and maintenance of the rolling straight-edge are contained in the TRRL Report No 290/1970.

The surface irregularities on each carriageway shall be measured by two runs of the rolling straight-edge, suitably spaced over the width of the carriageway, as directed by the Employer's Agent. Where the Employer's Agent and the Contractor agree, one run instead of two runs may be made.

PE 12 TESTING

Routine inspection and testing will be carried out by the Employer's Agent in accordance with SANS 1200 G.

PE 13 MEASUREMENT AND PAYMENT

Note:

No direct payment will be made for the cost of complying with Sub-clause PS 8.6, PS 8.7, PS 10, PS 13, PSA 5.7, PSA 5.9, PSA 5.10 and PSD 5.1.6. No additional payment will be made for difficult work or hand operations in confined areas. Payment will be deemed to be covered by the rates and sums tendered and paid for under the various items of work included under the contract.

PE 13.1 CONCRETE PAVEMENT (THICKNESS AND DESIGN FLEXURAL STRENGTH INDICATED) EXCLUDING TEXTURING AND CURING ..... Unit : m^2

The unit of measurement shall be the square metre of pavement placed and finished in accordance with the specifications. No additional payment over the unit Contract price shall be made for any pavement with an average thickness in excess of that shown on the Drawings. The quantity shall be calculated from the authorized dimensions of the completed pavement surface, except when the Drawings show or the Employer's Agent requires local deviations from the specified thickness. The volume of the concrete, in such cases, shall be converted into an equivalent area in square metres based on the specified thickness of the slab.

The tendered rate shall also include full compensation for determining mix proportions, for mixing, transporting, placing and finishing of the concrete, including formwork, repairs to defective surfaces, grinding and retexturing if

required, repairing joints and cracks, protecting the pavement against damage, construction joints and for process control.

PE 13.2 TEXTURING AND CURING OF CONCRETE PAVEMENT:

(a) Texturing Unit : m^2

(b) Curing ..... Unit : m^2

The unit of measurement for texturing and for curing shall be the square metre of exposed completed pavement textured or cured as specified. The quantity shall be calculated from the specified horizontal dimensions of the completed pavement surface in the case of texturing or curing, plus the surface area of slab sides in the case of curing.

The tendered rate for texturing shall include full compensation for providing the required equipment and for applying the texturing as specified.

The tendered rate for curing shall include full compensation for providing the curing compound and for applying it at the specified nominal rate with an approved hand-operated sprayer, as specified. The tendered price shall also include full compensation for the spraying of curing compound in unsealed joints.

PE 13.3 VARIATION IN THE RATE OF APPLICATION OF THE CURING COMPOUND

.....Unit : litre

The unit of measurement in respect of increases or decreases in the rate of application of the curing compound shall be the litre.

PE 13.4 JOINTS:

(a) Expansion joints complete as indicated on drawings ..... Unit : m

(b) Construction joints complete as indicated on drawings ..... Unit : m

(c) Saw cut joints complete as indicated on drawings ..... Unit : m

(d) Isolation joints type 1 complete as indicated on drawings ..... Unit : m

(e) Isolation joints type 2 complete as indicated on drawings ..... Unit : m

(f) Tie bars (diameter, length and joint type to be indicated).....Unit : No

(g) Dowel bars (diameter, length and joint type to be indicated).....Unit : No

The unit of measurement for joints shall be the metre length of completed and approved joint, except that tie bars and dowel bars across joints shall be measured separately by the number for each type installed.

The rate tendered for joints shall cover the cost of all labour, materials, plant and incidentals required to construct and form the joints as detailed and specified on the drawings inclusive of joint filler, sealant, for sawing, for the supply and installation of any temporary sealing necessary, for cleaning the cavities and joints, for priming and emulsions as well as polyester membranes.

The rate tendered for tie bars and dowel bars shall cover the cost of all labour, materials, plant and incidentals required and necessary to construct, position and install the bars as detailed on the drawings inclusive of the supply, cutting, placing, holding in position, supporting framework where required, for coatings as well as for tubular foam fillers.

PE 13.5 CORING AND TESTING OF CORES:

(a) 100 mm cores drilled from pavement .....Unit : No

(b) 150 mm cores drilled from pavement and tested for

compressive strength Unit : No

The unit of measurement shall be the number of cores drilled or drilled and tested on the instructions of the Employer's Agent. Cores drilled by the Contractor at his own initiative as part of his process control or for the resubmission of pavement sections which have been rejected, or for testing cracks sealed at the Contractor's own cost, shall not be measured for payment.

The rate tendered shall include full compensation for drilling the test cores and for repairs to the pavement, where applicable, having them tested by an approved laboratory, inclusive of all labour, transport, drilling and testing charges as well as for other incidentals.

PARTICULAR SPECIFICATION: PF

PF 613 KL (GROSS CAPACITY) CIRCULAR GROUND TANK SPECIFICATION

PF 1 SCOPE

This Particular Specification covers the design, supply, delivery, installation, testing and commissioning of a ground steel water storage tank supported by a reinforced concrete tank base/ring beam.

Specific requirements for the supply and installation are listed below:

- Comply with all health and safety requirements as per Occupational Health and Safety Act as well as this specification.
- Provide a health and safety plan for approval complete with all the requirements of OHS Act as well as this specification.
- Obtain the services of a registered professional structural engineer to do the design the tank base/ring beam and sign off the installation after completion.
- Ensure all steelwork (tank, pedestal & pipework) is galvanised in accordance with the applicable SABS standards.
- Expose up and, where necessary, re-route existing underground water pipes in the vicinity of the new tank and connect new tank system to new and or existing water mains complete with the necessary concrete thrust blocks
- Do landscaping and levelling of the site and fully compact with G5 material around the base of the tank to prevent the ponding of water at ring beam /foundation level.
- Cleaning, sterilization, re-filling and testing prior to commissioning of the system.
- Submission of all required test certificates, compliance certificates and local authority approvals, including the structural engineer's certificate confirming that the tank, and reinforced concrete ring beam conform to the Employer's Agent's design and is suitable for the imposed loads and tank capacity.
- Full maintenance during the 12 month guarantee period.
- Supplying all other items and meeting all requirements, whether specifically mentioned or not, for a complete, functional, safe and durable water storage system complying with all the relevant codes and specifications.
- Supplying all necessary safety notices, health and safety plan and safety equipment.
- Supplying "as built" drawings.

