



**KWANOMZAMO BULK SANITATION: IMPLEMENTATION OF KWANOMZAMO NEW
SEWER PUMP STATION AND RISING MAIN FROM BUNGALOWS**

CONTRACT NO: 220/2024

6CE CIDB Grading Required

NOVEMBER 2024

VOLUME 1

SERVICE PROVIDER		
TELEPHONE / FACSIMILE		
CLOSING DATE	WEDNESDAY, 04 DECEMBER 2024 AT 12:00	

ISSUED BY:

**Kouga Local Municipality
Physical Address:
16 Woltemade Street
Jeffreys Bay**

**Postal Address:
P O Box 21
Jeffrey Bay
6330**

**Contact Person: Mr Jacques du Toit
Tel: 042 – 200 2200 / 042 - 200 8300**

PREPARED BY:

**Engineering Advice & Services (Pty) Ltd
73 Heugh Road
Walmer
Gqeberha**

**Contact Person: Mr Pieter Joubert
Tel: 041 – 581 2421**

**KWANOMZAMO BULK SANITATION: IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION
AND RISING MAIN FROM BUNGALOWS**

GENERAL TENDER INFORMATION

TENDERS INVITED	:	04 November 2024
ESTIMATED CIDB CONTRACTOR GRADING	:	6CE or higher
CLARIFICATION MEETING	:	A compulsory clarification meeting to be held on Wednesday, 13 November 2024 @09:00am
VENUE FOR CLARIFICATION MEETING & SITE VISIT	:	Room 42, Kouga LM Woltemade Str Office, Jeffreys Bay followed by Site Inspection, Humansdorp
CLOSING DATE	:	04 December 2024
CLOSING TIME	:	12:00:00 PM / 12H00
CLOSING VENUE	:	Tender Box at the Municipal Office, Room 122 16 Woltemade Street (front) / 21 St. Croix Street (back), Jeffreys Bay
VALIDITY PERIOD OF TENDER	:	90 days
TENDER BOX	:	The Tender Documents (which includes the Form of Offer and Acceptance) completed in all respects, plus any additional supporting documentation required, must be submitted in a sealed envelope with the name and address of the tenderer, the tender No. and title and the closing date indicated on the envelope. The sealed envelope must be inserted into the appropriate official tender box before closing time. The onus remains with the tenderer to ensure that the tender is placed in the correct tender box.

KOUGA LOCAL MUNICIPALITY

BID No.: 220/2024

KWANOMZAMO BULK SANITATION: IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION AND RISING MAIN FROM BUNGALOWS

PARTICULARS OF BIDDER

Name of Bidder	
Contact Person:	
Postal Address	
Street Address	
Telephone Number	Code: Number:
Cell phone Number	
Facsimile Number	Code: Number:
E-Mail Address	
CSD Supplier Number (National Treasury)	
CIDB CRS Number	
Vat Registration Number	

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THE TENDER

PART 1 (OF 2): TENDERING PROCEDURES

T1.1 Tender Notice and Invitation to Tender

T1.2 Tender Data

T1.1: TENDER NOTICE AND INVITATION TO TENDER

KOUGA LOCAL MUNICIPALITY (EC108)

DIRECTORATE: WATER & SANITATION

NOTICE NO: 220/2024

KWANOMZAMO BULK SANITATION: IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION AND RISING MAIN FROM BUNGALOWS

Suitably qualified, capable and experienced Contractors are hereby invited to submit tenders for the Implementation of Kwanomzamo new sewer pump station and rising main from Bungalows for Kouga Municipality.

Tenders

An electronic copy of the tender document will be available on E-Tender portal www.etender.gov.za or the municipal website www.kouga.gov.za as from **Monday, 04 November 2024**. After downloading the tender document from the website each prospective bidder **MUST** ensure that all the pages of the tender document are printed.

A compulsory site clarification session will be arranged for **Wednesday, 13 November 2024 @9h00am at 16 Woltemade Street, Jeffreys Bay, Room 42. Please take note that no attendee arriving 15 minutes late or more will be allowed to attend the clarification meeting.**

Please note:

- Telegraphic, telephonic, telex, facsimile, email or late tenders will not be accepted.
- This contract will be evaluated on the 80 (price)
- The specific goals would be for a maximum of 20 points. To claim for specific goals prospective bidders MUST submit proof/required documents.
- **An electronic copy of the completed tender document with returnable documents must be submitted with tender submission saved in a flash drive or CD. Failure to submit AN ORIGINAL HARD COPY AND A COPY ON EITHER USB or CD will deem the bid non-responsive. One electronic device must be submitted per contract**
- **An estimated contractor CIDB Grading of 6CE or higher is required.**
- **A minimum functional assessment score of 75% will apply to this contract.**
- A valid Tax compliance Status pin must be submitted.
- Prospective Service Providers must register on Kouga Municipality's Supplier database as per the registration requirements.
- The National Treasury Central Supplier Database Summary report must be submitted.
- The Council reserves the right to accept any tender and, or part thereof, appoint more than one contractor, and does not bind itself to accept the lowest or any tender. The Council reserves the right to appoint any contractor.
- The validity period for submission will be 90 days from the closing date.
- Tenders that are deposited in the incorrect box or delivered to any other venue will not be considered.

Any inquiries relating to this tender must be submitted in writing via e-mail to tenders@kouga.gov.za and copied to melsgerber@kouga.gov.za.

Completed documents in a sealed envelope endorsed "**NOTICE NO: 220/2024: "KWANOMZAMO BULK SANITATION: IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION AND RISING MAIN FROM BUNGALOWS"**" must be placed in the Tender Box at 16 Woltemade Street (front entrance), Jeffrey's Bay, Room 122 on or before **WEDNESDAY, 04 DECEMBER 2024 at 12:00.**

C. DU PLESSIS

MUNICIPAL MANAGER

P.O. Box 21

JEFFREYS BAY
6330

For Placement:

Herald/Municipal Website/ Municipal Notice Boards in all offices/areas – 04 November 2024

PART A

INVITATION TO BID

YOU ARE HEREBY INVITED TO BID FOR REQUIREMENTS OF THE (NAME OF MUNICIPALITY/ MUNICIPAL ENTITY)					
BID NUMBER:	220/2024	CLOSING DATE:	04/12/2024	CLOSING TIME:	12h00
DESCRIPTION	KWANOMZAMO BULK SANITATION: IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION AND RISING MAIN FROM BUNGALOWS				
THE SUCCESSFUL BIDDER WILL BE REQUIRED TO FILL IN AND SIGN A WRITTEN CONTRACT FORM (MBD7).					
BID RESPONSE DOCUMENTS MAY BE DEPOSITED IN THE TENDER BOX SITUATED AT:					
KOUGA LOCAL MUNICIPALITY, 16 WOLTEMADE STREET, JEFFREYS BAY – ROOM 122					
SUPPLIER INFORMATION					
NAME OF BIDDER					
POSTAL ADDRESS					
STREET ADDRESS					
TELEPHONE NUMBER	CODE		NUMBER		
CELLPHONE NUMBER					
E-MAIL ADDRESS					
VAT REGISTRATION NUMBER					
TAX COMPLIANCE STATUS	TCS PIN:		OR	CSD No:	
B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE [TICK APPLICABLE BOX]	☐ Yes ☐ No		B-BBEE STATUS LEVEL SWORN AFFIDAVIT ☐ Yes ☐ No		
[A B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE/ SWORN AFFIDAVIT (FOR EMES & QSEs) MUST BE SUBMITTED IN ORDER TO QUALIFY FOR PREFERENCE POINTS FOR B-BBEE]					
1. ARE YOU THE ACCREDITED REPRESENTATIVE IN SOUTH AFRICA FOR THE GOODS /SERVICES /WORKS OFFERED?	☐ Yes ☐ No [IF YES ENCLOSE PROOF]		2. ARE YOU A FOREIGN BASED SUPPLIER FOR THE GOODS /SERVICES /WORKS OFFERED?	☐ Yes ☐ No [IF YES, ANSWER PART B:3]	
3. TOTAL NUMBER OF ITEMS OFFERED			4. TOTAL BID PRICE		
5. SIGNATURE OF BIDDER			6. DATE		
7. CAPACITY UNDER WHICH THIS BID IS SIGNED					
BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO:			TECHNICAL INFORMATION MAY BE DIRECTED TO:		
DEPARTMENT	Supply Chain Management		CONTACT PERSON	Mr Oyama Mayisela	
TELEPHONE NUMBER	042-200-2200		TELEPHONE NUMBER	071 882 5066	
E-MAIL ADDRESS	tenders@kouga.gov.za and copied to melsgerber@kouga.gov.za		E-MAIL ADDRESS	omayisela@kouga.gov.za	

T1.2: TENDER DATA

The conditions of tender are the Standard Conditions of Tender as contained in the CIDB Standard for Uniformity in Employer's Agenting and Construction Works Contracts as published in Board Notice 423 of 2019 of 08 August 2019. (See www.cidb.org.za).

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

"Bid" should read "tender," and vice versa, throughout the document – implying both words have the same meaning.

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

Clause Number	Tender Data
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C.1	General
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C.1.1	Actions
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The Employer is **KOUGA LOCAL MUNICIPALITY**.

C.1.1.2	Tenderers shall declare any perceived, known and potential conflict of interest under Returnable Documents, Form T2.1.14 Declaration of Intent of Persons in Service of State and Form T2.1.16 Declaration of Tenderers Supply Chain Management Practices.
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C.1.2	Tender Documents
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Add the following:

The following documents form part of this tender:

A. Available from the S.A. Federation of Civil Engineering Contractors, the S.A. Institute of Civil Engineering, the S.A. Bureau of Standards and the Government printers, as applicable:

1. Annex C, of the Standard Conditions of Tender of Government Gazette No. 42622 dated 8 August 2019.
2. The General Conditions of Contract for Construction Works 2015, as amended by the Contract Data.
3. S.A. Bureau of Standards Standardised Specifications for Civil Engineering Construction as amended by the Specification Data.

The Tender Documents issued by the Employer comprise:

VOLUME 1: The Tender Document (this document), in which are bound:

THE TENDER

Part T1: Tendering Procedures

T1.1 Tender Notice and Invitation to Tender

T1.2 Tender Data

Part T2: Returnable documents

T2.1 List of Returnable Documents

T2.2 Returnable Schedules

THE CONTRACT

Part C1: Agreements and Contract Data

C1.1 Form of Offer and Acceptance

C1.2 Contract Data

C1.3 Form of Performance Guarantee

C1.4 Occupational Health and Safety Agreement

C1.5 Disclosure Statement

C1.6 Adjudication Board Member Agreement

Part C2: Pricing data

C2.1 Pricing Instructions

C2.2 Bill of Quantities

C2.3 Summary Page of Bill of Quantities

Part C3: Scope of Work

C3.1 Description of the Works

C3.2 Employer's Agenting

C3.3 Procurement

C3.4 Construction

C3.5 Management

Part C4 : Site Information

C4.1 Scope

C4.2 Finishing-off of the Site

Appendix A : List of Tender Drawings

C.1.3 Interpretation

C.1.3.1 *Delete the clause and replace with the following:*

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.1.4 Communication

Delete the first sentence of the clause and replace with the following:

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

The Employer's Agent, for the purposes of any communication between the Employer and Tenderer is:

Name	:	Engineering Advice & Services Pty (Ltd)
Represented By	:	Pieter Joubert
Address	:	73 Heugh Road, Walmer, Gqeberha
Telephone	:	041 581 2421

C.1.5 Cancellation and Re-Invitation of Tenders

*Delete the full stop at the end of C.1.5.1 c) and replace with, or
Add the following after C.1.5.1 c):*

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

C.1.6 Competitive negotiation procedure

Add the following to C.1.6.2.1:

A competitive negotiation procedure will not be followed.

C.1.6.3 Proposal procedure using the two-stage system

Add the following between C.1.6.3 and C.1.6.3.1:

A two-stage system will not be followed.

Add the following after C.1.6.3.2.2

C.1.6.4 Objections, complaints, queries, and disputes/ Appeals in terms of Section 62 of the Systems Act/ Access to court

C.1.6.4.1 Disputes, objections, complaints, and queries

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

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

C.1.6.4.2 Appeals

- a) In terms of Section 62 of the Local Government: Municipal Systems Act, 32 of 2000 a person whose rights are affected by a decision taken by the Municipality, may appeal against that decision by giving written notice of the appeal and reasons to the Municipal Manager within 21 days of the date of the notification of the decision.
- b) An appeal must contain the following:
 - i) Must be in writing
 - ii) It must set out the reasons for the appeal
 - iii) It must state in which way the Appellant's rights were affected by the decision.
 - iv) It must state the remedy sought; and
 - v) It must be accompanied with a copy of the notification advising the person of the decision

C.1.6.4.3 Right to approach the courts and rights in terms of Promotion of Administrative Justice Act, 3 of 2000 and Promotion of Access to Information Act, 2 of 2000

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

- C.1.6.4.4 All requests referring to sub clauses C.1.6.4.1 and C.1.6.4.2 must be submitted in writing to:

The Municipal Manager, Kouga Local Municipality, PO Box 21, Jeffreys Bay, 6330.

- C.1.6.4.5 All requests referring to clause C.1.6.4. 3 regarding access to information or reasons must be submitted in writing to:

The Municipal Manager, Kouga Local Municipality, PO Box 21, Jeffreys Bay, 6330.

C.1.7 **Kouga Local Municipality Supplier Database Registration**

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

Tenderers who wish to register on the Kouga Local Municipality's Supplier Database may collect registration forms from the Supplier Management Unit located within the Supplier Management / Registration Office, 16 Woltemade Road, Jeffreys Bay.

C.1.8 **National Treasury Web Based Central Supplier Database (CSD) Registration**

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

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

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

C.2 Tenderer's obligations

C.2.1 **Eligibility**

*Delete the heading **Eligibility** and Replace with **Responsiveness Criteria***

C.2.1.1 *Delete the clause and replace with the following:*

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

Add the following after C.2.1.2:

- C.2.1.2 Only those tender submissions from which it can be established that a clear and unambiguous offer has been made to Employer, by whom the offer has been made and what the offer constitutes, will be declared responsive.

- C.2.1.3 Only those tenders that satisfy the following criteria will be declared responsive:

C.2.1.3.1 **Construction Industry Development Board (CIDB) Registration**

Only those tenders submitted by tenderers who are registered, or capable of being registered, with an active status with the CIDB, in a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25 (1B) or 25 (7A) of the Construction Industry Development Regulations, for a ME class of construction work, will be declared responsive. Tenderers must obtain such active status upon being requested to do so in writing and within the period contained in such a request, failing which their tenders will be declared non-responsive.

Joint Ventures are eligible to submit tenders provided that:

- a) every member of the joint venture is registered with an active status with the CIDB.

- b) the lead partner has a contractor grading designation of not lower than one level below the required grading designation in the CE class of construction work: and
- c) the combined contractor grading designation calculated in accordance with the Construction Industry Development Regulations is equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a 6CE class of construction work or a value determined in accordance with Regulation 25 (1B) or 25 (7A) of the Construction Industry Development Regulations.
- d) The CIDB grading is extended to Potentially Emerging (PE) Contractors one grade lower ie 5CE PE in the tender value range in terms of Regulation 25.(8).

For alpha-numeric associated with the contractor Grading Designations see Annex G attached.

C.2.1.4.2

Compliance with requirements of Kouga Local Municipality's SCM Policy and procedures

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

- a) Full name of entity submitting tender to be provided.
- b) Identification number or company or other registration number to be provided.
- c) Tax reference number to be provided.
- d) VAT registration number to be provided.
- e) A completed **Certificate of Authority for Partnerships/ Joint Ventures/ Consortiums** to be provided authorising the tender to be made and the signatory to sign the tender on the partnership /joint venture/consortium's behalf (applicable schedule to be completed).
- f) A copy of the partnership / joint venture / consortium agreement to be provided.
- g) A completed **Declaration of Interest – State Employees** to be provided and which does not indicate any non-compliance with the legal requirements relating to state employees (applicable schedule to be completed).
- h) A completed **Declaration – Conflict of Interest** and **Declaration of Bidder's past Supply Chain Management Practices** to be provided and which does not indicate any conflict or past practises that renders the tender non-responsive (applicable schedules to be completed).
- i) A completed **Certificate of Independent Bid Determination** to be provided and which does not indicate any non-compliance with the requirements of the schedule (applicable schedule to be completed).
- j) The tenderer (including any of its directors or members), has not been restricted in terms of abuse of the Supply Chain Management Policy.
- k) The tenderer's tax matters with SARS are in order.
- l) The tenderer is not an advisor or consultant contracted with the Employer.
- m) The tenderer is not a person, advisor, corporate entity, or a director of such corporate entity, involved with the bid specification committee.

C.2.1.4.3

Minimum score for functionality compliance

In order to be considered for a contract in terms of this tender, tenderers must achieve the minimum score for functionality as stated below. Verifiable proof of similar Scope of Work contracts successfully completed, must be submitted in the applicable Returnable Schedule, these must be substantiated with completion certificates and most recent contact information of the issuer of the certificate. Contractors are to ensure that all completion certificates submitted provide all the relevant information in order to claim the points. Failure to submit completion certificates with complete information may result in the contractor scoring no points for the particular item.

The description of the functionality criteria and the maximum possible score for each is shown in the table below. The score achieved for functionality will be the sum of the scores achieved, in the evaluation process, for the individual criteria.

CRITERIA	APPLICATION OF THE CRITERIA	WEIGHT
Company Experience Schedule 1H	Demonstrated experience of the tendering entity with by completion of projects that include at least two of the aspects below per submitted project: - Reinforced concrete sump or water retaining structure construction, - Construction of new Sewerage Pump Stations with a capacity of 25 l/s or more - Rising mains or pressure pipelines of 150mmØ or larger and total length more than 500m) Tenderers are to complete each row in the Returnable Schedule of work experience in full (below contract value ranges are VAT inclusive): 5 x completed projects > R10m 3 x completed projects > R10m 2 x completed projects > R10m 1 x completed projects > R10m	(Max 30 points) 30 points 20 points 10 points 5 points
Key Personnel Schedule P-1	Contracts Manager Civil and Structural Engineering Qualifications: Pr Eng / Pr Tech: B Eng / BSc / B Tech No Qualification (s) or CV attached Relevant Experience: 10+ years 6 – 10 years 3 – 5 years 0 - 2 years	(Max 10 points) 3 points 2 points 0 points 7 points 6 points 3 points 0 points
Key Personnel Schedule P-2	Construction Manager (Site Agent) Civil and Structural Engineering Qualifications: PrEng / PrTech: B Eng / BSc / B Tech No Qualification (s) or CV attached Relevant Experience:	(Max 15 points) 5 points 3 points 0 points

CRITERIA	APPLICATION OF THE CRITERIA	WEIGHT
	10+ years 6 – 10 years 3 – 5 years 0 - 2 years	10 points 6 points 2 points 0 points
Key Personnel Schedule P-3	Pipe Laying Foreman Relevant Experience: 15+ years 10 – 15 years 5 – 10 years 0 - 5 years	(Max 10 points) 10 points 7 points 5 points 0 points
Key Personnel Schedule P-4	Reinforced Concrete Work and Building Foreman Relevant Experience: 15+ years 10 – 15 years 5 – 10 years 0 - 5 years Please note: The experience of the personnel must be in water retaining structures	(Max 10 points) 10 points 7 points 5 points 0 points
Key Personnel Schedule P-5	OH&S Officer (SACPCMP Registered – Proof required) Relevant Experience: 10+ years 6 – 10 years 3 – 5 years 1 - 2 years	(Max 5 points) 5 points 3 points 2 points 1 points
Maximum possible score for Functionality		80 points

The minimum score for functionality is 75%. Tenderers that fail to achieve the minimum score for functionality will be declared as non-Responsive.

Where the entity tendering is a Joint Venture, the tender must be accompanied by a statement describing exactly what aspects of the work will be undertaken by each party to the joint venture (appended to Schedule 10, Part T2.2: Returnable Schedules).

Where the tenderer intends to sub-contract any of the work components listed above, full details of the intended sub-contractor and portions of work to be undertaken by them shall be provided with the tender. The verifiable experience of the sub-contractor relevant to the component of work to be performed by them will be taken into consideration when allocating scores. Intention to go into sub-consultancy agreement to be included else no points will be scored.

Tenderers shall ensure that all relevant information has been submitted with the tender offer in the prescribed format to ensure optimal scoring of functionality points for each Evaluation Criteria. Failure to

provide all information **IN THIS TENDER SUBMISSION** could result in the tenderer not being able to achieve the specified minimum scoring.

C.2.1.4.5 **Compulsory clarification meeting**

Tenderers are required to attend a compulsory clarification meeting and site visit at which they may familiarise themselves with aspects of the proposed work, services or supply and pose questions.

Details of the meeting(s) are stated in the General Tender Information.

Only those tenders submitted by tenderers who have signed the attendance register will be declared responsive.

C.2.1.4.6 **Good Standing with Bargaining Council**

Only those tenders submitted by tenderers who are in good standing with the Bargaining Council for the Civil Engineering Industry (BCCEI) at the time of the tender award will be declared responsive. Tenderers must attach such proof to the schedule titled Declaration in Respect of Compliance with Labour Legislation or obtain such upon being requested to do so in writing and within the period contained in such a request, failing which their tenders will be declared non-responsive. Refer to Schedule 10 of the Returnable Schedules

C.2.3 **Check documents**

C.2.3 *Amend the clause to read:*

“.....and notify the Employer’s **Agent** of any discrepancy.....”

Tenderers must examine the documents upon receipt to ensure that all pages and drawings (if applicable) are included and are to report any missing pages or drawings. Drawings which are illegible or indistinct, and errors or ambiguities in the Specifications, Schedule of Rates and Drawings or any contradictions between the specifications, Schedule of Rates and Drawings in order to obtain rulings on such errors, ambiguities or discrepancies. No claim for extras based on such errors, ambiguities or discrepancies will be considered after the opening of Tenders. Tenderers having any queries relating to discrepancies in, or omissions from the document shall contact the Employer or Employer’s Agent immediately.

C.2.7 **Clarification meeting**

Add the following after the second sentence:

The arrangements for the compulsory site visit/clarification meeting are as stated on the General Tender Information page and in the Responsiveness Criteria (if applicable).

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

Tenderers must sign the attendance list in the name of the tendering entity. Only Certificates of Attendance of Tenderers that attended the compulsory clarification meeting will be signed by the Employer or Employer’s representative, after the compulsory clarification meeting has been completed. Addenda may be issued to and **tenders will be received only from those tendering entities appearing on the attendance list if their Certificate of Attendance was signed by the Employer or Employer’s representative at the compulsory clarification meeting.**

Tender documents will not be made available at the site visit and/or clarification meeting.

C.2.8 **Seek Clarification**

Add the following after the first sentence:

The tenderer warrants that it has:

- a) inspected the Specifications and read and fully understood the Conditions of Contract.

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

The Employer will therefore not be liable for the payment of any extra costs resulting from any claim submitted by the tenderer arising from any alleged ambiguity or uncertainty contained in the tender document.

C.2.11 *Add the following to the clause:*

"In the event of a mistake having been made on the Schedule of Rates, 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."

Correction fluid shall not be used in the Schedule of Rates where prices are calculated to derive 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 **Alternative tender offers**

C.2.12.1 *Add the following to C.2.12.1 at the end of the first sentence:*

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

While it is not necessary to duplicate all parts of the main tender offer, the alternative tender offer shall be supported by the following documents as applicable:

- a) the schedule that compares the alternative(s) offered with the requirements of the issued tender documents
- b) preliminary designs, calculations, drawings and all other pertinent technical information and characteristics must be submitted with the alternative tender offer, in order to enable the Employer to evaluate the efficacy of the alternatives proposed
- c) revised Bills of Quantities, or parts thereof, highlighting the changes made, together with a revised Summary, the total of which has been carried to the Form of Offer
- d) details of any proposed amendments to the Pricing Assumptions

C.2.12.3 *Add the following to C.2.12.1 at the end of the first sentence:*

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

The Employer's costs in confirming the acceptability of the alternative offer will be, *inter alia*, taken into account in considering the alternative offer.

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

In the event that the alternative is accepted, the Contractor shall accept full responsibility that the alternative offer complies in all respects with the Employer's standards and requirements.

C.2.13 **Submitting a tender offer**

Add the following to C.2.13.1 at the end of the first sentence:

- C.2.13.1 Where the tendering entity is a joint venture it is recommended that the standard CIDB Joint Venture Agreement be used.

Add the following to C.2.13.3 at the end of the first sentence:

- C.2.13.3 Each Tenderer is required to return the original completed tender documents, including drawings with all the required information supplied, duly completed in non-erasable ink in all respects **together with one (1) copy of Parts T2, C1 and C2.**

An original Bill of Quantities and Form of Offer and Acceptance (Form C1.1), duly completed and signed by the tenderer, must be returned in respect of the project for which a tender is submitted.

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

"Only authorised signatories may sign the original and all copies of the tender offer where required in terms of C.2.13.3

In the case of a **ONE-PERSON CONCERN** submitting a tender, this shall be clearly stated.

In case of a **COMPANY** submitting a tender, include a copy of a **resolution by its board of directors** authorising a director or other official of the company to sign the documents on behalf of the company.

In the case of a **CLOSE CORPORATION** submitting a tender, include a copy of a **resolution by its members** authorising a member or other official of the corporation to sign the documents on each member's behalf.

In the case of a **PARTNERSHIP** submitting a tender, **all the partners** shall sign the documents, unless one partner or a group of partners has been authorised to sign on behalf of each partner, in which case **proof of such authorisation** shall be included in the Tender.

In the case of a **JOINT VENTURE/CONSORTIUM** submitting a tender, include **a resolution** of each company of the Joint Venture together with a resolution by its members authorising a member of the Joint Venture to sign the documents on behalf of the Joint Venture.

Accept that failure to submit proof of authorisation to sign the tender, shall result in a Tender Offer being regarded as non-responsive."

Add the following to C.2.13.5 at the end of the first sentence:

- 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:

Employer:	Kouga Local Municipality.
Physical address:	16 Woltemade Street, Jeffreys Bay.
Identification details:	Bid Number: 220/2024
	Title of Contract: KWANOMZAMO BULK SANITATION: IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION AND RISING MAIN FROM BUNGALOWS

Sealed tenders with the Tenderer's name and address and the endorsement "**BID NO. 220/2024: KWANOMZAMO BULK SANITATION: IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP**

STATION AND RISING MAIN FROM BUNGALOWS “ on the envelope, must be placed in the appropriate official tender box at the abovementioned address.

Add the following to C.2.13.6:

C.2.13.6 A two-envelope procedure will **not** be followed (C.3.5).

Add the following to C.2.13.9:

C.2.13.9 Telephonic, telegraphic, telex, facsimile, e-mailed or posted tender offers will not be accepted.

Add the following after C.2.13.9:

C.2.13.10 By signing the offer part of C1.1 Form of Offer and Acceptance the tenderer declares that all information provided in the tender submission is true and correct.

C.2.13.11 The Employer shall not formally issue tender documents in electronic format and shall only issue tender documents in hardcopy. An electronic version of the issued tender documents may be made available to the tenderer, upon written request in terms of this clause, subject to the following:

- a) electronic copies of the issued tender documents, or parts thereof, will only be provided to tenderers who have been issued with the tender documents as contemplated in C.1.2 in hardcopy.
- b) The electronic version shall not be regarded as a substitute for the issued tender documents.
- c) The Employer shall not accept tenders submitted in electronic format. Only those tenders that have been completed on the issued hard copy tender document shall be considered, provided that printed Bills of Quantities, in the same format (that is, layout, billed items and quantities) as those issued electronically by the Employer, may be submitted with the tender as stated in C.2.13.2.
- d) Where Addenda have been issued which amend the Bills of Quantities, then the printed Bills of Quantities shall take these into account. The pages of the issued Bills of Quantities should not be removed from the tender document.
- e) The Employer accepts no responsibility or liability arising from any reliance on or use of the electronic version provided in terms of this clause. Tenderers are alerted to the fact that electronic versions of the tender documents may not reflect any notices or addenda that amend the tender document.
- f) Any non-compliance with these provisions, including effecting any unauthorised alterations to the tender documents as contemplated in C.2.11, shall render the tender non-responsive. The Employer reserves the right to take any action against such tenderer allowed in law including, in circumstances where the tender had already been awarded, the right to cancel the contract.
- g) In requesting the electronic version of the tender documents or parts thereof, the tenderer is deemed to have read, understood, and accepted all the above conditions.

C.2.15 **Closing time**

Add the following to C.2.15.1 after the first sentence:

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 **Tender offer validity**

Add the following to C.2.16.1 after the first sentence:

C.2.16.1 The tender offer validity period is **(90 calendar days)**.

C.2.16.2 *Delete the clause and replace with the following:*

Tender offers shall be deemed to remain valid until formal acceptance by the Employer of an offer at any time after the expiry date of the original tender offer validity period, unless the Employer is notified in writing of anything to the contrary, including any further conditions, by the tenderer.

Any further conditions introduced by the tenderer will be considered at the sole discretion of the Employer.

C.2.17 **Clarification of tender offer after submission**

Add the following to C.2.17 at the end of the third sentence:

A tender will be rejected as non-responsive if the tenderer fails to provide any clarification or supporting documents requested by the Employer within the time for submission stated in the Employer's written request for such clarification or documents.

C.2.18 **Provide other material**

Delete the following word in C.2.18.1:

C.2.18.1 notarized

Add the following to C.2.18.1 at the end of the first paragraph:

Provide, on written request by the Employer, where the transaction value (tendered amount) inclusive of VAT **exceeds R 10 million:**

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

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

Add the following after C.2.18.2:

C.2.18.3 Tenderers shall fully cooperate with the Employer's external service provider appointed to perform a due diligence review and risk assessment upon receipt of such written instruction from the Employer.

Failure to fully cooperate could result in a tender being declared as non-responsive.

C.2.18.4 **Compliance with Occupational Health and Safety Act, 85 of 1993**

Tenderers are to note the requirements of the Occupational Health and Safety Act, 85 of 1993 and the Construction Regulations, 2014 issued in terms of Section 43 of the Act. The Tenderer shall be deemed to have read and fully understood the requirements of the above Act and Regulations and to have allowed for all costs in compliance therewith.

In this regard the Tenderer shall submit with his tender or upon request, appended to Schedule 16: Health and Safety Plan in T2.2: Returnable Schedules, a draft Health and Safety Plan in respect of the Works in sufficient detail to demonstrate the necessary competencies and resources to perform the construction work all in accordance with the Act, Regulations and Health and Safety Specification in Part C3.7 Health and Safety Specifications for the works detailed in Part C3 Scope of Work.

C.2.20 The successful Tenderer will be required to submit a Performance Guarantee in the prescribed format from an approved insurer or financial institution prior to the commencement of work on this contract.

C.2.23 **Certificates**

Add the following after the first sentence:

The tenderer is required to submit the following:

C.2.23.1 **Evidence of tax compliance**

Tenderers shall be registered with the South African Revenue Service (SARS) and their tax affairs must be in order and they must be tax compliant. In this regard, it is the responsibility of the Tenderer to submit evidence in the form of a valid Tax Clearance Certificate issued by SARS to the Employer at the Supplier Management Unit located within the Supplier Management / Registration Office, 16 Woltemade Street, Jeffreys Bay, or included with this tender. The tenderer must also provide its Tax Compliance Status PIN number on the **Compulsory Enterprise Questionnaire**

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

Tenderers are to note that the Employer will not award a contract to a Tenderer whose tax matters are not in order.

C.2.23.2 **Broad-Based Black Economic Empowerment Status Level Documentation**

In order to qualify for preference points, it is the responsibility of the tenderer to submit documentary proof, either as certificates, sworn affidavits or any other requirement prescribed in terms of the B-BBEE Act, of its B-BBEE status level of contribution in accordance with the applicable Codes of good practise as issued by the Department of Trade and Industry, to the Kouga Local Municipality at the Supplier Management Unit located within the Supplier Management / Registration Office, 16 Woltemade Street, Jeffreys Bay or included with the tender submission.

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

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

The applicable code for this tender is the **Amended Codes for Measuring Broad-Based Black Economic Empowerment in the Construction Sector)** unless in possession of a valid certificate in terms of the transitional arrangements contained in these Codes.

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

Add the follow new clause after C.2.23.2

C.2.24 **Proposed Deviations and Qualifications**

Where the tenderer cannot tender in all respects in accordance with the provisions contained in the tender documents, all deviations therefrom shall be clearly and separately listed in the schedule titled **Proposed Deviations and Qualifications by Tenderer** in T2.2 Returnable Schedules, or in a tenderer's covering letter expressly referenced in this schedule.

The tenderer accepts that the Employer will examine such deviations in terms of clause C.3.8.2 and shall not be bound to accept any such deviations or qualifications.

It must be clearly stated by the tenderer whether the sum tendered in the Tender Offer includes for all such deviations or qualifications listed or referred to in the schedule titled **Proposed Deviations and Qualifications by Tenderer** or not.

C.2.25 **Employment Contracts**

Accept that successful tenderers shall be obliged to conclude employment contracts with their employees failing which the Municipality reserves the right to terminate the awarded contract.

C.2.26 **Remuneration**

Accept that successful tenderers shall pay their workers in accordance with SAFCEC rates or Civil Engineering Bargain Council.

C.2.27 **Scope of Mandatory Subcontract Works**

The Kouga Local Municipality will enforce CIDB Contractor grading designation of 4CE to subcontract 30% work, that excludes the Main Contractor's Preliminary and General Costs, VAT and contingencies to

specified entities such as EE's, the rand value which is based on the goods, services and work undertaken by the specified entities.

C.3 The Employer's undertakings

C.3.2 Issue Addenda

Delete the words "three days" from the first sentence and replace with:

"Five working days where possible"

Add the following to C.3.2 at the end of the paragraph:

Notwithstanding any requests for confirmation of receipt of Addenda issued, the tenderer shall be deemed to have received such addenda if the employer can show proof of transmission thereof (or a notice in respect thereof) via electronic mail, facsimile, or registered post.

C.3.4 Opening of tender submissions

Add the following to C.3.4.2 at the end of the paragraph:

The location for opening of the tender offers is the Tender Submission Office at the address as stated on the General Tender Information page.

C.3.8 Test for responsiveness

C.3.8.2 *Delete par C.3.8.2 (c)*

Replace the final sentence of C.3.8.2 with the following:

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

Add the following after clause C.3.8.2

C.3.8.3 The Employer reserves the right to accept a tender offer which does not, in the Employer's opinion, materially and/or substantially deviate from the terms, conditions, and specifications of the tender documents.

C.3.9 Arithmetical errors, omissions, and discrepancies

Add the following after clause C.3.9.2

C.3.9.3 In the event of tendered rates or lump sums being declared by the Employer to be unacceptable to it because they are not priced, either excessively low or high, or not in proper balance with other rates or lump sums, the Tenderer may be required to produce evidence and advance arguments in support of the tendered rates or lump sums objected to. If, after submission of such evidence and any further evidence requested, the Employer is still not satisfied with the tendered rates or lump sums objected to, it may request the tenderer to amend these rates and lump sums along the lines indicated by it.

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

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

C.3.10 Clarification of a tender offer

Delete the clause and replace with the following:

C.3.10 The Employer may, after the closing date, request additional information or clarification from tenderer, in writing on any matter affecting the evaluation of the tender offer or that could give rise to ambiguity in a contract arising from the tender offer.

C.3.11 B-BBEE specific goals

Up to 100 minus **W₁** tender evaluation points will be awarded to tenderers on the basis of the data supplied in Part 2: Returnable Documents of the Tender Portion.

Tenders shall be evaluated in terms of the Preferential Procurement Regulations 2017. The value of the tender is estimated not to exceed R50 000 000-00 and therefore the 80/20 system shall be applicable. The financial offer will be scored using Formula 2 (Option 1) where the value of W1 is 80 points. Up to a maximum of 20 points for this tender will be awarded in terms of the tenderers B-BBEE status level of contribution.

Preference points shall be scored in accordance with Regulation 6 (2) or 7 (2) of the Preferential Procurement Regulations, 2017 therefore preference points will be awarded to a bidder for attaining the B-BBEE status level of contribution in accordance with the table below, but **points can only be obtained by submitting a certified B-BBEE Certificate**:

The value of this bid is estimated not to exceed R50 000 000.00 and therefore the (80/20) system shall be applicable

B-BBEE Status Level of Contributor	Number of Points for Preference (80/20)	Number of Points for Preference (90/10)
1	10	5
2	8	4
3	6	3
4	4	2
5	3	1
6	2	1
7	2	1
8	2	1
Non-compliant contributor	0	0

A trust, consortium or joint venture will qualify for points for their B-BBEE status level as a Legal entity, provided that the entity submits their B-BBEE status level certificate.

A trust, consortium or joint venture will qualify for points for their B-BBEE status level as an unincorporated entity, provided that the entity submits their consolidated B-BBEE scorecard as if they were a group structure and that such a consolidated B-BBEE scorecard is prepared for every separate tender.