PF 2 GENERAL

The usable gross capacity of 615 kl ground circular steel storage tank (15 m internal diameter, containing portable water), reinforced concrete base and associated equipment and pipework shall be complete and functional and

shall be as a minimum according to this specification and the latest revisions of the following standards and specifications:

i) Department of Public Works standard specification for potable water storage tanks.

ii) SANS 10400: The Application of the National Building Regulations

iii) Occupational Health and Safety Act and Regulations

iv) Regulations Governing Hazardous chemical substances R1179 as amended by R930

v) Department of Public Works specification PW371: Specification of Materials and Methods to be used and is available from National Public Works website.

vi) SANS 10252: Water supply and drainage for buildings

vii) SANS 121/ISO 1461 and SANS 32/ISO 10240 Hot dip galvanizing

viii) SANS 14713/ISO 14713 Protection against corrosion of iron and steel in structures.

ix) The following SABS 1200 specifications:

SABS 1200 A GENERAL

SABS 1200 C SITE CLEARANCE

SABS 1200 DB EARTHWORKS (PIPE TRENCHES)

SABS 1200 G CONCRETE (STRUCTURAL)

SABS 1200 LB BEDDING (PIPES)

x) All other relevant specifications, standards and documents whether referenced in the above documents or not.

This specification (PF) is supplemental to the above and is more specific. Any conflicting information must be referred to the Employer's Agent for clarification.

The potable water usable gross capacity of 615 kl ground circular steel storage tank (15 m internal diameter) is intended for use on a daily basis at Clarkebury Senior Secondary School in Engcobo in the Eastern Cape. The water tank is for domestic water usage on a daily basis and may also be used for fire-fighting purposes. The pipework and valves shall be installed to facilitate the installation and maintenance of the tank, tank base and system without disrupting the water supply to the school.

This Specification does not replace nor take precedence over nor detract from the Occupational Health and Safety Act or its Construction Regulations 2003. Nothing in this Specification shall relieve the Contractor of any obligations or responsibilities with regard to health and safety conditions and practices on site.

PF 3 WARRANTY

The contractor is to guarantee the new tank, repairs, coating, water proofing and workmanship for a period of 12 (twelve) months against any defects (latent or obvious), non-conformance and/or failure from date of works completion.

Any such defects and/or failure that may occur or become evident during the 12 month guarantee period shall be rectified within twenty four (24) hours after being notified of the occurrence of the defect. If the nature of the defect is such that it cannot be rectified within 24 hours, the repair time shall be mutually agreed between the Employer's Agent and the appointed Contractor. In the event that such failure and/or defect constitute a threat to the health and safety of the user and/or occupants, the contractor shall take immediate steps to rectify the fault.

The contractor shall also submit to the Employer's Agent a full report describing the nature of failure, cause of failure and possible methods to prevent failure in the future. Note that retention will only be released after the 12 month guarantee period.

In the event that the Contractor does not attend to such defects after being notified, the Department of Public Works and/or user reserve the right to effect the rectification of the defect and recover the costs thus incurred from the Contractor.

PF 4 SITE SAFETY

The usable gross capacity of 615 kl ground steel water storage tank, with reinforced concrete ring beam base and tank pipework is to be installed at Clarkebury Senior Secondary School in Engcobo within the Eastern Cape. The facilities are in use on a daily basis and, as the work requires scaffolding and work at high level, safety precautions shall be taken to prevent injury or death during the hoisting and lowing onto the ring beam from the delivery truck. As the tank will be located inside the school's premises, the work area shall be enclosed and clearly demarcated with safety barriers by the appointed Contractor to supply and install the new tank and decommission or demolishing the existing brick wall reservoir.

After completion of the works the site shall be left in a clean and neat condition. All packaging material, rubble, crates and items used for commissioning shall be removed from the site and disposed of in a correct and legal manner.

PF 5 WALL STRUCTURE

The total gauge thickness conforming to SABS 9364 (ISO9364).

PF 6 BOLT SPECIFICATION

Bolts should be hot dipped galvanised to SANS 121:2011 ISO 1461:2009. All bolts to be high tensile 8.8 grade.

PF 7 OUTLETS/INLETS

All fittings/nozzles to be manufactured from mild steel and hot dipped galvanised to SANS 121:2011 ISO 1461:2009 after fabrication.

PR PUMP STATION

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PR 1 SCOPE

This specification covers the supply, delivery and installation of one submersible pump per borehole as well as all appurtenant pipework and mechanical equipment.

WORKS TO BE PROVIDED BY THE CONTRACTOR

Unless otherwise stated the contractor shall provide the following for each borehole pump position.

- Submersible pump with flow inducer sleeve, motor and cable
- Drop pipework
- Surface pipework, pipe supports and flange adaptors
- Regulating valve
- Air release valve
- Check Valve
- Flow Sensor
- Flange adaptors
- Pressure gauge
- Water level measurement
- Magnetic flow meter
- Lifting Equipment
- Control Panel
- Control System
- Electrical Equipment

The system will operate on timer system which will allow for 18 hours of pumping in a 24 hour cycle. The entire system will consist of 1 borehole.

All equipment installations must be designed and installed by the contractor in accordance with SANS 10108.

PR 2 GENERAL

PR 2.1 EQUIPMENT ELIGIBILITY

The equipment provided shall have a successful record of use in South Africa in similar applications and shall also have at least three years of technical support in South Africa. Service and spares shall currently be available in South Africa. Upgraded versions of a manufacturer's earlier designs which comply with these criteria are also acceptable.

Equipment which does not satisfy these requirements is unacceptable unless specifically called for in the specifications or unless the Engineer agrees in writing.

PR 3 PERFORMANCE REQUIREMENTS

PR 3.1 SYSTEM

The installation shall be capable of performing the specified duties under normal, continuous operating conditions.

All components of the pump shall perform reliably over the specified ranges of duties.

PR 3.2 PUMP

PR 3.2.1 General

The pump set duty points are specified elsewhere.

No perceptible sign of cavitation shall be present across the full specified operating range.

PR 3.2.2 Curve Selection

The pump shall be selected to operate continuously whilst the water level within the hole is at the drawdown water level but shall also be capable of operating without damage when the water is at static level; i.e. when pumping begins.