No	Specific Goals Categories	Max points allocation	Evaluation Indicators
1	B-BBE Status Level Contributor	10	As for B-BBEE points allocation table above.
2	The promotion of enterprises located in a specific province for work to be done or services to be rendered in that province.	10	10 Points= Located within the boundaries of the Kouga Local Municipality 6 Points- Located within the boundaries of Sarah Baartman District Municipality 4 Points- Located within the boundaries of the Eastern Cape 1 Point- Outside of the boundaries of the Eastern Cape
Bidders MUST submit valid B-BBEE sworn affidavit/ certificate AND Latest Municipal Billing Clearance Certificate/ Copy of Municipal Account / Rental Documentation in the name of the bidding entity, to claim points for specific goals. Virtual offices will not be accepted.			

Annex C
(normative)
Standard Conditions of Tender

Standard Conditions of Tender

C.1 General

C.1.1 Actions

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

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

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

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

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

C.1.2 Tender Documents

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

C.1.3 Interpretation

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

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

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

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

- i) someone in a position of trust has competing professional or personal interests which make it difficult to fulfil his or her duties impartially;
- ii) an individual or tenderer is in a position to exploit a professional or official capacity in some way for their personal or corporate benefit; or
- iii) incompatibility or contradictory interests exist between an employee and the tenderer who employs that employee.

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

- c) **corrupt practice** means the offering, giving, receiving or soliciting of anything of value to influence the action of the employer or his staff or agents in the tender process;
- d) **fraudulent practice** means the misrepresentation of the facts in order to influence the tender process or the award of a contract arising from a tender offer to the detriment of the employer, including collusive practices intended to establish prices at artificial levels;

C.1.4 Communication and employer's agent

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

C.1.5 Cancellation and Re-Invitation of Tenders

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

- a) due to changed circumstances, there is no longer a need for the Employer's Agenting 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 C.3.11 and C.3.13 after tenderers have been requested to submit their best and final offer.

C.1.6.3 Proposal procedure using the two stage-system

C.1.6.3.1 Option 1

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

C.1.6.3.2 Option 2

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

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

C.2 Tenderer's obligations

C.2.1 Eligibility

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

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

C.2.2 Cost of tendering

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

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

C.2.3 Check documents

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

C.2.4 Confidentiality and copyright of documents

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

C.2.5 Reference documents

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

C.2.6 Acknowledge addenda

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

C.2.7 Clarification meeting

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

C.2.8 Seek clarification

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

C.2.9 Insurance

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

C.2.10 Pricing the tender offer

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

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

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

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

C.2.11 Alterations to documents

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

C.2.12 Alternative tender offers

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

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

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

C.2.13 Submitting a tender offer

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

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

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

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

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

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

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

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

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

C.2.14 Information and data to be completed in all respects

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

C.2.15 Closing time

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

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

C.2.16 Tender offer validity

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

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

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

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

C.2.17 Clarification of tender offer after submission

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

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

C.2.18 Provide other material

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

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

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

C.2.19 Inspections, tests and analysis

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

C.2.20 Submit securities, bonds and policies

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

C.2.21 Check final draft

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

C.2.22 Return of other tender documents

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

C.2.23 Certificates

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

C.3 The employer's undertakings

C.3.1 Respond to requests from the tenderer

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

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

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

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

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

C.3.2 Issue Addenda

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

C.3.3 Return late tender offers

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

C.3.4 Opening of tender submissions

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

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

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

C.3.5 Two-envelope system

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

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

C.3.6 Non-disclosure

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

C.3.7 Grounds for rejection and disqualification

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

C.3.8 Test for responsiveness

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

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

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

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

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

C.3.9 Arithmetical errors, omissions, and discrepancies

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

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

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

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

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

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

C.3.10 Clarification of a tender offer

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

C.3.11 Evaluation of tender offers

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

Conditions of tender are by definition the document that establishes a tenderer's obligations in submitting a tender and the employer's 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

Fair

Qualitative interpretation of goal

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.

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 work to evaluate each responsive tender offer using the tender evaluation methods and associated evaluation criteria and weightings that are specified in the tender data.

C.3.12 Insurance provided by the employer

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

C.3.13 Acceptance of tender offer

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

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

C.3.14 Prepare contract documents

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

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

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

C.3.15 Complete adjudicator's contract

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

C.3.16 Registration of the award

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

C.3.17 Provide copies of the contracts

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

C.3.18 Provide written reasons for actions taken

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

Annexure G
(normative)

Alpha-numerics associated with the Contractor Grading Designations

Table G1: Contractor grading designations and associated parameters, as per Government Notice 357 of 2019 [Notice No.42561], dated 23 May 2019.

Contractor Grading Designation	Tender Value Range designation	Maximum value of contract that a contractor is considered capable of performing (R)
1 (class of construction works)	1	500 000
2 (class of construction works)	2	1 000 000
3 (class of construction works)	3	3 000 000
4 (class of construction works)	4	6 000 000
5 (class of construction works)	5	10 500 000
6 (class of construction works)	6	20 000 000
7 (class of construction works)	7	60 000 000
8 (class of construction works)	8	200 000 000
9 (class of construction works)	9	No Limit

THE TENDER

PART 2 (OF 2): RETURNABLE DOCUMENTS

T2.1 List of Returnable Documents

T2.2 Returnable Documents

T2.1: LIST OF RETURNABLE DOCUMENTS

The original completed tender document (refer clauses 3.2 and 4.13 of the Tender Data), excluding Drawings, shall be returned with all the required information supplied, duly completed in non-erasable ink in all aspects.

The following documents and schedules are to be completed and returned, as they constitute the tender. Whilst many of the returnables are required for the purpose of evaluating the tenders, some will form part of the subsequent contract, as they form the basis of the tender offer. For this reason, it is very **important that tenderers submit, return, complete and sign all the information, documents and schedules, as requested.**

1. RETURNABLE SCHEDULES REQUIRED FOR TENDER EVALUATION PURPOSES

- 1A Status of Concern Submitting Tender
- 1B Authority for Signatory
- 1C Certificate of Attendance at Clarification Meeting
- 1D Declaration of Interest in Tender of Persons in Service of the State
- 1E Compulsory Enterprise Questionnaire
- 1F Declaration of Tenderer's Past Supply Chain Management Practises
- 1G Form MBD6: Preference Points Claim Form in Terms of the Preferential Procurement Regulations 2022
- 1H Schedule of Work Satisfactorily carried out by the Tenderer for Private Clients or Organs of State
- 1I Schedule of Contracts Awarded to Tenderer by Organs of State
- 1J Company Information Required for Tenders greater than R 10 million
- 1K Certificate of Independent Bid Determination
- 1L Proposed Amendments
- 1M Proof or Registration and good standing with the Construction Industry Development Board (CIDB)
- 1N Proof of Registration with the Supplier Database
- 1O Proof of registration and good standing with the Civil Engineering Bargaining Council
- 1P **Available personnel for this project:**
Details of Experience and Qualifications for Contracts Manager, Construction Manager, Pipe Laying Foreman, Reinforced Concrete and Building Foreman, and OH&S Officer
- 1Q Preliminary Project Program and cashflow

2. RETURNABLE DOCUMENTS REQUIRED FOR TENDER EVALUATION PURPOSES

- 2A Original Valid Tax Clearance Certificate/ Tax Pin
- 2B Municipal Billing Clearance Certificate
- 2C B-BBEE Status Level Certificates / Consolidated Scorecard

3. RETURNABLE SCHEDULES THAT WILL BE INCORPORATED INTO THE CONTRACT

- 3A Record of Addenda to Tender Documents
- 3B Personnel Schedule
- 3C Declaration Concerning Fulfilment of the Construction Regulations
- 3D Schedule of Construction Equipment
- 3E Schedule of Proposed Subcontractors

4. OTHER SCHEDULES AND DOCUMENTS THAT WILL BE INCORPORATED INTO THE CONTRACT

- C1.1 Form of Offer and Acceptance
- C1.2 Contract Data
- C2.2 Bill of Quantities

1A: STATUS OF CONCERN SUBMITTING TENDER

1. General

State whether the tenderer is a company, a closed corporation, a partnership, a sole practitioner or a joint venture:

(Mark the appropriate option below)

Public Company

Private Company

Closed Corporation

Partnership

Sole Proprietary

Joint Venture

Co-operative

2. Information to be provided (Attached to the tender)

If the Tendering Entity is a:		Documentation to be submitted with the tender
1	Closed Corporation, incorporated under the Close Corporation Act, 1984, Act 69 of 1984	CIPRO CK1 or CK2 (Copies of the founding statement) and list of members
2	Private Company incorporated with share capital, under the companies Act, 1973, Act 61 of 1973 (Including Companies incorporated under Art 53 (b))	Copies of: a) CIPRO CM 1 – Certificate of Incorporation b) CIPRO CM 29 – Contents of Register of Directors, Auditors and Officers c) CIPRO CM 39 – Notice of Change of Directors for private companies d) Shareholders Certificates of all Members of the Company.
3	Private Company incorporated with share capital, under the companies Act, 1973, Act 61 of 1973 in which any, or all, shares are held by another Closed Corporation or company with, or without, share capital	Copies of documents referred to in 1 and/or 2 above in respect of all such Closed Corporations and/or Companies.
4	Public Company incorporated with share capital, under the companies Act, 1973, Act 61 of 1973 (Including Companies incorporated under Art 21)	A signed statement by the Company's Secretary confirming that the Company is a Public Company. Copy of CM 29
5	Sole Proprietary or a Partnership	Certified Copy of the Identity Document of: a) Such Sole Proprietary, or b) Each of the Partners in the Partnership c) Copy of the Partnership agreement
6	Co-operative	CIPRO CR 2 – Copies of Company registration document. (The percentage of work to be done by each partner

If the Tendering Entity is a:		Documentation to be submitted with the tender
		must clearly be indicated on Form RDB 1 (or RDB 2 as applicable) of the tender document: MBD 6 Preference Points Claim Form in terms of the Preferential Procurement Regulations 2022).
7	Joint Venture	All the documents (as described above) as applicable to each partner in the JV as well as a copy of the Joint Venture agreement. (The percentage of work to be done by each partner of the joint venture must clearly be indicated in the Joint Venture Agreement).

Note:

- (i) If the shares are held in trust provide a copy of the Deed of Trust (only the front page and pages listing the trustees and beneficiaries are required) as well as the Letter of Authority as issued by the Master of the Supreme Court, wherein trustees have been duly appointed and authorised, must be provided.
- (ii) Include a copy of the Certificate of Change of Name (CM 9) if applicable. No. CM 9: name change certificate will be accepted as proof alone, for registration.

3. Bidders Must Register for VAT or be Registered for VAT Purposes in Terms of the Value-Added Tax Act, (Act No. 89 of 1991)

(Make an X in the appropriate space below)

Yes

☐

No

☐

REGISTRATION NO:

1B: AUTHORITY FOR SIGNATORY

Indicate the status of the tenderer by ticking the appropriate box hereunder. The tenderer must complete the certificate set out below for the relevant category.

A Company	B Partnership	C Joint Venture / Consortium	D Sole Proprietor	E Close Corporation

A Certificate for Company

I,, chairperson of the board of directors of
, hereby confirm that by resolution of the board
 (copy attached) taken on 20....., * Mr / Ms
 acting in the capacity of
, and who will sign as
 follows: be, and is hereby authorized to sign the
 tender and all documents and correspondences in connection with this tender as well as any contract resulting
 from it on behalf of the company.

NAME	CAPACITY	SIGNATURE

Note:

* Delete which is not applicable.

This resolution must be signed by all the Directors / Members / Partners of the Bidding Enterprise.

Should the number of Directors / Members / Partners exceed the space available above, additional names and signatures must be supplied on a separate page.

As witnesses:

1. Chairman:

2. Date:

B Certificate for Partnership

We, the undersigned, being the key partners in the business trading as, hereby authorize * Mr / Ms, acting in the capacity of, and who will sign as follows: be, and is hereby authorized to sign the tender and all documents and correspondences in connection with this tender as well as any contract resulting from it on behalf of the company.

NAME	ADDRESS	SIGNATURE	DATE

Note:

* Delete which is not applicable.

This resolution must be signed by all the Directors / Members / Partners of the Bidding Enterprise.

Should the number of Directors / Members / Partners exceed the space available above, additional names and signatures must be supplied on a separate page.

As witnesses:

.....

Signature:

.....

Date:

C Certificate for Joint Venture or Consortia

We, the undersigned, are submitting this tender offer in a * Joint Venture / Consortium and hereby authorise * Mr / Ms, acting in the capacity of lead partner, and who will sign as follows: be, and is hereby authorized to sign the tender and all documents and correspondences in connection with this tender as well as any contract resulting from it on behalf of the company.

This authorisation is evidenced by the attached power of attorney signed by legally authorised signatories of all partners to the * Joint Venture / Consortium.

NAME OF FIRM	ADDRESS	% OF CONTRACT VALUE	AUTHORISING SIGNATURE, NAME AND CAPACITY
(Lead Partner):			

Note:

* Delete which is not applicable.

This resolution must be signed by all the Members / Partners of the Bidding Enterprise.

Should the number of Members / Partners exceed the space available above, additional names and signatures must be supplied on a separate page.

As witnesses:

.....

Signature:

.....

Date:

D Certificate for Sole Proprietor

I, , hereby confirm that I am the
sole owner of the business trading as

As witnesses:

- 1.
- 2.

Signature:
Date:

E. Certificate for Close Corporation

We, the undersigned, being the key members in the business trading as

hereby authorize * Mr / Mrs, acting in the capacity of, to sign all documents in connection with this tender and any contract resulting from it on our behalf.

NAME	ADDRESS	SIGNATURE	DATE

Note:

* Delete which is not applicable.

This resolution must be signed by all the Directors / Members / Partners of the Bidding Enterprise.

Should the number of Directors / Members / Partners exceed the space available above, additional names and signatures must be supplied on a separate page.

As witnesses:

1.

Chairman:

2.

Date:

1C: CERTIFICATE OF ATTENDANCE AT CLARIFICATION MEETING
--

This is to certify that

..... (Tenderer)

of

.....
..... (address)

was represented by the person(s) named below at the compulsory Clarification Meeting and Site Visit held for all tenderers
at (location) on
..... (date), starting at (time).

We acknowledge that the purpose of the meeting was to acquaint ourselves with the site of the works and / or matters incidental to doing the work specified in the tender documents in order for us to take account of everything necessary when compiling our rates and prices included in the tender.

Particulars of person(s) attending the meeting on behalf of **the tenderer**:

Name Signature

Capacity

Name Signature

Capacity

Attendance of the above persons at the meeting is confirmed by the **Employer's Representative**, namely:

Name Signature

Capacity Date & Time

1D: DECLARATION OF INTEREST IN TENDER OF PERSONS IN SERVICE OF THE STATE

1. Where the tenderer is a natural person, state / declare whether the tenderer or an employee is in the service of the state, or has been in the service of the state during the past twelve months.

YES / NO (INDICATE)

If so, state particulars:

.....

If so and where applicable, state the date of resignation:

.....

2. Where the tenderer is not a natural person, state / declare whether any of its directors, managers, principal shareholders or stakeholders is in the service of the state, or have been in the service of the state during the past twelve months.

YES / NO (INDICATE)

If so, state particulars:

.....

3. State / declare whether a spouse, child or parent of the tenderer or any of its directors, managers, shareholders or stakeholders referred to in subparagraph 2 is in the service of the state, or have been in the service of the state during the past twelve months.

YES / NO (INDICATE)

If so, state particulars:

.....

4. State / declare whether the tenderer or any of its directors, managers, shareholders, stakeholders or employees referred to in subparagraph 2 is a person who is an advisor or consultant contracted with the municipality or municipal entity.

YES / NO (INDICATE)

If so, state particulars:

.....

5. State / declare whether the tenderer or any of its directors, managers, shareholders or stakeholders referred to in subparagraph 2 is involved in another entity for this particular tender.

YES / NO (INDICATE)

If so, state particulars:

.....

I, the undersigned, warrant that I am duly authorised to do so on behalf of the enterprise and confirm that the contents of this schedule are, to my personal knowledge and best belief, both true and correct.

Signed

Date

Name

Position

Tenderer

1E: 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: PARTICULARS OF SOLE PROPRIETORS AND PARTNERS IN PARTNERSHIPS

Name*	Identity Number*	Personal Income Tax Number*

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

SECTION 5: PARTICULARS OF COMPANIES AND CLOSE CORPORATIONS

Company registration number

Close corporation number

Tax reference number

SECTION 6: RECORD OF SERVICE OF THE STATE

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

- | | |
|--|---|
| ☐ a member of any municipal council
☐ a member of any provincial legislature
☐ a member of the National Assembly or the National Council of Province
☐ a member of the board of directors of any municipal entity
☐ an official of any municipality or municipal entity | ☐ an employee of Parliament or a provincial legislature
☐ a member of an accounting authority of any national or provincial public entity
☐ an employee of any provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act 1 of 1999) |
|--|---|

If any of the above boxes are marked, disclose the following: (insert separate page if necessary)

Name of Sole Proprietor, Partner, Director, Manager, Principal Shareholder or Stakeholder	Name of Institution, Public Office, Board or Organ of State and Position held	Status of Service (tick appropriate column)	
		Current	Within last 12 months

*Insert separate page if necessary

SECTION 7: RECORD OF SPOUSES, CHILDREN AND PARENTS IN THE SERVICE OF THE STATE

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

- | | |
|--|---|
| ☐ a member of any municipal council | ☐ an employee of Parliament or a provincial legislature |
| ☐ a member of any provincial legislature | ☐ a member of an accounting authority of any national or provincial public entity |
| ☐ a member of the National Assembly or the National Council of Province | ☐ an employee of any provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act 1 of 1999) |
| ☐ a member of the board of directors of any municipal entity | |
| ☐ an official of any municipality or municipal entity | |

Name of Spouse, Child or Parent	Name of Institution, Public Office, Board or Organ of State and Position held	Status of Service (tick appropriate column)	
		Current	Within last 12 months

*Insert separate page if necessary

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

- (i) authorizes the Employer to obtain a tax clearance certificate from the South African Revenue Services that my / our tax matters are in order;
- (ii) confirms that 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;
- (v) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of my belief both true and correct.

I, the undersigned, warrant that I am duly authorised to do so on behalf of the enterprise and confirm that the contents of this schedule are, to my personal knowledge and best belief, both true and correct.

Signed

Date

Name

Position

Enterprise name

1F: DECLARATION OF TENDERER'S PAST SUPPLY CHAIN MANAGEMENT PRACTISES

1. This form serves as a declaration to be used by the Employer in ensuring that when goods and services are being procured, all reasonable steps are taken to combat the abuse of the supply chain management system.
2. The tender of any Tenderer may be rejected if that Tenderer, or any of its directors have:
 - a) abused the Municipality's / Municipal entity's supply chain management system or been guilty of any improper conduct in relation to such system;
 - b) been convicted for fraud or corruption during the past five years;
 - c) wilfully neglected, reneged on or failed to comply with any government, Municipal or other public sector contract during the past five years; or
 - d) been listed in the Register for Tender Defaulters in terms of Section 29 of the Prevention and Combating of Corrupt Activities Act, 2004 (Act 12 of 2004).
3. In order to give effect to the above, this form and the questionnaire must be completed in full and signed. Failure to comply will result in the tender being declared non-responsive.

ITEM	QUESTION	RESPONSE	
4.1	Is the Tenderer or any of its directors listed on the National Treasurer's database as a company or persons prohibited from doing business with the public sector? (Companies for persons who are listed on this database were informed in writing of this restriction by the National Treasury after the <i>audi alteram partem</i> rule was applied) The Database of Restricted Suppliers now resides on the National Treasury's website(www.treasury.gov.za)	Yes	No
	If so, furnish particulars:		
4.2	Is the Tenderer or any of its directors listed on the Register for Tender Defaulters in terms of Section 29 of the Prevention and Combating of Corrupt Activities Act, 2004 (Act 12 of 2004)? (To access this Register enter the National Treasury's website, www.treasury.gov.za, click on the icon "Register for Tender Defaulters" or submit your written request for a hard copy of the Register to facsimile number 012-326-5445)	Yes	No
	If so, furnish particulars:		
4.3	Was the Tenderer or any of its directors convicted by a court of law (including a court of law outside the Republic of South Africa) for fraud or corruption during the past five years?	Yes	No

ITEM	QUESTION	RESPONSE	
	If so, furnish particulars:		
4.4	Was any contract between the Tenderer and the Municipality / Municipal entity or any other organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes	No
	If so, furnish particulars:		
4.5	Does the tenderer or any of its directors owe any Municipal rates and taxes or Municipal charges to the Municipality/Municipal entity, or to any other Municipality/Municipal entity, that is in arrears for more than three months?	Yes	No
	If so, furnish particulars:		

I, the undersigned, warrant that I am duly authorised to do so on behalf of the enterprise and confirm that the contents of this schedule are, to my personal knowledge and best belief, both true and correct.

Signed

Date

Name

Position

Tenderer

1G: FORM MDB 6.1 – PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2022
--

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

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

1. GENERAL CONDITIONS

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

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

1.2 To be completed by the organ of state

(delete whichever is not applicable for this tender).

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

B-BBEE Status Level of Contributor	Number of Points for Preference (80/20)
1	10
2	8
3	6
4	4
5	3
6	2
7	2
8	2
Non-compliant contributor	0

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

SPECIFIC GOALS

No	Specific Goals Categories	Max points allocation	Evaluation Indicators
1	B-BBE Status Level Contributor	10	As for B-BBEE points allocation table above.
2	The promotion of enterprises located in a specific province for work to be done or services to be rendered in that province.	10	10 Points= Located within the boundaries of the Kouga Local Municipality 6 Points- Located within the boundaries of Sarah Baartman District Municipality 4 Points- Located within the boundaries of the Eastern Cape 1 Point- Outside of the boundaries of the Eastern Cape
Bidders MUST submit valid B-BBEE sworn affidavit/ certificate AND Latest Municipal Billing Clearance Certificate/ Copy of Municipal Account / Rental Documentation in the name of the bidding entity, to claim points for specific goals. Virtual offices will not be accepted.			

- 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:

$$\begin{array}{ccc} \mathbf{80/20} & \mathbf{or} & \mathbf{90/10} \\ \mathbf{Ps = 80 \left(1 - \frac{Pt - P_{min}}{P_{min}} \right)} & \mathbf{or} & \mathbf{Ps = 90 \left(1 - \frac{Pt - P_{min}}{P_{min}} \right)} \end{array}$$

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:

$$\begin{array}{ccc} \mathbf{80/20} & \mathbf{or} & \mathbf{90/10} \\ \mathbf{Ps = 80 \left(1 + \frac{Pt - P_{max}}{P_{max}} \right)} & \mathbf{or} & \mathbf{Ps = 90 \left(1 + \frac{Pt - P_{max}}{P_{max}} \right)} \end{array}$$

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)

5. DECLARATION WITH REGARD TO COMPANY/FIRM

5.1. Name of company/firm.....

5.2. Company registration number:

5.3. 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]

5.4. 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 TENDERERS(S)	
SURNAME AND NAME:	
DATE:	
ADDRESS	

1H: SCHEDULE OF WORK SATISFACTORILY CARRIED OUT BY THE TENDERER FOR PRIVATE CLIENTS OR ORGANS OF STATE

(Organs of State include any Local, Provincial or National Government Authority)

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

Employer, Contact Person and Telephone Number	Description of Contract	Value of Work Inclusive of VAT (Rand)	Date Completed (State current if not yet complete)

Please note that the above needs to be supported by:

- a) Copy of Appointment Letter
- b) Copy of Completion Certificate
- c) Contact details of the Employer or Employer's Agent. If the Reference cannot be contacted, to verify the information supplied, the Contract will not be considered.

I, the undersigned, warrant that I am duly authorised to do so on behalf of the enterprise and confirm that the contents of this schedule are, to my personal knowledge and best belief, both true and correct.

Signed

Date

Name

Position

Tenderer

11: SCHEDULE OF CONTRACTS AWARDED TO THE TENDERER BY ORGANS OF THE STATE
(Organs of State include any Local, Provincial or National Government Authority)

In terms of Clause 21(d)(iii) of the Supply Chain Management Policy, the tenderer shall list hereunder, particulars of contracts awarded to him by any Organ of State, during the past 5 years. **Any material non-compliance or dispute concerning the execution of any of these contracts must be mentioned.**

Include only those contracts where the tenderer identified in the signature block below was directly contracted by the Employer. Tenderers must not include services provided in terms of a sub-contract agreement. Where contracts were awarded in the name of a joint venture and the tenderer formed part of that joint venture, indicate in the column entitled "Title of the contract for the service" that the contract was in joint venture and provide the name of the joint venture that contracted with the employer. In the column for the value of the contract for the service, record the value of the portion of the contract performed (or to be performed) by the tender.

Organ of state, i.e. national or provincial department, public entity, municipality or municipal entity	Title of contract for the service	Value of Work Inclusive of VAT (Rand)	Date Completed (State current if not yet complete)

Any material non-compliance or dispute concerning the execution of any of these contracts?	Yes	No
If so, furnish particulars:		

Please note that the above needs to be supported by:

- d) Copy of Appointment Letter
- e) Copy of Completion Certificate
- f) Contact details of the Employer or Employer's Agent. If the Reference cannot be contacted, to verify the information supplied, the Contract will not be considered.

I, the undersigned, warrant that I am duly authorised to do so on behalf of the enterprise and confirm that the contents of this schedule are, to my personal knowledge and best belief, both true and correct.

Signed

Date

Name

Position

Tenderer

1J: COMPANY INFORMATION REQUIRED FOR TENDERS GREATER THAN R 10 MILLION

1. Is the tenderer is required by law to prepare audited annual financial statements? YES / NO

2. If so, provide audited annual financial statements:

- for the past three years; or
- since their establishment if established during the past three years.

Indicate whether these have been included in the tender. YES / NO

3. If answer for Question No.1 is NO, does the tenderer have annual financial statements? YES / NO

4. If so, provide audited annual financial statements:

- for the past three years; or
- since their establishment if established during the past three years.

Indicate whether the annual financial statements have been included in the tender. YES / NO

5. If answer for Question No.1 is NO, the tenderer shall attach to this form a letter from the tenderer's bank; in which the bank declares how the tenderer conducts its account. The contents of the bank's letter must state the credit rating that it accords to the tenderer for the business envisaged by this tender. The minimum acceptable credit rating applicable to tenderers for this tender is a C credit rating. The value of the bank rating must be calculated and checked with R2.5 million. Failure to provide the required letter with the tender submission may render the tenderer's offer unresponsive in terms of Clause 5.8 of the tender condition.

Indicate whether a credit rating letter from the bank has been included in the tender. YES / NO

6. Does the tenderer have any undisputed commitments for Municipal services towards a municipality or other service provider in respect of which payment is overdue for more than 30 days?

YES / NO

If so, state particulars:

.....

.....

.....

7. Has any contracts been awarded to the tenderer by an organ of state during the past five years?

YES / NO

If so, state particulars:

.....

.....

.....

8. Has there been any material non-compliance or dispute concerning the execution of such contract?

YES / NO

If so, state particulars:

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

9. Is any portion of the goods or services expected to be sourced out from outside the Republic?

YES / NO

If so, state what portion and whether any portion of payment from the Municipality is expected to be transferred out of the Republic.

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

I, the undersigned, warrant that I am duly authorised to do so on behalf of the enterprise and confirm that the contents of this schedule are, to my personal knowledge and best belief, both true and correct.

Signed

Date

Name

Position

Tenderer

1K: CERTIFICATE OF INDEPENDENT BID DETERMINATION

I, the undersigned, in submitting the accompanying bid:

.....
(Bid Number and Description)

in response to the invitation for the bid made by:

.....
(Name of Municipality / Municipal Entity)

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

I certify, on behalf of that:
(Name of Bidder)

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

*** 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.

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

Signed

Date

Name

Position

Tenderer

1L: PROPOSED AMENDMENTS

The Tenderer should record any deviations or qualifications he may wish to make to the tender documents in this Returnable Schedule. Alternatively, a tenderer may state such deviations and qualifications in **a covering letter to his tender and reference such letter in this schedule.**

The Tenderer's attention is drawn to Clause 3.8 of the Standard Conditions of Tender referenced in the Tender Data regarding the Employer's handling of material deviations and qualifications.

Page Number	Clause / Item	Proposal

I, the undersigned, warrant that I am duly authorised to do so on behalf of the enterprise and confirm that the contents of this schedule are, to my personal knowledge and best belief, both true and correct.

Signed

Date

Name

Position

Tenderer

1M: PROOF OF REGISTRATION WITH THE CONSTRUCTION INDUSTRY DEVELOPMENT BOARD

Tenderers must attach to this page, proof of registration and good standing with the CIDB. (In the case of Joint Ventures, proof must be provided for each partner).

1N: PROOF OF REGISTRATION WITH THE CENTRAL SUPPLIER DATABASE (CSD)

All existing and prospective service providers/creditors to the Kouga Municipality's supplier database should note that registration with the electronic Central Suppliers Database (CSD www.csd.gov.za for self-registering), developed by National Treasury, is a requirement.

Prospective tenderers are to attach the ***Certificate of Registration with CSD*** to this page.

10: DECLARATION IN RESPECT OF COMPLIANCE WITH LABOUR LEGISLATION

Only those tenders submitted by tenderers who are in good standing with the Bargaining Council for the Civil Engineering Industry (BCCEI) at the time of the tender award will be declared responsive. **Tenderers must attach such proof of good standing with the Civil Engineering Bargaining Council to this schedule.**

1P: DETAILS OF EXPERIENCE AND QUALIFICATIONS FOR CONTRACTS MANAGER, CONSTRUCTION MANAGER (SITE AGENT), GENERAL FOREMAN AND OH&S AGENT
--

Tenderers shall set out in the Schedules hereunder details of the Experience and Qualifications for the **Contract Manager**, the **Construction Manager (Site Agent)**, **Pipe Laying Foreman**, **Reinforced Concrete and Building Works Foreman**, and the **OHS Safety Officer Experience** in work of a similar nature to that for which their Tender is submitted.

The tenderer is reminded that the information provided with this Schedule shall be used in terms of Clauses C.2.1.4.3 in Part T.1.2 Tender Data to confirm the tendering entity's responsiveness of the Tender submitted. The tenderer is therefore required to supply detailed information relating to previous projects, and projects to date, to clearly illustrate that the tendering entity meets key staff experience requirements stipulated in Clause C.2.1.4.3.

Note: Only the information provided on this Schedule, or attached hereto, will be considered. Failure to complete this Schedule, with supporting documents (Qualification or Registration with Professional Institution), may result in the tender being non-responsive.

RETURNABLE SCHEDULE P-1 CONTRACTS MANAGER	NAME & SURNAME : YEARS ACCRUED RELEVANT EXPERIENCE: QUALIFICATIONS :.....				
CONTRACT & CLIENT	NATURE OF WORK	POSITION HELD	VALUE OF WORK R(m)	DATE COMPLETED	EMPLOYER AND CONSULTING EMPLOYER'S AGENT (NAME, TEL No.)

NOTE : Attach CV and Proof of Qualifications as per Tender's Obligations clause C2.1.4.3, in order to score ANY Functionality Points. The CV should confirm that the person is currently employed by the Bidder, alternatively the CV should be accompanied by an Employment Contact between the parties.

Also add this person to the Company's Organogram structure.

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

RETURNABLE SCHEDULE P-2 CONSTRUCTION MANAGER (SITE AGENT)	NAME & SURNAME : YEARS ACCRUED RELEVANT EXPERIENCE : QUALIFICATIONS :				
CONTRACT & CLIENT	NATURE OF WORK	POSITION HELD	VALUE OF WORK R(m)	DATE COMPLETED	EMPLOYER AND CONSULTING EMPLOYER'S AGENT (NAME, TEL No.)

NOTE : Attach CV and Proof of Qualifications as per Tender's Obligations clause C2.1.4.3, in order to score ANY Functionality Points. The CV should confirm that the person is currently employed by the Bidder, alternatively the CV should be accompanied by an Employment Contract between the parties.

Also add this person to the Company's Organogram structure.

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

RETURNABLE SCHEDULE P-3 PIPE LAYING FOREMAN	NAME & SURNAME : YEARS ACCRUED RELEVANT EXPERIENCE : QUALIFICATIONS :				
CONTRACT & CLIENT	NATURE OF WORK	POSITION HELD	VALUE OF WORK R(m)	DATE COMPLETED	EMPLOYER AND CONSULTING EMPLOYER'S AGENT (NAME, TEL No.)

NOTE : Attach CV and Proof of Qualifications as per Tender's Obligations clause C2.1.4.3, in order to score ANY Functionality Points. The CV should confirm that the person is currently employed by the Bidder, alternatively the CV should be accompanied by an Employment Contract between the parties.

Also add this person to the Company's Organogram structure.

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

RETURNABLE SCHEDULE P-4 REINFORCED CONCRETE WATER RETAINING STRUCTURE WORKS AND BUILDING WORKS	NAME & SURNAME :				
	YEARS ACCRUED RELEVANT EXPERIENCE :				
	QUALIFICATIONS :				
CONTRACT & CLIENT	NATURE OF WORK	POSITION HELD	VALUE OF WORK R(m)	DATE COMPLETED	EMPLOYER AND CONSULTING EMPLOYER'S AGENT (NAME, TEL No.)

NOTE : Attach CV and Proof of Qualifications as per Tender's Obligations clause C2.1.4.3, in order to score ANY Functionality Points. The CV should confirm that the person is currently employed by the Bidder, alternatively the CV should be accompanied by an Employment Contact between the parties.

Also add this person to the Company's Organogram structure.

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

RETURNABLE SCHEDULE P-5 OHS SAFETY OFFICER	NAME & SURNAME : YEARS ACCRUED EXPERIENCE AS OHS SAFETY OFFICER : QUALIFICATIONS : SACPCMP REGISTRATION NO :				
CONTRACT & CLIENT	NATURE OF WORK	POSITION HELD	VALUE OF WORK R(m)	DATE COMPLETED	EMPLOYER AND CONSULTING EMPLOYER'S AGENT (NAME, TEL No.)

NOTE : Attach CV and Proof of Qualifications as per Tender's Obligations clause C2.1.4.3, in order to score ANY Functionality Points. The CV should confirm that the person is currently employed by the Bidder, alternatively the CV should be accompanied by an Employment Contract between the parties.

Also add this person to the Company's Organogram structure.

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

1Q: PROJECT PROGRAM AND CASHFLOW

Tenderers **must attach to this page**, the preliminary works programme and the cashflow projections for the project duration.

2A: ORIGINAL VALID TAX CLEARANCE CERTIFICATE

In terms of Clause 43 of the Municipal Supply Chain Management Policy, tenderers must ensure that they are up-to-date with their payments of taxes.

It is a condition of bid that the taxes of the successful bidder must be in order, or that satisfactory arrangements have been made with South African Revenue Service (SARS) to meet the bidder's tax obligations.

The tenderer must attach to this page an **original(s)** of a **valid** Tax Clearance Certificate(s) and the Tax compliance Status pin must be submitted.

Note:

1. In order to meet this requirement bidders are required to complete in full the form TCC 001 "Application for a Tax Clearance Certificate" and submit it to any SARS branch office nationally. The Tax Clearance Certificate Requirements are also applicable to foreign bidders / individuals who wish to submit bids.
2. SARS will then furnish the bidder with a Tax Clearance Certificate that will be valid for a period of 1 (one) year from the date of approval.
3. The original Tax Clearance Certificate must be submitted together with the bid. Failure to submit the original and valid Tax Clearance Certificate will result in the invalidation of the bid. Certified copies of the Tax Clearance Certificate will not be acceptable.
4. In bids where Consortia / Joint Ventures / Sub-contractors are involved, each party must submit a separate Tax Clearance Certificate.
5. Copies of the TCC 001 "Application for a Tax Clearance Certificate" form are available from any SARS branch office nationally or on the website www.sars.gov.za
6. Applications for the Tax Clearance Certificates may also be made via eFiling. In order to use this provision, taxpayers will need to register with SARS as eFilers through the website www.sars.gov.za

2B: MUNICIPAL BILLING CLEARANCE CERTIFICATE
--

In terms of Clause 38 of the Municipal Supply Chain Management Policy, tenderers must ensure that they are up-to-date with their payments of municipal accounts.

The tenderer shall attach to this page a Municipal Billing Clearance Certificate, which provides proof that his payment of Municipal accounts is up-to-date.

These certificates are obtainable from:

Kouga Local Municipality
33 Da Gama Road
Jeffreys Bay.

Should the tenderer not be based in the Kouga Local Municipality, he shall submit a Municipal Billing Clearance Certificate issued by the municipality in which he is based.

2C: B-BBEE STATUS LEVEL CERTIFICATES / CONSOLIDATED B-BBEE SCORECARD

Bidders who qualify as EMEs in terms of the B-BBEE Act shall submit and attach to this page a certificate issued by an Accounting Officer as contemplated in the CCA or a Verification Agency accredited by SANAS or a Registered Auditor. Registered auditors do not need to meet the prerequisite for IRBA's approval for the purpose of conducting verification and issuing EMEs with B-BBEE Status Level Certificates.

Bidders other than EMEs shall submit and attach to this page their original and valid B-BBEE status level verification certificate or a certified copy thereof, substantiating their B-BBEE rating issued by a Registered Auditor approved by IRBA or a Verification Agency accredited by SANAS.

A trust, consortium or joint venture acting as a legal entity shall submit and attach to this page their B-BBEE status level certificate.

A trust, consortium or joint venture acting as an unincorporated entity shall submit and attach to this page their consolidated B-BBEE scorecard as if they were a group structure and such a consolidated B-BBEE scorecard shall be prepared for every separate bid.