The pump shall be selected to operate close to best efficiency at duty point. Preference shall be given to pumps which operate at or to the left of the best efficiency point. Pumps shall permit an increase in flow of 20% above the duty point without operating outside of the manufacturer's recommended range for continuous pump operation.

PR 4 OPERATION AND CONTROL

PR 4.1 GENERAL

The equipment shall be designed to shut down safely and without damage upon failure of the electrical supply.

The borehole shall be fitted with an electromagnetic flow meter.

The pressure on the pump discharge shall be indicated by a pressure gauge.

The emergency stop shall be incorporated into the control panel.

PR 4.2 CONTROL PANEL

PR 4.2.1 General

A control panel shall be provided and shall be securely mounted on a sturdy, hot-dip galvanised base anchored to the concrete wall.

A three way selector switch shall be provided on the panel to select between the operating modes described below. The switch shall be lockable in each of the three positions.

PR 4.2.2 Position 1: Manual Operation

When the selector is in the "Manual" position, manual operation shall be active.

This mode of operation shall allow manual control of the pump from the control panel. Buttons shall be provided to start and stop the pump.

The protection systems shall be active during the manual operation and, in particular, pump start shall be prevented if the water level sensor in the borehole indicates a low-level.

PR 4.2.3 **Position 2: Off**

When the selector switch in the “Off” position, the pump start button shall be disabled.

PR 4.2.4 **Position 3: Automatic Operation**

When the selector switch is in “Automatic” position, the pump shall run on condition that the specified operating controls, e.g. water level control, allow it to run.

PR 4.2.5 **Display**

The following information shall be indicated on the panel.

- The status of the pump (stop, trip, run, etc.)
- Motor data (amps, voltage, running hours)
- The flow rate from the magnetic flow meter.

All alarms, trips and operation of the emergency stop.

PR 4.2.6 **Protection**

The pump shall stop under any of the following conditions:

- Motor protection
- Signal from borehole low-level sensor; i.e. water level drops to 2 metres above the pump.
- Motor over temperature; as measured by the integral temperature sensor.

PR 5 SYSTEM DESIGN AND CONFIGURATION

PR 5.1 GENERAL

Design drawings shall be submitted to the engineer for approval to illustrate the configuration of equipment and pipework as designed by the contractor. The contractor shall design, supply and install the complete borehole pumping system which includes, but is not limited to, the concrete base for the well head, pipework, valves and specials, the pump set drop pipe and cable (if applicable) and all other mechanical equipment required. The contractor shall further also be responsible for designing, providing and installing the electrical supply work, the control panel and the control system.

Pump installations utilising HDPE pipework shall be slung on a stainless steel cable. A cable is not required if the drop pipe is of rigid PVC or steel.

Surface pipework shall be mounted horizontally on the concrete base and shall be supported approximately 300 mm above the floor level.

Valves shall be mounted in horizontal pipework. A regulating valve, a check valve, an isolation valve and an air valve shall be provided in the horizontal pipework. An electromagnetic flow meter and a pressure gauge shall also be provided in this pipework as well as a flow sensor.

The design shall ensure that each pipe special and each valve is correctly supported and all thrust forces shall be calculated and designed for. The thrust force on the check valve shall be transferred to the concrete structure via steel pipe supports.

PR 5.2 MOTOR COOLING

The inlet or the bottom of the motor, whichever is lower, shall be positioned as per item PR 7.6, but at least 4 metres above the bottom of the hole.

If the inlet screen is provided only at the bottom of the hole, then the bottom of the motor shall be positioned at least 1 m above the inlet screen.

If water can enter at any height other than through the bottom screen, the pumpset shall be provided with a flow inducer sleeve which guides water flow over the motor prior to entering the pump. The sleeve shall be of stainless steel or of moulded plastic and shall be securely attached to the pumpset body.

PR 6 DROP PIPEWORK

PR 6.1 DROP PIPEWORK

PR 6.1.1 Pipe Material

The drop pipe material shall be chosen as per the table below:

	Diameter ≤ 50 mm Length ≤ 100 metre	Diameter ≤ 50 mm Length ≥ 100 metre	Diameter > 50 mm
Class 16 HDPE	Yes	No	No
Class 16 HDPE	Yes	Yes	No
uPVC (≥ 100 metre pressure rating)	Yes	Yes	Yes
Hot-dip galvanised (HDG) carbon steel	Yes	Yes	Yes

NOTES:

- HDPE shall be provided as a single length, i.e. without joins.
- uPVC shall be specifically designed for borehole applications and shall be provided in lengths with factory attached couplings. Threads shall be square with parallel threads. Seal O-rings shall be factory fitted.
- HDG steel pipes shall either be flanged or shall be of heavy duty construction and with heavy duty zinc coating. Threads shall be fully coated with a suitable anti-corrosion compound.

PR 6.1.2 Pipe Diameter

The drop pipework shall be of the same diameter along its full length.

The pipework diameter shall match the outlet diameter of the pump.

PR 6.2 SURFACE PIPEWORK

PR 6.2.1 General

Surface pipework shall comply with the requirements of Aur 0001. This calls for, inter alia, the manufacture of pipe specials to comply with Aur 7001.

Surface pipework shall be of hot-dip galvanised steel. The pipework shall be galvanised after all fabrication has been completed. Pipework which has the zinc coating damaged by welding, cutting, grinding or any other means shall be blasted to bare steel and then re-galvanised.

Pipework and pumps of nominal diameter 50 mm and larger shall be flanged. Smaller sized may be screwed.

Flanges shall comply with the requirements of AUR 7023.

PR 6.2.2 Pipe Couplings

Flanges shall be provided in order to accommodate minor misalignment and to allow dismantling of pipework and valves.

Couplings shall comply with the requirements of AUR 7023.

PR 6.2.3 Pipe Supports

Pipe supports shall comply with Aur 7024.

PR 7 PUMPING EQUIPMENT

PR 7.1 GENERAL

The pumpset shall be of the submersible, electric motor driven, borehole type, capable of operating continuously under water.

The pump shall be supplied complete with mechanical seal, submersible motor, integral check valve and electrical supply cable.

PR 7.2 PUMPS

Pumps shall be of all stainless steel construction and with stainless steel impellers.

PR 7.3 MOTOR

The motor shall be suitable for permanent immersion. The motor body shall be of stainless steel. The cooling fluid shall be water but additives are acceptable.

The motor rating shall exceed the pump's shaft power required at maximum duty by not less than 25 percent.

The motor shall incorporate a temperature sensor.

Preference shall be given to motors that are manufactured in South Africa and comply with the requirements of SABS 948.

The motors shall be standard catalogue models and shall be readily available.

The motors shall be suitable for submersion up to a depth of 1.5 times the actual depth of submersion.

The rotation speed of the motors shall not exceed 3000 rpm

The motors shall have dynamically balanced rotors supported by maintenance-free, sealed-for-life ball bearings.

The motors shall be suitably coated to ensure their satisfactory operation under the specified class of service.

PR 7.4 **DESIGN AND CONSTRUCTION**

The motor shall be close coupled to the pump. The motor shaft seal shall be of the mechanical type. The seal faces shall be silicon carbide on silicon carbide.

The materials of pump construction shall be selected to conform to the operating conditions and the quality of water to be pumped.

Cognisance must be taken of the high iron and manganese concentrations associated with borehole water.

Pump bearing shall be lubricated by the fluid handled. A pump and motor shall not be adversely affected by suspended concentrations of up to 25 g/m^3.

PR 7.5 **PUMP TECHNICAL DETAILS**

The pumps shall be currently catalogued products. Documentation shall include performance curves or selection tables indicating flow, head, NPSH required, power absorbed, speed and efficiency for the expected range of operating conditions.

Performance curves and selection tables shall be based on a reproducible and certified test carried out in an approved laboratory. Certified detail selection shown on these performance curves or tables shall be submitted.

The possible percentage variation of data measured on site by the supplied and/or installed instrumentation when compared with the catalogued performance data must be submitted.

The pumps shall be installed in accordance with the manufacturer's instructions and shall be maintained in "as new" condition at start up.

Details of the equipment shall include the following:

(a) Operating, testing and commissioning instructions

(b) Problem analysis guide

Full details of periodic and annual maintenance and service to be undertaken by the maintenance staff, in accordance with a preventive maintenance programme, shall be submitted.

The Contractor shall state in the technical data sheets the minimum selected service life for which the pumps have been engineered and the components selected, when operated under normal working conditions, with optimum servicing and maintenance.

The minimum acceptable service life for each pump is 10 years for 6000 operating hours per annum.

PR 7.6 **PERFORMANCE REQUIREMENTS.**

The pumps shall further be capable of the following:

The table indicates that the boreholes will be utilised at the recommended 24 hour yield for 12 hours a day.

PUMP INFORMATION FOR BOREHOLE EC-T12-1804

BOREHOLE NAME	PUMP TYPE	DELIVERY OF PUMP @ 12 hr yield	STATIC HEAD (m)	INSTALLATION DEPTH	Dynamic WL @ 12h pumping rate
EC-T12-1804	SUBMERSIBLE	2 l/s	41 m	45.2 m	10 mbgl

PIPE INFORMATION

LENGTH OF PIPELINE (BH TO ELEVATED TANKS)	CLASS OF PIPE	DIAMETER	TYPE
155m	10	63 MM ND	HDPE

PUMP INFORMATION FOR BOREHOLE EC-T12-1806

BOREHOLE NAME	PUMP TYPE	DELIVERY OF PUMP @ 12 hr yield	STATIC HEAD (m)	INSTALLATION DEPTH	Dynamic WL @ 12h pumping rate
EC-T12-1806	SUBMERSIBLE	3 l/s	39 m	45.2 m	17 mbgl

PIPE INFORMATION

LENGTH OF PIPELINE (BH TO ELEVATED TANKS)	CLASS OF PIPE	DIAMETER	TYPE
532m	10	63 MM ND	HDPE

The specified operating points shall be within the pump manufacturer's recommended operating range for the pump as tendered. Adequate information must accompany the tender to confirm the above.

Preference will be given to pumps of the self-regulating type and where the power consumption characteristic is such that with an increase in delivery to beyond a certain limit the power consumption decreases, thereby ensuring that the motor is not overloaded in the event of a large reduction in pumping head.

PR 8 VALVES

PR 8.1 REGULATING VALVE

A regulating valve shall be provided in order to allow regulation of the pumped flow if this is required by the operator.

The valve shall be a metal seated, manually operated globe valve, KS BOA-H or VIR 9555P, or approved equivalent.

PR 8.2 CHECK VALVES

A check valve shall be provided on the discharge pipework of each pump leg. The valve shall be of the single door check valve type and shall with Aur 7017

A check valve shall also be provided in the pump itself.

Check valves shall be provided in the drop pipe at spacing of not greater than 30 m.

PR 8.3 ISOLATION VALVE

An isolation valve shall be provided on the discharge pipework of each pump. The valve shall be of the metal seated, wedge gate valve type and shall comply with Aur 7015.

PR 8.4 AIR RELEASE VALVE

An air release valve shall be provided on the pipework. The valve shall comply with Aur 7022.

PR 9 INSTRUMENTATION

PR 9.1 GENERAL

An hour meter which cannot be reset shall be provided.

Instrumentation shall comply with the requirements of Aur 0001.

PR 9.2 WATER LEVEL SENSOR

The water level shall be measured in order to provide protection for the pump and motor against low water level.

It will also serve to monitor operational water levels in the borehole to prevent damage to the aquifer. The equipment shall be OTT hydromet or similar approved.

- Two Channel Data Logger with Integrated Pressure Transducer, 0-40 m Range (OTT Orpheus Mini or similar approved)
- 40 m Vented Cable
- HYDRAS3 + COMPACT PROGRAMMER
- PC READOUT CABLE (IRDA USB)

PR 9.3 FLOW METER

One full-bore magnetic flow meter, with both ends flanged, shall be provided on the discharge pipework.

One flange adaptor shall be provided at each end of the flow meter; i.e. a total of two.

The flow meter shall comply with Aur 8004 and shall be provided with both local readout and transmission capability. The flow meter will also be equipped with a back-up battery to serve as the power source during power outages.

PR 9.4 PRESSURE GAUGE

Each pump shall be provided with a discharge pressure gauge.

A flanged nozzle or stainless steel socket shall be provided for the gauge and shall comply with Aur 0001.

Gauges shall comply with Aur 0001.

PR 10 LIFTING EQUIPMENT

PR 10.1 GENERAL

The contractor shall provide suitable lifting equipment for raising the pumpset out of the borehole.