Tertiary institutions and public entities shall submit and attach to this page their B-BBEE status level certificates in terms of the specialized scorecard contained in the B-BBEE Codes of Good Practice.

All EME / B-BBEE certificates must reflect the B-BBEE status level of the bidder and must be certified.

3A: RECORD OF ADDENDA TO TENDER DOCUMENTS
--

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

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

Attach additional pages if more space is required.

I, the undersigned, warrant that I am duly authorised to do so on behalf of the enterprise and confirm that the contents of this schedule are, to my personal knowledge and best belief, both true and correct.

Signed

Date

Name

Position

Tenderer

3B: PERSONNEL SCHEDULE

The tenderer shall insert the number of personnel he proposes to employ on this tender/Contract:

JOB DESCRIPTION	NON-LOCAL (Key Personnel) (Permanently employed by Contractor)	LOCAL			
		Women	Men	Youth	SMME
Contract Manager**					
Site Agent**					
Civil Employer's Agent					
Quantity Surveyor					
Surveyors					
Pipe Laying Foreman					
Water Retaining Structure Foreman					
Building Foreman					
Foremen					
Operators					
Bricklayers					
Mechanics					
Electricians					
Watchmen					
Gang Bosses					
Pipe Layers					
Labourers					
* Other					
Total					

* To be filled in / completed by tenderer.

The CV's of the Contracts Manager and Site Agent must be attached, in which they highlight their previous experience. The Company Profile of the proposed Sub Contractor is also to be submitted.

I, the undersigned, warrant that I am duly authorised to do so on behalf of the enterprise and confirm that the contents of this schedule are, to my personal knowledge and best belief, both true and correct.

Signed

Date

Name

Position

Tenderer

3C: DECLARATION CONCERNING FULFILMENT OF THE CONSTRUCTION REGULATIONS

In terms of Regulation 4(3) of the Construction Regulations (2014), hereinafter referred to as the Regulations, promulgated on 7 February 2014 in terms of Section 43 of the Occupational Health and Safety Act, 1993 (Act No 85 of 1993), the Employer shall not appoint a Contractor to perform construction work unless the Contractor can satisfy the Employer that his/her firm has the necessary competencies and resources to carry out the work safely and has allowed adequately in his/her tender for the due fulfilment of all the applicable requirements of the Act and the Regulations.

Tenderers shall answer the questions below:

1. I confirm that I am fully conversant with the Regulations and that my company has (or will acquire / procure) the necessary competencies and resources to timeously, safely and successfully comply with all of the requirements of the Regulations.

(Tick)

Yes	
No	

2. Indicate which approach shall be employed to achieve compliance with the Regulations.

(Tick)

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

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

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

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5. List potential key risks identified and measures for addressing risks:

.....

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.....

.....

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

(Tick)

Yes	
No	

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

1. ID NO:
(Name in Print):

2. ID NO:
(Name in Print):

3D: SCHEDULE OF CONSTRUCTION EQUIPMENT

The following are lists of major items of relevant equipment that I/we **presently** own or lease and will have available for this contract or will acquire or hire for this contract if my/our tender is accepted.

- (a) Details of major equipment that is owned by and immediately available for use on this Contract should my / our tender be accepted.

Quantity	Description, Size, Capacity, etc.

- (b) Details of major equipment that will be **hired in**, or acquired, for use on the Contract should my / our tender be accepted.

Quantity	Description, Size, Capacity, etc.

Attach additional pages if more space is required.

I, the undersigned, warrant that I am duly authorised to do so on behalf of the enterprise and confirm that the contents of this schedule are, to my personal knowledge and best belief, both true and correct.

Signed

Date

Name

Position

Tenderer

3E: SCHEDULE OF PROPOSED SUBCONTRACTORS

We notify you that it is our intention to employ the following Subcontractors to work on this Contract.

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

Name and Address of Proposed Subcontractor	Nature and Extent of Work	Previous Experience with Subcontractor

I, the undersigned, warrant that I am duly authorised to do so on behalf of the enterprise and confirm that the contents of this schedule are, to my personal knowledge and best belief, both true and correct.

Signed

Date

Name

Position

Tenderer

CONTRACT

PART 1 (OF 4): AGREEMENT AND CONTRACT DATA

- C1.1 Form of Offer and Acceptance
- C1.2 Contract Data
- C1.3 Form of Guarantee
- C1.4 Health and Safety Agreement
- C1.5 Disclosure Statement
- C1.6 Adjudication Board Member Agreement

C1.1: FORM OF OFFER AND ACCEPTANCE

(Agreement)

1. OFFER

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

TENDER NO 220/2024: KWANOMZAMO BULK SANITATION: IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION AND RISING MAIN FROM BUNGALOWS

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:

.....

.....

.....

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

This Offer may be accepted by the Employer by signing the Acceptance part of this Form of Offer and Acceptance and returning one copy of this document to the Tenderer before the end of the period of validity stated in the Tender Data, whereupon the Tenderer becomes the party named as the Contractor in terms of the Conditions of Contract identified in the Contract Data.

For the **Tenderer**:

.....
Signature

.....
Name

.....
Capacity

Name and Address of Organisation:

.....

.....

.....

.....

.....

Signature and Name of Witness:

.....

Signature

.....

Name

Date:

2. ACCEPTANCE

By signing this part of this Form of Offer and Acceptance, the Employer identified below accepts the Tenderer's Offer. In consideration thereof, the Employer shall pay the Contractor the amount due in accordance with the Conditions of Contract identified in the Contract Data. Acceptance of the Tenderer's Offer shall form an agreement between the Employer and the Tenderer upon the terms and conditions contained in this Agreement and in the Contract that is the subject of this Agreement.

The terms of the contract are contained in

Part C1: Agreements and Contract Data (which includes this Agreement)

Part C2: Pricing Data

Part C3: Scope of Work

Part C4: Site Information

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

Deviations from and amendments to the documents listed in the Tender Data and any Addenda thereto 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 representative(s) of both parties.

The tenderer shall within two weeks after receiving a completed copy of this Agreement, including the Schedule of Deviation (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 the obligations in accordance with those terms shall constitute a repudiation of this Agreement.

Notwithstanding anything contained herein, this Agreement comes into effect on the date when the Tenderer receives one fully completed original copy of this document, including the Schedule of Deviations (if any). Unless the Tenderer (now Contractor) within five (5) 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.

For the **Employer**:

.....
Signature

.....
Name

.....
Capacity

Name and Address of Organisation:

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

Signature and Name of Witness:

.....
Signature

.....
Name

Date:

3. SCHEDULE OF DEVIATIONS

Notes:

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

1. Subject:
Details:
2. Subject:
Details:
3. Subject:
Details:
4. Subject:
Details:
5. Subject:
Details:
6. Subject:
Details:
7. 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 changes to the terms of the offer agreed by the Tenderer and the Employer during this process of offer and acceptance.

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

For the Tenderer:

.....

Signature

.....

Name

.....

Capacity

Name and Address of Organisation

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Witness Signature

.....

Witness Name

.....

Date

For the Employer:

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Name and Address of Organisation

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4. CONFIRMATION OR RECEIPT

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

the (day)

of (month)

20 (year)

at (place)

For the **Contractor**:

.....
Signature

.....
Name

.....
Capacity

Signature and Name of Witness:

.....
Signature

.....
Name

C1.2: CONTRACT DATA

The General Conditions of Contract for Construction Works, Third Edition, (2015) published by the South African Institution of Civil Engineer's Agents (SAICE), Private Bag X200, Halfway House, 1685, are applicable to this Contract and are obtainable from www.saice.org.za.

Copies of these Conditions of Contract may be obtained on the tenderer's own cost from the South African Institution of Civil Engineering (SAICE). (Tel: 011 – 055 947).

PART 1: 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
1.1.1.5	The commencement date shall be the date on which the Contractor receives a copy of the signed form of offer and acceptance and schedule of deviations if applicable.
1.1.1.13	The Defects Liability Period is 12 months, measured from the date of the Certificate of Completion.
1.1.1.14	The time for achieving Practical Completion is 6 months , calculated from the Commencement Date.
1.1.1.15	The Employer is the Kouga Local Municipality, represented by Mr. J du Toit and/or such other person or persons duly authorised thereto by the Employer in writing.
1.1.1.16	The Employer's Agent is Engineering Advice & Services (Pty) Ltd , hereinafter also refer to as " EAS ", represented by an employee duly authorised thereto in writing. Any reference to the term "Engineer" in this Contract shall mean "Employer's Agent" and vice versa.
1.1.1.17	Any reference to the term "Engineers Representative" in the Contract shall mean "Employers Agent Representative" and vice versa.
1.1.1.26	The Pricing Strategy is: Re-measurable Contract
1.2.1.2	The Employer's address for receipt of communications is: 33 Da Gama Road Jeffreys Bay Postal Address: P O Box 21 Jeffrey Bay 6330 Telephone: 042 200 2200 email: tenders@kouga.gov.za
1.2.1.2	The Employer's Agent's address for receipt of communications and notices is: Engineering Advice & Services (Pty) Ltd 73 Heugh Road Walmer Gqeberha

Clause	Description / Wording
	6070 Telephone: 041 581 2421
3.2.3	The Employer's Agent shall obtain specific approval from the Employer before executing any of his functions or duties according to the following Clauses of the General Condition of Contract: 1. New Clause 3.2.3.1 "For expenditure on the Contract to exceed the Contract Sum"; 2. Existing Clauses: 3.3.1 - Nomination of person as Employer's Agent's Representative. 5.7.2 - Work at night as well as by day 5.8 – Non-working times 5.12 - Granting of extension of time excluding Clause 5.12.2.2 (Abnormal climatic conditions) 5.13 - Reduction of penalty for delay. 5.14.2 - The issue of a Certificate of Practical Completion. 5.14.4 - The issue of a Certificate of Completion. 5.16.1 - The issue of a Final Approval Certificate. 6.3 – Variation Orders which may exceed R 20 000 6.6 - Instruction to expend on Provisional and Prime Cost Sums 6.11 - Adjustment of General Items & Approval of Claims 8.2.2.2 - Order to repair and make good damage arising from any "excepted" risk.
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. 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 the employers agent 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.
4.1.3	<u>Add the following new clauses at the end of clause 4.1.2:</u> "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.

Clause	Description / Wording
	(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
4.1.4	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 fourteen (14) days after receiving a completed copy of the Agreement and shall be implemented and maintained from the Commencement of the Works. (ii) 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."
4.3.1	<u>Add the following</u> to the clause: "The Contractors attention is drawn to the following: • The Basic Conditions of Employment Act of 1997 (Act No 75 of 1997); • 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; • Occupational Health and Safety Act of 1993 (Act No 85 of 1993); • 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); • Construction Regulation 2014; • All other relevant applicable laws, regulations, statutory provisions and agreements. 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, Waste License, etc."
4.3	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.

Clause	Description / Wording
	(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)(b) 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 after the Commencement Date and shall be implemented and maintained from the Commencement of the Works. (ii) 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."
5.3.1	The documentation required before the commencement of the Works is: a) Health and Safety Plan (Refer Clause 4.3) The Contractor shall deliver his health and safety plan, complete with Risk Assessment, in terms of Regulation 5(1) of the Construction Regulations (2014). b) Initial Programme (Refer Clause 5.6) including Cash Flow forecast The Contractor shall deliver his Initial Programme of carrying out the Works. c) Security (Refer Clause 6.2) The Contractor shall submit a Performance Guarantee from an Insurance Company or Bank to be jointly and severally bound with the Contractor, in accordance with the provisions of the Form of Guarantee, in a sum equal to ten per cent (10%) of the Contract Sum. The wording of the Guarantee shall be identical to the pro-forma provided under Clause C1.3: Form of Guarantee of the Contract Data. d) Insurance (Refer Clause 8.6) The Contractor shall submit a "Letter of Confirmation" from the approved Insurance Company certifying that: i) that the applicable Contractor complies in full with all the requirements and stipulations of Clause

Clause	Description / Wording
	8.6 of the Conditions of Contract, as amended in the Contract Data and, ii) the Insurance Company will immediately notify the Employers Agent of any changes or amendments to the policy / policies and, iii) the Insurance Company will immediately notify the Employers Agent of any non-payment or default relating to the premiums and or policy / policies and, iv) the Insurance Company will immediately notify the Employers Agent should any of the applicable insurances expire or be cancelled before the issue of the "Certificate of Completion" or the "Final Approval Certificate", as the case may be." v) Letter of Good Standing from the Compensation Commissioner (if not insured with a Licensed Compensation Insurer) also be submitted, and vi) A copy of the Health and Safety Mandatory Agreement required in terms of Section 37(2) of the Occupational Health and Safety Act 85 of 1993 as amended, per the proforma in C1.4 e) Letter of Good standing with the Building Industry Bargain Council The Contractor shall commence executing the Works within twenty-eight (28) days after the Commencement Date.
5.3.2	The documentation shall be submitted within 14 days from the Commencement Date.
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."
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,"
5.4.2	Access to and possession of Site shall not be exclusive to the Contractor but as set out in the Scope of Work and Site Information.
5.6.1	The Contractor shall deliver his Works programme within fourteen (14) 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". Non-working days are Saturdays and 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. The work done by the Contractor should be done at hours of the day so as not to influence the normal operation of the existing infrastructure in any manner.
5.8.3	Add the following new Clause: "5.8.3 The additional cost of supervision and monitoring by the Employers Agent or his representatives, outside non-working times, in accordance with Clause 5.8.1 shall be for the Contractor's account."

Clause	Description / Wording
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.
5.12.2.4	In the event of any disruption which is entirely beyond the Contractor's control, the only compensation will be under the rates tendered for under items A 1.2.10.1 through to A.1.2.10.4
5.12.3	Delete the entire subclause 5.12.3.
5.12.5	<u>Add the following</u> 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 in account for the extension of time.
5.13.1	The penalty for failing to complete the Works is R5 000 per day.
5.14.1	The requirements for Practical Completion are that the Works reach a state of readiness, fit for the intended purpose and occupation without danger or undue inconvenience or consequence to the Employer or public. • The installation, testing and backfilling of all water pipes, including thrust blocks, air valves, valves, scour valve chambers, pressure reducing valves. • Reinstatement of all provincial road crossings to the satisfaction of the engineer and the Eastern Cape Department of Transport • Reinstatement of the rail road crossing to the satisfaction of the engineer and Transnet Freight Rail
5.14.2	Issue of Certificate of Practical Completion Replace "the Employer's Agent" in the second line with the following: ", the Contractor shall notify the Employer's Agent, who shall inspect the works and the Employer's Agent"
5.14.4	Add the following to Clause 5.14.4:

Clause	Description / Wording
	"The work listed in terms of Clause 5.14.2 shall however be completed within 21 days from the date of issue of the Certificate of Practical Completion. Should the Contractor fail to complete all the work so listed within the stated period of 21 days, the date of issue of the Certificate of Practical Completion shall be amended and extended in respect of the outstanding work by the amount of additional time taken by the Contractor to complete all such work."
5.14.5.5	Delete the contents of Clause 5.14.5.5 and replace with: "Insurance of the Works shall continue until the expiration of the Defects Liability Period, in terms of the new Clause 8.6 contained in this Contract Data".
5.16.3	The latent defect period is 10 years and shall commence on the date of the Final Completion Certificate.
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 Fixed 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. 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. 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 fourteen (14) days after the Commencement Date.
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."
6.2.3	Replace the entire contents of Clause 6.2.3 with the following: "The Contractor shall ensure that the Fixed Performance Guarantee remains valid and enforceable until the issue of the Certificate of Completion."
6.5.1.2.3	The percentage allowance shall be seven percent (7%).
6.8.2	Contract Price adjustment will not be applicable to this contract.
6.8.3	Price adjustments for variations in the costs of special materials are not allowed.
6.10.1	In subclause 6.10.1 delete "monthly".
6.10.1.5	The percentage advance on materials on site not yet built into the Permanent Works is 80%.
6.10.1.9	<u>Add the following new clause:</u> "The Contractor is required to submit completed, accurate and signed monthly Expanded Public Works Programme (EPWP) reports, together with all monthly payment certificates. Payment to the Contractor will not be processed until the EPWP reporting for a specific month is provided. In addition, a penalty

Clause	Description / Wording
	for late submission of R1500.00 per day will be applicable for every day after the 5 th working day of the subsequent month to the reporting month."
6.10.3	Replace the entire contents of Clause 6.10.3 with the following: "Payment of the amounts referred to in Clauses 6.10.1.1, 6.10.1.2, 6.10.1.3 and 6.10.1.4 shall be subject to a retention by the Employer of an amount (called the "retention money"), being the percentage retention stated in the Contract Data, of the said amounts due to the Contractor, until the retention money reaches the "Limit of retention money" stated in the Contract Data." The percentage retention shall be ten per cent (10%) and the "Limit of retention money" shall be five per cent (5%) of the Contract Price, excluding Value Added Tax.
6.10.4	<u>Replace</u> the wordings "within 7 days" and "within 28 days" in Clause 6.10.4 with the wording "within 5 working days: and "within 30 days".
6.10.6.2	<u>Replace</u> the contents of Clause 6.10.6.2 with the following: "No interest shall be payable to the Contractor upon any moneys retained or overdue in terms of the Contract."
6.11.1	Delete this clause.
7.2.1	Add the following at the end of Clause 7.2.1: "Unless otherwise directed in writing by the Employers Agent, all materials for the Permanent Works shall be new and unused."
7.8	The Defects Liability Period shall be twelve (12) months, measured from the date of Certificate of Completion.
7.8.1	In subclause 7.8.1 delete the following: "(fair wear and tear excepted)"
7.8.2.2	In sub-subclause 7.8.2.2 add the following: ", subject to such work being done on a written instruction by the Employer's Agent."
8.6	<u>Delete Clause 8.6. and replace with the following:</u>
8.6.1	Notwithstanding the provisions contained in the General Conditions of Contract regarding insurance, and without limiting the obligations, liabilities and responsibilities of the Contractor in any way whatsoever and on the understanding that the Contractor is not relieved from his obligations towards the Employer regarding the provision (by the Contractor) of any other insurances, the Contractor shall effect and maintain for the duration of the Contract until the expiry of the Defects Liability Period, including initial transit to the Contract site ⇒ Contract Works Insurance (including SASRIA Insurance) and ⇒ Public Liability (Third Party) Insurance both in the joint names of the Employer and the Contractor (including all Sub-Contractors whether nominated or otherwise), and those on whose behalf the Employer has authority to arrange insurance. The Contractor shall pay for all deductibles incurred as a result of claims made under the Contract.

Clause	Description / Wording
8.6.2	The Policy will be subject to the normal Terms, Exceptions and Conditions applicable to such insurance and will provide the following cover: <u>Section 1 – The Contract Works</u> (a) The Contract Works to be undertaken in terms of the Insured Contract, including all temporary works erected or in the course of erection and all materials for incorporation therein. “Temporary Works” shall mean all constructional aids, equipment or structures (not being part of the permanent works) used or intended for use on the Insured Contract and which (i) do not comprise mobile plant, (ii) the Insured does not intend to remove from the Contract Site on completion of the Contract, and/or (iii) have no residual value at the completion of the Contract (other than scrap value) solely due to their specialized nature, to the extent that the value has been included in the Contract price. (b) Surrounding property (as defined in the Policy) not included in nor forming part of the property insured under Item 1 above. <u>Section 2 – Contract Liability</u> Indemnity against the insured parties legal liability in the event of accidental death of or injury to third party persons and/or accidental loss of or damage to third party property arising directly from the execution of the contract.
8.6.3	THE SUMS INSURED/LIMIT OF LIABILITY Section 1 – CONTRACT WORKS (a) Property insured under Section 1(a) The Contract Works The Agreed and Accepted Contract Value (subject to a maximum of R100M) in respect of any one Contract plus a maximum of 25% escalation, unless the Insurers’ agreement to amend these limits is obtained in writing. (b) Property insured under Section 1(b) Surrounding Property R2,500,000 each and every loss SECTION 2 - CONTRACT LIABILITY Limit of Indemnity R10 000 000 (Ten Million Rand) for any one occurrence or series of occurrences arising out of one event.
8.6.4	INCLUDED CONTRACTS The following Contracts are specifically included in the “blanket” cover arranged by the Contractor. The Contractor shall arrange with the Insurer for specific insurance cover for these contracts, and shall confirm such arrangement and all specific Terms & Conditions of such policy with the Contractor in writing. 1. Any Contract with a Contract Price at award of over R100,000,000 2. Any Contract with a construction period at award exceeding 24 months 3. Any Contract with a Maintenance or Defects Liability Period exceeding 12 months 4. Any Contract involving 4.1 Underground Mine or Colliery Working’ 4.2 Tunnelling 4.3 Foul Berthing

Clause	Description / Wording																																																											
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8.6.5	THE DEDUCTIBLES The first amount payable by the Insured in respect of each and every occurrence giving rise to a claim under the Policy shall be as follows: (A) <u>STANDARD BUILDING CONTRACTS</u> <table border="1"> <thead> <tr> <th rowspan="2"></th><th rowspan="2">Description</th><th colspan="2">Existing</th><th colspan="2">Renewal</th></tr> <tr> <th>Gross rate</th><th>Excess</th><th>Gross rate</th><th>Excess</th></tr> </thead> <tbody> <tr> <td>A1</td><td>Contract Value up to R10M</td><td>0.205%</td><td>R 10,000</td><td>0.205%</td><td>R 10,000</td></tr> <tr> <td>A2</td><td>Contract Value above R10M up to R25M</td><td>0.255%</td><td>R15,000</td><td>0.255%</td><td>R15,000</td></tr> <tr> <td>A3</td><td>Contract Value above R25M</td><td>0.255%</td><td>R25,000</td><td>0.255%</td><td>R25,000</td></tr> </tbody> </table> (B) <u>CIVIL & ALL OTHER CONTRACTS</u> <table border="1"> <thead> <tr> <th rowspan="2"></th><th rowspan="2">Description</th><th colspan="2">Existing</th><th colspan="2">Renewal</th></tr> <tr> <th>Gross rate</th><th>Excess</th><th>Gross rate</th><th>Excess</th></tr> </thead> <tbody> <tr> <td rowspan="2">B1</td><td>Contract Value up to R1M</td><td rowspan="2">0.350%</td><td>0.25% of claim minimum R10 000</td><td rowspan="2">0.350%</td><td rowspan="2">R 10,000</td></tr> <tr> <td>Canals/water channels & bridges</td><td>R35,000</td></tr> <tr> <td rowspan="2">B2</td><td>Contract Value above R1M up to R5M</td><td rowspan="2">0.350%</td><td>0.25% of claim minimum R20 000</td><td rowspan="2">0.350%</td><td>0.25% of claim minimum R15,000</td></tr> <tr> <td>Canals/water channels & bridges</td><td>R35,000</td><td>Minimum R35,000</td></tr> </tbody> </table>						Description	Existing		Renewal		Gross rate	Excess	Gross rate	Excess	A1	Contract Value up to R10M	0.205%	R 10,000	0.205%	R 10,000	A2	Contract Value above R10M up to R25M	0.255%	R15,000	0.255%	R15,000	A3	Contract Value above R25M	0.255%	R25,000	0.255%	R25,000		Description	Existing		Renewal		Gross rate	Excess	Gross rate	Excess	B1	Contract Value up to R1M	0.350%	0.25% of claim minimum R10 000	0.350%	R 10,000	Canals/water channels & bridges	R35,000	B2	Contract Value above R1M up to R5M	0.350%	0.25% of claim minimum R20 000	0.350%	0.25% of claim minimum R15,000	Canals/water channels & bridges	R35,000	Minimum R35,000
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8.6.6	The Contractor will pay all premiums in connection with the insurance affected by the Contractor.																			
8.6.7	In the event of any occurrence which is likely to give rise to a claim under the insurance arranged by the Contractor, the Contractor or sub-Contractor shall (a) in addition to any statutory requirement or other requirements contained in the Conditions of Contract, immediately notify the Employer's Insurance Brokers by telephone or in writing giving the circumstances, nature and an estimate of the loss or damage; (b) complete a Claims Advice Form available from the Insurance Brokers to whom the form shall be returned without delay – a copy shall be sent to the Employer's Agent; (c) negotiate the settlement of claims with the Insurers through the Employer's Insurance Brokers, subject to the settlement being approved by the Employer.																			
8.6.8	The Employer and Insurers shall have the right to make all and any enquiries, either on the site or elsewhere, as to the cause and results of any such occurrence and the Contractor shall give full facilities for carrying out such enquiries.																			
8.6.9	Any amount which becomes payable as a result of a claim by the Contractor under the insurance effected by the Contractor shall be paid net of the deductibles to the Employer, who shall pay the said amount to the Contractor upon rectification, repair or reinstatement of the loss or damage, but this provision shall not in any way affect the Contractor's obligations, liabilities and responsibilities in terms of the Contract.																			

Clause	Description / Wording
8.6.10	Submission of a Tender shall be deemed as acceptance by the Contractor that he is satisfied with the scope of the insurances effected by the Employer.
8.6.11	The Contractor and/or Sub-Contractor shall provide, as a minimum, the following: (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.
8.6.12	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.
8.6.13	The Contractor may affect, at his own cost, any insurance additional to that affected by the Employer which he deems necessary in his own interests. The Employer reserves the right to call for full information regarding such insurances.
8.6.14	The insurances to be provided by the Contractor and Sub-Contractor shall be affected with Insurers and on terms approved by the Employer (which approval shall not be unreasonably withheld) and the Contractor shall, if required by the employer, produce to the employer the Policy or Policies of insurance and the receipts for payment of the current premiums.
8.6.15	If the Contractor fails to effect and keep in force the insurances referred to, then the employer may effect and keep in force any such insurance and pay such premium or premiums as may be necessary for that purpose and, from time to time, deduct the amount paid by the Employer from any monies due or which may become due to the Contractor or recover same as a debt from the Contractor.
8.6.16	Where the Contractor is responsible for the appointment of Sub-Contractors, then the Contractor shall (a) ensure that potential and appointed Sub-Contractors are aware of the whole content of this Special Conditions of Contract Clause; and (b) Ensure the compliance of Sub-Contractors with this Special Conditions of Contract clause, where applicable.

Clause	Description / Wording
8.6.17	The Contractor warrants that he shall give all notices and shall observe all the Terms and Conditions and requirements of all insurances applicable to this Contract.
9.1.4	<u>Replace the contents of Clause 9.1.4 with the following:</u> “Up to the time of termination of the Contract by either party in terms of this Clause, or 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 expiry of the Due Completion Date.
9.2.1.3	Add the following after Clause 9.2.1.3.8: “9.2.1.3.9 Has failed to provide the required insurances or fixed performance guarantee within the prescribed time; 9.2.1.3.10 Has committed a corrupt or fraudulent act during the tender process or the execution of the Contract; or 9.2.1.3.11 Has benefitted from an official or other role player committing any corrupt or fraudulent act during the tender process or in the execution of the Contract.”
9.2.1.3.7	<i>Delete “or” at the end of this clause.</i>
10.3.2	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.”
10.13	<i>Add the following additional clause:</i> “Mandatory Subcontract Works

Clause	Description / Wording
	A minimum of 15% of the value of the Contract excluding the Main Contractor's Preliminary and General Costs, VAT and contingencies shall be subcontracted to EEs as stated in Part C3: Scope of Works, Section C3.3: Procurement. The 15% allowance shall include EE Preliminary and General and Profit. Refer to PSA 8.10."
10.16	<u>Add the following new clause:</u> "Expanded Public Works Programme (EPWP) reports The Contractor is required to submit completed, accurate and signed monthly Expanded Public Works Programme (EPWP) reports, attached to this tender document as Annexure B, together with all monthly payment certificates. Payment to the Contractor will not be certified until the EPWP reporting for a specific month is provided. In addition, a penalty for late submission of R1500.00 per day will be applicable for every day after the 5th working day of the subsequent month to the reporting month."

PART 2: DATA PROVIDED BY THE CONTRACTOR

Clause	Description / Wording
1.1.1.9	The Contractor is:
1.2.1.2	The Contractor's address for receipt of communications and notices is: Address (Postal): Address (Physical): Telephone Number (Work): Telephone Number (After Hours): Facsimile Number: Electronic Mail Address (E-mail):

PRO FORMA PERFORMANCE GUARANTEE

GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means:

Physical address:

"Employer" means:

"Contractor" means:

"Employers Agent" means:

"Works" means:

"Site" means:

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

"Contract Sum" means: The accepted amount inclusive of tax of R

Amount in words:

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

Amount in words:

"Expiry Date": This Performance Guarantee shall remain in full force and effect **until the issue of the Certificate of Completion of the Works** in terms of the Contract. (Refer Clause 2 hereunder).

CONTRACT DETAILS

Employers Agent issues: Interim Payment Certificates, Final Payment Certificate and the Certificate of 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 date of issue by the Employers Agent of the **Certificate of Completion of the Works** or the date of payment in full of the Guaranteed Sum, whichever occurs first unless the Guarantor is advised in writing by the Employer of his intention to institute claims, and the particulars thereof, in which event this guarantee shall remain in full force and effect until all such claims have been paid or liquidated. The Employers Agent and / or the Employer shall inform 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 Employers Agent in an Interim or Final Payment Certificate has not been made in term of the Contract and failing such payment within (7) seven 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 zero percent (0%) interest.
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 affairs with the Contractor in any manner which the Employer may deem fit and the Guarantor shall not have the right to claim his release from this Performance Guarantee on account of any conduct alleged to be prejudicial to the Guarantor.
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 jurisdiction of the Magistrate's Court.

Signed at

Date

Guarantor's signatory (1)

Capacity

Guarantor's signatory (2)

Capacity

Witness signatory (1)

Witness signatory (2)

C1.4: HEALTH AND SAFETY AGREEMENT

ARTICLE OF AGREEMENT IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL SAFETY ACT (1993)

BETWEEN

THE KOUGA LOCAL MUNICIPALITY
(Hereinafter referred to as the "EMPLOYER")

AND

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

Herein represented by in his/her capacity as
....., duly authorised by virtue of a resolution dated
....., attached hereto as Annexure A, of the said
(Herein after referred to as the "CONTRACTOR")

WHEREAS the CONTRACTOR is the mandatory of the EMPLOYER as contemplated in an agreement in respect of:

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

Contract number:

AND WHEREAS section 37 of the Occupational Health and Safety Act, 1993 (Act 85 of 1993, hereinafter referred to as the "ACT"), imposes certain powers and duties upon the EMPLOYER.

AND WHEREAS the parties have agreed to enter into an agreement in terms of section 37(2) of the ACT.

NOW THEREFORE the parties agree as follows:

- (a) 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 thereof.
- (b) The CONTRACTOR undertakes that all relevant duties, obligations and prohibitions imposed in terms of the ACT and Regulations will be fully complied with. Provided that should the EMPLOYER prescribe certain arrangements and procedures, that same shall be observed and adhered to by the CONTRACTOR, his officials and employees. The CONTRACTOR shall bear the onus of acquainting himself/herself/itself with such arrangements and procedures.
- (c) The CONTRACTOR hereby accepts sole liability for such due compliance with the relevant duties, obligations, prohibitions, arrangements and procedure, if any, imposed by the ACT and Regulations and the EMPLOYER expressly absolves the EMPLOYER from itself being obliged to comply with any of the aforesaid duties, obligations, prohibitions, arrangements and procedure as the case may be.

- (d) 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 ensure that the CONTRACTOR has complied with the undertakings as more fully set out in paragraphs (a) and (b) above, which steps may include, but shall not be limited to, the right to inspect any appropriate site or premises occupied by the CONTRACTOR, or to inspect any appropriate records held by the CONTRACTOR or to take such steps it may deem necessary to remedy the default of the CONTRACTOR at the cost of the CONTRACTOR.
- (e) The CONTRACTOR shall be obliged to report forthwith to the EMPLOYER any investigations, 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 agreement, and shall, on written demand, provide full details in writing of such an investigation, complaint or criminal charge as the case may be.

Signature(s) of authorised agents:

.....

Name(s) (in block letters):

.....

Capacity of authorized agents:

.....

for and on behalf of the Contractor:

.....

(Name and address of organization)

Witness:

.....
 (Full name in block letters as well as signature)

.....
 (Signature)

Date:

for and on behalf of the Employer:

Signature of authorized agent:

Name of authorized agent:

Capacity of authorized agent:

for the **Employer:**

**KOUGA LOCAL MUNICIPALITY
P O Box 21
Jeffreys Bay
6330**

Witness:

.....
(Full name in block letters as well as signature)

.....
(Signature)

Date:

C1.5: DISCLOSURE STATEMENT

**PRO FORMA
DISCLOSURE STATEMENT**

Date:

Contract:
(Name)

Contractor:
(Name)

Employer:
(Name)

Employers Agent:
(Name)

Dear Sirs

I am willing and available to serve as (ad-hoc / standing) Adjudication Board Member in the above-mentioned Contract.

In accordance with the General Conditions of Contract for Construction Works Adjudication Board Rules relating to the disclosure statements by selected or nominated persons to the adjudication, I hereby state that:

- I shall act with complete impartiality and know of nothing at this time, which could affect my impartiality.
- I have had no previous involvement in this project.
- I do not have any financial interest in this project.
- I am not currently employed by the Contractor, Employer or Employers Agent.
- I do not have any financial connections with the Contractor, Employer or Employers Agent.
- I do not have or have not had a personal relationship with any authoritative member of the Contractor, Employer or the Employers Agent which could affect my impartiality.
- I undertake to immediately disclose to the parties any changes in the above position which could affect my impartiality or be perceived to affect same.

Should there be any deviation from the foregoing statements, details shall be given.

I further declare that I am experienced in the work which is carried out under the Contract and in interpreting the contract documentation.

Name in full:

Signature:

PRO FORMA
ADJUDICATION BOARD MEMBER AGREEMENT

This Agreement is entered into between:

Adjudication Board Member:

Name:

Physical Address:

Postal Address:

E-mail Address:

Facsimile Number:

Telephone Number:

Mobile Number:

Contractor:

Name:

Physical Address:

Postal Address:

E-mail Address:

Facsimile Number:

Telephone Number:

Mobile Number:

Employer:

Name:

Physical Address:

Postal Address:

E-mail Address:

Facsimile Number:

Telephone Number:

Mobile Number:

The Contractor and the Employer will hereinafter be collectively referred to as the Parties.

The Parties entered into a Contract for

..... (Name of project) which provides that a dispute under or in connection with the General Conditions of Contract for Construction Works, Second Edition 2015 (GCC), must be referred to **ad-hoc / standing adjudication**.

The undersigned natural person has been appointed to serve as Adjudication Board Member and together with the undersigned Parties agree as follows:

1. The Adjudication Board Member accepts to perform his duties in accordance with the terms of the Contract, the General Conditions of Contract for Construction Works Adjudication Board Rules and this Agreement.
2. The Adjudicator undertakes to remain independent and impartial of the Contractor, Employer and Employers Agent for the duration of the Adjudication Board proceedings.
3. The Adjudication Board Member agrees to serve for the duration of the Adjudication Board proceedings.
4. The parties may at any time, without cause and with immediate effect, jointly terminate this Agreement.
5. Unless the Parties agree, the Adjudication Board Member shall not act as arbitrator or representative of either Party in any subsequent proceedings between the Parties under the Contract. No Party may call the Adjudication Board Member as a witness in any such subsequent proceedings.
6. The standing Adjudication Board's duties shall end upon the Adjudication Board Member(s) receiving notice from the Parties of their joint decision to disband the Adjudication Board.
7. The Adjudication Board Member shall be paid in respect of time spent upon or in connection with the adjudication including time spent travelling:
 - a. A monthly retainer of (amount) for (number) of months, and/or
 - b. A daily fee of (amount) based on a (number) hour day, and/or
 - c. An hourly fee of (amount), and/or
 - d. A non-recurrent appointment fee of (amount) which shall be accounted for in the final sums payable
8. The Adjudication Board Member's expense incurred in adjudication work shall be reimbursed at cost.

Upon submission of an invoice for fees and expenses to the Parties, the **(Contractor / Employer)** * shall pay the full amount within 28 days of receipt of the invoice and shall be reimbursed by the other party by half the amount so that fees and expenses are borne equally by the Parties. Late payment of such invoice shall attract interest at prime plus 3% points compounded monthly at a prime rate charged by the Adjudication Board Member's bank.