The Safe Working Load (SFL) of the complete installation shall be at least one tonne or one third greater than the mass of the pumpset, whichever is greater.

The lifting equipment shall comply with Aur 1003.

PR 10.2 DESIGN

A hand cranked winch which is supported on a gantry; i.e. a steel support structure; shall be provided for lifting the pumpset and drop pipe out of the hole.

The final position shall be confirmed with the Engineer on site.

PR 10.3 GANTRY

The gantry; i.e. support structure for the winch; shall comply with Clause 8 of Aur 1003.

The gantry shall be of hot-dip galvanised carbon steel.

The required steel is as follows:

- I-Sections: 203x133x35, 0.16t
- H-Sections: 152x152x23, 0.3t
- Gusset plates, base plates: 0.06t
- Grade 8.8 bolts: 0.02t

PR 10.4 WINCH

The winch shall comply with clause 14 of Aur 1003.

The winch shall be a DYMOT 1500S MK2 or similar approved winch.

The winch shall incorporate an enclosed, cast iron gearbox. The gearbox shall ensure that the load remains in position when the handle is released and this is a requirement for both raising and lowering of the load. The self-locking facility shall not be achieved by a ratchet device.

PR 10.5 **Trolleys**

The trolley shall be a geared type arrangement and be fitted with a locking device to secure the trolley in position on the beam.

PR 11 MATERIALS AND COATINGS

The Contractor shall provide the materials and coatings as tabulated below.

Pump and Motor Casings	**Stainless steel.**
Impellers	Stainless steel.
Winch	Manufacturer's standard.
Winch Support Structure	Hot-dip galvanised carbon steel.
Surface Pipework	Hot-dip galvanised carbon steel.
Pipework Supports	Hot-dip galvanised carbon steel.
Drop Pipe	As per clause "Pipework"
Control Panel	Stainless steel.
Control Panel Support	Hot-dip galvanised steel.
Pumpset Cable Protection	Stainless steel.
Flange Fasteners	Hot-dip galvanised steel.
Fasteners (other than flange fasteners)	Stainless steel.

PR 12 FABRICATION

Fabrication and welding shall comply with the requirements of Aur 0001.

PR 13 FASTENERS

Fasteners shall comply with the requirements for fasteners in Aur 0001.

Pipework flange fasteners shall be of hot-dip galvanised steel. All other fasteners shall be of EN Grade 1.4401 stainless steel.

PR 14 SPARES

The spares which are to be provided are specified elsewhere.

PR 15 INSTALLATION

Installation work shall comply with the requirements for installation in Aur 0001.

The electrical cable shall be well secured to the pipe at 2 metre intervals.

PR 16 SAFETY

The Contractor shall design and install all equipment installations in accordance with the requirements of the Occupational Health and Safety Act of South Africa and, if applicable, in accordance with the requirements of SANS 10108 for hazardous areas.

Each motor driven device shall be provided with an emergency stop station in an appropriate position.

PR 17 MANUAL

The Manual to be provided in terms of the Contract shall include manufacturer's printed literature on operation and maintenance of, at least, the pumpset and the magnetic flow meter. The serial numbers of the pump and of the motor shall be provided in the Manual.

PR 18 INSPECTIONS

The Contractor shall make arrangements for the Engineer to inspect the equipment for compliance prior to payment being made.

The Contractor shall make arrangements for the Engineer to inspect the installation on Site.

PR 19 TESTING REQUIREMENTS

PR 19.1 GENERAL

The Contractor shall be responsible for all costs relating to the Engineer's witnessing of any factory testing which is specified.

PR 19.2 REPORT

The Contractor shall submit reports for all specified tests to the Engineer prior to the equipment being delivered to Site.

PR 19.3 FACTORY

Pumpset curves for head, flow, and power demand at the operating speed shall be submitted to the Engineer before the pumps leave the factory.

The pumpsets shall be tested at the manufacturer's works in accordance with ISO 9906, Grade 1B for pumps with motor powers of 75 kW and above and in accordance with ISO 9906 Grade 2B for pumps with motor powers of less than 75 kW.

If more than one pump is to be provided in terms of the Contract, each pump shall be tested and a curve shall be provided for each pump.

The pumps shall be tested with their motors coupled and the efficiency of the complete pumpset at the duty point shall be submitted with the pump curves.

PR 19.4 SITE

The Contractor shall demonstrate the correct operation of the equipment and achievement of the specified performance requirements on Site to the Engineer prior to the commissioning of the Works.

The Contractor shall measure the power demand for the motor measured on Site in order to confirm that the specified motor power margin has been obtained.

The Contractor shall submit site test reports to the Engineer and shall provide copies in the Manual.

PR 20 MEASUREMENT AND PAYMENT

PR 20.1 DESIGN, SUPPLY, DELIVER AND INSTALL SUBMERSIBLE PUMP AND MOTOR COMPLETE INCLUDING CABLING TO CONNECT TO MOTOR CONTROL PANEL AND SPECIFIED ACCESSORIES ..... Unit : Sum

The rate tendered shall cover the cost of the design, manufacture, corrosion protection, supply, testing, storage and installation materials, as well as any other ancillary costs and the cost of actions up to a limit of construction that can be seen on the drawings and that are outlined in the specifications that are necessary to provide a complete and efficient working system.

PR 20.2 DROP PIPEWORK ..... Unit: Sum

The tendered rate shall cover the cost of the design, manufacture, corrosion protection, supply, testing and installation, as well as any ancillary costs associated. Work shall be done according to, but not limited to, Specification PR 6.1.

PR 20.3 SURFACE PIPEWORK ..... Unit : Sum

The tendered rate shall cover the cost of the design, manufacture, corrosion protection, supply, testing and installation, as well as any ancillary costs associated. Work shall be done according to, but not limited to, Specification PR 6.2.

PR 20.4 REGULATING VALVE ..... Unit : No

The tendered rate shall cover the cost of the design, manufacture, corrosion protection, supply, testing and installation, as well as any ancillary costs associated. Work shall be done according to, but not limited to, Specification PR 8.1.

PR 20.5 CHECK VALVE ..... Unit : No

The tendered rate shall cover the cost of the design, manufacture, corrosion protection, supply, testing and installation, as well as any ancillary costs associated. Work shall be done according to, but not limited to, Specification PR 8.2.