This Agreement is entered into by:

Contractor's signature:

Contractor's name:

Place:

Date:

Employer's signature:

Employer's name:

Place:

Date:

Adjudication Board Member's signature:

Adjudication Board Member's name:

Place:

Date:

*** Delete the inapplicable party**

CONTRACT

PART 2 (OF 4): PRICING DATA

- C2.1 Pricing Instructions
- C2.2 Bill of Quantities
- C2.3 Summary Page for Bill of Quantities

C2.1: PRICING INSTRUCTIONS

C2.1.1 PREAMBLE TO THE BILL OF QUANTITIES

- C2.1.1.1 The method of measurement published by the South African Bureau of Standards in Clause 8 of the Standardized Specifications for Civil Employers Agenting Construction is applicable, subject to the variations and amendments contained in the section "Applicable SABS 1200 Standardized Specifications".
- C2.1.1.2 Descriptions in the Bill of Quantities are abbreviated and comply generally with those in the Standardized Specifications. Clause 8 of each Standardized Specification, read together with the relevant clauses of the Scope of Work, set out what ancillary or associated activities are included in the rates for the operations specified. Should any requirements of the measurement and payment clause of the applicable Standardized Specification, or the Scope of Work, conflict with the terms of the Bill, the requirements of the Standardized or Scope of Work, as applicable, shall prevail.
- C2.1.1.3 The reference clauses in a specification in which further information regarding the bill item can be obtained appear under the "Reference Clause" or "Payment Refers" column in the Bill. The reference clauses indicated are not necessarily the only sources of information in respect of schedule/billed items. Further information and set specifications may be found elsewhere in the contract documents. Standardized Specifications are identified by the letter or letters which follow SABS in the SABS 1200 series of specifications, e.g. G for SABS 1200 G.
- C2.1.1.4 Work reserved for Labour Intensive construction methods will be numbered with a prefix "LI" in the Bill to distinguish them from the conventional construction works. Such work shall be constructed using local labour who is temporarily employed in terms of the Scope of Work.
- C2.1.1.5 Unless otherwise stated, items are measured nett in accordance with the Drawings, and no allowance is made for waste. The Bill has to be completed in black non-erasable ink and the tenderer is referred to the Conditions of Tender as well as the Tender Data with regard to the correction of errors.
- C2.1.1.6 The quantities set out in the Bill of Quantities are the estimated quantities of the work. The tenderers attention is directed to Clause 6.7 of the Conditions of Contract and the Contractor will be required to determine the actual and final quantities of the Works to be executed and the Contractor shall undertake whatever quantities may be directed by the Employers Agent from time to time. The Contract Price for the completed contract shall be computed from the actual quantities of work done, valued at the relevant unit rates and prices.
- C2.1.1.7 The prices and rates to be inserted in the Bill of Quantities are to be the full inclusive prices for the work described under the several items. Such prices and rates shall cover all costs and expenses that may be required in and for the execution of the work described, and shall cover the cost of all general risks, liabilities, and obligations set forth or implied in the documents on which the tender is based, as well as overhead charges and profit. Reasonable prices shall be inserted as these will be used as a basis for assessment of payment for additional work that may have to be carried out.
- C2.1.1.8 A price or rate is to be entered against each item in the Bill of Quantities, whether the quantities are stated or not. An item against which no price / rate is entered will be considered to be covered by the other prices or rates in the Bill.

- C2.1.1.9 Except where rates only are required, the tenderer shall insert all amounts to be included in his total tendered price in the "Amount" column and show the corresponding total tendered price.
- C2.1.1.10 All prices or rates inserted in the Bill of Quantities shall be EXCLUDING VAT. Provision has been made on the Summary Page of the Bill of Quantities, for the addition of VAT.
- C2.1.1.11 Arithmetical errors of responsive tenders shall be corrected in the manner specified under the Conditions of Tender as well as the Tender Data. **(Refer also CIDB Practice Note No. 2 dated February 2008)**
- C2.1.1.12 The units of measurement described in the Bill of Quantities are metric units. Abbreviations used in the Bill of Quantities are as follows:
- | | |
|--|----------------------------|
| mm = Millimetre | h = hour |
| m = Metre | kg = kilogram |
| km = kilometre | t = ton (1 000kg) |
| 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 | Lab.month = Labourer.Month |
| MPa = Mega Pascal | % = per cent (percentage) |
| Mℓ = Mega litre | kW = kilowatt |
- C2.1.1.13 The quantities set out in the Bill are the estimated quantities of the Works but the Contractor will be required to undertake whatever quantities as may be directed by the Employers Agent from time to time. The Contract Price for the completed Contract shall be computed from the actual quantities of work done, valued at the relevant unit rates and prices.
- C2.1.1.14 An item against which no price / rate is entered or where a word or phrase such as "included" or "provided elsewhere" will be accepted as a rate of nil (R 0,00) having been entered against such items and covered by the other prices or rates in the Bill. Any work executed to which such a payment item applies, shall be measured under the appropriate items in the Priced Bill and valued at a rate of nil (R 0,00). The rate of nil shall be valid irrespective of any change in the quantities during the execution of the Contract.

NOTE: CORRECTION OF ENTRIES MADE BY TENDERER

Any entry made by the tenderer in the Bill of Quantities, 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.

C2.2: BILL OF QUANTITIES

A : PRELIMINARY & GENERAL						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
A		<u>SECTION A : PRELIMINARY AND GENERAL</u>				
A 1	SABS 1200 A	<u>GENERAL</u> as specified in SABS 1200 A and in the project specification				
A 1.1	8.3	<u>SCHEDULED FIXED-CHARGE AND VALUE-RELATED ITEMS :</u>				
A 1.1.1	8.3.1	<u>Contractual Requirements</u>	Sum	1		
A 1.1.2	8.3.2.1	<u>Facilities for Engineer :</u>				
A 1.1.2.1	8.3.2.1 (a)	(a) Furnished offices	Sum	Rate Only		
A 1.1.2.2	8.3.2.1 (c)	(b) Nameboards (2 No.) as per Drawing 2299-T-005	Sum	1		
A 1.1.3	8.3.2.2	<u>Facilities for the Contractor</u>	Sum	1		
A 1.1.4	PSA 8.3.3	<u>Other fixed-charge obligations including compliance with the OH&S Act (Act 85 of 1993): Occupational Health and Safety Measures in the Workplace, Construction Regulations 2014 and all other applicable regulations</u>				
A 1.1.4.1		(a) <u>Provisions of Occupational Health and Developing OH&S Documentation</u>				
A 1.1.4.1.1		(i) Provision for fulfilling OH&S Functions and Obligations	Sum	1		
A 1.1.4.1.2		(ii) Provision for the preparation of a Hazard Identification & Risk Assessment	Sum	1		
A 1.1.4.1.3		(iii) Provision for the development of a Documented Plan for OH&S, Method Statements and/or Safe Work Procedures	Sum	1		
A 1.1.4.1.4		(iv) Provision for the preparation of a Project/Site Specific OH&S Plan	Sum	1		
A 1.1.4.1.5		(v) Provision of the implementation and management of the OH&S Plan	Sum	1		
A 1.1.4.1.6		(vi) Provision for ensuring Contractor(s) compliance to statutory and regulatory requirements, including monitoring & auditing of Contractor(s)	Sum	1		
A 1.1.4.1.7		(vii) Provision for OH&S training, promotion & awareness	Sum	1		
A 1.1.4.1.8		(viii) Provision for emergency preparedness & response plan	Sum	1		
A 1.1.4.1.9		(ix) Provision of personal protective equipment & protective clothing, disinfection equipment / hand sanitiser dispensers, (SABS approved)	Sum	1		
A 1.1.4.1.10		(x) Provision for SANS approved Occupational Health and Safety Signage, Pictograms, Posters and Notices (including the provision of signage displaying hand hygiene, sanitisation, face masks, social distancing and prevention tips)	Sum	1		
A 1.1.4.1.11		(xi) Provision of facilities such as eating area, ablutions, and the like	Sum	1		
A 1.1.4.1.12		(xii) Baseline Medical Examination (pre-employment)	No.	20		
A 1.1.4.1.13		(xiii) Exit Medical Examination	No.	20		
A 1.1.5	8.3.4	<u>Removal of site establishment</u>	Sum	1		
CARRIED FORWARD :						

A : PRELIMINARY & GENERAL						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
A 1.2	8.4	<u>SCHEDULED TIME-RELATED ITEMS</u>				
A 1.2.1		<u>Contractual Requirements</u>	Month	6		
A 1.2.2	8.4.2.1	<u>Facilities for Engineer :</u>				
A 1.2.2.1	8.4.2.1 (a)	(a) Furnished offices	Month	Rate Only		
A 1.2.2.2	8.4.2.1 (c)	(c) Nameboards (2 No) as per Drawing 2299-T-005	Month	6		
A 1.2.3	8.4.2.2	<u>Facilities for Contractor</u>	Sum	1		
A 1.2.4	8.4.3	<u>Supervision for duration of construction</u>	Month	6		
A 1.2.5	8.4.4	<u>Company and head office overhead costs for the duration of the contract</u>	Sum	1		
A 1.2.6	8.4.5	<u>Other time related obligations including Health and Safety Obligations (incl. compliance with the performance specification applicable to Site Management and related Regulations)</u>				
A 1.2.6.1		(a) Maintaining OH&S Functions and Obligations	Month	6		
A 1.2.6.2		(b) Maintaining Hazard Identification & Risk Assessment	Month	6		
A 1.2.6.3		(c) Updating and maintaining the implementation and management of the OH&S Plan	Month	6		
A 1.2.6.4		(d) Maintaining Contractor(s) compliance to statutory and regulatory requirements including screening all workers, and monitoring and auditing of all Contractor(s)	Month	6		
A 1.2.6.5		(e) Ongoing OH&S training, promotion & awareness (incl. regular Toolbox Talks)	Month	6		
A 1.2.6.6		(f) Maintaining Occupational Health and Safety signage, pictograms, posters and notices (including signage displaying hand hygiene, sanitisation, face masks, social distancing and prevention tips)	Month	6		
A 1.2.6.7		(g) Employment of Construction Health & Safety Officer (CHSO) on site	Month	6		
A 1.2.6.8		(h) Employment of Incident Investigator on site	Month	6		
A 1.2.6.9		(i) Employment of Excavation Work Supervisor site	Month	6		
A 1.2.6.10		(j) Employment of First Aider(s) on site	Month	6		
A 1.2.6.11		(k) Maintaining Health and Safety File(s) and handing consolidated file(s) over to the Employer on completion of the Project	Month	6		
A 1.2.7		<u>Community Liason Officer (CLO)</u>	Month	6		
A 1.2.8		<u>PSC Committee Members</u>	Month	6		
A 1.2.9		<u>Provision of Site Security Personnel</u>	Month	6		
A 1.2.10	PSA 8.4.6	<u>Compensation in terms of subclause 5.12.2.4 of the General Conditions of Contract 2015 for delays incurred :</u>				
A 1.2.10.1		(a) Plant	Sum/w_day	2		
A 1.2.10.2		(b) Labour	Sum/w_day	2		
A 1.2.10.3		(c) Supervision	Sum/w_day	2		
CARRIED FORWARD :						

A : PRELIMINARY & GENERAL						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
A 1.2.10.4		(d) Other services, facilities, etc. not covered by items A 1.2.10.1 to A 1.2.10.3	Sum/w_day	2		
A 1.2.11		<u>Environmental Managemant Plan (EMP) as per Project Specifications PA</u>				
A 1.2.11.1		(a) Development of approved EMP	Sum	1		
A 1.2.11.2		(b) Compliance with the requirements of the Environmental Management Plan (EMP)	Month	6		
A 1.3	8.5	<u>SUMS STATED PROVISIONALLY BY ENGINEER :</u>				
A 1.3.1		<u>Additional testing required by the Engineer</u>	Prov Sum	R	50 000.00	
A 1.3.2		<u>Overheads, charges, profits, etc on item A 1.3.1</u>	%	R	50 000.00	
A 1.3.3		<u>Dewatering of Excavation as approved by the engineer</u>	Prov Sum	R	100 000.00	
A 1.3.4		<u>Sum allocated to and for payment to the Contractor for providing and arranging Accredited Training for his labourers (Local labourers only)</u>	Prov Sum	R	10 000.00	
A 1.3.5		<u>Overheads, charges, profits, etc on items A 1.3.3 to A 1.3.4</u>	%	R	110 000.00	
A 1.3.6		<u>Provide Training to Municipal Employees on the operation and maintenance of all equipment supplied and installed</u>	Prov Sum	R	40 000.00	
A 1.3.7		<u>Overheads, charges, profits, etc on item A 1.3.6</u>	%	R	40 000.00	
A 1.4	PSA 8.7	<u>DAYWORK :</u>				
A 1.4.1		(a) <u>Labour : (rates shall include for on costs)</u>				
A 1.4.1.1		(i) Unskilled	hour	40		
A 1.4.1.2		(ii) Semi-skilled	hour	30		
A 1.4.1.3		(iii) Foreman	hour	20		
A 1.4.1.4		(iv) Artisan	hour	20		
A 1.4.1.5		(v) Survey assistant	hour	20		
A 1.4.2		(b) <u>Materials :</u>				
A 1.4.2.1		Allow a provisional sum for materials based on their nett cost	Prov Sum	R	50 000.00	
A 1.4.3		(c) <u>Plant and Equipment: (Rates shall include for on costs)</u>				
A 1.4.3.1		(i) Excavator / Backactor (TLB or equivalent) State make..... and model.....	hour	40		
A 1.4.3.2		(ii) Excavator (On tracks 20t minimum) State make..... and model.....	hour	50		
CARRIED FORWARD :						

A : PRELIMINARY & GENERAL						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
A 1.4.3.3		(iii) Pedestrian type vibrating roller (Bomag 45S or equivalent) State make..... and model.....	hour	20		
A 1.4.3.4		(iv) Motor Grader State make..... and model.....	hour	20		
A 1.4.3.5		(v) Watercart State make..... and model.....	hour	10		
A 1.4.3.6		(vi) Loader State make..... and model.....	hour	10		
A 1.4.3.7		(vii) Trucks 14 ton State make..... and model.....	hour	10		
A 1.4.3.8		(viii) Crane Truck 5t State make..... and model.....	hour	30		
A 1.4.3.9		(ix) Pump including all necessary hoses (50mm dia) State make..... and model.....	hour	20		
A 1.4.3.10		(x) High pressure jetting machine (500mm-500KPa) State make..... and model.....	hour	10		
A 1.4.3.11		(xi) Water Tanker 10 kl potable water State make..... and model.....	hour	10		
A 1.4.3.12		(xii) Water cart, 500L State make..... and model.....	hour	10		
A 1.4.3.13		(xiii) Petrol pipe cutter State make..... and model.....	hour	10		
A 1.4.3.14		(xiv) Portable generator set (5-7 KVA, single phase) State make..... and model.....	hour	20		
CARRIED FORWARD :						

A : PRELIMINARY & GENERAL						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
A 1.4.3.15		(xv) Portable generator set (10-15 kVA, 3-phase) State make..... and model.....	hour	20		
A 1.4.3.16		(xvi) Angle grinder 230 mm State make..... and model.....	hour	10		
A 1.4.3.17		(xvii) Vibrating Roller 10t (Bomag 212 or equivalent) State make..... and model.....	hour	10		
A 1.5	8.8	<u>TEMPORARY WORKS :</u>				
A 1.5.1	8.8.2	<u>Accommodation of Traffic</u>	Sum	1		
A 1.5.2	8.8.4	<u>Existing Services :</u>				
A 1.5.2.1	8.8.4 (a)	(a) Supply or hire of GPR (Ground Penetrating Radar) or similar for the location of existing services	Sum	1		
A 1.5.2.2	8.8.4 (b)	(b) Use of GPR	Day	5		
A 1.5.2.3	8.8.4 (c)	(c) Excavate by hand in soft material to expose existing services	m ³	100		
A 1.6		<u>WORKS UNDERTAKEN BY EXEMTED MICRO ENTERPRISES (EME'S):</u>				
A 1.6.1		Identifying, engaging, appointing and managing EMEs (The tendered amount shall cover all administration, management and company overhead charges, finance costs, risk, profit and all other incidental costs, in full compliance with the Contract). Note: No additional mark-up will be payable to the Contractor for the works undertaken by EMEs other than the rates tendered by the Contractor for the respective work items and activities in the BoQ. No additional P&Gs charges will be payable to the Contractor other than the P&Gs charges tendered by the Contractor. The Contractor shall therefore make provision for the respective EME's P&Gs costs and charges in the P&Gs rates and charges tendered.	%	R 3 500 000.00		
CARRIED FORWARD TO SUMMARY :						

SECTION B : PUMP STATION SUMP AND INLET CHAMBER						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
B		<u>SECTION B : PUMP STATION SUMP AND INLET CHAMBER</u>				
B1	SABS 1200 C	<u>SITE CLEARANCE</u>				
B1.1	8.2.1	Clear and Grub	m ²	900		
B2	SABS 1200 D	<u>EARTHWORKS</u> As specified in SABS 1200 D and in the project specification.				
	8.3.1	<u>Site Preparation</u>				
B2.1	8.3.1.2	Remove topsoil to nominal depth of 100mm, stockpile and maintain	m ²	900		
B2.2	8.3.2	<u>Bulk Excavation</u>				
B2.2.1	8.3.2(a)	(a) <u>Excavate in all materials for Pump Station Site and use for embankment or backfill or dispose, as ordered</u>				
B2.2.1.1		(i) Use for backfill and compact in maximum 150 mm thick layers to 95% Mod AASHTO	m ³	25		
B2.2.1.2		(ii) Dispose of or to stockpile	m ³	10		
	8.3.2(b)	(b) Extra over 2.2.1.1 through 2.2.1.2 for				
B2.2.3		(i) Hard rock excavation	m ³	18		
B2.2.4		(ii) Hand excavation where orderd	m ³	7		
B2.3	8.3.3	<u>Restricted Excavation</u>				
B2.3.1	8.3.3(a)	(a) <u>Excavate for restricted foundations of Pump Station Sump and Inlet Screening Chamber as if in soft material and use for backfill or dispose, as ordered</u>				
B2.3.1.1		(i) Use for backfill and compact in maximum 150 mm thick layers to 95% Mod AASHTO	m ³	650		
B2.3.1.2		(ii) Dispose of or to stockpile	m ³	730		
B2.3.2	8.3.3(a)	(b) <u>Excavate for restricted foundations for Pump Station, MCC and Generator Top Structure building foundations as if in soft material and use for backfill or dispose, as ordered</u>				
B2.3.2.1		(i) Use for backfill and compact in maximum 150 mm thick layers to 95% Mod AASHTO	m ³	14		
B2.3.2.2		(ii) Dispose of or to stockpile	m ³	135		
B2.3.3	8.3.3(b)	(c) <u>Extra over B2.3.1 and B2.3.2 for</u>				
		(i) Hard rock excavation	m ³	764		
		(ii) Hand excavation where orderd	m ³	306		
B2.4	8.3.6	<u>Overhaul in excess of 0.5km</u>				
B2.4.1		(a) Long overhaul (provisional)	m ³ /km	3285		
CARRIED FORWARD :						

SECTION B : PUMP STATION SUMP AND INLET CHAMBER						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
B2.5	8.14	<u>Excavate and dispose of unsuitable material from sides or bottom of restricted foundations, footings and pump station sumps where ordered and replace with:</u>				
B2.5.1		(a) Selected material complying with subclause 3.2.2 of SABS 1200 ME compacted to 95% of modified AASHTO maximum density	m ³	153		
B2.5.2		(b) 15MPa/19mm concrete	m ³	20		
B2.5.3		(c) Selected Rockfill uniformly graded 50mm to 200mm	m ³	60		
B3	SABS 1200 GA	<u>CONCRETE (SMALL WORKS)</u> As specified in SABS 1200 GA and in the project specification <u>Minor works as directed on site:</u> (pump station sump, inlet chamber, plinths, foundations and the like)				
B3.1	8.2	<u>Formwork:</u>				
B3.1.1		<u>Vertical</u>				
B3.1.1.1	8.2.2	(a) Smooth outside of sump walls and outside inlet screen chamber walls	m ²	245		
B3.1.1.2	8.2.2	(b) Smooth sump walls inside	m ²	270		
B3.1.1.3	8.2.2	(c) Smooth outside face of sump roof slab above ground level	m ²	15		
B3.1.1.4	8.2.2	(d) Smooth outside face of sump floor slab - under top structure walls	m ²	25		
B3.1.1.5	8.2.2	(e) Smooth sides of openings in sump roof slab	m ²	15		
B3.1.2		<u>Horizontal</u>				
B3.1.2.1	8.2.2	(a) Smooth soffit of sump roof slab	m ²	80		
B3.1.3	8.2.4	<u>Box Out Holes / form Voids</u>				
B3.1.3.1	8.2.4 (b)	(a) <u>Small, other than circular of area up to and including 0.1 m²</u>				
B3.1.3.1.1		(i) 0m to 0.5m deep	No	Rate Only		
B3.1.3.2	8.2.4 (d)	(b) <u>Large, other than circular of area over 0.1m² up to and including 0.5m²</u>				
B3.1.3.2.1		(i) 0.5m to 1m deep	No	1		
B3.2	8.3	<u>Reinforcement:</u>				
B3.2.1	8.3.1	(a) Mild Steel bars of all diameters	kg	2000		
B3.2.2	8.3.1	(b) High Tensile Steel bars of all diameters	kg	23200		
B3.2.3	8.3.2	(c) High tensile Steel Reinforcing Mesh (Ref 395)	m ²	100		
B3.3	8.4	<u>Concrete:</u>				
B3.3.1	8.4.3	(a) <u>Strength concrete:</u>				
B3.3.1.1		(i) 35MPa/19mm - (Inlet Chamber Platform)	m ³	1		
B3.3.1.2		(ii) 35Mpa/19mm				
B3.3.1.2.1		a) Sump Roof slab	m ³	16		
B3.3.1.2.2		b) Inlet chamber roof slab	m ³	Rate Only		
CARRIED FORWARD:						

SECTION B : PUMP STATION SUMP AND INLET CHAMBER						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
B3.3.1.3		(iii) 35MPa/19mm - (Watertight) complete with xypex admix				
B3.3.1.3.1		a) Sump Floor	m³	35		
B3.3.1.3.2		b) Sump Walls	m³	75		
B3.3.1.3.3		c) Inlet Chamber Walls	m³	15		
B3.3.1.3.4		d) Inlet Chamber Floor	m³	3		
B3.3.1.4		(iv) 15MPa/19mm - (blinding)	m³	5		
B3.3.2	8.4.4	(b) <u>Unformed surface finishes:</u>				
B3.3.2.1	8.4.4 (a)	(i) Wood-floated finish (Sump Roof Soffit)	m²	80		
B3.3.2.2	8.4.4 (b)	(ii) Steel-floated finish (Sump Floor)	m²	95		
B3.3.2.3	8.4.4 (b)	(iii) Steel-floated finish (Inlet Chamber Roof)	m²	Rate Only		
B3.3.2.4	8.4.4 (b)	(iv) Steel-floated finish (Benching in Inlet Chamber)	m²	10		
B3.3.2.5	8.4.4 (b)	(v) Steel-floated finish (Sump Roof Slab external exposed concrete)	m²	90		
B3.3.2.6	8.4.4 (b)	(vi) Steel-floated finish (Inlet Chamber Platform)	m²	10		
B3.4	PSG 8.5	<u>Joints</u>				
B3.4.1		(a) Horizontal wall construction joint ABE (or similar approved) 250mm uPVC Waterstop	m	125		
B3.4.2		(b) SikaSwell A-2010 (or similar approved) Water bar	m	125		
B3.4.3		(c) Roof "sliding" joint 350mm wide with 2 layers of 500 micron DPC	m	65		
B3.5	PSGA 8.7	<u>Grouting</u>				
B3.5.1		Grouting pipe through concrete				
B3.5.1.1		(a) 110mm diameter pipe	No	2		
B3.5.1.2		(b) 160mm diameter pipe	No	Rate Only		
B3.5.1.3		(c) 250 mm diameter pipe	No	2		
B3.5.1.4		(d) 315mm diameter pipes	No	4		
B3.6	PSGA 8.9	<u>Additional Tests on concrete as instructed by engineer</u>				
B3.6.1		(a) Core strength test	per test	Rate Only		
B3.6.2		(b) Sets of three cubes per test	per test	Rate Only		
B3.7	PSGA 8.10	<u>Painting of Pump Station Sump</u>				
B3.7.1		(a) Prepare concrete surface of pump station sumps and paint with Sikaguard 63 N - minimum dry film 450 micron, or similar approved complete	m²	410		
B3.8	PSGA 8.11	<u>Testing of watertightness and disinfection as per PSGA 7.4</u>	Prov Sum	R 20 000.00		
B4		<u>PUMP STATION ANCILLARIES</u>				
B4.1		<u>Shut-off sluice valve in sump</u>	Prov Sum	R 30 000.00		
CARRIED FORWARD:						

SECTION B : PUMP STATION SUMP AND INLET CHAMBER						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
B 4.2		<u>Connecting Pipe between Inlet Screening Chamber and Sump</u>				
B4.2.1	LD 8.2.1	(a) 315mm Ø Class 34 uPVC Pipe - Excavate, Supply, Lay, Bed and Test	m	12		
B4.2.2	LD 8.2.2	(b) 1000mm Ø Precast Sewer Roca Manholes between Inlet Screening Chamber and Sump complete with benching, sealing and medium duty type 4 cover slab and frame	No	2		
B4.2.3		(c) 300mm Ø Stainless Steel Grade 304 Spool Piece (Flange to Open End Length = 2000mm)	No	2		
B4.2.4		(d) 300mm Ø Flanged Wedge Gate Valve	No	2		
B4.2.5		(e) 315mm Ø Cast Iron Flange Adaptor	No	2		
B4.3		<u>Sump Covers</u> Supply and install Polymer Concrete Cover & Frame to SABS 1882/2003 for openings in sump roof slab complete including manufactured steel bar and locking mechanism				
B4.3.1		(i) Maverick Type 10A	No	4		
B4.4		<u>Manufacture, supply and install Fiberglass Grating for inlet screening chamber cover complete with frame and hinges for access</u>	Prov Sum	R	50 000.00	
B4.5		<u>Manufacture, supply and install Screen Grid for Inlet screening chamber complete with frame, bolts and hinges</u>	Prov Sum	R	30 000.00	
CARRIED FORWARD TO SUMMARY :						

SECTION C : PUMP STATION TOP STRUCTURE						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
C 1		<u>SECTION C : PUMP STATION TOP STRUCTURE</u>				
C 1.1	SABS 1200 D	<u>EARTHWORKS</u> As specified in SABS 1200 D and in the project specification.				
C 1.1.1	8.3.3	<u>Restricted Excavation</u> Note: Excavation volume for building foundation is included in Section B				
C 1.2	SABS 1200 GA	<u>CONCRETE (SMALL WORKS)</u> As specified in SABS 1200 GA and in the project specification				
C 1.2.1	8.2	<u>FORMWORK</u>				
C 1.2.1.1	8.2.1	<u>Rough, Vertical Plane</u>				
C 1.2.1.1.1		- Sides of Footing	m²	20		
C 1.2.1.2	8.2.2	<u>Smooth, Vertical Plane</u>				
C 1.2.1.2.1		- Sides of Plinths	m²	8		
C 1.2.1.2.2		- Sides of Beams - 270mm high	m²	24		
C 1.2.1.2.3		- Sides of Cable Trenches	m²	Rate Only		
C 1.2.1.2.4		- Sides of Columns - 270mm x 270mm	m²	40		
C 1.2.1.2.5		- External Ramps to Door Entrances	m²	22		
C 1.2.2	8.3	<u>REINFORCING</u>				
C 1.2.2.1	8.3.1	<u>Mild Steel Bars</u>				
C 1.2.2.1.1		- 8mm diameter	kg	200		
C 1.2.2.2	8.3.1	<u>High-tensile Steel Bars</u>				
C 1.2.2.2.1		- 10mm diameter	kg	200		
C 1.2.2.2.2		- 12mm diameter	kg	900		
C 1.2.2.2.3		- 16mm diameter	kg	2400		
C 1.2.2.3	8.3.2	<u>Mesh</u>				
C 1.2.2.3.1		- Ref 395	m²	1100		
C 1.2.3	8.4	<u>CONCRETE</u>				
C 1.2.3.1	8.4.3	<u>Strength concrete, grade 30MPa/19mm</u>				
C 1.2.3.1.1		- Pump Station, MCC and Generation Room Footings	m³	10		
C 1.2.3.1.2		- Pump Station, MCC and Generator Room Floor	m³	20		
C 1.2.3.1.3		- Pump Station Plinths	m³	6		
C 1.2.3.1.4		- Pump Station Columns	m³	4		
C 1.2.3.1.5		- External Ramps to Door Entrances	m³	8		
C 1.2.3.1.6		- Pump Station Beam	m³	2		
C 1.2.3.2		<u>Final floor screed of 20mm after generator and panel have been installed (area)</u>	m³	2		
CARRIED FORWARD :						

SECTION C : PUMP STATION TOP STRUCTURE						
ITEM NO	PAYMENT REFERS		UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
C 1.2.3.3	8.4.4	<u>Unformed Surface Finishes</u>				
C 1.2.3.3.1	8.4.4 (b)	(a) Steel-floated finish				
C 1.2.3.3.1.1		- Floor of Pump Station, MCC and Generator Room	m ²	95		
C 1.2.3.3.1.2		- Top of Pump Plinths	m ²	15		
C 1.2.3.4	8.5	<u>Floor Joints</u>				
C 1.2.3.4.1		- 10mm Jointex filler with tear-off strip, sealed with sikaflex 11FC+	m	60		
C 1.3	PE 5	<u>BUILDING WORKS</u>				
C 1.3.1		<u>Brick Work</u>				
C 1.3.1.1		- 270mm double brick walls (50mm Cavity). "Brickforce" reinforcing every 3rd course	m ²	280		
C 1.3.2		<u>Plaster Work</u>				
C 1.3.2.1		- 12mm thick plaster to internal faces of walls	m ²	210		
C 1.3.3		<u>Waterproofing</u>				
C 1.3.3.1		- One layer of 250 micron "Consol Plastics Gunplas USB Green" waterproof sheeting sealed at laps with "Gunplas Pressure Sensitive Tape" under surface beds complete	m ²	95		
C 1.3.3.2		- Derbigum waterproofing system to be applied by an accredited applicator to reinforced concrete roof as per manufacturers specification	m ²	100		
C 1.3.3.3		- Damp proof course on walls complying with SABS 952 complete	m	55		
C 1.3.3.4		- Torch-on waterproof concrete roof on Pump Station, MCC and Generator Buildings complete	m ²	100		
C 1.3.3.5		- Apply two coats of Sikaguard 63N (As per manufacturers specifications) for the generator room floor and first 150mm of walls complete	m ²	30		
C 1.3.4		<u>Pre-stressed fabricated lintels complying with SABS 1504</u>				
C 1.3.4.1		(i) 110 x 70mm Lintels in lengths not exceeding 3m	No	18		
C 1.3.4.2		(ii) 110 x 150mm Lintels in lengths not exceeding 3m	No	6		
C 1.3.5		<u>Roofing</u>				
C 1.3.5.1		- Supply and Install Shukuma Roof Slab for Pump Station, MCC and Generator Buildings	m ²	100		
C 1.3.6		<u>Earth filling (G7) supplied by the contractor, compacted to 93% Mod AASHTO density</u>				
C 1.3.6.1		(i) Under floors	m ³	25		
C 1.3.6.2		(ii) Backfilling to trenches, holes, etc	m ³	Rate Only		
C 1.3.7		<u>Earth filling (G5) imported from commercial sources, compacted to 93% Mod AASHTO density</u>				
C 1.3.7.1		(i) Under floors	m ³	90		
CARRIED FORWARD :						

SECTION C : PUMP STATION TOP STRUCTURE						
ITEM NO	PAYMENT REFERS		UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
C 1.4		<u>DOORS AND JOINERY</u>				
C 1.4.1		<u>Double Transformer Doors</u>				
C 1.4.1.1		(i) 1525 x 2135mm approved galvanised Transformer doors (1.6mm steel) complete with 100mm heavy duty 4.0mm thick flanged brass hinges, pull handle, padlatch and barrel bolts to double doors as well as louvre vest lined on the inside with a vermin roof mesh screen.	No	2		
C 1.4.1.2		(ii) 1525 x 3000mm approved galvanised Transformer doors (1.6mm steel) complete with 100mm heavy duty 4.0mm thick flanged brass hinges, pull handle, padlatch and barrel bolts to double doors as well as louvre vest lined on the inside with a vermin roof mesh screen.	No	1		
C 1.5		<u>IRONMONGERY</u>				
C 1.5.1		<u>Locks</u>				
C 1.5.1.1		Approved three lever lockset	No	3		
C 1.6		<u>METALWORK</u>				
C 1.6.1		<u>Louvres</u>				
C 1.6.1.1		- TROX Model Series WG (or equivalent approved) 1320mm (H) x 1585mm (W)	No	6		
C 1.7		<u>PAINTWORK</u>				
C 1.7.1		<u>One coat bonding liquid and two coats interior quality washable white PVA emulsion paint</u>				
C 1.7.1.1		(i) On internal plastered walls	m²	210		
C 1.7.1.2		(ii) On narrow widths	m²	50		
CARRIED FORWARD TO SUMMARY:						

SECTION D : MECHANICAL INSTALLATIONS						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
D	PC	<u>SECTION D : MECHANICAL INSTALLATIONS</u>				
D1	PC 3	<u>PUMPS</u>				
D1.1		<u>Supply and install Gormann Rupp VS6 A3S-B pump on galvanised direct coupled base / Guard coupled to 55kw 4p WEG IE3 FM Electric motor + GRP 33-07 ARV complete</u>	No	2		
D1.2	PC 3.9	<u>Commission Pump Station</u>				
D1.2.1		(i) Testing and Commissioning of all Mechanical equipment	Sum	1		
D2	PC 2.8	<u>PIPEWORK, VALVES AND FITTINGS</u>				
D2.1		<u>Suction Pipework</u>				
D2.1.1		Supply, delivery and installation of all 250mm 304L suction pipework from sump to suction end of pump as per drawing 2299-T-400 including all gaskets and fasteners, made according to good engineering practices. Price includes bracketing members for pipework complete.	Sum	1		
D2.2		<u>Delivery Pipework</u>				
D2.2.1		Supply, delivery and installation of all 250mm 304L delivery pipework from delivery end of pumps to connection of 250mm Ø uPVC rising main including all gaskets and fasteners, all AVK swing-check valves c/w counter-levers AND AVK RSV gate valves c/w handwheels, all pipework made according to good engineering practices. Price includes bracketing members for pipework complete.	Sum	1		
D2.3		<u>Air valve</u>				
D2.3.1		Supply, delivery and install a flanged Airvalve (Vent-O-Mat Series RGX - model 050 RGX X 16 0 1 or equivalent) complete with stainless steel bolts and nuts and mount with flanged valve on a flanged tee piece in the pipe manifold complete.	No	2		
D3		<u>PUMPSTATION ANCILLARY WORKS</u>				
D3.1		<u>Overhead I-Beam, Block and Tackle System</u>	Prov Sum	R 200 000.00		
CARRIED FORWARD TO SUMMARY :						

SECTION E: ELECTRICAL INSTALLATION						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
E	PD	<u>SECTION E : ELECTRICAL INSTALLATION</u>				
E 1		<u>CIVIL WORKS RELATED TO ELECTRICAL BULK SERVICES</u>				
E1.1		<u>TRENCH EXCAVATION</u>				
E1.1.1		400mm wide x 600mm deep	m	120		
E1.1.2		Select from excavation materials and install a sandbedding in trench - 300mm deep and 400mm wide (150mm above and 150mm deep below the cable).	m³	14		
E1.1.3		Backfilling of trenches with excavated soil after cables have been laid and tested, complete with compacting of backfilling, levelling off of trenches and removing and dumping of surplus excavated material.	m³	14		
E 1.2		<u>SLEEVES</u>				
E 1.2.1		<u>Supply and install the following uPVC Class 6 sleeves, complete:</u>				
E 1.2.1.1		- Ø 160mm diameter	m	Rate Only		
E 1.2.1.2		- Ø 110mm diameter	m	51		
E 1.2.1.3		- Ø 50mm diameter	m	20		
E 1.3		<u>DANGER TAPE</u>				
E 1.3.1		<u>Supply and install danger tape:</u>				
E 1.3.1.1		- Danger tape	m	120		
E 2		<u>ELECTRICAL EQUIPMENT: BUILDING INSTALLATION</u>				
E 2.1		<u>CABLES, WIRING AND EARTHWIRE</u>				
E 2.1.1		<u>Supply and install LV aluminium armoured PVC/SWA/PVC cables as per specifications and drawings provided, including glands, shrouds and termination.</u>				
E 2.1.1.1		(a) 95mm² x 4 core Alu SWA/PVC/SWA cable				
E 2.1.1.1.1		- Supply	m	110		
E 2.1.1.1.2		- Install	m	110		
E 2.1.1.1.3		- Terminations	No	4		
E 2.1.1.2		(b) 70mm² x 4 core Alu SWA/PVC/SWA cable				
E 2.1.1.2.1		- Supply	m	Rate Only		
E 2.1.1.2.2		- Install	m	Rate Only		
E 2.1.1.2.3		- Terminations	No	Rate Only		
E 2.2		<u>ROUTE MARKERS</u>				
E 2.2.1		<u>LV cable markers with information labels</u>				
E 2.2.1.1		- Supply	No	10		
E 2.2.1.2		- Install	No	10		
CARRIED FORWARD :						