PR 20.6 ISOLATING VALVE ..... Unit : No

The tendered rate shall cover the cost of the design, manufacture, corrosion protection, supply, testing and installation, as well as any ancillary costs associated. Work shall be done according to, but not limited to, Specification PR 8.3.

PR 20.7 AIR RELEASE VALVE ..... Unit : No

The tendered rate shall cover the cost of the design, manufacture, corrosion protection, supply, testing and installation, as well as any ancillary costs associated. Work shall be done according to, but not limited to, Specification PR 8.4.

PR 20.8 **WATER LEVEL SENSOR** Unit : No

The tendered rate shall cover the cost of the design, manufacture, corrosion protection, supply, testing and installation, as well as any ancillary costs associated. Work shall be done according to, but not limited to, Specification PR 9.2.

PR 20.9 **FLOW METER** ..... Unit : No

The tendered rate shall cover the cost of the design, manufacture, corrosion protection, supply, testing and installation, as well as any ancillary costs associated. Work shall be done according to, but not limited to, Specification PR 9.3.

PR 20.10 **PRESSURE GAUGE** ..... Unit : No

The tendered rate shall cover the cost of the design, manufacture, corrosion protection, supply, testing and installation, as well as any ancillary costs associated. Work shall be done according to, but not limited to, Specification PR 9.4.

PR 20.11 **DESIGN, SUPPLY, DELIVER AND INSTALL A GANTRY COMPLETE AS PER SPECIFICATION** ..... Unit: Sum

The sum tendered shall cover the cost of the design, manufacture, corrosion protection, supply, testing, storage and installation materials, as well as any other ancillary costs and the cost of actions that necessary to provide a complete and efficient working gantry as per the specifications (PR 10.1, PR 10.2, PR 10.3 and PR 10.5).

PR 20.11 **HAND CRANKED WINCH**……Rate Only

The tendered rate shall cover the cost of the design, manufacture, corrosion protection, supply, testing and installation, as well as any ancillary costs associated. Work shall be done according to, but not limited to, Specification PR 10.4.

PS ELECTRICAL INSTALLATION

CONTENTS

PS 01 GENERAL

PS 02 RELEVANT ACTS; REGULATIONS AND STANDARDS

PS 03 SITE CONDITIONS

PS 04 SCOPE

PS 05 SUPPLY AUTHORITY

PS 06 SUPPLY TO THE MOTOR CONTROL PANELS

PS 07 PUMP MOTOR CONTROL PANELS

PS 08 PRESSURE SWITCH

PS 09 LV CABLES

PS 10 TIME SWITCH

PS 11 FLOW SENSOR

PS 12 ADDITIONAL PROTECTION EQUIPMENT

PS 13 MEASUREMENT AND PAYMENT

PS 1 GENERAL

This specification covers the supply, installation and commissioning of the electrical installations.

PS 2 RELEVANT ACTS, REGULATIONS AND STANDARDS

All work and materials shall comply with the terms and directions of the latest amendment or edition of the relevant Acts, Regulations and Standards such as:

The Occupational Health & Safety Act, No 85 of 1993 and Regulations.

The code of Practice for the Wiring of Premises, SABS 10142.

The by-laws and regulations of the local authority and/or the electricity supply authority concerned.

The relevant SABS, BS, IEC supporting specifications referred to herein.

PS 3 SITE CONDITIONS

Location	:	Clarkebury
Ambient dry bulk temperature	:	-5ºC to 40ºC
Altitude	:	670 MASL
Lightning	:	3-5 flashes/km²/yr

PS 4 SCOPE

The Contractor shall be responsible for the design, supply, delivery, installation, testing and commissioning of the electrical equipment to render complete operational systems. The work comprises of the following for each installation:

(i) Power supply from the Clarke Bury SSS point of supply to the borehole motor control panel.

(ii) The design, supply, delivery and installation of motor control panel, incorporating the required control.

(iii) Supply, delivery and installation of a flow sensor and pressure switch in the delivery line in the pump control centre from the abstraction works.

(iv) The supply, delivery and installation of an LV cable from the motor control panel to the pressure switch.

(v) The connection of the submersible pump to the motor control panel.

(vi) The testing and commissioning of the electrical installation.

NOTE :

The Contractor must confirm the ratings for the various motors before commencing with the manufacture of the motor control panels, failing which any cost to change the installation to accommodate the final pump and motor selections shall be for his account.

PS 5 SUPPLY AUTHORITY

The supply authority is the Eskom.

PS 6 SUPPLY TO THE MOTOR CONTROL PANELS

The Contractor shall be responsible for the design, supply, delivery and installation of the LV cable from the Eskom points of supply to the pump motor control panels.

All underground cables shall be installed at a minimum depth of 800mm below finished ground level.

PS 7 PUMP MOTOR CONTROL PANELS

(i) Each enclosure shall be of the wall unit type, which shall be mounted on the wall of the relevant pump control shelter.

(ii) The degree of protection of the enclosure shall be IP65 to SABS 1222.

(iii) The enclosures shall be vermin proof and sufficiently ventilated.

(iv) The cubicles inside the motor control panels shall be labelled as indicated by the ID numbers on the circuit diagrams.

(v) The colour of the motor control panels shall be as follows:

EXTERIOR - B26 as per SABS 1091

INTERIOR - B26 as per SABS 1091, with white equipment mounting chassis plates.

(vi) Incomer :

The incoming compartment shall contain the following equipment.

- A suitably rated triple-pole main MCB (door interlocked) with instantaneous magnetic trip relay.
- One earth leakage protection unit.
- Voltmeter phase selection switch and a suitably rated voltmeter (0-500V).
- One suitably rated ammeter and associated current transformer.
- A kilowatt-hour meter with current transformers, on the main supply.
- Suitable rated surge arrestor per phase.

The compartment shall further contain:

- 3/P MCB (door interlocked) with instantaneous magnetic trip
- Start selection switch, Manual-Off-Auto.
- 2 No pushbuttons for manual Run-Stop.
- Running-hour meter
- Terminals as required.

(vii) The Contractor/Nominated Subcontractor shall be responsible for designing the interlocking and power circuits for the motor control panels.

PS 8 PRESSURE SWITCH

(i) One pressure switch equal to SAUTER type DFC 17B78 or approved equivalent shall be provided and installed on the delivery pipe from each pump. A 20mm plugged pipe socket shall be provided on the main pipe work for the installation of each pressure switch. All required reducers to install the pressure switches shall form part of the contract.

The pressure switches shall be rated for the following duty:

Maximum safe working pressure	:	1600kPa
Pressure adjustment range	:	0-1600kPa
Adjustment sensitivity	:	10kPa
Switching hysteresis	:	Adjustable in the range 10 to 80kPa. It is a requirement that the hysteresis be adjustable down to 10kPa.

The precise cut out settings for the various pumps will be determined when the systems are commissioned.

(ii) The degree of protection for the pressure switches shall be at least IP65 to SABS 1222.

(iii) The pressure switches shall be suitably protected against over pressures above the maximum working pressure, to protect the switches against the deleterious effects of pressure surges.

(iv) A terminal box with minimum IP rating of 65 to SABS 1222 shall be supplied and installed in close proximity to each pressure switch. The pressure switches shall be connected to their respective terminal boxes by means of cabtyre installed in conduit and terminated on the pressure switches and terminal boxes by means of metallic compression glands.

A 7-core, 1,5mm² armoured cable shall be supplied and installed between each terminal box and pump motor control panel. Each cabtyre shall be connected to the armoured cable in the terminal box by means of a terminal strip.

PS 9 LV CABLES

LV cable requirements shall be as determined on site. The voltage drop calculations together with complete cable routes shall be submitted to the Engineer for approval prior to commencing with the installations.

PS 10 TIME SWITCH

Each pump station shall be equipped with an electronic timerthat can be set to different time intervals. Typically time intervals of 12 hours will be prescribed with the starter only trying to start during these pre-set time intervals. The pump will be able to be started in either the manual or auto mode.

PS 11 FLOW SENSOR

Flow sensor of the Turck type suitable for operation at pressures from 3 bar to 24 bar. This unit shall comprise an insertion type sensor, fitted into the delivery line, and a signal processor fitted into the PCC. A delay timer (0- 60 seconds) shall be installed to allow the motor to run up to speed and water to flow prior to activating the flow sensor.

PS12 ADDITIONAL PROTECTION EQUIPMENT

Each electrical installation shall make provision for the following protection equipment.

- Overload by electromagnetic delay relays (115 % increase above full-load current)
- Single phase protection
- Phase rotation protection

- Surge arrestors shall be installed and be of the metal oxide type in accordance with SABS 171
- Earth leakage which may consist of an earth mat, electrode earth, or a combination of the two. The maximum resistance to earth is 1ohm. Where exposed and run below 2 metres, earth wires shall be protected in galvanised conduit which shall be neatly and firmly fixed.
- Fault/reset and lamp rest push buttons
- Lighting protection. The entire installation shall be bonded against lightning in accordance with SABS 03.

PS 13 MEASUREMENT AND PAYMENT

PS 13.1 **DESIGN, SUPPLY, DELIVER, INSTALL, TEST AND COMMISSION LV CABLE, PRESSURE SWITCH, TIMER SWITCH AND FLOW SENSOR FOR MOTOR CONTROL PANEL** ..... Unit : Sum

The sum tendered shall cover the cost of the design, supply, delivery, installation, testing and commissioning of the LV cables, including all required installation material, protective sleeve pipes, excavation, cable warning tape, backfilling and compacting of trenches (Electrical connection point approximately 30m from borehole).

PS 13.2 **DESIGN, SUPPLY, INSTALL AND COMMISSION OF CONTROL PANEL**..... Unit : Sum

The sum tendered shall cover the cost of the design, supply, manufacture, work testing, delivery to site and site testing and commissioning of the motor control panel.

PS 13.3 **CONNECTION FEES** ..... Unit : Sum

The tendered rate shall provide full compensation in respect of the registration of the construction work, connection fees and any inspection fees that may be payable to the supply authority.

C4: SITE INFORMATION

C4.1 SITE INFORMATION

For the purposes of the Contract it will be deemed that, prior to submitting his Tender, the Contractor has acquainted himself fully with the information and data provided within the specifications.

The Contractor shall have no claim against the Employer in respect of geotechnical or subsurface conditions encountered during the course of the Contract.

C4.2 NATURE OF GROUND AND SUBSOIL CONDITIONS

The ground conditions were not predetermined. It must be assumed, however, that excavations will be unstable and that these excavations will require shoring or other means of protection.

C4.3 FINISHING-OFF THE SITE

The site shall be finished-off in accordance with the specifications and to the satisfaction of the Employer's Agent.

APPENDIX A

LABOUR REPORTING

15.1.1 Actual Number of persons employed

Occupational Category	Total		Adult				Youth				Disabled			
			Women		Men		Female		Male		Female		Male	
	Persons	Person Days	Persons	Person Days	Persons	Person Days	Persons	Person Days	Persons	Person Days	Persons	Person Days	Persons	Person Days
Clerical														
Labourer														
Managerial														
Semi-skilled														
Skilled														
Supervisor														
Total														

Please note: - The definition of youth is any person under the age of 35 years. (18-35 Years)
- Each person may only be counted once. If a person falls into more than one category, disabled persons take preference, then youth, then adults.
- Must include all occupational categories (Clerical, Labourer, Managerial, Semi-skilled, Skilled and Supervisor).

15.1.1 Actual Number of persons employed

Occupational Category	Total		Adult				Youth				Disabled			
			Women		Men		Female		Male		Female		Male	
	Persons	Person Days	Persons	Person Days	Persons	Person Days	Persons	Person Days	Persons	Person Days	Persons	Person Days	Persons	Person Days
Clerical														
Labourer														
Managerial														
Semi-skilled														
Skilled														
Supervisor														
Total														

Please note: - The definition of youth is any person under the age of 35 years. (18-35 Years)
- Each person may only be counted once. If a person falls into more than one category, disabled persons take preference, then youth, then adults.
- Must include all occupational categories (Clerical, Labourer, Managerial, Semi-skilled, Skilled and Supervisor).

15.1.2. Average daily wage per category
Please note that the totals are calculated averages for the number of records submitted per category.