SECTION E: ELECTRICAL INSTALLATION						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
E 2.3		<u>CABLES FOR POWER DISTRIBUTION</u>				
E 2.3.1		<u>Supply and install unarmoured PVC sheathed LV Copper cables to various power supply points</u>				
E 2.3.1.1		(a) 25mm ² x 4 core cable Cu				
E 2.3.1.1.1		- Supply	m	20		
E 2.3.1.1.2		- Install	m	20		
E 2.3.1.1.3		- Terminations	No	4		
E 2.3.1.2		(b) 4mm ² x 4 core cable Cu				
E 2.3.1.2.1		- Supply	m	125		
E 2.3.1.2.2		- Install	m	125		
E 2.3.1.2.3		- Terminations	No	8		
E 2.4		<u>WIRING</u>				
E 2.4.1		<u>Supply and install PVC insulated conductors installed in conduits or wire trunking. Earth conductors shall be green PVC insulated (including off-cuts and waste)</u>				
E 2.4.1.1		- 4mm ²	m	80		
E 2.4.1.2		- 2,5mm ²	m	650		
E 2.4.1.3		- 1,5mm ²	m	975		
E 2.4.2		<u>Supply and install bare earthwire in sleeves or in trenches</u>				
E 2.4.2.1		- 35mm ²	m	110		
E 2.4.2.2		- 25mm ²	m	10		
E 2.4.2.3		- 16mm ²	m	Rate Only		
E 2.4.2.4		- 10mm ²	m	20		
E 2.4.2.5		- 4mm ²	m	125		
E 2.4.3		<u>Supply and install insulated earthwire in conduit or in trenches</u>				
E 2.4.3.1		- 4mm ²	m	20		
E 2.4.3.2		- 2,5mm ²	m	325		
E 2.4.3.3		- 1,5mm ²	m	488		
E 2.5		<u>CONDUIT AND ACCESSORIES</u>				
E 2.5.1		<u>CONDUIT</u>				
E 2.5.1.1		<u>Supply and install, including bends, saddles and all accessories</u>				
E 2.5.1.1.1		(a) Galvanised type:				
E 2.5.1.1.1.1		- 32mm diameter conduit	m	40		
E 2.5.1.1.1.2		- 25mm diameter conduit	m	80		
E 2.5.1.1.1.3		- 20mm diameter conduit	m	60		
E 2.5.1.1.2		(b) PVC Type:				
E 2.5.1.1.2.1		- 32mm diameter conduit	m	40		
E 2.5.1.1.2.2		- 25mm diameter conduit	m	350		
E 2.5.1.1.2.3		- 20mm diameter conduit	m	238		
CARRIED FORWARD :						

SECTION E: ELECTRICAL INSTALLATION						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
E 2.5.2		<u>CONDUIT BOXES</u>				
E 2.5.2.1		<u>Supply and install</u>				
E 2.5.2.1.1		(a) Galvanised type:				
E 2.5.2.1.1.1		- 100mm x 100mm x 50mm (4" x 4" box)	No	20		
E 2.5.2.1.1.2		- 100mm x 50mm x 50mm (4" x 2" box)	No	16		
E 2.5.2.1.1.3		- 50 mm Round conduit box	No	40		
E 2.5.2.1.2		(b) PVC Type:				
E 2.5.2.1.2.1		- 100mm x 100mm x 50mm (4" x 4" box)	No	12		
E 2.5.2.1.2.2		- 100mm x 50mm x 50mm (4" x 2" box)	No	8		
E 2.5.2.1.2.3		- 50 mm Round conduit box	No	20		
E 2.5		<u>MOULDED CASE CIRCUIT BREAKERS BY ABB OR SCHNEIDER. RATES TO BE FOR</u>				
E 2.5.1		<u>SITE OR FACTORY WORKS</u>				
E 2.5.1		<u>160 A Triple Pole, 25kA</u>				
E 2.5.1.1		- Supply	No	1		
E 2.5.1.2		- Install	No	1		
E 2.5.2		<u>Busbar Extensions for cable terminations</u>	No	3		
E 2.5.3		<u>Allow for 25mm² copper tails to busbars</u>	No	3		
E 2.6		<u>LUMINAIRES, SUPPLIED AND FITTED</u>				
E 2.6.1		<u>Supply, connect and install light fixtures and poles. Note: All luminaires shall bare the</u>				
		<u>SABS mark of compliance.</u>				
E 2.6.1.1		<u>Surface mounted vapour proof LED light fitting, IP 65 rated. Request lighting Nimbis</u>	No	10		
		<u>38WLED, 4000K or better approved</u>				
E 2.6.1.2		<u>External surface mounted wall light with eyelid, ECG and 13W LED IP65 rated. (As</u>	No	7		
		<u>per Regent Lighting Giza Eyelid or better approved)</u>				
E 2.6.1.3		<u>Round ceiling mounted bulkhead with LED lamp including high pressure die-cast</u>	No	4		
		<u>aluminium base and trim ring, opal high impact acrylic diffuser and IP65 protection</u>				
E 2.6.1.4		<u>Exterior LED floodlight : Request lighting, Gamma 15WLED lamp.</u>	No	8		
A 1.4.2.1		<u>4000K, IP65 rated or better approved. Fitting to include motion sensor</u>				
E 2.6.1.5		<u>3m galvanized pole with spigot and baseplate</u>	No	4		
E 2.6.1.6		<u>Daylight switch including York Box and Clear Cover</u>	No	1		
E 2.6.1.7		<u>Motion Sensor</u>	No	5		
E 2.7		<u>LIGHT SWITCHES</u>				
CARRIED FORWARD :						

SECTION E: ELECTRICAL INSTALLATION						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
E 2.7.1		<u>Supply and install light switches complete with cover plates, connected to wiring and fitted in switch box</u>				
E 2.7.1.1		- 16A One lever, one way, weatherproof, IP65 switch	No	3		
E 2.7.1.2		- 16A, 1L, 1W Switch	No	2		
E 2.8		<u>SWITCH SOCKET OUTLETS</u>				
E 2.8.1		<u>Supply and installation of switched socket outlets complete with cover plates connected to wiring and fitted in box. Switchgear to be Crabtree, CBI or better approved.</u>				
E 2.8.1.1		(a) 16A, 1 x 164-1 and 2 x 164-2 switched weatherproof socket outlets installed in 4 x 4 box.				
E 2.8.1.1.1		- Supply	No	5		
E 2.8.1.1.2		- Install	No	5		
E 2.8.1.2		(b) 32A 5 Pin (3P+N+E) wall mounted socket outlet, IP56 rated				
E 2.8.1.2.1		- Supply	No	1		
E 2.8.1.2.2		- Install	No	1		
E 2.9		<u>ISOLATORS</u>				
E 2.9.1		<u>Supply and installation of isolators for safety and maintenance purposes of mechanical equipment</u>				
E 2.9.1.1		(a) 100A tripple pole weather proof surface mounted isolator	No	2		
E 2.9.1.2		(b) 30A Tripple tripple pole weather proof surface mounted isolator	No	2		
E 2.9.1.3		(c) 30A double pole weatherproof surface mounted	No	3		
E 2.10		<u>CABLE TRAYS & LADDERS</u>				
E 2.10.1		<u>Supply and install cable ladder complete with all accessories and fixtures</u>				
E 2.10.1.1		(a) 300mm wide heavy duty cable ladder				
E 2.10.1.1.1		- Supply	m	Rate Only		
E 2.10.1.1.2		- Install	m	Rate Only		
E 2.10.1.2		(b) 229mm wide medium duty cable tray				
E 2.10.1.2.1		- Supply	m	18		
E 2.10.1.2.2		- Install	m	18		
E 2.10.1.3		(c) 152mm wide medium duty cable tray				
E 2.10.1.3.1		- Supply	m	25		
E 2.10.1.3.2		- Install	m	25		
E 2.10.1.4		(d) 127mm x 76mm (OL8000/P8000) wiring ducts with covers				
E 2.10.1.4.1		- Supply	m	15		
E 2.10.1.4.2		- Install	m	15		
CARRIED FORWARD :						

SECTION E: ELECTRICAL INSTALLATION						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
E 2.11		<u>BACKUP POWER SUPPLY</u>				
E 2.11.1		<u>GENERATOR</u>				
E 2.11.1.1		Supply and install 100 kVA Prime Rated diesel generator including Deep Sea 7310 controller, diesel engine, alternator, main circuit breaker inside cabinet and all accessories. The generator set shall include a sound proof canopy which shall comply with SANS 140, SANS 717, specification and all local municipal by-laws. The plinth tank shall be double wound and have a min capacity of 500 litres. The base tank and shall be included as part of the set. The 160A change-over switch to be included as part of the AMF panel and shall be included as part of the generator unit. Battery charger, jacket heater and external E-stop to be included as part of the set.				
E 2.11.1.1.1		- Supply	Item	1		
E 2.11.1.1.2		- Install	Item	1		
E 2.11.1.1.3		- Commission	Item	1		
E 2.11.1.1.4		- Earthing of generator set	Item	1		
E 2.11.1.1.5		- Delivery to site	Item	1		
E 2.11.1.1.6		- 3m stainless steel exhaust pipe	Item	1		
E 2.11.1.1.7		- Radiator Cowl (1.5m x 1.6m x 2m)	Item	1		
E 2.12		<u>DIESEL FUEL</u>				
E 2.12.1		<u>Diesel Fuel, 50ppm for the generator set</u>				
E 2.12.1.1		- Supply to site and fill	ℓ	500		
E 3		<u>PUMP CONTROL AND INSTRUMENTATION</u>				
E 3.1		<u>MCC</u>				
E 3.1.1		This part of the bill is for the ordering, delivery to site, installation, testing and commissioning of a low voltage Motor Control Centre (MCC) complete with circuit breakers. Including testing and commissioning.				
E 3.1.1.1		- Supply low voltage floor standing MCC, bolted and assembled complete with equipment as per line diagram drawing and BOQ items in section below.	No	1		
E 3.1.1.2		- Delivery and installation of MCC (LV)	No	1		
E 3.1.1.3		- Complete earthing of MCC	No	1		
E 3.1.1.4		- Testing and commissioning of MCC	Item	1		
E 3.1.1.5		- Complete earthing of Pump Station building	Item	1		
E 3.2		<u>PUMP CONTROL CABLING</u>				
E 3.2.1		<u>Supply, install in cabinet, connect and commission all equipment and cabling for the switchgear to the following motors and sensors. Supply, deliver, install and commission the following instrumentation cabling:</u>				
E 3.2.1.1		(a) LV Cables between MCC and control instrumentation, including copper earthing, glands shrouds and termination:				
E 3.2.1.1.1		(i) 1.5mm x 4C SWA				
E 3.2.1.1.1.1		- Supply	m	140		
E 3.2.1.1.1.2		- Install	m	140		
CARRIED FORWARD :						

SECTION E: ELECTRICAL INSTALLATION						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
E 3.2.1.1.2		(ii) 1.5mm x 3C SWA				
E 3.2.1.1.2.1		- Supply	m	45		
E 3.2.1.1.2.2		- Install	m	45		
E 3.2.1.1.3		(iii) 1mm x 1 pair Dekabon				
E 3.2.1.1.3.1		- Supply	m	85		
E 3.2.1.1.3.2		- Install	m	85		
E 3.2.1.1.4		(iv) 0.22mm² x 4 core Maylor control cable				
E 3.2.1.1.4.1		- Supply	m	110		
E 3.2.1.1.4.2		- Install	m	110		
E 3.3		<u>VSD</u>				
E 3.3.1		<u>ABB VSD for 55 kW motors. VSD to include input chokes for harmonic control.</u>				
E 3.3.1.1		- Supply	No	2		
E 3.3.1.2		- Install	No	2		
E 3.3.1.3		- Commission and program	No	2		
E 3.4		<u>MOTOR SENSORS AND DISPLAY</u>				
E 3.4.1		<u>Supply and install sensors to 55kW motors for monitoring and protection purposes</u>				
E 3.4.1.1		(a) Front end bearing temperature sensor				
E 3.4.1.1.1		- Supply	No	2		
E 3.4.1.1.2		- Install	No	2		
E 3.4.1.2		(b) Rear end bearing temperature sensor				
E 3.4.1.2.1		- Supply	No	2		
E 3.4.1.2.2		- Install	No	2		
E 3.4.1.3		(c) Motor winding temperature sensor				
E 3.4.1.3.1		- Supply	No	2		
E 3.4.1.3.2		- Install	No	2		
E 3.4.1.4		(d) Motor Vibration Sensor				
E 3.4.1.4.1		- Supply	No	2		
E 3.4.1.4.2		- Install	No	2		
E 3.4.2		<u>Programmable Logic Controller (PLC)</u>				
E 3.4.2.1		(a) Supply and Install PFC200, 2nd Generation, 2 x Ethernet ports, RS-232/-485 to control the two motors or similarly approved				
E 3.4.2.1.1		- Supply	Sum	1		
E 3.4.2.1.2		- Install	Sum	1		
E 3.4.2.1.3		- Commission	Sum	1		
E 3.4.2.2		(b) Program	Sum	1		
E 3.4.2.2.1		(i) 16-channel digital input module; DC 24 V				
E 3.4.2.2.1.1		- Supply and install	No	2		
E 3.4.2.2.2		(ii) 16-channel digital output module; DC 24 V				
E 3.4.2.2.2.1		- Supply and install	No	2		
E 3.4.2.2.3		(iii) 16-channel analog input module; DC 24 V				
E 3.4.2.2.3.1		- Supply and install	No	1		
CARRIED FORWARD :						

SECTION E: ELECTRICAL INSTALLATION						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
E 3.4.2.3		(c) HMI Panel Display				
E 3.4.2.3.1		(i) 10.1" wide TFT, Android, ETHx2, USB A&B, MEM Card				
E 3.4.2.3.1.1		- Supply	Sum	1		
E 3.4.2.3.1.2		- Install	Sum	1		
E 3.4.2.3.1.3		- Commission	Sum	1		
E 3.4.2.3.1.4		- Program	Sum	1		
E 3.4.2.4		(d) Remote Access & Monitoring				
E 3.4.2.4.1		(i) Industrial Internet remote IIoT Gateway and Remote Access Router				
E 3.4.2.4.1.1		- Supply	Sum	1		
E 3.4.2.4.1.2		- Install	Sum	1		
E 3.4.2.4.1.3		- Commission	Sum	1		
E 3.4.2.4.1.4		- 4G EU Extension Card	Sum	1		
E 3.4.2.4.1.5		- 4G LTE SISO Medium Gain Antenna with 2m cable (straight connection)	Sum	1		
E 3.4.3		<u>Supply and install an 2kVA pure sine wave UPS with 30 minutes back up time inside a dedicated MCC cubicle, including all wires and connections</u>				
E 3.4.3.1		- Supply	Item	1		
E 3.4.3.2		- Install	Item	1		
E 3.4.3.3		- Commission	Item	1		
E 3.4.3.4		- Remote E-Stop with cover mounted on goose neck adjacent to pump motor	Item	2		
E 3.4.5		<u>Level Control</u>				
E 3.4.5.1		(a) Mobrey MCU900 installed complete with ultrasonic sensors in wetwell and electronic display on MCC	Item	2		
E 3.4.5.2		(b) Ball valve float installed complete in wetwell and wired to PLC	Item	6		
E 3.4.5.3		(c) Provisional Sum for installation of a telemetry contact system and Scada setup by a specialist	Prov Sum	R	65 000.00	
E 4		<u>SUNDRIES</u>				
E 4.1		Allow for all costs and expenses in connection with the following:				
E 4.1.1		<u>Providing "as built" drawings</u>	Item	1		
E 4.1.2		<u>Preparation and submission of Electrical DB drawings for approval by the Engineer/Client</u>	Item	1		
E 4.1.3		<u>Providing 3 final copies of the Installation, Operation and Maintenance Manual prior to the issue of the Taking-Over Certificate</u>	Item	1		
E 4.1.4		<u>Provision of all Test Certificates and Certificate of Compliance in terms of the Code of Practice for Wiring of Premises</u>	Item	2		
E 4.1.5		<u>Checking, starting up, testing and commissioning of the Complete Works</u>	Item	1		
E 4.1.6		<u>Compliance with the requirements of the Occupational Health and Safety</u>	Item	1		
E 4.1.7		<u>Maintaining the Works during the Defects Notification Period</u>	Item	1		
CARRIED FORWARD :						

SECTION E: ELECTRICAL INSTALLATION						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
E 4.1.8		<u>Warning signage</u>	Item	1		
E 4.1.9		<u>Other expenses incurred in complying with the requirements of the Scope of Work not included above (Specify)</u>				
E 4.1.9.1		(a)	Item			
E 4.1.9.2		(b)	Item			
E 4.1.9.3		(c)	Item			
E 4.3		<u>SECURITY INFRASTRUCTURE</u>				
E 4.3.1		<u>Pepper gas system</u>	Prov Sum	R	66 000.00	
E 4.3.2		<u>Electric Fence installation</u>	Prov Sum	R	40 000.00	
E 4.3.3		<u>Alarm installation</u>	Prov Sum	R	27 000.00	
E 4.3.4		<u>CCTV installation</u>	Prov Sum	R	68 000.00	
E 5		<u>OVERHEAD LINE INFRASTRUCTURE</u>				
E 5.1		<u>TIME RELATED</u>				
E 5.1.1		<u>Allow for all TIME related items of the Principal Building Agreement as well as any special requirements relating to this sub-contract</u>				
E 5.1.1.1		List all TIME related items as required - specify				
E 5.1.1.1.1		(a)	Sum	1		
E 5.1.1.1.2		(b)	Sum	1		
E 5.1.1.1.3		(c)	Sum	1		
E 5.1.1.1.4		(d)	Sum	1		
E 5.2		<u>FIXED CHARGE RELATED</u>				
E 5.2.1		<u>Allow for all FIXED charge related items in terms of the Principal Building Agreement as well as any special requirements relating to this sub-contract</u>				
E 5.2.1.1		List all FIXED charge related items as required - specify				
E 5.2.1.1.1		(a)	Sum	1		
E 5.2.1.1.2		(b)	Sum	1		
E 5.2.1.1.3		(c)	Sum	1		
E 5.2.1.1.4		(d)	Sum	1		
E 5.3		<u>VALUE RELATED</u>				
E 5.3.1		<u>Allow for all VALUE charge related items in terms of the Principal Building Agreement as well as any special requirements relating to this sub-contract</u>				
E 5.3.1.1		List all VALUE charge related items as required - specify				
E 5.3.1.1.1		(a)	Sum	1		
E 5.3.1.1.2		(b)	Sum	1		
E 5.3.1.1.3		(c)	Sum	1		
E 5.3.1.1.4		(d)	Sum	1		
E 6		<u>CIVIL WORKS RELATED TO BULK ELECTRICAL WORKS</u>				
E 6.1		<u>TRENCH EXCAVATION</u>				
E 6.1.1		<u>400mm wide x 600mm deep in pickable soil</u>	m	100		
CARRIED FORWARD :						

SECTION E: ELECTRICAL INSTALLATION						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
E 6.1.2		Select from excavation materials and install a sandbedding in trench - 150mm deep and 400mm wide (75mm above and 75mm deep below the cable).	m ³	6		
E 6.1.3		Backfilling of trenches with excavated soil after cables have been laid and tested, complete with compacting of backfilling, levelling off of trenches and removing and dumping of surplus excavated material.	m ³	18		
E 6.1.4		400mm wide x 600mm deep in hard rock soil	m	Rate Only		
E 6.1.5		Select from excavation materials and install a sandbedding in trench - 150mm deep and 400mm wide (75mm above and 75mm deep below the cable).	m ³	Rate Only		
E 6.1.6		Backfilling of trenches with excavated soil after cables have been laid and tested, complete with compacting of backfilling, levelling off of trenches and removing and dumping of surplus excavated material.	m ³	Rate Only		
E 6.2		<u>SLEEVES</u>				
E 6.2.1		Supply and install the following uPVC Class 6 sleeves, complete:				
E 6.2.1.1		- Ø160mm diameter	m	Rate Only		
E 6.2.1.2		- Ø110mm diameter	m	Rate Only		
E 6.2.1.3		- Ø50mm diameter	m	Rate Only		
E 6.3		<u>DANGER TAPE</u>				
E 6.3.1		Supply and install the following danger tape:				
E 6.3.1.1		- Danger tape	m	100		
E 6.4		<u>POLE EXCAVATIONS</u>				
E 6.4.1		Allow for the following hole excavations by hand or auger as per Eskom DT standards.				
E 6.4.1.1		- Pole hole 1.5m deep - Normal to pickable shale type soil - by hand	No	22		
E 6.4.1.2		- Pole hole 1.5m deep - Hard rock (Compressor required)	No	5		
E 6.4.1.3		- Pole hole 1.5m deep - Hard rock (Rock Drilling Machine required)	No	Rate Only		
E 6.4.1.4		- MV stay hole - Normal to pickable shale type soil	No	10		
E 6.4.1.5		- MV stay hole - Hard rock (Compressor required)	No	6		
E 6.4.1.6		- MV stay hole - Hard rock (Rock Drilling Machine required)	No	Rate Only		
E 6.4.1.7		- MV strut hole - Normal to pickable shale type soil	No	1		
E 6.4.1.8		- MV strut hole - Hard rock (Compressor required) 11m Poles	No	1		
E 6.4.1.9		- MV strut hole - Hard rock (Rock Drilling Machine required)	No	Rate Only		
E 6.4.1.10		- MV - Overhead Flying Stay hole (Normal to pickable shale type soil)	No	4		
E 6.4.1.11		- MV - Overhead Flying Stay hole (Compressor required)	No	4		
E 6.4.1.12		- MV - Overhead Flying Stay hole (Rock Drilling Machine required)	No	Rate Only		
CARRIED FORWARD :						

SECTION E: ELECTRICAL INSTALLATION						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
E 7		<u>BULK ELECTRICAL SERVICES</u>				
E 7.1		<u>STEP-DOWN TRANSFORMER</u>				
E 7.1.1		<u>Supply and install 100kVA 11000V/420V Step-down Transformer, pole mounted.</u>				
		<u>Coastal Finish Complete with tap changer, earth studs, oil drain, open MV busings and LV cable bushings.</u>				
E 7.1.1.1		- Supply	No	1		
E 7.1.1.2		- Install	No	1		
E 7.1.1.3		- Commission	No	1		
E 7.1.1.4		- Delivery to Site including offloading.	Sum	1		
E 7.1.1.5		- Earthing of Transformer - 1.5m Earth Spike driven into the ground within 5 meters of each other. Earth spikes connected with 16mm ² BCE wire	No	3		
E 7.1.1.6		- 16mm ² Insulated Cu conductor installed from transformer MV and LV side (fixed to pole), and connected to Earth Spike; Cad Welded.	m	25		
E 7.1.1.7		- Steel metering cubicle pole mounted. The cubicle to contain 160A tripple pole MCCB, rated at 15kA with bubar stubs for cable termination. Three phase meter with 160:5A CT's and Voltage sensing fuses to be allowed for.	No	1		
E 7.2		<u>MV POLES</u>				
E 7.2.1		<u>Allow for the Erection of the following MV poles according to SABS 754 and Eskom DT Standards. Rate to include delivery to site. 1:10 cement/sand (soilcrete) mixture for the backfill to be allowed for.</u>				
E 7.2.1.1		(a) 11m, 160-180 Top wooden pole D-DT 0055				
E 7.2.1.1.1		- Supply	No	19		
E 7.2.1.1.2		- Install	No	19		
E 7.2.1.2		(b) 11m, 180-200 Top wooden pole D-DT 0055				
E 7.2.1.2.1		- Supply	No	6		
E 7.2.1.2.2		- Install	No	6		
E 7.2.1.3		(c) 8m pole 160-179mm top D-DT 0055 (for T-off & Trfr struct)				
E 7.2.1.3.1		- Supply	No	2		
E 7.2.1.3.2		- Install	No	2		
E 7.3		<u>MV STAYS, STRUTS & FLYING STAYS</u>				
E 7.3.1		<u>Allow for the complete supply and erection of a MV stay, strut and flying stay assemblies as per Eskom DT standards. MV stay with the 97kN longrod type stay insulator.</u>				
E 7.3.1.1		- Strut pole for MV structures including Danger sign and Barb Wire	No	2		
E 7.3.1.2		- Flying stay for MV structure with the 97kN longrod type stay insulators - excluding the pole	No	6		
E 7.3.1.3		- MV stay with porcelain type MV stay insulator and stay bracket) as per D-DT-0341.	No	3		
E 7.3.1.4		- Barb Wire (D-DT 3170) anti climbing 1m down stay.	No	12		
E 7.3.1.5		- Danger sign (D-DT3202) and Barb Wire (D-DT 3170) anti-climbing on strut pole.	No	2		
E 7.4		<u>EARTH SPIKE</u>				
E 7.4.1		<u>Earth spike at MDB. 1x 1.5m Earth spikes with 16mm² BCEW to be terminated onto earth bar.</u>				
E 7.4.1.1		- Supply	No	3		
E 7.4.1.2		- Install	No	3		
CARRIED FORWARD :						

SECTION E: ELECTRICAL INSTALLATION						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
E 7.5		<u>MV VOLTAGE CONDUCTORS</u>				
E 7.5.1		<u>Supply and install the following MV CONDUCTORS: Allow for the complete supply and installation of the conductor type below according to Eskom DT Standards. This shall include the laying out of conductors, stringing, initial & final tensioning and recording thereof, making off ends and jumpers, terminations etc. Note: For ordering of conductors, conductors, measurement shall NOT be taken from this bill. Actual conductor lengths shall be measured on site for ordering and installation purposes.</u>				
E 7.5.1.1		(a) AAAC PINE CONDUCTOR				
E 7.5.1.1.1		- Supply	m	4700		
E 7.5.1.1.2		- Install	m	4700		
E 7.5.1.2		(b) ACSR FOX CONDUCTOR (D-DT 3136)				
E 7.5.1.2.1		- Supply	m	Rate Only		
E 7.5.1.2.2		- Install	m	Rate Only		
E 7.5.1.2.3		- Electro magnetic cable identification	R/hr	2		
E 7.6		<u>LV CABLES</u>				
E 7.6.1		<u>Supply and install the following armoured PVC sheeted copper LT cables including terminations, glands, shroud, lugs, clamping, supports and all accessories.</u> <u>Note: For ordering of cables, measurement shall NOT be taken from this bill.</u> <u>Actual cable lengths shall be measured on site for ordering and installation purposes.</u> <u>Install cable according to SANS 10142 requirements with sand and danger tape.</u>				
E 7.6.1.1		(a) Quote for the supply, installation and termination of 95mm ² x 4 core Alu armoured cable inside trenching or fixed to poles.				
E 7.6.1.1.1		- Supply	m	100		
E 7.6.1.1.2		- Install	m	100		
E 7.6.1.1.3		- Termination	m	2		
E 7.6.1.1.4		- Joints	m	Rate Only		
E 7.6.1.2		(b) Quote for the supply, installation and termination of 70mm ² x 4 core CU armoured cable inside trenching or fixed to poles.				
E 7.6.1.2.1		- Supply	m	Rate Only		
E 7.6.1.2.2		- Install	m	Rate Only		
E 7.6.1.2.3		- Termination	m	Rate Only		
E 7.6.1.2.4		- Joints	m	Rate Only		
E 7.7		<u>EARTH WIRING</u>				
E 7.7.1		<u>Supply and install conductors in trenching (including offcuts and wastes).</u>				
E 7.7.1.1		(a) 50mm ²				
E 7.7.1.1.1		- Supply	m	100		
E 7.7.1.1.2		- Install	m	100		
E 7.7.1.1.3		- Termination	No	1		
E 7.7.1.2		(b) 16mm ²				
E 7.7.1.2.1		- Supply	m	35		
E 7.7.1.2.2		- Install	m	35		
E 7.7.1.2.3		- Termination	No	4		
CARRIED FORWARD :						

SECTION E: ELECTRICAL INSTALLATION						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
E 7.7.1.3		(c) Exothermic weld per earth grid joint				
E 7.7.1.3.1		- Supply	No	8		
E 7.7.1.3.2		- Install	No	8		
E 7.8		<u>CONDUIT</u>				
E 7.8.1		<u>Supply and install, including bends, saddles, wastes and all accessories</u>				
		<u>BOSAL type:</u>				
E 7.8.1.1		(a) 100mm diameter conduit				
E 7.8.1.1.1		- Supply	m	15		
E 7.8.1.1.2		- Install	m	15		
E 7.8.1.2		(b) 70mm diameter conduit				
E 7.8.1.2.1		- Supply	m	Rate Only		
E 7.8.1.2.2		- Install	m	Rate Only		
E 7.9		<u>MV STRUCTURES</u>				
E 7.9.1		<u>Allow for the supply, dressing and installation of the following MV structures as per Eskom DT standards. The rate shall include all material items as per the relevant DT standard, the attachment of the conductors to the hardware and the final adjustment of stays and struts. The rate shall include bonding (3X3.35 steel wire(D-DT 3124), galvanised bonding clips(D-DT 3033) galvanised staples (D-DT 3129). The supply and erection of stays and poles are measured elsewhere. All crimps will be of the indent type as per D-DT 3098 & 3153.</u>				
E 7.9.1.1		(a) 3 Phase Delta Steel A- Frame intermediate assemblies - 0 degrees with 4kN Line Posts insulators (porcelain 11kV with 31mm/kV creepage).				
E 7.9.1.1.1		- Supply	m	19		
E 7.9.1.1.2		- Install	m	19		
E 7.9.1.2		(b) 3 Phase Delta Steel A-Frame intermediate assemblies - 0 degrees D2063 - 10kN Posts & road-crossing ties.				
E 7.9.1.2.1		- Supply	m	2		
E 7.9.1.2.2		- Install	m	2		
E 7.9.1.3		(c) 3 Phase Delta Steel A- Frame Strain assemblies - 30-90 degrees with 11kV 31mm/kV creepage Silicone rubber longrod insulators.				
E 7.9.1.3.1		- Supply	m	4		
E 7.9.1.3.2		- Install	m	4		
E 7.9.1.4		(d) Steel cross arm cable take-offs complete.				
E 7.9.1.4.1		- Supply	m	3		
E 7.9.1.4.2		- Install	m	3		
E 7.10		<u>MV CUT OUTS OR LINKS</u>				
		<u>Allow for the complete supply and installation of a MV cut out unit as per Eskom D-DT 3086 with 22kV 31mm/kV creepage with fuse holder & fuses or solid link as indicated below.</u>				
E 7.10.1		(a) 11kV Standard Type Fuse Assemblies complete				
E 7.10.1.1		- Supply	m	2		
E 7.10.1.2		- Install	m	2		
CARRIED FORWARD :						

SECTION E: ELECTRICAL INSTALLATION						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
E 7.10.2		(b) 10A Fuses				
E 7.10.2.1		- Supply	m	6		
E 7.10.2.2		- Install	m	6		
E 7.10.3		(c) 100A Fuses				
E 7.10.3.1		- Supply	No	3		
E 7.10.3.2		- Install	No	3		
E 7.10.4		(d) Surge Arrestors				
E 7.10.4.1		- Supply	No	9		
E 7.10.4.2		- Install	No	9		
E 8		<u>COMPLETION</u>				
E 8.1		<u>TEST AND COMMISSION</u>				
E 8.1.1		<u>Test and commission entire electrical installation as required. Issue COC's for entire electrical installation under this contract.</u>	Sum	1		
E 8.1.2		<u>Compliance to OHS specifications, as specified.</u>	Sum	1		
E 8.2		<u>LIAISON WITH AUTHORITIES</u>				
E 8.2.1		<u>Electrical Connection: Liaise with electrical supply authority to provide electricity to the facility.</u>	Sum	1		
E 8.2.2		<u>Council switching fees</u>	Sum	1		
E 8.2.3		<u>11kV Switching fees by specialist other than Council</u>	Sum	1		
E 8.3		<u>MAINTENANCE</u>				
E 8.3.1		<u>Provision of full maintenance of electrical equipment and installation for the full period of 12 (Twelve) calendar months of the maintenance period. The maintenance period starts on practical completion.</u>	Sum	1		
E 8.3.2		<u>Any training to client and staff</u>	Sum	1		
E 8.3.3		<u>Update and prepare "As Built" drawings</u>	Item	1		
E 8.3.4		<u>Supply complete operating manuals of entire electrical installation</u>	Item	1		
E 8.3.5		<u>Any additional items required by the contractor - specify</u>				
E 8.3.5.1		a)				
E 8.3.5.2		b)				
E 8.3.5.3		c)				
E 8.3.5.4		d)				
E 8.3.5.5		e)				
CARRIED FORWARD TO SUMMARY :						

SECTION F : PUMP RISING MAIN						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
F		<u>SECTION F : PUMP RISING MAIN</u>				
F1	SABS 1200 C	<u>SITE CLEARANCE:</u>				
	8.2.1	as specified in SABS 1200 C and in the project specification				
F1.1	8.2.1	<u>Clear and grub:</u>				
F1.1.1		(a) Line of rising main where ordered by the Engineer, 4m wide	m	1615		
F1.2	8.2.5	<u>Take down existing fences</u>				
F1.2.1		(a) Temporarily remove fence sections for a minimum length per pipe crossing to facilitate construction of the rising main.	km	0.2		
F2	SABS 1200 DB	<u>EARTHWORKS (PIPE TRENCHES):</u>				
		as specified in SABS 1200 DB and in the project specification				
F2.1	8.3.2	<u>Excavation:</u>				
F2.1.1	8.3.2 (a)	(a) <u>Excavate in all materials for trenches, backfill, compact and dispose of surplus material:</u>				
F2.1.1.1		(i) <u>Trenches of width up to 900mm for 250mm diameter rising main</u>				
F2.1.1.1.1		- Depth up to 1.0m	m	100		
F2.1.1.1.2		- Depth 1.0m - 2.0m	m	1515		
F2.1.2	8.3.2 (b)	(b) <u>Extra over for hard rock excavation</u>	m³	371		
F2.2	PSD 8.3.14	<u>Excavate and dispose of unsuitable material from sides and bottom of trenches where ordered and replaced with:</u>				
F2.2.1		(a) Selected Rockfill uniformly graded 50mm to 200mm	m³	40		
F2.3	8.3.3	<u>Excavation ancillaries :</u>				
F2.3.1	8.3.3.1	<u>Make up deficiency in backfill material : (provisional)</u>				
F2.3.1.1	8.3.3.1 (a)	(a) <u>From other necessary excavations on site</u>	m³	371		
F2.3.1.2	8.3.3.1 (c)	(b) <u>By importation from commercial or off-site sources selected by the Contractor :</u>				
F2.3.1.2.1		(i) Subbase quality material complying with subclause 3.2.1 of SABS 1200 ME	m³	40		
F2.4	8.3.5	<u>Existing Services that Intersect or Adjoin the Pipe Trench</u>				
F2.4.1	8.3.5 (a)	(a) <u>Services that intersect a trench</u>				
F2.4.1.1		(i) Water Pipes				
F2.4.1.1.1		- 25mm - 100mm Ø	No	5		
F2.4.1.1.2		- 100mm - 250mm Ø	No	2		
F2.4.1.1.3		- 250mm - 450mm Ø	No	2		
F2.4.1.1.4		- Greater than 450mm Ø	No	2		
F2.4.1.2		(ii) Water Erf Connections	No	10		
F2.4.1.3		(iii) Sewer Pipes				
F2.4.1.3.1		- 110mm - 160mm Ø	No	5		
F2.4.1.3.2		- 160mm - 250mm Ø	No	5		
CARRIED FORWARD :						

SECTION F: RISING MAIN						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
F2.4.1.3.3		- 250mm - 450mm Ø	No	5		
F2.4.1.4		(iv) Sewer Erf Connections	No	10		
F2.4.1.5		(v) Stormwater Pipes and Culverts	No	2		
F2.4.1.6		(vi) Underground Electrical Cables	No	2		
F2.4.1.7		(vii) Overhead Electrical Cables	No	5		
F2.4.1.8		(viii) Fibre & Communication Cables	No	2		
F2.4.2	8.3.5 (b)	(b) <u>Services that adjoin a trench</u>				
F2.4.2.1		(i) Water Pipes				
F2.4.2.1.1		- 25mm - 100mm Ø	m	10		
F2.4.2.1.2		- 100mm - 250mm Ø	m	10		
F2.4.2.1.3		- 250mm - 450mm Ø	m	10		
F2.4.2.2		(ii) Sewer Pipes				
F2.4.2.2.1		- 110mm - 160mm Ø	m	100		
F2.4.2.2.2		- 160mm - 250mm Ø	m	100		
F2.4.2.2.3		- 250mm - 450mm Ø	m	100		
F2.4.2.3		(iii) Stormwater Pipes and Culverts	m	10		
F2.4.2.4		(iv) Underground Electrical Cables	m	10		
F2.4.2.5		(v) Overhead Electrical Cables	m	500		
F2.4.2.6		(vi) Fibre & Communication Cables	m	100		
F2.4.2.7		(vii) Street Light	m	2		
F2.4.2.8		(viii) Road Sign Post	m	2		
F3	SABS 1200 LB	<u>BEDDING (PIPES)</u> as specified in SABS 1200 LB and in the project specification				
F3.1	8.2.1	<u>Provision of bedding from trench excavation:</u>				
F3.1.1	8.2.1 (a)	(a) Selected granular material	m³	10		
F3.2	8.2.2	<u>Supply only of bedding by importation:</u>				
F3.3	8.2.2.3	<u>From commercial sources:</u>				
F3.3.1	8.2.2.3 (a)	(a) Selected granular material	m³	610		
F3.3.2		(b) 19mm concrete stone to SABS 1083	m³	40		
F3.3.3		(c) 13mm concrete stone to SABS 1083	m³	40		
F3.4		<u>Supply and Install Geotextile (3m wide strip)</u>				
F3.4.1		(a) Nonwoven Continuous Filament Needle-pinned Polyester Textile (Kaytech Grade A1 or equivalent approved) wrapped around 19mm and 13mm stone bedding round pipe where instructed by the Engineer	m²	390		
F4	SABS 1200 L	<u>MEDIUM PRESSURE PIPES</u>				
F4.1	8.2.1	<u>Supply, lay and bed pipes complete with couplings:</u>				
F4.1.1		(a) 250mm uPVC class 9 (as per SABS 966 Part 1) pipes bedded as detailed on the drawings:	m	1000		
CARRIED FORWARD :						

SECTION F: RISING MAIN						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
F4.1.2		(b) 250mm uPVC class 12 (as per SABS 966 Part 1) pipes bedded as detailed on the drawings:	m	615		
F4.2		<u>Extra over items of F 4.1 for the supplying, laying and bedding of specials</u> <u>(complete with ancillaries and couplings):</u>				
F4.2.1	8.2.2	(a) <u>uPVC Class 16 Bends</u>				
F4.2.1.1		(i) <u>11.25 degrees :</u>				
F4.2.1.1.1		- 250 mm	No	4		
F4.2.1.2		(ii) <u>22.5 degrees :</u>				
F4.2.1.2.1		- 250 mm	No	3		
F4.2.1.3		(iii) <u>45 degrees :</u>				
F4.2.1.3.1		- 250 mm	No	9		
F4.2.1.4		(iv) <u>90 degrees :</u>				
F4.2.1.4.1		- 250 mm	No	Rate Only		
F4.2.2	8.2.2	(b) <u>Isolation Valve Chamber Fittings and Specials</u>				
F4.2.2.1		(i) <u>Class 16 flanged wedge gate valves for diameters stated</u> <u>(complete):</u>				
F4.2.2.1.1		- 250 mm	No	1		
F4.2.2.2		(ii) <u>Supply and Install Long Barrell Flange Adaptor (VJ or similar approved)</u> <u>complete with bolts as per Drawing 2299-T-301 for the following</u> <u>diameters:</u>				
F4.2.2.2.1		- 250 mm	No	3		
F4.2.2.3		(iii) <u>Supply and Install Mild Steel Galvanised 720 Sigma Coated spool piece</u> <u>flanged on one end, with puddle piece as per Drawing 2299-T-301</u> <u>complete with bolts for the following sizes and lengths:</u>				
F4.2.2.3.1		- 250mm (Flange to Open End Length = 820mm)	No	1		
F4.2.2.4		(iv) <u>Supply and Install Mild Steel Galvanised 720 Sigma Coated spool piece</u> <u>flanged both ends, with puddle piece as per Drawing 2299-T-301</u> <u>complete with bolts for the following sizes and lengths:</u>				
F4.2.2.4.1		- 250mm (Flange to Flange Length = 820mm)	No	1		
F4.2.3	8.2.2	(c) <u>Air Valve Chamber Fittings and Specials</u>				
F4.2.3.1		(i) <u>Air valve Vent-o-mat RGX or similar approved as per Drawings 2299-T-300</u> <u>and 2299-T-303 complete for the following diameters stated :</u>				
F4.2.3.1.1		- 50 mm	No	2		
CARRIED FORWARD :						

SECTION F: RISING MAIN						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
F4.2.3.2		(ii) <u>Supply and Install Long Barrell Flange Adaptor (VJ or similar approved) complete with bolts as per Drawings 2299-T-300 and 2299-T-303 for the following diameters:</u>				
F4.2.3.2.1		- 250 mm	No	6		
F4.2.3.3		(iii) <u>Supply and Install Mild Steel Galvanised 720 Sigma Coated spool piece flanged both ends, with puddle piece as per Drawings 2299-T-300 and 2299-T-303 complete with bolts for the following sizes and lengths:</u>				
F4.2.3.3.1		- 250mm (Flange to Flange Length = 820mm)	No	2		
F4.2.3.4		(iv) <u>Supply and Install Mild Steel Galvanised 720 Sigma Coated unequal tee piece flanged on all ends for air accumulation chamber complete with bolts as per Drawings 2299-T-300 and 2299-T-303 for the following sizes and lengths:</u>				
F4.2.3.4.1		- 250 mm x 150mm (Flange to Flange Length = 560mm)	No	2		
F4.2.3.5		(v) <u>Supply and Install Mild Steel Galvanised 720 Sigma Coated blank flange with reduced diameter spool piece, flanged on both ends as per Drawings 2299-T-300 and 2299-T-303 for the following diameters and sizes:</u>				
F4.2.3.5.1		- 150 mm x 50mm (Flange to Flange Length = 150mm)	No	2		
F4.2.3.6		(vi) <u>Class 16 flanged resilient seal gate valves LHC completed with handwheel for diameters stated:</u>				
F4.2.3.6.1		- 50 mm	No	2		
F4.2.3.7		(vii) <u>Supply and Install Mild Steel Galvanised 720 Sigma Coated spool piece flanged one end, with puddle piece as per Drawings 2299-T-300 and 2299-T-303 complete with bolts for the following sizes and lengths:</u>				
F4.2.3.7.1		- 250mm (Flange to Flange Length = 820mm)	No	2		
F4.2.3.8		(viii) <u>Supply and Install Non-Return Valve (Counter Weight) complete with bolts as per Drawing 2299-T-303 for the following diameter:</u>				
		- 250 mm	No	2		
F4.3	8.2.11	<u>Anchor/thrust blocks and pedestals:</u>				
F4.3.1		(a) Concrete (20MPa/19)	m ³	15		
F4.3.2		(b) Formwork (rough)	m ²	30		
F4.4	8.2.14	<u>Brick Work Chambers :</u>				
F4.4.1		(i) <u>Isolation Valve Chamber to details shown on Drawing 2299-T-301 including excavation, lavenworks, brickwork, reinforcing and concrete complete</u>				
F4.4.1.1		- 250mm Ø	No	1		
CARRIED FORWARD :						

SECTION F: RISING MAIN						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
F4.4.2		(ii) <u>Air Valve Chamber to details shown on Drawings 2299-T-300 and 2299-T-303 including excavation, layerworks, brickwork reinforcing and concrete complete</u>				
F4.4.1.2		- 250mm Ø	No	2		
F4.4.3		(iii) <u>Stilling Chamber at end of rising main at Existing Kwanomzamo WWTW Complete including the excavation, supply, lay and bedding of the short length of 315mm uPVC Class 34 pipe to connect the stilling chamber to the existing inlet works as per Drawing 2299-T-302</u>	No	1		
F4.5		<u>Pipe Route Markers</u>				
F4.5.1		Supply and install pipe route markers at 200m spacings and at each change in the horizontal alignment of the rising main as per detail on drawings	No	24		
F5	SABS 1200 ME	<u>SUBBASE PIPE ROAD CROSSINGS</u> as specified in SABS 1200 ME and in the project specification				
F5.1	8.3.3	<u>Construct subbase wearing course with material from commercial sources:</u>				
F5.1.1		Backfilling and compaction in layers not exceeding 150mm thickness with imported G5 material at road crossings compacted to 98% modified AASHTO maximum density	m ³	250		
CARRIED FORWARD TO SUMMARY:						

SECTION G : GENERAL						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
G		<u>SECTION G : GENERAL</u>				
G1	SABS 1200 D	<u>EARTHWORKS</u> as specified in SABS 1200 D and in the project specification				
G1.2	8.3.12	<u>Road traffic signs and markings (Provisional) :</u>				
G1.2.1	8.3.12	(a) <u>Supply and initial erection of signs :</u>				
G1.2.1.1		(i) Hand held stop/go signs	No	2		
G1.2.1.2		(ii) Construction ahead signs	No	2		
G1.2.1.3		(iii) Speed restriction signs	No	2		
G1.2.1.4		Drums	No	4		
G2		<u>FENCING</u>				
G2.1		<u>Supply and erection Shukuma Wall Complete as per Drawing 2299-T-405 and manufacturers specifications</u>				
G2.1.1		(a) Precast Wall Slabs Height = 3.6m (3 x 1.2m) x Length = 6m x 0.135m Thick	m ²	414		
G2.1.2		(b) Precast Shukuma Columns	No	20		
G2.2		<u>Supply and erection Gate as per Drawing 2299-T-405 and manufacturers specifications</u>				
G2.2.1		(a) Supply and erection of new 2.4m heigh, 4m long ClearVu Fencing (or similar approved)	No	1		
G3	SANS 1200 ME	<u>SUBBASE</u>				
G3.1	8.3.3	<u>Construct Subbase with Material from Commercial Sources</u>				
G3.1.1		(a) G5 quality natural gravel wearing course, compacted to 95% Mod AASHTO maximum density, 150mm thick	m ³	60		
G4	SANS 1200 MJ	<u>SEGMENTED PAVING</u>				
G4.1	8.2.2	<u>Construction of Paving Complete:</u>				
G4.1.1		(a) 80mm grey Concrete Interlocking Paver (Herring Bone Pattern, Type S-A - 25 MPa) as per CMA Handbook for Access Roads including 20mm bedding sand and 3% cement stabilised grouting sand	m ²	400		
G5	SABS 1200 GA	<u>CONCRETE (SMALL WORKS)</u> as specified in SABS 1200 GA and in the project specification				
G5.1		<u>Minor works as directed on site (slabs, walls, motorslopes and the like)</u>				
	8.2	<u>Formwork :</u>				
G5.1.1	8.2.1	(a) Rough (covered)	m ²	20		
G5.1.2	8.2.2	(b) Smooth (exposed)	m ²	20		
CARRIED FORWARD :						

SECTION G : GENERAL						
ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD :						
G5.2	8.3	<u>Reinforcement :</u>				
G5.2.1	8.3.1	(a) <u>Steel Bars</u>				
G5.2.1.1	8.3.1	(i) Mild steel of all diameters	t	0.1		
G5.2.1.2	8.3.1	(ii) High tensile steel of all diameters	t	0.1		
G5.2.2	8.3.2	(b) <u>High tensile welded mesh</u>				
G5.2.2.1		(i) Ref 395	m ²	20		
G5.2.2.2		(ii) Ref 617	m ²	20		
G5.3	8.4	<u>Concrete :</u>				
G5.3.1	8.4.3	(a) <u>Strength concrete :</u>				
G5.3.1.1		(i) 20MPa/19	m ³	3		
G5.3.1.2		(ii) 25MPa/19	m ³	3		
G5.3.1.3		(iii) 30MPa/19	m ³	3		
G5.3.1.4		(iv) 35MPa/19	m ³	3		
G5.3.1.5		(v) 35MPa/19 (water tight) complete with xypex admix	m ³	6		
G5.3.2	8.4.4	(b) <u>Unformed surface finishes :</u>				
G5.3.2.1	8.4.4 (a)	(i) Wood-floated finish	m ²	10		
G5.3.2.2	8.4.4 (b)	(ii) Steel-floated finish	m ²	10		
G4.3.3	8.5	(c) <u>Joints:</u>				
G5.3.3.1		(i) Construction joints for Concrete Works (cold joint)	m	20		
C 2.3.3.2		(ii) Expansion joints for Concrete Works (cold joint)	m	20		
C 2.3.3.3		(iii) Saw-cut joints for Concrete Works (cold joint)	m	20		
CARRIED FORWARD TO SUMMARY:						

C2.3: SUMMARY OF THE BILL OF QUANTITIES

SECTION A: PRELIMINARY & GENERAL	R
SECTION B: PUMP STATION SUMP	R
SECTION C: TOP STRUCTURE BUILDING	R
SECTION D: MECHANICAL INSTALLATION	R
SECTION E: ELECTRICAL INSTALLATION	R
SECTION F: RISING MAIN	R
SECTION G: GENERAL	R

NETT TOTAL OF TENDER	R
<i>ADD 15% FOR VALUE ADDED TAX</i>	R

OFFER AMOUNT CARRIED FORWARD TO FORM OF OFFER	R
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Notes:

1. Contract Price is not subject to Contract Price Adjustment (Clause 6.8.2 of the Conditions of Contract).
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.

Signed Date

Name Position

Tenderer

CONTRACT

PART 3 (OF 4): SCOPE OF WORK

C3.1 Description of the Works

C3.2 Employer's Agenting

C3.3 Procurement

C3.4 Construction

C3.5 Management

C3.1: DESCRIPTION OF THE WORKS

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.

C3.1.1 EMPLOYER'S OBJECTIVES

The objective of the Employer (Kouga Local Municipality) is to implement a new bulk sewerage pump station and rising main in Kwanomzamo. The proposed Geelhout Pump Station will be constructed to serve the proposed housing development of approximately 1250 erven. Additionally, the associated rising main of 1600m will be installed to the existing Kwanomzamo waste water treatment works. This much-needed sewerage infrastructure will unlock future housing development of the Kwanomzamo area.

C3.1.2 OVERVIEW OF THE WORKS

The project comprises the:

- Supply, installation and testing of 1600m of 250mm Ø Class 12 and Class 9 u-PVC rising main
- Construction of a reinforced concrete sewerage pump station sump
- Construction of the pump station top structure consisting of a pump room, MCC room and standby generator room
- Supply, installation and testing of all Mechanical and Electrical equipment, including:
 - 2 x self-priming sewerage pumps with 1 x 55kw motor each
 - Supply and installation of all stainless steel suction and delivery pipework
 - Supply and installation of a 100kVA standby diesel generator
 - Supply and installation of the overhead electrical supply line to the pump station
- General Pump station site earthworks, security fencing and ancillary items

C3.1.3 EXTENT OF THE WORKS

The works will span from the proposed Geelhout pump station site to the existing Humansdorp Waste Water Treatment Works in Kwanomzamo.

The Scope of this Contract includes as briefly set out as per C3.1.2.

The scope of work listed above is not necessarily complete and shall not limit the work to be undertaken by the Contractor. For a more detailed description of the works, as well as estimated quantities associated with the respective activities, refer to the tender drawings and the bill of quantities.

C3.1.4 LOCATION OF THE WORKS

The location of the work will be carried out as indicated in the locality plan overleaf and situated in Humansdorp, Eastern Cape.



Locality Plan of Proposed Geelhout Pump Station and Rising Main

C3.1.5 TEMPORARY WORKS

Temporary works that is envisioned on this contract will include shuttering for the reinforced concrete water retaining structures, concrete floor slabs and cover slabs. Shoring may be required, depending on the trench and excavation conditions.

The Contractor's attention is however directed to:

- Locating, dealing with and protection of existing services.
- Dealing with and accommodation of traffic.
- Providing access to erven and properties without disruptions
- The requirements, principals and responsibilities specified within the various specifications contained under the Contract Part 3: Scope of Work.

C3.1.6 EXISTING SERVICES

The Contractor shall ensure that the position of all existing services affected by the works have been verified before construction works commences. The Contractor shall take all necessary steps to ascertain the location of existing services before commencing any portion of the Works and shall exercise the greatest care when working in the vicinity of such services.

Should it be necessary to lower or relocate a service, the Contractor will be required to make the necessary arrangements with the relevant service provider and to inform the Employer's Agent accordingly. All available existing services information have been indicated on the provided drawings. However, it should be noted that services might not be limited to the details indicated on the drawings.

C3.1.7 PROVIDING ACCESS TO PRIVATE PROPERTIES, BUILDING AND FACILITIES

Access to properties, buildings and businesses must be provided by the Contractor at all times during the course of the contract. The Contractor shall provide suitable provision for pedestrians and vehicles to maintain such access. Such temporary access shall be in the form of portable bridges, temporary backfill or other approved means and shall always allow for the safe passage of vehicles, pedestrians and goods. The Contractor shall be responsible for maintaining such crossings and removing the same when they are no longer required.

The full extent of all areas in which plant and personnel are operating shall be at all times be clearly demarked and barricaded to prevent access by members of the public.

C3.1.8 ACCOMMODATION OF TRAFFIC

The Contractor should note that no existing roads or traffic lanes may be closed to traffic without prior written permission of the Employer's Agent and the approval of the KLM and or the Municipal Traffic Employer's Agent's office.

Every effort shall be made by the Contractor to keep disruption of existing traffic and pedestrian movements to the absolute minimum during construction. Where existing roads are used, they shall be protected from damage by construction traffic and repaired where instructed by the Employer's Agent.

The safety and convenience of the travelling public is to be considered of utmost importance and every effort must be made to ensure that all temporary road signs, cones, flagmen and speed controls are maintained and effective, and that courtesy is extended to the public at all times.

It is important that the traffic accommodation requirements described in these specifications are adhered to and that all installations meet with the approval of the relevant traffic authority.

Work, including the erection and removal of traffic control facilities, shall be executed between sunrise and sunset on Monday to Friday, inclusive. Occupation of existing traffic lanes will only be allowed during daylight hours on normal working days, which are defined as Monday to Friday, inclusive.

The travelling public has the right of way on public roads, and the Contractor shall make use of approved methods to control the movement of his equipment and vehicles so as not to constitute a hazard on public roads.

Failure to maintain road signs, warning signs or flicker lights, and the like, in good condition shall constitute ample reason for the Employer's Agent to bring the works to a stop until the road signs, etc., have been repaired / reinstated to his satisfaction.

The Contractor may not commence construction activities before adequate provision has been made to accommodate traffic in accordance with the requirements of these specifications and Chapter 13 of Volume 2 of the South African Road Traffic Signs Manual (SARTSM).

The Contractor shall submit proposals in connection with all signs and accommodation of traffic to the Employer's Agent for approval.

C3.2.1 DESIGN SERVICES AND ACTIVITY MATRIX

Works designed by, per design stage:

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

C3.2.2 DESIGN PROCEDURES

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.

Where the Contractor is to supply the design of designated parts of the permanent works he shall supply full working drawings supported by a professional Employer's Agent's design certificate.

The Contractor is responsible for the design of all the Temporary Works/Workshop Drawings/Electrical diagrams and pipework drawings required for the construction and execution of the Permanent Works. This includes, inter alia, bypass pumping, temporary interconnections of pipework, temporary MCC operations, manual operation of pumps and panels etc., all health and safety measures as well as temporary support systems, until the completion of the Contract.

As guidance to the Contractor, the following Temporary Works that may be required during construction and execution of the Permanent Works are:

- (i) Shoring and trench protection
- (ii) Support work and scaffolding
- (iii) Shuttering for reinforced concrete water retaining structures
- (iv) Fall protection and safety when working at heights
- (v) Record keeping and recording of As Built data for the Engineer.

The above description is not necessarily complete and shall not limit the work to be carried out.

C3.2.3 DRAWINGS

The Contractor shall use only the dimensions stated in figures on the Drawings in setting out the Works and dimensions shall not be scaled from the Drawings, unless required by the Engineer.

The contractor is to provide the Employer with a full set of Workshop Drawings and pump specifications of all pumping, electrical panels (equipment) and pipework that he intends to install. Please note that material and pumps may only be ordered once the Employer has approved the above.

The Engineer will, on the request of the Contractor, and in accordance with the provisions of the Conditions of Contract, provide such dimensions as may have been omitted from the Drawings.

The Contractor shall ensure that accurate As-Built records are kept of all infrastructure installed or relocated during the contract and where necessary, levels shall also be provided.

A marked-up set of Drawings shall be kept and updated by the Contractor on a day to day basis. This information shall be supplied to the Engineer's Representative as and when needed.

All information in possession of the Contractor where required by the Engineer and/or the Engineer's Representative to complete the As-Built/Record Drawings, must be submitted to the Engineer's Representative before the Certificate of Completion may be issued.

The Tender Drawings prepared by the Employer for the construction of the Permanent Works are listed and bound under **Appendix A**. The Employer reserves the right to issue amended and/or additional Drawings during the Contract.

C3.3.1 PREFERENTIAL PROCUREMENT**C3.3.1.1 Requirements**

Refer to Clauses C.2.23.2 and C.3.11 of the Tender Data and Form 1G: Form MBD 6: Preference Points Claim form in terms of the Preferential Procurement Regulations 2022 (80/20 version) of the Tender Data.

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 C.2.23.2 and C.3.11 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.

The sub-contracting of work is required for all CIDB-related projects in the following ranges:

- a) R 5M >, but < R 10M requires Bidder to sub-contract 10% of the value of the project
- b) R 10M >, but < R 15M requires Bidder to sub-contract 15% of the value of the project
- c) R 15M >, but < R 20 requires Bidder to sub-contract 20% of the value of the project
- d) R 20M >, but < R 30M requires Bidder to sub-contract 25% of the value of the project
- e) R 30M > requires Bidder to sub-contract 30% of the value of the project

IV. The sub-contracting value will be based on the estimated value of the project either determined by the director or project manager. Where the successful bidder's price falls within any other range, the sub-contracting range included in the Bid Document will be applied.

V. The municipality may include sub-contracting for any other none CIDB related project as may be requested by the Director of the Department to promote local development.

VI. Community Based Suppliers or service providers/ward-based suppliers or service providers must be considered for subcontracting by the main contractor. The first preference for subcontracting must be given to community or ward-based suppliers of that particular ward where the project is taking place. If the required skill or expertise is not available from the ward / area where the project is taking place, the main contractor is permitted to accept service provers or suppliers within the KLM jurisdiction. Those service provider or suppliers would then contract directly with the main contractor.

C3.3.2.2 Preferred subcontractors / suppliers

Local Emerging Enterprises registered on the Kouga Local Municipality Database and/or nominated by the municipality.

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.

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

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 comprehend 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 Employer's Agenting 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 (CPG) 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:

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

Where D = tendered Contractor participation goal percentage.

D_o = 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.

C3.4.1 WORKS SPECIFICATION**C3.4.1.1 Applicable SANS standards**

The applicable SABS 1200 Standardised Specifications for Civil Employer's Agenting Construction read in conjunction with the SABS 0120 Code of Practice for use with standardised specifications for Civil Employer's Agenting Construction and Contract Documents will apply until such time as the SANS standards for civil Employer's Agenting are finalised.

C3.4.1.2 Other standards

Not applicable.

C3.4.1.3 Applicable national and international standards

For the purpose of this Contract the latest issues of the following Standardized Specifications for Civil Employer's Agenting Construction, applicable at the date of the tender advertisement shall apply:

SANS 1200 A	-	General
SANS 1200 AB	-	Employer's Agent's Office
SANS 1200 C	-	Site Clearance
SABS 1200 D	:	Earthworks
SANS 1200 DB	-	Earthworks (Pipe trenches)
SANS 1200 G	-	Concrete (Structural)
SANS 1200 GA	-	Concrete (Small Works)
SANS 1200 HA	-	Structural Steelwork (Sundry items)
SANS 1200L	-	Medium Pressure Pipelines
SANS 1200 LB	-	Bedding (Pipes)
SANS 10400	-	Building Regulations South Africa
SABS 1200 LC	:	Cable Ducts

Notes to tenderer:

1. Should any variation and/or addition conflict with the requirements of the standardized specification, the variation or addition will prevail.
2. The term "project specifications" appearing in any of the SANS1200 standardised specifications must be replaced with the term "scope of work".
3. The General Conditions of Contract applicable to this contract are the "Conditions of Contract for Construction Works (3rd Edition) 2015" published by the South African Institute of Civil Employer's Agenting, together with the Special Conditions of Contract form part of the contract.
4. The terms "Schedule of Quantities", (used throughout the Standard Specifications) and "Bill of Quantities", (used in all other documents forming part of this contract), and "Pricing Schedule" are synonymous.

The variations and additions to the specifications are listed in C3.4.11.

In addition, the following Particular Specifications for work not covered by the SABS 1200 Standardized Specifications are also bound in the Scope of Work.

C3.4.1.4 Particular/Generic Specifications

The particular and/or generic specifications listed below are applicable to this contract. These specifications are also bound into this document.

PA	Environmental Management
PD	Health and Safety Specifications
PC	Pump station Mechanical
PD	Electrical Installation
PE	Building work

C3.4.1.5 Certification by recognised bodies

Not applicable

C3.4.1.6 Agreement certificates

Not applicable.

C3.4.2 PLANT AND MATERIALS

C3.4.2.1 Plant and materials supplied by the employer

The Employer will not supply any plant or materials on this contract. The Contractor shall provide all plant and materials.

C3.4.2.2 Materials, samples and shop drawings

Materials or work, which does not conform to the approved samples submitted in terms of Clause 7.4 of the Conditions of Contract, will be rejected. The Employer's Agent reserves the right to submit samples to tests to ensure that the material represented by the sample meets the specification requirements.

The costs of any such test conducted by or on behalf of the Employer's Agent, the results of which indicate that the samples provided by the Contractor do not conform to the requirements of the Contract, shall, in accordance with the provisions of Clause 7.4.4 of the Conditions of Contract, be for the Contractor's account.

C3.4.3 CONSTRUCTION EQUIPMENT

C3.4.3.1 Requirements for equipment

All construction plant and equipment used on this contract shall be in good working order, well maintained, of adequate size and fit for purpose. No plant or equipment that leaks oil, fuel or hydraulic fluids may be used on site.

Any plant or equipment that, in the opinion of the Employer's Agent, is not of adequate size or fit for use shall be removed from the site and replaced with acceptable plant and equipment, all at the Contractor's cost.

C3.4.3.2 Equipment provided by the Employer

The Employer shall not supply any equipment.

C3.4.4 EXISTING SERVICES

The Contractor shall familiarize himself with all existing services and liaise with all relevant authorities for the location and detection of existing services. The Contractor shall also use all necessary means to locate and expose services without damage to such services. The Contractor shall protect any services which are visible or can be reasonably expected to be in certain positions. If the Employer's Agent rules that the Contractor has negligently damaged services, the

Contractor shall pay the amount certified by the Employer's Agent to the Employer. The Employer's Agent ruling shall be final.

If the Employer's Agent rules that the damage was not due to the Contractor's negligence, the Employer shall pay for the repair of the services so damaged. The responsibility shall remain with the Contractor to establish the position of existing services prior to commencing any excavation.

C3.4.5 SITE ESTABLISHMENT

C3.4.5.1 Location of site camp and materials storage area

The Contractor shall establish his Site camp and materials storage area at a mutually acceptable location. Written confirmation of the owner's permission to occupy the chosen location shall also be issued to the Employer's Agent if it falls outside the bounds of the site.

The site of the camp must be kept clean and tidy, and on completion of the works the Contractor shall remove all temporary offices, sheds, etc. and shall reinstate the area to the Employer's Agent and/or the owner's satisfaction.

The Employer shall not provide any services to the site during construction. The Contractor shall be responsible for arranging, at his own cost, for the provision of all services he may require in the area, as well as elsewhere on the Site.

The Contractor shall not use the area nor allow it to be used for any purposes not directly associated with the execution of the Contract.

The conditions of the EIA RoD will apply to Site Establishment as much as to any other aspect(s) of the Project. The Contractor shall adhere to the conditions as stipulated in the environmental management specification (PA).

C3.4.5.2 Water Supply

The Contractor shall make his own arrangements regarding the supply of water.

The Contractor shall, at his own expense, be responsible for obtaining and distributing all water as may be required for the purposes of executing the Contract, including water for both construction purposes and domestic use as well as for making all arrangements in connection therewith. The Contractor shall further, at his own expense, be responsible for providing all necessities for procuring, storing, transporting and applying water required for the execution of the Contract, including but not limited to all piping, valves, tanks, pumps, meters and other plant and equipment, as well as for all work and superintendence associated therewith.

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 sources of all water utilised for the purposes of the Contract shall be subject to the prior approval of the Employer's Agent, which approval shall not be unreasonably withheld. The Contractor shall comply with all prevailing legislation in respect of drawing water from natural and other sources and shall, when required by the Employer's Agent, produce proof of such compliance.

The distribution of water shall be carried out by the Contractor strictly in accordance with the applicable laws and regulations. All water provided by the Contractor for construction purposes shall be clean, free from undesirable concentrations of deleterious salts and other materials and shall comply with any further relevant specifications of the Contract.

The Contractor shall, whenever reasonably required by the Employer's Agent, produce test results demonstrating such compliance. Water provided by the Contractor for human consumption shall be healthy and potable to the satisfaction of the health authorities in the area of the Site.

The Employer accepts no responsibility for the shortage of water due to any cause whatsoever or for the additional costs incurred by the Contractor as a result of such shortage.

The Contractor shall take note that no separate or direct payment of any kind whatsoever will be made for any cost incurred to obtain, distribute, consume and use water or for the provision of a water supply point or 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.

C3.4.5.3 Power / Electricity Supply

The Contractor shall make his own arrangements with the Electricity Department for a supply of electricity if required and shall pay establishment and consumption costs at the tariffs ruling at the time.

The Contractor shall, at his own expense, be responsible for obtaining and distributing all electricity as he may require for the purposes of executing the Contract, including electricity for both construction purposes and domestic use as well as for making all arrangements in connection therewith.

The distribution of electricity shall be carried out by the Contractor strictly in accordance with the applicable laws and regulations. No separate payment will be made to the Contractor for the obtainment, distribution and consumption of electricity, the costs of which will be deemed to be in the Contractor's tendered rates and prices.

C3.4.5.4 Temporary offices for the Engineer

Not required.

C3.4.5.5 Sanitary facilities

The Contractor shall, at his own expense, be responsible for safely and hygienically dealing with and disposing of all human excrement and similar matter generated on the Site during the course of the Contract, all to the satisfaction of the responsible health authorities in the area of the Site as well as the Employer's Agent.

All such excrement shall be removed from the Site and shall not be disposed of by the Contractor on the Site. The Contractor shall further comply with any other requirements in this regard as may be stated in the Contract.

The Contractor shall further, as a minimum, supply and maintain chemical toilets for use by his workmen. The number of toilets shall be based on one toilet per fifteen personnel on site.

Under no circumstances will the Contractor's staff be allowed to use any other toilet facilities in and around the Site.

C3.4.5.6 Contract name boards and identity boards

As indicated in the BOQ.

C3.4.5.7 Accommodation of employees

The Contractor shall make his own arrangements for the accommodation of his employees. Where field accommodation is required, the Contractor shall comply fully with the wishes of the various landowners, as in their agreement with the Employer, to the satisfaction of both land owner and Employer.

C3.4.5.8 Security of Contractor's site camp

Security of the Contractor's site camp will be the Contractor's own responsibility and no additional payment will be made should additional security measures need to be taken during the Contract.

C3.4.6 SITE USAGE

Access to site shall be limited to the Contractor and his personnel. The Contractor shall be responsible to control unauthorized entry to the site and shall inform the Employer's Agent of any breach of such rules. The site shall be managed and used for its intended purpose. The Contractor is required to keep a visitors log, and ensure full compliance with site safety standards.

However, please note that the site will be spread across a large part of the town and that existing vehicle and pedestrian traffic will have to be accommodated. It will be the responsibility of the Contractor to ensure that no unauthorised persons gain access to the various works, excavations, or any potential hazard on site. It is recommended that all excavations and open trenches be closed as soon as possible to minimise risks.

C3.4.7 SURVEY CONTROL AND SETTING OUT OF THE WORKS

Benchmarks shall be used to set out the works and to control designed levels.

Before commencement of work, the Contractor shall liaise with the Employer's Agent in order to establish the exact status of all survey control and boundary pegs on the Site.

The position and level of all benchmarks shall be checked, recorded and protected.

On completion of the Contract, all pegs that have unavoidably been disturbed shall be replaced by the Employer. Pegs which have, in the opinion of the Employer's Agent, been disturbed due to the negligence of the Contractor will be replaced at the Contractor's expense.

C3.4.8 PERMITS AND WAY LEAVES

The Employer's Agent is responsible for obtaining all necessary permits and way leaves from all relevant authorities.

C3.4.9 FACILITIES PROVIDED BY THE CONTRACTOR

C3.4.9.1 Office for the Employer's Agent

An office for the Employer's Agent staff is not required.

C3.4.9.2 Sanitary facilities

No latrines are available and therefore the Contractor shall supply portable chemical toilets for use by his workmen. The number of toilets shall be based on one toilet per fifteen personnel on site. Under no circumstances will the Contractor's staff be allowed to use private or public toilet facilities.

The Contractor shall provide water and soap for his staff to be able to wash with at each site of the Works. The waste water shall be disposed of off-site.

C3.4.9.3 Security on site

The Contractor shall make provision for security on site (including site camp) against theft, robbery, and riots as his sole responsibility. The cost for providing adequate security, as and when required, must be borne by the Contractor.

C3.4.10 FEATURES REQUIRING SPECIAL ATTENTION

C3.4.10.1 Site maintenance

During progress of the work and upon completion thereof, the Site of the Works shall be kept and left in a clean and orderly condition. The Contractor shall store materials and equipment for which he is responsible in an orderly manner and shall keep the Site free from debris and obstructions.

C3.4.10.2 Testing and quality control

a) Contractor to engage services of an independent laboratory

Notwithstanding the requirements of the Specifications pertaining to testing and quality control, the Contractor shall engage the services of an approved independent laboratory to undertake all testing of materials, the results of which are specified in, or may reasonably be inferred from, the Contract.

These results will be taken into consideration by the Employer's Agent in deciding whether the quality of materials utilised and workmanship achieved by the Contractor comply with the requirements of the Specifications.

The above shall apply irrespective of whether the specifications indicate that the said testing is to be carried out by the Employer's Agent or by the Contractor.

The Contractor shall be responsible for arranging with the independent testing laboratory for the timeous carrying out of all such testing specified in the Contract, at not less than the frequencies and in the manner specified. The Contractor shall promptly provide the Employer's Agent with copies of the results of all such testing carried out by the independent laboratory.

For the purposes of this clause, an "independent laboratory" shall mean an "approved laboratory" (as defined in subclause PSA 7.2) which is not under the management or control of the Contractor and in which the Contractor has no financial interest, nor which has any control or financial interest in the Contractor.

b) Additional testing required by the Employer's Agent

In addition to the provisions of subclause C3.4.10.2 (a): Contractor to engage services of an independent laboratory, the Employer's Agent shall be entitled at times during the Contract to require that the Contractor arrange with the independent laboratory to carry out any such tests, additional to those described in subclause C3.4.10.2 (a), at such times and at such locations in the Works as the Employer's Agent shall prescribe. The Contractor shall promptly and without delay arrange with the independent laboratory for carrying out all such additional testing as required by the Employer's Agent, and copies of the test results shall be promptly submitted to the Employer's Agent.

c) Costs of testing

(i) Tests in terms of subclause C3.4.10.2(a)

The costs of all testing carried out by the independent laboratory in accordance with the requirements of subclause C3.4.10.2 (a) above shall be borne by the Contractor and shall be deemed to be included in the tendered rates and prices for the respective items of work as listed in the Bill of Quantities and which require testing in terms of the Specifications.

No separate payments will be made by the Employer to the Contractor in respect of any testing carried out in terms of subclause C3.4.10.2 (a).

Where, as a result of the consistency of the materials varying or as a result of failure to meet the required specifications for the work it becomes necessary to carry out additional tests (e.g. re-tests on rectified work and/or replacement materials), the costs of such additional testing shall be for the Contractor's account

(ii) Additional tests required by the Employer's Agent

The costs of any additional tests required by the Employer's Agent in terms of subclause C3.4.10.2.(b): Additional testing required by the Employer's Agent, shall be reimbursed to the Contractor against substitution of the Provisional Sum allowed therefore in the Bill of Quantities; provided always that the costs of any such additional tests ordered by the Employer's Agent, the results of which indicate that the quality of the materials utilised and/or the standard of workmanship achieved are/is not in accordance with the specifications, shall not be reimbursable to the Contractor.

C3.4.10.3 Subcontractors

All matters pertaining to subcontractors (including Selected Subcontractors appointed in terms of Clause 6.3 of the Conditions of Contract) 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.

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

All matters arising from the subcontract agreements shall be dealt with directly between the Contractor and the subcontractors and the Employer's Agent will not be involved.

C3.4.10.4 Opening up and closing down of designated borrow pits

Not applicable.

C3.4.10.5 Access to properties (where relevant)

The Contractor shall organise the work to cause the least possible inconvenience to the public and to the property owners adjacent to or affected by the work, and except as hereunder provided, shall at all times provide and allow pedestrian and vehicular access to properties within or adjoining or affected by the area in which he is working. In this respect the Contractor's attention is drawn to Clause 8.1.1 of the Conditions of Contract.

Where applicable and if as a result of restricted road reserve widths and the nature of the work, the construction of bypasses is not feasible, construction shall be carried out under traffic conditions to provide access to erven and properties.

Notwithstanding the above, the Contractor may, with the prior approval of the Employer's Agent (which approval shall not be unreasonably withheld), make arrangements with and obtain the acceptance of the occupiers of erven and properties to close off part of a street, road, footpath or entrance temporarily, provided that the Contractor duly notifies the occupiers of the intended closure and its probable duration, and reopens the route as punctually as possible. Where possible, such streets, roads, footpaths and entrances shall be made safe and reopened to traffic overnight. Such closure shall not absolve the Contractor from his obligations under the Contract to provide access at all times. Barricades, traffic signs, drums and other safety measures appropriate to the circumstances shall be provided by the Contractor to suit the specific conditions.

C3.4.10.6 Employment of local labour

It is the intention that this Contract should make maximum use of the local labour force that is presently under-employed. 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 Contractor shall fill in the form entitled Key Personnel in the Forms to be completed by the Tenderer. The data stated on the above-mentioned form will be strictly monitored during the Contract period and any deviations therefrom shall be subject to the prior approval of the Employer's Agent, which approval shall not be unreasonably withheld.