Occupational Category	Category Average	Adult		Youth		Disabled	
		Women	Men	Female	Male	Female	Male
		Daily wage	Daily wage	Daily wage	Daily wage	Daily wage	Daily wage
Clerical							
Labourer							
Managerial							
Semi-skilled							
Skilled							
Supervisor							
Average of the Daily Wage							

15.2.1 Non-Accredited Training

Training Type	Total		Adult				Youth				Disabled			
			Women		Men		Female		Male		Female		Male	
	Persons Trained	Training Days	Persons	Person Days	Persons	Person Days	Persons	Person Days	Persons	Person Days	Persons	Person Days	Persons	Person Days
Administration														
Technical														
Life skills/ ISD														
Literacy & Numeracy														
Vocational Skills														
Business Skills														
Total Training														

15.2.2 Accredited Training

Training Type	Total		Adult				Youth				Disabled			
			Women		Men		Female		Male		Female		Male	
	Persons Trained	Training Days	Persons	Person Days	Persons	Person Days	Persons	Person Days	Persons	Person Days	Persons	Person Days	Persons	Person Days
Administration														
Technical														
Life skills/ ISD														
Literacy & Numeracy														
Vocational Skills														
Business Skills														
Total Training														

Training Type	If Accredited		
	NSB Number	NQF Level	ETQA/ CETA
Administration			
Technical			
Life skills / ISD			
Literacy & Numeracy			
Vocational Skills			
Business Skills			
Total Training			

Note:

NQF Level of Training

Level 1 – General Education and Training
Level 2,3,4 - Further Education and Training
Level 5 - Higher Education and Training

NSB Number:

NSB 01: Agriculture and Nature Conservation
NSB 02: Culture and Arts
NSB 03: Business, Commerce and Management Studies
NSB 04: Communication Studies and Language
NSB 05: Education, Training and Development
NSB 06: Manufacturing, Engineering and Technology
NSB 07: Human and Social Studies
NSB 08: Law, Military Science and Security
NSB 09: Health Science and Social Services
NSB 10: Physical, Mathematical, Computer and Life Sciences
NSB 11: Services
NSB 12: Physical Planning and Construction

Please remember to include all the EME's that worked on the project since it started. Then add all the person days and all the funds paid to each EME since the start of the project, and only record the latest total in the table.

For example, if an EME completed all their work during the first reporting period, the name and details of that EME must be added to every subsequent report.

EME	**Information about the EME. (If it is a subsidiary: provide information for whole group and not for the EME only)**		**Information about the work on the PROJECT**			
Name of EME	No. of permanent employees	Turnover previous 12 months	Total no. of person days to date	Amount paid to EME to date. (Total)	Person days locally sourced: 0-25% 26-50% 51-75% 75-100%	Total value of work: EME Involvement

Note that Black Economic Empowerment (BEE) Organisations are referred to in the table below as Affirmable Business Enterprises (ABE's).

The definition of an ABE is as per the Department of Public Works definition: *A sole trader, partnership or legal entity which adheres to statutory labour practises, is registered with South African revenue Services and is a continuing and independent enterprise for profit, providing a commercially useful function and for which at least two thirds (67%) is owned by one or more PDI's and whose management and daily business operations are in control of one or more PDI's who effectively own it, and provided that the annual average turnover excluding VAT, does not exceed the maximum values given for each respective ABE category.*

Please remember to include all the ABE's that worked on the project since it started. Then add all the person days and all the funds paid to each ABE since the start of the project, and only record the latest

ABE	**Information about the abe. (If it is a subsidiary: provide information for whole group and not for the ABE only)**		**Information about the work on the PROJECT**			
Name of ABE	No. of permanent employees	Turnover previous 12 months	Total no. of person days to date	Amount paid to ABE to date. (Total)	Person days locally sourced: 0-25% 26-50% 51-75% 75-100%	Total value of work: EME Involvement

LABOUR MONTHLY SUMMARY SHEET

Name of Contractor
Project Name
Project Number
Applicable Month

No of Working Days: Maximum including training = 23 days per month

Number of workers	rnal	Initials	First Name	ID Number	Birth Date	(M)ale / (F)emale	(D)isabled	Rate per day	Number of days worked this month	Number of training days this month	Total amount paid to beneficiary	Course name	Course Code
1											0		
2											0		
3											0		
4											0		
5											0		
6											0		
7											0		
8											0		
9											0		
10											0		
11											0		
12											0		
13											0		
14											0		
15											0		
16											0		
17											0		
18											0		
19													
20											0		
											0		
20				**Totals for month**					**0**	**0**	**0**		

Page 1

Signature Consultant

BENEFICIARY LIST

Name of Contractor
Project Name
Project Number
Month:

Youth = 35yrs and less

Number of workers	Surname	Initials	Name	ID Number	Date of Birth	Male/Female	Has Disability (Y?N)	Is Youth (Y/N)	Education Level*	Date Start	Contact Number
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											

Signature of CLO

PAYMENT REGISTER

Contractor Name
Period
Project Number
Month:

Name and surname	ID Number	Contact no	of Workday	Task Rate	Payment Due	Signature for Payment Received	Comments

Signature of CLO

Signature of Contractor to verify accuracy

Signature of Consultant

Signature of Contractor for receipt of monies

Province of the
EASTERN CAPE
EDUCATION

Nyanga Senior Secondary School
EMIS No.: 200400893
P-Number: P9011641

DAILY SITE ATTENDANCE REGISTER

Name of Contractor:
Project Name:
Project Number: **P=Public Holiday** **2=Training**
Month: **1=At Work** **A=Absent** **L=Leave** **SC=Site Closed** **SL=Sick Leave**

	Surname	Initials	ID Number	Birth Date	Rate per day (R)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Work days	Total Training Days	Total work days & training days
1																																					0	0	0
2																																					0	0	0
3																																					0	0	0
4																																					0	0	0
5																																					0	0	0
6																																					0	0	0
7																																					0	0	0
8																																					0	0	0
9																																					0	0	0
10																																							
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16																																							
17																																							
18																																							
19																																							
20																																							
Totals																														**TOTALS**							0	0	0

Signature of CLO

Week 1 -2: Signature of Contractor Organisation

Week 3-4: Signature of Contractor Organisation

TRAINING DATA

Contractor
Project Name
Project Number
Month:

	Surname	Initials	ID Number	Birth Date	Training Ptrovider	Course Name	Course code	Cost of course	Accredited/ non-accredited	Number of training days
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
20										**0**

Page 1

Signature CLO

APPENDIX B

DRAWINGS