C3.4.10.7 Monthly statements and payment certificates

The statement to be submitted by the Contractor in terms of Clause 6.10 of the Conditions of Contract shall be prepared by the Contractor at his own cost, strictly in accordance with the standard payment certificate prescribed by the Employer's Agent, in digital electronic computer format. The Contractor shall, together with a copy of the digital electronic computer file of the statement, submit two (2) A4 size paper copies of the statement.

For the purposes of the Employer's Agent payment certificate, the Contractor shall subsequently be responsible, at his own cost, for making such adjustments to his statement as may be required by the Employer's Agent for the

purposes of accurately reflecting the actual quantities and amounts which the Employer's Agent deems to be due and payable to the Contractor in the payment certificate.

The Contractor shall, at his own cost, make the said adjustments to the statement and return it to the Employer's Agent within three (3) normal working days from the date on which the Employer's Agent communicated to the Contractor the adjustments required. The Contractor shall submit to the Employer's Agent five (5) sets of A4 size paper copies of such adjusted statement, together with a copy of the electronic digital computer file thereof.

Any delay by the Contractor in making the said adjustments and submitting to the Employer's Agent the requisite copies of the adjusted statement for the purposes of the Employer's Agent payment certificate will be added to the times allowed to the Employer's Agent in terms of Clause 6.10.4 of the Conditions of Contract to submit the signed payment certificate to the Employer and the Contractor. Any such delay will also be added to the period in which the Employer is required to make payment to the Contractor.

C3.4.10.8 Construction in restricted areas

Working space is sometimes restricted. The construction method used in these restricted areas largely depends on the Contractor's Plant. Notwithstanding, measurement and payment will be strictly according to the specified cross-sections and dimensions irrespective of the method used and the rates and prices tendered will be deemed to include full compensation for any difficulties encountered by the Contractor while working in restricted areas. No extra payment or any claim for payment due to these difficulties will be considered or entertained.

C3.4.10.9 Notices, signs, barricades and advertisements

All notices, signs and barricades, as well as advertisements, may be used only if approved by the Employer's Agent. The Contractor shall be responsible for their supply, erection, maintenance and ultimate removal and shall make provision for this in his tendered rates.

The Employer's Agent shall have the right to instruct the Contractor to move any sign, notice or advertisement to another position, or to remove it from the Site of the Works if in his opinion it is unsatisfactory, inconvenient or dangerous.

C3.4.10.10 Workmanship and quality control

The Employer, the Contractor and the Employer's Agent shall operate and maintain their own individual contract administration and quality assurance systems.

The Contractor shall implement his own Quality Assurance plan for executing the works for compliance with the aforementioned standards and specifications.

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 suitably qualified and experienced Employer's Agents, foremen, surveyors, materials 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 times.

The cost of supervision and process control, including testing and mix designs carried out by the Contractor, will be deemed to be included in the rates tendered for the related items of work.

The Contractor's attention is drawn to the provisions of the various Standardized 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 Employer's Agent for examination and measurement, the Contractor shall furnish the Employer's Agent with the results of the relevant tests, mix designs, measurements and levels to demonstrate the achievement of compliance with the Specifications.

C3.4.10.11 Public Safety

The Contractor shall at all times ensure that his operations do not endanger any member of the public.

As the area is adjacent to a residential area the Contractor shall take special precautions to prevent public access to any danger areas on the Works, e.g. by temporary barricades and/or fencing.

C3.4.10.12 Sand and Dust Control

The Contractor shall, for the duration of the contract, take appropriate measures to control the dust and soil movement which may arise due to his operations.

C3.4.10.13 Construction Regulations (2014)

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

The proposed type of work, materials to be used and potential hazards likely to be encountered on this Contract are detailed in the various specifications, Bill of Quantities and Drawings as well as in the Employer's health and safety specification, Refer Regulation 4(1) of the Construction Regulations as well as Particular Specification PB.

The Contractor shall, in terms of Regulation 5(1) of the Construction Regulations, provide a comprehensive health and safety plan detailing his proposed compliance with the regulations, for approval by the Employer or his H&S Agent.

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

A payment item is included in the Bill of Quantities to cover the Contractor's cost for compliance with the OHS Act and the above-mentioned regulations.

The Contractor shall obtain his own copy of the Construction Regulations.

The Employer and the Contractor hereby agrees, in terms of the provisions of Section 37(2) of the Occupational Health and Safety 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:

- (a) 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.
- (b) 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.
- (c) 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.
- (d) The Contractor agrees that any duly authorised official of the Employer shall be entitled, although not obliged, to take such steps as may be necessary to ensure that the Contractor has conformed to his undertakings as described in paragraphs a) and b) 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.

- (e) The Contractor shall be obliged to report forthwith to the Employer, his H&S Agent 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, his H&S Agent and Engineer, of such investigation, complaint or criminal charge.

The Contractor shall furthermore, in compliance with Constructional Regulations (2014) to the Act:

- (a) 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 H&S Agent. The Contractor's health and safety plan and risk assessment shall be submitted to the Employer within the time as stated in the Conditions of Contract and shall be implemented and maintained from the Commencement of the Works.
- (b) The Employer, or his assigned H&S 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 Engineer, at the request of the Employer or his H&S Agent, to suspend all or any part of the Works, with no recourse whatsoever by the Contractor for any damages or loss incurred as a result of such suspension, until such time that the Employer or his H&S agents are satisfied that the issues in which the Contractor has been in default have been rectified.

C3.4.1.1 Spoil Sites

The Contractor shall obtain his own spoil sites and submit the location of this site for approval by the Client. No payment will be made for the cost of hauling material to spoil sites.

C3.4.1.2 Benchmarks and Survey Pegs

A plan reflecting the positions and co-ordinate information of installed benchmarks and survey pegs will be issued to the Contractor on the commencement of the Works. The Contractor's attention is drawn to clause 5.1.2 of SABS 1200A and PSA 5.1.2 regarding the protection of these.

C3.4.1.3 Finishing and tidying

The Contractor shall take note that progressive and systematic finishing and tidying will form an essential part of this Contract. On no account shall spoil, rubble, materials, equipment or unfinished operations be allowed to accumulate in such a manner as to unnecessarily be a hindrance to or impede the activities of others. In the event of this occurring the Employer shall have the right to withhold payment for as long as may be necessary in respect of the relevant works in the area(s) concerned.

C3.4.2 EXTENSION OF TIME DUE TO ABNORMAL RAINFALL

A claim for extension of time in respect of delays suffered by the Contractor in consequence of abnormal wet climatic conditions will be considered by the Engineer in terms of Clause 5.12 of the Conditions of Contract and in accordance with provisions set out hereunder.

For the purposes of extension of time, a delay caused by abnormal wet climatic conditions will be regarded as a delay only if, in the opinion of the Engineer, all progress on an item or items of work on the critical path of the Contractor's working programme as approved in terms of Clause 5.6 of the Conditions of Contract has been brought to a halt.

Unless it is customary to carry out the work, in respect of which a delay was suffered, by rotary shifts or by day and by night, only delays to critical path items experienced as a result of wet climatic conditions during normal working hours (as defined in Clause 5.8 of the Conditions of Contract) will be taken into account for extension of time. This will apply notwithstanding the fact that a delay may have occurred on a portion of the Works on the critical path due to wet climatic conditions, which work was being executed outside the said normal hours with the permission of the Engineer, granted in

terms of Clause 5.8 of the Conditions of Contract.

The Contractor shall make due allowance within his programme submitted in terms of Clause 5.6 of the Conditions of Contract, for the total delay to work items on the critical path resulting from normal wet climatic conditions. The specified allowances for this Contract are defined in Clause 5.12.2.2 of the Conditions of Contract.

Extension of time, if granted by the Engineer, will be determined as the aggregate number of normal working hours for which all progress on the item or items on the critical path was brought to a halt as a result of wet climatic conditions, less the number of normal working days specified in Clause 5.12.2.2 of the Conditions of Contract.

In determining the revised Due Completion Date of the Contract, the Engineer shall add the equivalent number of normal working days delay determined in accordance with this Clause and all intervening normal non-working days to the prevailing Due Completion Date.

C3.4.3 VARIATIONS AND ADDITIONS TO SABS 1200 STANDARDIZED SPECIFICATIONS AND PARTICULAR SPECIFICATIONS

The following variations and additions to the SABS 1200 Standardized Specifications shall apply to this Contract.

It should be noted that these variations and additions to the SABS 1200 Standardized Specifications shall be implemented and effected prior to the interpretation and application of such.

The prefix “PS” indicates an amendment to SABS 1200 Standardized Specifications. The prefix “PSA” indicates an amendment to the SABS 1200 A Standardized Specification, “PSDB” to SABS 1200 DB Standardized Specification and so on.

Similarly, the numbers following the applicable “PS” prefix indicate the corresponding SABS 1200 Standardized Specification clause number to which this variation or addition shall apply.

An asterisk (*) placed after to a “PS letter and clause number” denotes the inclusion of an additional new clause for which no equivalent appears within the relevant SABS 1200 Standardized Specification.

For example, “PSMK 8.2.11” indicates an amendment to clause 8.2.11 within the SABS 1200 MK Standardized Specification, “PSL 5.3” indicates an amendment to clause 5.3 within the SABS 1200 L Standardized Specification and so on.

The prefix “PSMK 8.2.14*” denotes the inclusion of an additional new clause within the SABS 1200 MK Standardized Specification for which no equivalent appears.

The terms “project specification”, “Project Specification” or “Portion 2 of the project specification” appearing in any of the SABS 1200 Standardized Specifications shall be replaced with the term “Scope of Work”.

The term “Scope of Work” shall mean Part 3 of The Contract.

SABS 1200 and SANS 1200 shall have corresponding meanings.

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 Employer’s Agenting 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 Standardised Specifications, the Drawings or the Scope of Works. “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 other 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."

"All manufactured materials supplied shall be new materials unless the contrary is specified. All materials specified to be in accordance with SABS Specifications shall bear the SABS mark, where such a mark is available for the type of product."

Add the following Clause to Clause 3:

"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 10 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 beacons and pegs subject to 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's 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 5.10."

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.

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 further requirements of Clauses 4.4 and 5.1.2.2 of SABS 1200D (as amended) shall 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 the 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 any such service is 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 for the public and/or workmen, all in accordance with the requirements of the prevailing legislation and related regulations.

Unless otherwise instructed by the Employer's Agent, no services shall be left exposed after its exact position has been determined and all excavations carried out for the purpose of exposing underground services shall be promptly backfilled and compacted. In roadways, the requirements of subclause 5.9 of SABS 1200 DB should be observed. In other areas compaction is to be to 90% modified AASHTO density.

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 to telecommunication cables, 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 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 thereunder, the Contractor shall at its 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) :

- (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) 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 on 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 as to ensure compliance of the Act by all subcontractors engaged by the Contractor and their employees engaged on the Works ; and
- (e) Comply fully with all other requirements pertaining to safety as may be specified in the Contract.

The Employer and the Employer's Agent shall be entitled, although not obliged, to 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 and/or Employer's Agent's representative may reasonably require.

Where any such investigations reveal, or where it comes to the Employer's Agent'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 General Conditions of Contract 3rd Edition 2015, 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's Agent, 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 43 of the Conditions of Contract should the Contractor fail to complete the Works on or before the specified Due Date for Completion 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 9.2.1.3.6 of the Conditions of Contract and for the Employer to cancel 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 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 5.13* ACCOMMODATION OF OTHER CONTRACTORS

The Contractor shall be required to accommodate other contractors on the Site of the Works during the Contract period.

Adequate access to the site of their works shall be given the above stated contractors at all times.

No direct payment will be made for the cost of providing adequate access and accommodating the stated contractors on the Site of the Works, as well as the cost of any inconvenience 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 5.14* 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 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 'authorised' 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 'authorised' 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 Standard of Finished Work Not to Specification

Insert the words "or checks by an approved laboratory ..." after the words "Where the Employer's Agent's 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 Bill

Delete the words: "and South West Africa."

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, plus as applicable, the Civil Employer's Agenting Industry Holiday (Dec / Jan) and all gazetted public holidays for the Civil Employer's Agenting 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 8.3.1 and PSA 8.4.1 shall collectively cover all charges for:

- risks, costs and obligations in terms of the Conditions of Contract and of this standardised specification; and
- head-office and site overheads and supervisions; 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, for providing services such as water, electricity, sewage and rubbish disposal, for access roads and all other facilities required, as well as for the maintenance and removal on completion of the Works of these facilities and for the cleaning-up of the site of the Contractor's establishment and reinstatement to not less than its original condition; and

PSA 8.2 PAYMENT

PSA 8.2.2 Time-related items

Replace the contents of this Clause with the following:

"Subject to the provisions of 8.2.3 and 8.2.4, payment for each time-related item will be made monthly in equal amounts, calculated by dividing the sum tendered for each item by the duration of construction as defined in PSA 8.1.2.1 in months, until the sum tendered has been paid in full, provided always that the total of the monthly amounts so paid for each item is not more than in proportion to the progress of the work 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:

Sum of Tendered amounts for Time Related Items x Extension of Time authorised by Variation Order

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 Employer's Agent's furnished office including internet connection
.....Unit: Sum

"(c) One Employer's Agent's nameboard.....Unit: Sum

The facilities provided shall comply with the applicable requirements of SABS 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 8.3.3 Other fixed-charge obligations including compliance with the OH&S Act (Act 85 of 1993)

The sum shall cover the fixed costs of all other obligations that are required for the proper execution of the Works in accordance with the requirements of the specification and the conditions of contract, and that are not specifically covered in 8.3.1, 8.3.2 or 8.3.4.

PSA 8.4.1 Contractual requirementsUnit: 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:

- (i) One Employer's Agent's nameboard.....Unit: Sum
- (ii) Survey labourers.....Unit: Labourer Month
- (iii) One Employer's Agent's furnished office including internet connection and cellphones.....Unit: Sum

The facilities provided shall comply with the applicable requirements of SABS 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 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 Clauses 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, for Contracts where contract price adjustment is specified, be subject to such 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 Clauses 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

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 6.3 and 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 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 the Conditions of Contract 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 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's 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 8.8.2 Dealing with Traffic

Delete the entire Clause. The provision of PSA 5.10 shall apply. Refer also PSA 5.2, PSA 5.3, PSA 5.7 and PSA 5.10"

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: m³

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 within a free haul distance of 0,5km and disposing of surplus material as directed, keeping the excavation safe, dealing with water, protecting the exposed services, and nay 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 8.8.5 Cost of survey in terms of Land Survey Act

Replace the contents of Clause 8.8.5 with the following:

"(a) Locate, record and protect erf boundary and survey pegs.....Unit: Sum

The sum tendered shall cover the cost of complying with the requirements of 5.1.2 and PSA 5.1.2 as well as the cost of exposing and marking the pegs on completion of the Works.

(b) Replace pegs recorded as missing at commencement of Contract as well as pegs removed in terms of PSA 5.1.2 (a), (b) and

(c).....Unit: No

The rate tendered shall cover the cost of arranging for a registered surveyor to replace the pegs, as well as the payment of the surveyor. The Contractor shall however note that pegs recorded as missing at the start of the work and subsequently found by the surveyor to be in their correct position will not be measured for payment.

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 Clauses 8.3.3 and 8.4.5."

"PSA 8.8.6 Dealing with waterUnit: 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 SABS 1200 D and Sub clause 5.1.2 of SABS 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 duration of the contract, 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.

"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 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) ContractorUnit: 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 Works and Employer's health and safety specification (Refer Particular Specification PA). 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.

PSAB **EMPLOYER'S AGENT'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.

PSAB 5 CONSTRUCTION

PSAB 5.1 NAMEBOARDS

Replace the contents of this Sub-Clause with the following:

"The Employer's Agent's 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 8 MEASUREMENT AND PAYMENT

Delete the contents of this Clause. The appropriate measurement and payment clauses have been included under Clause 8 of SABS 1200 A and PSA.

PSC SITE CLEARANCE

PSC 3 MATERIALS

PSC 3.1 DISPOSAL OF MATERIAL

Add the following:

"The Contractor shall make use of the approved dumping site as stipulated in the document

PSC 5 CONSTRUCTION

PSC 5.1 AREAS TO BE CLEARED AND GRUBBED

Add the following:

"Areas to be cleared will be indicated by the Employer's agent on site"

PSC 5.5 CLEARING OF VEGETATION

Add the following:

"Except if otherwise agreed, where areas have to be recleared on the written instruction of the Employer's Agent, such reclearing 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 reclearing 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 Employer's Agent. 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."

"PSC 8.2.5 Take down and re-erect existing fences.....Unit: m

Add the following to subclause 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"

The Contractors' attention is drawn to the existing fence type which is that of Betaview. If the existing material is damaged it will be replaced with new material of which will be deemed to be covered in this rate.

PSC 8.2.9 Transport material and debris to unspecified sites and dump

Delete this subclause.

Notwithstanding the fact that a disposal site will be as indicated in the document, the transportation of material and debris generated by any clearing operation will not be measured for payment."

Replace the heading and contents of subclause 8.2.10 with the following:

"PSC 8.2.10 Remove topsoil to nominal depth of 100 mm, stockpile and maintain Unit: m³

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 and width of 1m, 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.

PSD EARTHWORKS

PSD 2 INTERPRETATIONS

PSD 2.1 SUPPORTING SPECIFICATIONS

Replace Clause 2.1.2 with the following:

"PSD 2.1.2: Any of the other SABS 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 new 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."

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 Engineer 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 Engineer in good time shall entitle the Engineer to reclassify, at his discretion, such excavated material."

PSD 3.1.2 Classes of excavation

Notwithstanding the provisions of this subclause 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.

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 and the PI shall not exceed 18
- d) The minimum compaction shall be 93% of modified AASHTO maximum density or that specified on the drawings."

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

Add the following:

"With reference to the last line of this subclause the material to be used for backfill shall be either 15 MPa/19 concrete or material complying with PSME 3.2.1, being a subbase (G5) quality material compacted in layers not exceeding 150mm layers to 90% of modified AASHTO maximum density, as ordered by the Engineer."

"PSD 3.3.3* Selection in Excavations and Borrow Areas / Pits

Approval of a borrow area or pit 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 Clause 4.4 with the following:

"The Contractor shall, for the purposes of detecting and locating underground services in accordance with the provisions of Subclause 5.4 of SABS 1200 A and Subclause 5.1.2 of SABS 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 the 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 (2014)".

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 Clause 5.1.2.2 with the following:

"The exposure by the Contractor of underground services, as required in terms of Clause 5.4 of SABS 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 Engineer.

Unless otherwise instructed or agreed by the Engineer, 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% of modified AASHTO maximum density, and
- b) In all other areas: 93% of modified AASHTO maximum 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 the Contract or as directed.

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 subclause 8.3.6.1 of SABS 1200 DB."

PSD 5.1.2.3 Protection of cables

Replace 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 Subclause 5.4.2 of SABS 1200 A, 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 SABS 1200 A (as amended), immediately notify the Engineer 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."

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 5.1.6 Road traffic control

Delete the contents of 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 applicable requirements, layouts and guidelines as specified in the applicable manual.

Traffic accommodation and signage shall be erected and maintained by the Contractor and the number, type and layout of the traffic signs shall comply with the South African Development Community's South African Road Traffic Signs Manual, Volume 2 – Chapter 13, Roadworks Signing.

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 10 mm), 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 Engineer. 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 1000 mm, but the Contractor may excavate a greater working width at no additional cost to the Employer. The contractor is required to ensure that adequate slope battering/benching is applied to ensure all excavated faces are stable. "

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 Engineer may direct that over-excavation be backfilled with 15 MPa/19 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 re-trim the excavations if necessary and, unless other remedial measures are agreed to by the Engineer, 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 for spoiling and hauling the material to such sites will be made in accordance with the provisions of Subclause 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 Engineer'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 Engineer and shall be replaced by the Contractor with materials acceptable to the Engineer, all at the Contractor's cost.

When required, or when ordered by the Engineer, material shall be temporary stockpiled at sites indicated by the Engineer 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

Replace the heading “Embankments” of Sub-clause 5.2.3.1 with “Embankments and Platforms”.

PSD 5.2.3.1 Embankments and Platforms

Replace the first sentence of the sixth paragraph with the following:

"Each layer shall be compacted at OMC to a density as specified and in the case of cohesive soil and 100% of modified AASHTO maximum density in the case of non-cohesive soil."

PSD 5.2.4.3 Grass or other vegetation

Add the following at the end of the subclause:

"Hydroseeding:

The following materials shall be used in hydroseeding:

(a) Fertilizer

The type of fertiliser 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:

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 Scope of Work.

Straw Stabilization:

One bale of hay per 20 m² shall be rotivated or harrowed into the sand. Harrowing or rotivation shall be done across the direction of the prevailing winds."

Grass sods:

Grass sods shall be fine kweek (Cynodon Dactylon) or kikuyu (Pennistum Clandestinum) as specified by the Engineer.

The grass sods shall be nursery grown, cut, delivered and laid within 36 hours from harvesting. It shall be free of weeds and disease and contain a minimum soil (topsoil) thickness of at least 100 mm.

The area to be harvested shall be well watered prior to harvesting and handled with extreme care to retain the maximum amount of moisture and soil within the roots. The contractor shall place and plant the sods on the areas indicated by the Engineer. Prior to the placement, the area to receive sods shall be fertilized by applying 40 g/m² of super phosphate fertiliser and thereafter be well watered.

Sods shall be fitted closely together and any hollows shall be filled with topsoil to produce an even and smooth surface. During and directly after the laying the sods, the sods shall be well watered and rolled to obtain a level and even surface."

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 various tendered rates and prices. No separate compensation shall apply for the transportation of such materials."

PSD 8 MEASUREMENT AND PAYMENT

PSD 8.1 BASIC PRINCIPALS

Add the following at the end of Clause 8.1:

"For the purpose of this Contract, the bulk excavation for to the sump foundation layer and platform shall be measured and paid for as "Restricted Excavation."

PSD 8.3 SCHEDULED ITEMS

PSD 8.3.1 Site Preparation

Replace 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 SABS 1200 C shall apply."

PSD 8.3.2 Bulk Excavation

Replace the contents of subclause 8.3.2 with the following:

"a) Excavate in all materials and use for embankment fills, platforms, berms, backfill or dispose, as ordered
..... Unit: m³

The unit of measurement shall be the cubic metre measured in place in accordance with Subclause 8.2 of SABS 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 PSA 5.1 and Subclause 5.1 of SABS 1200 D 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.

b) Extra-over for:

- 1) Hard rock excavation Unit : m³
- 2) Boulder excavation, Class A Unit : m³
- 3) Boulder excavation, Class B Unit : m³

The rate shall cover the additional cost of the operations enumerated in a) above for any portion of the excavation that is classified as hard rock, boulder excavation class A or boulder excavation class B as applicable.

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)."

PSD 8.3.3 Restricted excavation

Replace the heading of subclause 8.3.3 (a) with the following:

"a) Excavate in all materials for restricted foundations, footings and trenches and use for embankment fills, platforms, berms, backfill or dispose, as ordered Unit: m³

Replace the first sentence of subclause 8.3.3 a) with the following:

"Separate items will be scheduled for each type of excavation or structure and for each type or manner of disposal of excavated material."

Replace "in 5.2.2.1 – 5.2.2.3 (inclusive)" at the end of subclause a) with "in Clauses 5.2.2.1 to 5.2.2.4 (inclusive)."

PSD 8.3.3 b) Extra-over for:

Replace the contents of subclause 8.3.3 b) with the following:

- "
- 1) Hard rock excavation Unit : m³
 - 2) Boulder excavation, Class A Unit : m³
 - 3) Boulder excavation, Class B Unit : m³

The rate shall cover the additional cost of complying with the requirements of a) above and for all the operations enumerated in a) above for any portion of the excavation that is classified as hard rock, boulder excavation class A or boulder excavation class B, as applicable.

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)."

"PSD 8.3.3(c)* Extra over 8.3.3(a) for hand excavation where ordered Unit: m³

This item shall apply to hand excavation ordered by the Engineer or when the Engineer 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 Engineer.

The volume shall be computed from the dimensions specified, shown on the Drawings, or ordered by the Engineer.

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 backfilling using soilcrete 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 of 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 Engineer.

Over excavation beyond that allowed for, will not qualify for payment.”

PSD 8.3.4 Importing of Materials

Delete 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 8.3.11 Grassing or other vegetation cover

Replace the contents with the following:

"a) Planting of grass cuttings Unit: m²

The tendered rate shall include full compensation for supplying, planting and maintenance in accordance with the requirements of PSD 5.2.4.3.

b) Planting of grass sods Unit: m²

The tendered rate shall include full compensation for supplying, laying, planting, fertilizing, rolling, and maintaining the grass sods, all in accordance with the requirements of PSD 5.2.4.3.

c) Hydroseeding Unit: m²

The tendered rate shall include full compensation of 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.

d) Straw Stabilization Unit: m²

The tendered rate shall include all costs to supply, spread and rotivate or harrow the straw 100 mm deep into the soil."

PSD 8.3.12 Road traffic signs and markings

Delete the contents of this Sub-Clause.

The provisions of PSA 5.10 shall apply.

“PSD 8.3.14* Excavate and dispose of unsuitable material from sides or bottom of restricted foundations, footings and pump station sumps where ordered and replaced with imported rockfill quality (50 mm to 200 mm uniformly graded) material from commercial sources Unit: m³

The rate tendered shall cover the cost of the acquisition of the rockfill quality (50 mm to 200 mm uniformly graded) material from commercial sources, for transporting, placing, and compacting the material until “lock up” is achieved.”

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 roadways, up to underside of the road layers, shall be subbase quality (G5) material complying with clause 3.2.1 of SABS 1200 ME compacted in 150 mm layers to 98% of modified AASHTO maximum density.

The area subject to loads from road traffic shall be held to apply for a width of 500 mm beyond the back of kerb or edge of roadway."

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 150 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 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 3.6 MATERIALS FOR REINSTATEMENT OF EXISTING ROADS AND PAVED AREAS

PSDB 3.6.1 Subbase and base:

Delete the contents of Clause 3.6.1 and replace with the following:

"Where trenches cross existing surfaced roads the following shall apply:

- a) The service (pipe, cable etc.) shall be laid on a bedding cradle, and covered with a fill blanket, as specified in SABS 1200 LB or in the Project Specification.
- b) The remaining portion of the trench, from the top of the fill blanket to the road surface, shall be filled with cellular trench backfill material.
- c) The specification for this material is as follows:

- | | | | |
|-------|----------------|---|--|
| (i) | Definition | : | Material shall consist of a cellular light-weight concrete incorporating large volumes of controlled micro-air cement and sand. |
| (ii) | Density Range | : | 150 - 1400 kg/m ³ and have an equivalent CBR value greater than 100. |
| (iii) | Consistency | : | Material shall be of a pickable nature after final setting. |
| (iv) | Admixture | : | The admixture is a pre-foam organic compound accelerated by the addition of calcium chloride. Chloride free additive must be used where the outer casing of the service being covered is metallic. |
| (v) | Setting Times | : | The finished product must achieve initial set within 90 minutes. It must then be able to carry light traffic. |
| (vi) | Specifications | : | British Standards draft S.W.P. 146 of July 1990. |

Delete the heading and contents of Clause 3.6.4 and replace with the following:

“PSDB 3.6.4 Bituminous and Premix Surfacing

Where this project is undertaken simultaneously with the construction of bituminous and/or premix surfaced roads, a hot premix and/or bituminous surfacing in accordance with the specifications applicable to the road surfacing shall be used in the reinstatement of the road surface. Where the construction of surfaced roads do not form part of this project a hot premix (Type IVa or 7 mm sidewalk mix) laid on a cleaned surface which has been previously tack coated with an anionic emulsion shall be used in the reinstatement of the road surface.”

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 subclause 3.7:

“Notwithstanding anything to the contrary stated in this subclause the Contractor shall, where so ordered, selectively stockpile topsoil, material complying with 3.3 and 3.4, 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 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.

Along any section of the trench where water is present and prevents the installation of the pipeline to the required specifications, the bottom will be stabilized with 100mm thick 19mm stone if so ordered by the Engineer and the pipe will then be bedded in 13mm aggregate wrapped in geotextile (Bidim U14 or approved equivalent) or as detailed on the drawings.

PSDB 5.1.3 Accommodation of Traffic and Access to Properties

Replace the semi-colon and the word “and” at the end of Subclause 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 Engineer, 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 5.1.5* Excavation for the removal of existing pipelines

Where existing pipes have to be recovered, lifted, removed and relayed, they shall be carefully opened up by machine trenched excavation up to 300 mm above the crown of the pipes, after which the whole pipe shall be fully exposed by means of hand excavation. The trench excavation width shall comply with Subclause 5.2.

If so instructed by the Engineer, the Contractor shall, before commencing with the trench excavation of the pipeline, expose the pipeline to be removed by means of careful hand excavation at positions and interval agreed with the Engineer, in accordance with the requirements of subclause PSA 5.4.1.

Measurement and payment for locating the exact positions of the pipelines, where required by the Engineer, shall be made in accordance with PSD 8.8.4.

The Contractor shall thereafter expose and remove from the ground, the existing water pipelines. The pipes shall be pulled out of their sockets and removed from the trench in a manner approved by the Engineer and brought to the surface for inspection and re-use.

All pipes and specials encountered shall be removed from the trench in a manner as to avoid causing damage to the pipe itself and as approved by the Engineer and cleaned sufficiently as to allow inspection of the pipes and specials by the Engineer and stacked in such a manner as will facilitate the inspection of each pipe and special.

Pipes that are declared suitable for re-use and pipes declared unfit for re-use shall be dealt with in accordance with the respective manner described in the specifications, or on the Drawings or the Engineer's instructions, as relevant."

Pipes and specials that are suitable for re-use shall be transported to the Contractor's yard where they shall be off-loaded and neatly stacked to the satisfaction of the Engineer. The Contractor shall be responsible for compiling a written report on all pipes and special recovered.

Pipes and specials which are declared by the Engineer as unsuitable for re-use shall be transported to a spoil site and covered with spoil material to a depth of not less than 300 mm.

After the successful removal of the pipes, the remaining portion of the trench and the existing bedding shall be excavated to the original trench bottom level. The provisions of subclauses PSDB 5.6 and PSDB 5.7 shall apply.

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 700 mm, 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 Engineer, 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 SABS 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 Subclause with:

"or to spoil in accordance with the requirements of PSD 5.2.2.3 and Subclause 5.2.2.3 of SABS 1200 D, as instructed by the Engineer."

PSDB 5.6.6 Completion of backfilling

Add the following:

"If in the opinion of the Engineer insufficient progress is being made with the backfilling of trenches, the Engineer will be entitled to order that no further excavation takes place until the backfilling operation has caught up."

"PSDB 5.6.9* Backfilling around structures

Backfilling around a structure shall not be commenced before it has been approved by the Engineer.

Granular material shall be used as backfill material around structures as shown on the Drawings and shall be placed in layers not exceeding 150 mm compacted thickness, each layer being thoroughly compacted to 100% of modified AASHTO density as instructed by the Engineer before the succeeding layer is placed.

Unsuitable or surplus excavated material shall be spoiled in accordance with the requirements of PSD 5.2.2.3 and Subclause 5.2.2.3 of SABS 1200 D, as instructed by the Engineer."

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* Procedure for Backfilling with Trenchfill

- a) The cellular backfill material (hereinafter called "trenchfill") shall be ordered from an approved supplier and shall be delivered to site in a truck-mixer. The material shall be poured directly into the trench and no vibrating or additional compaction shall be necessary.
- b) The trenchfill shall be cast flush with the surrounding road surface and trowelled to an even surface.
- c) After the trenchfill has set, either the same day or the following day, the top 40mm of the trenchfill shall be scabbled-off using a pick or paving breaker and the depression filled, reinstated and compacted using hot asphalt. During and after compaction, the asphalt shall be finished flush with the surrounding road surface.
- d) The asphalt reinstatement of the trench shall be carried out by the Contractor.

"PSDB 5.9.8* 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 subclause 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 m³

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 Engineer and up to a depth of 1,0 metre, trench excavation by hand as well as for any inconveniences related to the continuation with Plant and Equipment across and over hand-excavated trenches.

The volume shall be computed from the dimensions specified, shown on the Drawings or ordered by the Engineer.

Normal handwork required to clean and trim any excavations as well as sides and bottoms of mechanically excavated trenches or excavations will not qualify for payment in terms of this clause."

Add the following subclauses after subclause 8.3.2(c):

"(d) Excavate in all materials for chambers, junction boxes 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 as measured in place according to the authorised dimensions and shall exclude the volume of material so excavated and paid for under sub-items (a) and (b).

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 Engineer 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: m³

Measurement and payment shall be in accordance with the provisions of 8.3.2(b) and PSDB 8.3.2(b)."

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 subclause with the following:

"Measurement and payment shall be in accordance with subclause PSD 5.2.5."

PSDB 8.3.5 Existing Services that intersect or adjoin a pipe trench

PSDB 8.3.5(b) Services that adjoin a trench

Replace the wording "measuring for shoring" at the end of the first sentence within 8.3.5(b)2) with the words: "protected by shoring".

Add the following at the end of this subclause:

- “
- (v) the additional cost of detection, exposure, hand excavation, protection, alteration and backfill material (the last if outside trench dimensions),
 - (vi) the rate for this payment item shall cover the cost of any necessary shoring,
 - (vii) the additional cost of any shoring necessary.

Existing services which have been exposed and paid for under clause 8.8.4 of SANS 1200 A and PSA 8.8.4 shall not qualify for payment under this clause. Services that have been abandoned will not be measured for payment.”

PSDB 8.3.6.1 Reinstate road surfaces

Replace from “a) Gravel on shoulders” through to “....Etceteras.....Unit: m²” with the following:

“(a) Backfilling using Trenchfill Unit: m³

(b) Hot asphalt type IVA (min thickness 40 mm) Unit: m²

For item (a) the volume will be computed from the length of trench as applicable and the width determined from the applicable side allowances specified in 8.2.3, and the depth from road surface to top of selected fill blanket. Payment for this item will be additional to that for excavation covered by 8.3.2.

For item (b) the area will be computed from the length of paved trench surface as applicable and the width determined from the applicable side allowances specified in 8.2.3. The final compacted thickness of the layer must be not less than 40 mm.

The rates shall further cover the cost of temporary accommodation of traffic (including the signs and by-passes), arranging for safety of the public, excavation (including breaking up, removal and disposal of surplus material) and the subsequent reinstatement as specified in 5.9, and shall include the cost of delays and the cost of any risk of having to repair damage as specified in 5.10.

PSDB 8.3.7 Accommodation of Traffic

Delete Subclause 8.3.7. The provisions of PSA 5.10 shall apply.

PSDB 8.3.8* Trim, shape and compact in-situ material for top structure platform Unit: m³

The unit of measurement shall be the area of excavation or fill surface trimmed and compacted as called for on the Drawings.

The rate tendered shall cover the cost of trimming the surface of the excavation or fill to the tolerances specified in PSD 6.1(c), as well as for watering, mixing and compacting the surface to a depth of 150 mm to 90% of modified AASHTO maximum density. The rate tendered shall further include for working in restricted areas.

PSG CONCRETE (STRUCTURAL)

PSG 3 MATERIALS

PSG 3.2 CEMENT

PSG 3.2.1 Applicable Specifications

Replace the contents of this sub clause with the following:

"Subject to the provisions of 3.2.2, cement shall comply with the requirements of SABS EN 197-1 as amended for a CEM I – 42, 5 cement."

PSG 3.2.2 Alternative types of cement

Replace the contents of this sub clause with the following:

"Subject to the provisions of below, only CEM I - 42.5 cement complying with the requirement of SABS ENV 197-1 shall be used.

Should the Contractor however wish to use any other type of cement, he shall first obtain the Engineer's prior written approval (refer also 8.1.3.2 and 8.1.3.3).

The tendered rates however, shall be based on the use of CEM I - 42.5 cement only."

PSG 3.2.3 Storage of cement

Add the following:

"Cement shall not be stored for longer than 12 weeks without the Engineer's permission."

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."

Add the following new subclauses:

"PSG 3.9* WATERSTOPS

PVC waterstops shall comply with the requirements of CKS 389 and as detailed on the drawings and the Bill of Quantities.

PSG 3.10* ROOFING FELT

Three-ply roofing felt shall comply with the requirements of SABS 92 for type 40 felt.

PSG 3.11* BUTYL RUBBER SEALING STRIPS

The dimensions of the sealing strip for use in the sump are shown on the Drawings. The strips shall have a factory-applied bonding layer on one side and shall be permanently bonded to the prepared concrete surface, in accordance with the manufacturer's instructions.

The strip shall have a breaking elongation of not less than 300% and a tensile strength of 8, 0 MPa.

The completed joint shall be guaranteed 100% watertight and resistant to the long term effects of chemically treated water.

PSG 3.12* LAMINATED BUTYL RUBBER WATERPROOFING STRIPS

3-mm thick laminated butyl rubber strips shall be permanently fixed to the concrete where shown on the Drawings.

The preparation of the concrete surface the installation of bond breakers and aluminium backing strips, the fixing of the laminated butyl rubber waterproofing strip with an epoxy-resin-based adhesive and the forming of lapped joints shall all be done according to the manufacturer's specifications to provide a watertight joint.

PSG 3.13* CURING COMPOUND

Curing compound shall be white pigmented natural resin based liquid curing compound complying with ASTM 309-74.

PSG 3.14* STAINLESS STEEL

The following grades of stainless steel shall be used:

- 304L for welded applications,
- 304 for not-welded applications."

PSG 3.15* MATERIALS FOR BUILDING WORK

PSG 3.15.1 Cement

The requirements stipulated for sub clause 3.2.1 and PSGA 3.2.1 shall apply.

PSG 3.15.2 Sand

Sand for mortar shall comply with SABS 1090.

PSG 3.15.3 Bricks

Brickwork shall be built in stretcher bond. The walls shall be built to the dimensions shown on the Drawings or as 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 be NFX Burnt clay engineering bricks, having a nominal compressive strength of 28 MPa, and complying with the requirements of SABS 227.". The bricks shall be obtained from an approved manufacturer and samples of the bricks shall be submitted to the Engineer for approval.

PSG 3.18.4 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 4 PLANT

PSG 4.1 GENERAL

Add the following new sub clause:

"PSG 4.1.1 Minimum Plant

The Contractor shall have the following minimum equipment and 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 Engineer 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."

Replace the heading of sub clause 4.5 to read: "FORMWORK AND SCAFFOLDING"

PSG 4.5 FORMWORK AND SCAFFOLDING

PSG 4.5.1 Design

Add the following:

"All formwork and scaffolding used on or for any part of the Works shall be designed and approved by a recognised authority / designer / structural engineer before commencing with the erection of any formwork or scaffolding.

The Contractor shall appoint and reimburse the authority / designer / structural engineer and submit, to the Engineer, proof of the approved designs.

Irrespective of the above, such approval shall not relieve 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 of 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 Engineer.

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.

Alternative tie methods other than above may be proposed but must be qualified in the tender and will be subject to the Engineer's approval.

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 Engineer shall only inspect the reinforcing after it has been fixed in place, the formwork cleaned, cover blocks positioned and tied, 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) 50 mm or
- b) 5 mm plus the maximum size of the coarse aggregate or,
- c) the cover as specified on the Drawings, whichever is the greater."

PSG 5.2 FORMWORK

PSG 5.2.1 Classification of finishes

(b) Smooth

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 Engineer, 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 for formwork

Add the following:

"Construction joints shall be positioned as shown on the Drawings."

PSG 5.2.5 Removal of formwork

Add the following sub clause:

"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 Engineer.

The holes or cavities left by ferrule cones in the concrete of water-retaining structures shall be filled with an approved non-shrink grout applied strictly in accordance with the manufacturer's specifications."

PSG 5.4 PIPES AND CONDUITS

Add the following:

"All pipes passing through concrete floors, walls or slabs shall be cast into the concrete member simultaneously with the casting of the member. Openings for pipes shall only be left in concrete members when so directed by the Engineer 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.

The cost of such method will be deemed to be included in the rates tendered for items PSG 8.9.

Openings left for pipes shall be filled with approved non-shrink grout."

PSG 5.5 CONCRETE

PSG 5.5.1 Quality

PSG 5.5.1.5 Durability

The exposure conditions of the pump station concrete are classified as "severe".

PSG 5.5.1.7 Strength concrete

Add the following:

"The concrete mixes shall be designed by an approved laboratory.

Design

The proportions of the various sizes of aggregate, cement and water shall be such as to produce a dense concrete of adequate workability for the particular circumstances under which the concrete will be transported, placed and compacted. Approved plasticising additives may be used, or instructed to be used by the Engineer, to ensure adequate workability in preference to varying the proportions of water or cement.

All exposed concrete shall be of the same colour. No change in materials or processes shall be made without the Contractor first satisfying the Engineer that no change in colour will result.

Trial mixes

Whenever "Designed Mixes" are required by the Schedules of Quantities or Drawings, after approval of the aggregates the Contractor shall design for each class of concrete required for the Works, have trial mixes designed within the limits specified herein for 28 day and 7 day strengths and he shall have cubes made and tested by an approved laboratory at his own expense. The test results of cubes made from trial mixes shall be used to determine the proportions for the "Designed Mixes" to be used in the Works.

Details of the mixes as designed shall in all cases be submitted to the Engineer for approval, 30 days before concreting is carried out and no concrete shall be placed in structures before such approval in writing has been obtained. The proportions of cement, aggregates and water for each mix as approved shall not be changed except with approval of the Engineer.

The Engineer must receive for any particular concrete mix:-

- Proportions of each design tested
- Strength of each cube tested

- Density of each cube tested
- The Contractor's nomination of the design he proposes."

PSG 5.5.3 Mixing

PSG 5.5.3.2 Ready-mixed concrete

Add the following:

"Ready-mixed concrete may be used.

Should the Contractor however elect to use ready-mixed concrete in the Works he shall provide a qualified technical assistant who shall check the quality of the materials used, the accuracy and effectiveness of the water gauges and all relevant parts of the batching and mixing equipment, the moisture content of the aggregates, the quantities batched, the time of departure of each batch and all other matters which may affect the quality of timely arrival of the concrete.

The technical assistant shall commence work at the batching plant sufficiently in advance of the batching of the first mix to carry out all the required checks and shall remain at the plant throughout the period in which concrete for the Works is being batched.

The technical assistant shall maintain a continuous record of all the tests and checks carried out by him. The record shall be available for the Engineer's inspection at all times and a copy of the record for each day shall be given to the Engineer the following morning.

The Contractor shall further take samples for testing from every load delivered to the Site."

PSG 5.5.5 Placing

Add the following:

"Concreting of the wall between horizontal construction joints shall be carried out in both directions from a point on the wall in order to close the gap with fresh concrete."

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 structure walls in positions indicated on the Drawings or approved by the Engineer. Vertical construction joints will however not be permitted.

The cost of all horizontal construction joints not shown on the Drawings will be deemed to be included in the rates tendered for cast in situ concrete.

The walls 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 Engineer's 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 5.5.8 Curing and protection

Add the following:

"As soon as the concrete has hardened sufficiently, it shall be protected against loss of moisture. Unless otherwise authorised by the Engineer curing shall be continuously maintained for 7 days.

Failure to maintain continuous curing for the above mentioned period will be considered as failure to comply with the Specification, irrespective of subsequent wetting, and will be dealt with as specified.

The Contractor shall take all measures necessary to prevent the occurrence of shrinkage cracks in the concrete, having regard to the effect of sun and wind on concrete that is necessarily rich to withstand severe exposure. No part of any face of freshly placed concrete shall be exposed to the sun or wind for more than 0,5 hour after being placed until it is fully cured.

Curing shall be accomplished by one or more of the following methods approved by the Engineer for each type of structure:

- (a) sprinkling or spraying with water continuously
- (b) ponding of water on exposed surfaces
- (c) covering with moisture-retaining materials, such as sand, cotton or jute mats, kept continuously wet
- (d) covering with waterproof plastic sheets or curing paper firmly held at the edges
- (e) application of liquid curing compounds. The use of membrane curing compounds will be allowed subject to the Contractor producing sufficient cube test results which conclusively indicate the adequacy of the compound by comparing cubes which have been cured with the proposed curing membrane and left exposed to the elements with an equal number of air cured and water cured cubes. A discolouration and weathering test shall also be carried out on a sample concrete surface of at least 5 m². Any curing compound which permanently discolours the concrete surface or which weathers in an unsightly manner will not be acceptable. If approved the curing compound may only be used on vertical faces of cast in-situ members of the structures.

Before any membrane curing compound is used, each batch shall be tested on a trial surface to ensure that it forms a satisfactory membrane and any compound which is unsatisfactory in the opinion of the Engineer, shall be rejected. Surfaces where curing membranes are used shall be treated in such a manner that the final concrete texture and colour blends in with the rest of the concrete work. Furthermore, the Engineer shall, at his discretion require the Contractor to immediately adopt an effective alternative means of curing any area of the structure to which a membrane has been applied, which in the opinion of the Engineer, is unsatisfactory."

PSG 5.5.10 Concrete surfaces

All unformed concrete surfaces shall, except where otherwise ordered, be given a steel float finish.

Add the following subclauses:

"5.5.10.4 Where the surfaces of the concrete are to be additionally hardened or protected the positions of such surfaces and the method to be used will be shown on the Drawings and will be scheduled. Materials or products with a ferrous content will not be allowed.

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/m³, and the maximum cement content shall be 400 kg/m³ in reinforced concrete, or 500 kg/m³ in pre-stressed concrete.

The maximum water : cement ratio for water-retaining structures shall be 0,53"

Add the following new subclauses:

"PSG 5.5.16 Applied loads

No crushed-stone covering or any other loads shall be placed on the roof of the structure before the concrete has attained its design strength, unless approved supports are provided.

PSG 5.5.17 Pipes and conduits

All pipes passing through concrete floors, walls or slabs shall be cast into the concrete member simultaneously with the casting of the member. Openings for pipes shall only be left in the concrete members when so directed by the Engineer or when shown on the Drawings. Pipes shall be installed in such openings according to the details shown on the Drawings.

If watertightness 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 prior to casting in. The cost of such method will be deemed to be included in the rates tendered for item PSG 8.9.

PSG 5.5.18 Soilcrete

Where soilcrete is specified for filling, the soilcrete shall comply with the requirements of sub clause PSDB 3.5 (d) of SABS 1200 DB and shall be placed as specified in the sub clause.

PSG 5.5.19 Brickwork

Brickwork shall be carried out as specified for manholes in sub clause 5.6.4 of SABS 1200 LD using bricks conforming to the requirements for bricks as per sub clause 3.5.1 of SABS 1200 LD.

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 5.5.20 Plasterwork

Plasterwork shall consist of a single coat, comprising one application of a 1 : 4 cement : sand mixture with a wood float 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 5.5.21 Granolithic screed / benching

Granolithic concrete shall consists of 1 part of cement, 1,5 parts of sand and 3 parts of 9,5 mm maximum size aggregate by volume. In all other respects it shall comply with the specifications clauses for concrete.

The contact surface of the base concrete shall comply with the requirements for a Degree of Accuracy II finish.

Immediately before placing the granolithic concrete, the base concrete shall be thoroughly cleaned by scrubbing, all the standing water then removed, and a 1:3 cement mortar grout of thick cream consistency well brushed into the prepared surface, the granolithic concrete shall then be applied before the cement grout sets. The granolithic concrete shall not have a slump exceeding 50 mm.

It shall be brought true to profile as shown on the Drawings with a Degree of Accuracy I finish."

PSG 6 TOLERANCES

PSG 6.2 PERMISSIBLE DEVIATIONS

PSG 6.2.3 Specified permissible deviations

Add the following:

"Degree of Accuracy II is applicable, except where specifically shown otherwise on the Drawings.

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:

"Vertically, per metre of height
subject to a maximum of"

Permissible deviation		
Degree of accuracy		
III	II	I
mm	mm	mm
5	3	2
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 test cubes and shall arrange to have them tested by an approved laboratory.

The cost of all testing, including the cost of sampling, storage and the 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 Engineer will only carry out such control testing as he may require.

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 Subclause 7.3. Samples for testing shall be taken of such concrete at the point of placing.

The rates of sampling and testing will be selected by the Engineer depending on the magnitude of the Works and daily pours. At least one sample (sufficient for 6 cube moulds) shall be taken from each day's casting and from randomly selected daily batches to represent an average volume of not more than those given in the table below. Each sample shall be taken from one particular batch.

Rate 1 Highly Stressed Structure	Rate 2 Ordinary Structure	Rate 3 Mass Concrete
10 m ³ or 10 batches	20 m ³ or 20 batches	50 m ³ or 50 batches
Whichever is the lesser volume		

Unless otherwise agreed by the Engineer tests shall be carried out in an approved laboratory and certified copies of all test results shall be submitted to the Engineer immediately after the test.

Compliance with the specified characteristic strength will be judged by tests made on cubes at an age of 28 days. Tests shall also be made at 7 days.

Not more than 5 % of the tests shall fall below the specified strength.

The average strength determined from any group of three consecutive test cubes shall exceed the specified strength by not less than 7,5 MPa.

Each individual test result shall be greater than 85 % of the specified strength.

When the average strength of three consecutive test cubes fails to meet the second of the above requirements, the mix proportions of subsequent batches of concrete shall be modified to increase the strength.

Where durability and impermeability are prime considerations, the Engineer may order the density of wet concrete to be measured regularly as a check on the concrete mix. This shall be done by placing a sample of concrete being poured in a standardised container, compacting by vibration and then determining the density.

The Engineer may also order tests on the hardened concrete in the structure. These may include non-destructive methods or the taking of cored samples.

In evaluating test results, the Engineer will take the following into consideration:-

- (i) The validity of test results.
- (ii) Confirmation that specimen sampling and testing has been carried out in accordance with BS 1881.
- (iii) The mix proportions actually used in the concrete under investigation.
- (iv) The actual section of the structure represented by the test cube/s.
- (v) The possible influence of any reduction in concrete quality on the strength and durability of the affected section of the structure.

The Engineer may thereafter declare the concrete to be defective and order action to be taken as specified."

Add the following sub clause:

PSG 7.3.6 Disinfection of Structure

Before testing for watertightness, the structure shall be thoroughly cleaned out, pressure sprayed and washed down with clean water and thereafter with the disinfect solution.

The roof soffit, beams, columns and walls shall be thoroughly sprayed down and the floor scrubbed with the solution specified in sub clause 5.10 of SABS 1200 L.

On completion of the disinfection, the disinfectant solution shall be run to waste before the structure is filled for testing for watertightness.

Should any further work be necessary in the structure after testing, the structure shall be disinfected at the Contractor's expense."

Add the following sub clause:

PSG 7.3.7 Testing structure for water tightness

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 structure.

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 Engineer in relation to a fixed bench mark, and the water level 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 shall 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 and rainfall, if applicable, shall not exceed 1/500th of the average water depth of the full tank, or 10 mm.

Should the structure not satisfy the 7-day test, then, after the completion of remedial work, it shall be refilled if necessary left for a further stabilisation period, a further test of 7 days duration shall then be undertaken in accordance with this clause.

In the event of appreciable leakage being evident at any stage of the filling or testing or in the event of the Engineer considering the final degree of watertightness to be unsatisfactory, the Contractor when ordered by the Engineer 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 Engineer that a sufficient degree of watertightness has been obtained.

The costs of emptying the water-retaining structure which cannot be drained shall be borne by the Contractor.

The water shall be discharged in a manner approved by the Engineer and shall be such that the Employer can utilise the water if he so desires.

The water shall further 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.

8.1.1.10 Formwork to horizontal surfaces in reservoirs, 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 Engineer.

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 after "mixing, testing" in the second line of sub clause 8.1.3.3(a) "including transport to an approved laboratory,"

Add the following to PSG 8.1.3.3(a):

The tendered rate for walls shall also include for forming vertical joints where authorised."

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 8.1.3.1(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."

PSG 8.2.5 Narrow Widths

Add the following:

"Widths in excess of 300 mm shall not be regarded as narrow widths."

PSG 8.2.6 Box out holes / Form voids

Replace the heading of item (d) with the following:

"Large other than circular, of area over 0,1m² up and including 3m²."

PSG 8.4 SCHEDULED CONCRETE ITEMS

PSG 8.4.3 Strength Concrete, Grade

Replace "Unit: m³" with "Unit: m³ or m²"

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 8.5 JOINTS

Replace "Unit: m" with "Unit: m or m²."

"PSG 8.9* Inserts (type of description stated) Unit: No

The tendered rate shall cover the cost of taking delivery, installing and fixing in position as detailed, for splitting and cutting the formwork where required, dealing with the reinforcement, ensuring watertightness and casting into concrete of the scheduled items and shall further include all clearing and cleaning preparation as well as for finishing.

Pipes for casting into concrete will be measured elsewhere.

The provision of the items to be built in and fixed will, except if otherwise stated, be measured for payment elsewhere."

"PSG 8.10* TESTING FOR WATERTIGHTNESS AND DISINFECTION

(a) (Structure stated) Unit: Sum

The unit of measurement shall be the number of each structure successfully disinfected and passing the specified watertightness tests to the satisfaction of the Engineer.

The sums tendered shall cover the cost of all labour, plant and materials including water to test and disinfect, as well as for the disposal of the disinfectant."

PSGA CONCRETE (SMALL WORKS)

PSGA 3 MATERIALS

PSGA 3.2.1 Applicable specifications

Add the following to this subclause:

"Where reference is made in this specification or the standard specifications to the cement specifications, e.g. SABS 471: Portland cement and rapid hardening Portland cement, it shall be replaced with the new specification:

SANS 50197-1 "Cement composition, specifications and conformity criteria Part 1: Common cements."

Furthermore, where reference is made in this specification or the standard specification to a different cement type, the following names will apply and the Engineer will confirm the relevant new name from the table below:

AFRISAM Info correct as at 10/2010		Limpopo	Mpumalanga	Gauteng	Free State	KZN	Eastern Cape	NW Province	Northern Cape
CEM I	52,5N	RHC	RHC	RHC	RHC		RHC	RHC	RHC
CEM II A-M	42,5N	HSC	HSC	HSC	HSC	HSC	HSC	HSC	HSC
CEM II B-L	32,5N				APC		APC		APC
CEM III A	32,5N			EBC					
CEM V A	32,5N	APC	APC	APC	APC			APC	

LAFARGE Info correct as at 10/2010		Limpopo	Mpumalanga	Gauteng	Free State
CEM II A-V	52,5N	Rapidcem/ Fastcast	Rapidcem/ Fastcast	Rapidcem/ Fastcast	Rapidcem/ Fastcast
CEM II A-V	42,5N	Powercrete Plus	Powercrete Plus	Powercrete Plus	
CEM II A-M	42,5N	Powercrete Plus	Powercrete Plus	Powercrete Plus	Powercrete Plus
CEM II B-M (V-S)	32,5N	RoadCem	RoadCem	RoadCem	RoadCem
CEM IV A-V	32,5R				
CEM IV B-V	32,5R	Buildcrete/ Civilcrete/ LeClassic	Buildcrete/ Civilcrete/ LeClassic	Buildcrete/ Civilcrete/ LeClassic	Buildcrete/ Civilcrete/ LeClassic

LAFARGE Info correct as at 10/2010		KZN	Eastern Cape	NW Province	Northern Cape
CEM II A-V	52,5N	Rapidcem/ Fastcast		Rapidcem/ Fastcast	Rapidcem/ Fastcast
CEM II A-V	42,5N	Powercrete Plus			
CEM II A-M	42,5N	Powercrete Plus	Powercrete Plus	Powercrete Plus	Powercrete Plus
CEM II B-M (V-S)	32,5N	RoadCem		RoadCem	RoadCem
CEM IV A-V	32,5R	Buildcrete/ Civilcrete			
CEM IV B-V	32,5R	Buildcrete/ Civilcrete/ LeClassic	Buildcrete/ Civilcrete/ LeClassic	Buildcrete/ Civilcrete/ LeClassic	Buildcrete/ Civilcrete/ LeClassic

NPC Info correct as at 10/2010		KZN	Eastern Cape
CEM II B-S	42,5N	NPC Plus	NPC Plus
CEM II A-L	32,5R	NPC Plus	NPC Plus
CEM II B-L	32,5N	NPC Pro	NPC Pro

CEM III A	32,5N	NPC Pro	NPC Pro
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PPC Info correct as at 10/2010	Limpopo	Mpumalanga		Gauteng	Free State	KZN	Eastern Cape	NW Province	Northern Cape	Western Cape
CEM I	52,5N	OPC	OPC	OPC	OPC	OPC		OPC		
CEM I	42,5R								Rapo	Rapo
CEM I	42,5N	OPC	OPC	OPC	OPC	OPC	OPC	OPC	OPC	OPC
CEM II A-L	32,5R						Surebuild			
CEM II B-L	32,5R	Surebuild	Surebuild	Surebuild	Surebuild	Surebuild		Surebuild	Surebuild	
CEM II B-V	32,5R		Surebuild	Surebuild		Surebuild				
CEM II B-M	32,5R	Surebuild	Surebuild	Surebuild	Surebuild	Surebuild	Surebuild		Surebuild	Surebuild

Notes:

- * OPC cements previously performed approximately as CEM 1 32,5R products
- ** PC25FA cements under the old standards achieved lower compressive strengths than the OPC's of the time
- *** Some PFAC cements meet the new standard for MC 22,5X. Others required modification before meeting the requirements for MC 22,5X"
- **** Surebuild cement will not be allowed to be used on this project.

“PSGA 3.8* Curing compound

Curing compound shall be white pigmented natural resin based liquid curing compound complying with ASTM C 309-74.”

PSGA 4 PLANT

PSGA 4.2 Mixing Plant

Add the following:

“All site mixed concrete shall be mixed in a rotary type mixer and the minimum size of mixer that may be used shall have the capacity to mix a batch comprising one standard 50kg bag of cement.”

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. Reliable test records of concrete made from the same materials and mix proportions will, without prejudicing the requirements of this subclause, be accepted as a basis for approving a mix design.”

PSGA 5.4.2 Batching

Notwithstanding the requirements of this subclause, 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.

PSGA 5.4.6 Compaction

Replace “or (if approved) ... forking” in the first sentence of subclause 5.4.6.3. with “using approved vibrators”.

PSGA 5.4.7 Curing and protection

Notwithstanding the provisions of this subclause, all cast in situ concrete shall, except where otherwise authorised, be cured in accordance with the requirements of subclause (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 7 TESTS

PSGA 7.1.2 Frequency and sampling

Notwithstanding the requirements of this subclause, 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 Engineer will only carry out such check testing as he requires.

PSGA 7.4 Testing of watertightness and disinfection

Procedure

No backfilling around the structure to be tested shall be permitted until the water tightness test has been carried out to the satisfaction of the Engineer and written consent is obtained from the Engineer to backfill.

The watertightness test shall only be conducted once the Engineer has visually inspected and approved the structure in writing.

The watertightness of the sump shall be performed in two stages as follows:

Fill the structure by admitting water at a rate not exceeding 2 m in 24 hours until the top water level has been reached. Simultaneously chlorine dissolved in water is to be added. Upon completion of the filling process, the residual chlorine levels shall be 5 parts per million. The Contractor shall provide, set up and ultimately remove an apparatus (hook gauge) suitable for conveniently and accurately measuring to within 0,25 mm, the water level in the reservoir. The water level will then be carefully noted and recorded by the Engineer in relation to a fixed benchmark. The structure shall be allowed to remain filled for a period of 14 days to permit complete absorption by the concrete. During this period, readings will be taken by the Engineer.

Any loss of water which may have occurred shall then be made up by filling the structure to top water level. The water content shall then remain undisturbed for a period of not less than seven days, during which time the water level shall again be recorded by the Engineer at 24 hour intervals. The structure shall be considered watertight if the drop in level does not exceed 7 mm in 7 days and no leakage is apparent.

Notwithstanding the above, in the event of appreciable leakage being evident at any stage of the filling or testing or in the event of the Engineer considering the final degree of watertightness to be unsatisfactory, the Contractor, when ordered by the Engineer shall discontinue such filling or testing and shall, at his own expense, take approved steps immediately to rectify the leakage and to make the work thoroughly sound to complete satisfaction of the Engineer. All such work of rectification shall be continued assiduously until a satisfactory test is obtained, which shall prove to the Engineer that a sufficient degree of watertightness has been obtained.

Upon the successful completion of the watertightness test, the Contractor shall leave the water in the reservoir, unless instructed otherwise.

Before the expiry of the period of maintenance, the Engineer shall have the right to retest the structure. In the event of these tests indicating to the Engineer an unsatisfactory degree of watertightness the Engineer before passing the final certificate will again require the Contractor at his own expense to rectify the leakage in such a manner as will cause least interruption of the water supply to consumers and will ensure soundness of the work to the satisfaction of the Engineer. The volume of water used in carrying out the first watertightness test shall be to the Client's account. Thereafter, any refilling due to failure of the watertightness test, shall be to the Contractor's account. The Works shall not be certified complete until the structure has been proved by means of testing to be watertight to the Engineer's satisfaction.

PSGA 8 MEASUREMENT AND PAYMENT

PSGA 8.1.2 Reinforcement Unit : (t)

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 Engineer.

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 subclause.

Add after "testing" in the second line of subclause 8.1.3.3(a) "including transport to an approved laboratory".

PSGA 8.7(c)* Grouting in of pipework Unit: m³

The rates for (c) above shall cover the cost of scabbling, cleaning, and preparing the concrete surfaces, providing an approved grout, placing and ramming it solidly into all voids and pockets, and mitring the outside edges to a true wood-floated surface.

Formwork, if any, will be measured separately in terms of 8.2.

PSGA 8.9 Additional Tests on concrete as instructed by engineer Unit: no.

- (a) Core strength test
- (b) Sets of three cubes per test

The rate tendered shall cover the cost of the coring, testing and reinstating with an approved concrete repair product"

PSGA 8.10 Painting of Pump Station Sump Unit: m²

Prepare concrete surface of pump station sumps and paint with Sikaguard 63 N - minimum dry film 450 micron, or similar approved

PSGA 8.11 Testing of watertightness and disinfection Unit : Sum

The rate shall cover all work and equipment required for filling the structure with water at the required rate and the erection of safe and sufficient temporary scaffolding for the purposes of inspecting the entire structure on the outside during the testing procedure, from the base level to the roof slab.

The Contractor shall in the construction programme include for the time period to fill the reservoir, stabilisation and the monitoring period. No additional payment shall be made for any delays this process incurs on any other work in progress.

PSHA STRUCTURAL STEELWORK (SUNDRY ITEMS)

PSHA 3 MATERIALS

PSHA 3.1 STRUCTURAL STEEL

Add the following:

"Where stainless steel is to be used, the grade shall be 316L or as shown on the Drawings."

PSHA 5 CONSTRUCTION

PSHA FABRICATION AND ASSEMBLY

PSHA 5.2.4 Welding

The Contractor shall submit with his shop Drawings full details of welding procedures. All welds shall be continuous.

Unless otherwise approved no longitudinal or overhead welding shall be carried out on site. Under no circumstances will cutting and welding of grid covers and frames be permitted on site.

Welders undertaking manual welding of permanent steelwork shall be experienced and competent artisans.

PSHA 5.2.6 Handrails

Add the following:

"Handrail stanchions shall be spaced at as indicated on the Drawings or approved by the Engineer in writing.

Handrails and stanchions shall be of stainless steel, grade 304 as scheduled, unless otherwise indicated on the Drawings."

Handrails shall be deemed to be inclusive of knee rails as well as bumrails, complete with anchor bolts as specified.

PSHA 5.2.7 Ladders

Replace the heading of with "Ladders and Step Irons"

Add the following:

"Ladders and step irons shall be of stainless steel grade 316 L, as specified."

"PSHA 5.2.8.3* All open grid floors and frames shall be stainless steel grade 316L as detailed. All open grid floor panels shall be open-ended as specified, except where bonding is specified on the Drawings. Cut outs shall be provided where indicated on the Drawings"

PSHA 8 MEASUREMENT AND PAYMENT

PSHA 8.3 SCHEDULED ITEMS

Replace the heading of sub clause 8.3.1 to read:

"PSHA 8.3.1 Structural steel for: (Type of structure indicated) Unit: t, No or Sum"

Add the following after the last sentence of sub clause 8.3.1:

"Alterations to existing structural steelwork will be described in the schedule and measured in number. Rates for these

items shall include full compensation for all labour tools, storing, additional steelwork, reinstallation, cleaning

“PSHA 8.3.3 Ladders, complete and installed Unit: Sum”

Add the following:

“Separate items will be scheduled for ladders of different materials, dimensions and height

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 Agents' drawings shall apply."

PSL 2.4 ABBREVIATIONS

Add: "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 $\pm 2\%$.

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, Heavy Duty Galvanised and Sigma 720 Coated inside and outside."

PSL 3.4.2 Pipes of nominal bore up to 150 mm

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 3.7.2 Polyethylene pipes

Replace the contents with the following:

"Polyethylene pipes shall be black HDPE pipes complying with SABS ISO 4427, manufactured from PE80 or PE100 material with a nominal pressure rating (PN) of 12,5 bar.

Compression fittings to be used with HDPE pipes and shall be "Plasson", "Alprene" or approved equivalent with a nominal pressure rating of 16 bar (PN 16)".

"PSL 3.7.3* uPVC pipes

uPVC pipes and fittings shall be provided with spigot and socket rubber ring joints and shall be manufactured to standards acceptable to the Employer's Agent. Solvent welded fabricated fittings will not be acceptable.

uPVC pipes and fittings shall comply with SABS 966-1."

"PSL 3.7.4* Copper tubing and fittings

Copper tubing shall be class O and comply with the requirements of SABS 460. Fittings shall be brass “Conex” compression fittings to SABS 1067.”

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 SABS 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 Clause, all CI pipes, fittings and specials shall be coated internally and externally using “Heavy Duty Galvanised and Sigma 720 Coated”. The coating shall be 300 – 450 microns thick and shall be applied by an approved applicator. Fusion bonded epoxy (FBE) coating applied internally and externally to SABS 1217 or DIN 30677 will also be accepted.

PSL 3.9.2 Steel pipes for Potable Water

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 SABS 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 280 or approved equivalent	45	50	75
2	Sigmaguard 720 (White) or approved equivalent	125	150	175
3	Sigmaguard 720 (Blue) 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 Table 1600/3 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

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 Subclause with the following:

"PSL 3.10.1* Gate valves

Gate valves shall be AVK Series 01/60 or approved equivalent gate valves which conform to the requirements of SABS 664 and shall be of the resilient seal type. All valves shall have a working pressure rating of at least 16 Bar and shall be clockwise opening with non-rising spindle and cap top 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 dezincification 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* Ball Valves

Ball valves installed, as part of the air valve installation shall be three-piece full bore stainless steel ball valves with PTFE seats as supplied by Vac-Cent Services, or approved equivalent.

PSL 3.10.3* Air Valves

Air valves shall be "A.R.I." or approved equivalent. The valves shall further be as specified on the drawings and Bill of Quantities in terms of size, pressure rating and model number.

"PSL 3.10.4* Hydrants

Hydrants shall conform to SABS 1128: Part 1 – 1997 and shall be of the underground screwdown type with captive stopper and rising spindle. The hydrants shall further have a maximum height of 320mm, be anti-clockwise opening and the outlet connection shall be of the London Thread type."

PSL 3.11.1 Bricks

All bricks to be used on this contract shall be NFX burnt clay masonry units to SABS 227."

PSL 3.11.5 Manhole covers and frames

The requirement of this Sub-Clause shall apply, except that the type of cover and frame to be used shall be as called for on the drawings or ordered by the Employer's Agent.

PSL 3.11.6 Surface Boxes

All surface boxes, including air valve chambers shall be as specified and detailed on the Drawings.

PSL 5 CONSTRUCTION

PSL 5.1.1 General

Add the following:

"uPVC 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 Subclause, 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 top of the valve box is to be set. To ensure the aforementioned, valve spindle extension pieces shall be fitted by the Contractor.”

PSL 5.6 VALVE AND HYDRANT CHAMBERS

Notwithstanding the requirements of this subclause, the requirements of subclause 5.6.1 and 5.6.2, valve chambers shall be constructed in accordance with the details shown on the drawings.

PSL 5.11* MARKERS FOR VALVES AND FIRE HYDRANTS

An appropriate marker shall be placed by the Contractor at the position of each valve.

The markers shall be manufactured and installed in accordance with the details shown on the drawings.”

PSL 6 TOLERANCES

PSL 6.2 CONTROL POINTS

Add the following:

“Valves shall be located as indicated on the plan layout opposite the boundary peg of the erf, and to within a longitudinal tolerance of 100mm.”

PSL 7 TESTING

PSL 7.3.1 Test pressure and time of test

With reference to subclause 7.3.1.2 the maximum working pressure shall be the specified pressure class of the section of pipeline being tested.

Replace the last line of subclause 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 subclause 7.3.1.4.

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:

“Couplings shall be held to include compression couplings required to join lengths of HDPE pipeline.

The rate tendered shall further cover the cost of the work provided for under 8.2.4, and with respect to testing, the supply and installation of all equipment, fittings and specials required, as well as the cost of water drawn. 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 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 in PSL 3.2.1, PSL 3.9.2, PSL 3.9.6 and PSL 3.9.7 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 in PSL 3.9.6 and PSL 3.9.7".

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 Sub-Clause. Provision has been made under PSL 8.2.1 for the measurement and payment of work included under this Sub-Clause.

PSL 8.2.10 Temporary valves etc

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.

Replace the heading and contents of Sub-Clause 8.2.13 with the following:

"PSL 8.2.13 Chambers

Air Valve and Scour Valve Chambers.....Unit: No

Chambers 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 and 2,0m respectively 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 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, frames, locking bars, vents, and concrete pedestals as required.

Note:

The Contractor shall note that the specials and fittings in the various chambers along the route of the pipeline have been grouped together in the Schedule of Quantities and not separately itemised per Sub-Clauses 8.2.2 and 8.2.3. The payment provisions as specified shall none the less apply as appropriate."

"PSL 8.2.16* Supply and install valve markers.....Unit: No

The rate tendered shall cover the cost of the supply of the markers complying with the details shown on the drawings, as well as the cost of all labour and equipment required to install the markers as specified in PSL 5.11, of as directed."

PSLB BEDDING

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 13,2 mm sieve and not more than 5% passing a 0.075 mm sieve and has a compactability factor not exceeding 0,4.”

PSLB 3.3 BEDDING

Add the following:

“For the purposes of this clause uPVC, HDPE 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 Engineer a bedding cradle of the specified thickness, comprising of 6,7 mm concrete stone complying with SABS 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 subclause, 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 subclause, 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 subclause, 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 importation of material from sources other than trench excavation, shall be disposed of at an approved spoil site obtained by the Contractor. No overhaul and haulage shall be applicable or payable on the removal and disposal of such material.”

PSLB 8.1.6 Free-haul

Delete the words “of 0,5 km” in the first line of this Clause.

PSLB 8.2.2.3 From commercial sources

(c)* 6,7 mm concrete stone to SABS 1083 Unit: m³

Add the following to the end of this Clause:

“Commercial sources shall include off-site sources located by the Contractor.”

PSLB 8.2.5 Overhaul of Material for Bedding ... etc.

Delete this sub clause

Free haul will apply indefinitely over the full site.

PSLC CABLE DUCTS

(1) PSLC 3 MATERIALS

PSLC 3.1 DUCTS

Notwithstanding the provisions of this subclause, cable ducts to be used shall be uPVC, heavy duty structured wall sewer pipes complying with SABS 1601 with a pipe stiffness of 400 kPa, complete with cuff joints and rubber compression seal.

PSLC 3.2 BEDDING

Delete sub-clauses 3.2.1 and 3.2.2 and replace with the following:

“The requirements and specifications of PSLB 3.1 shall apply.”

PSLC 3.3 BACKFILL

Notwithstanding the provisions of this subclause, the material to be used for backfill in areas subject to road traffic loads shall be subbase quality material complying with the requirements of subclause 3.2.1 of SABS 1200 ME and PSME 3.2.1.

PSLC 5 CONSTRUCTION

PSLC 5.1 EXCAVATION OF TRENCHES

Notwithstanding the contents of this subclause, the requirements of PSDB and SABS 1200 DB shall apply.”

PSLC 5.2 BEDDING AND COMPACTION OF BEDDING

Notwithstanding the contents of this subclause, the requirements of PSLB and SABS 1200 LB shall apply.”

PSLC 5.10 POSITION TO BE MARKED

Marking is required on both sides of the carriageway.

Delete in the second line: “...the letters “GPO or ESC”, as applicable, ...” and replace with “...the letters “T” and “E”, as applicable.”

Add: “The height of the letter shall be at least 100 mm.”

PSLC 8 MEASUREMENT AND PAYMENT

PSLC 8.2.5 Supply, lay, bed and prove duct

Delete the words “for GPO ducts,” in subclause (a).

PARTICULAR SPECIFICATIONS

The following particular specifications are included:

- PA: Environmental Management
- PB: Health & Safety Specifications
- PC: Pump station Mechanical
- PD: Electrical Installation
- PE: Building work

PARTICULAR SPECIFICATION: PA

PA

ENVIRONMENTAL MANAGEMENT (COMPREHENSIVE)

PA 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 Employer's Agenting 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.

PA 2 NORMATIVE REFERENCES

PA 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) Kouga Local Municipality Health and Safety Specification

PA 3 DEFINITIONS & ABBREVIATIONS

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:

DEDEAT:

Department of Economic Development, Environmental Affairs and Tourism.

DFFE:

Department of Forestry, Fisheries and the Environment

DWS:

Department of Water and Sanitation

EEA:

External Environmental Auditor

EIA:

Environmental Impact Assessment

EMPr:

Environmental Management Programme

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.

Invasive Alien Vegetation:

An undesirable plant growth which shall include, but not be limited to, all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act.

No-Go Areas:

Generally, those areas outside the designated working areas, including but not limited to: existing services and infrastructure, occupied property; grave sites; cultivated lands, wetland areas, 'Special or Sensitive Environments' as defined in the EMPr.

PA 4 ROLES AND RESPONSIBILITIES

PA 4.1 RESPONSIBILITIES OF THE EMPLOYER'S AGENT

Specific to environmental management, the role of the Employer's Agent will be to ensure enforcement of the Environmental Management Programme and Procedures and supplementary recommendations made by the EEA; review and approve the Method Statements submitted by the Contractor; and liaise with the Contractor, the EEA and DEDEAT on environmental matters as necessary.

Responsibilities of the Employer's Agent will include, but not be limited to:

- i) Communicating the advice of the EEA and/or contents of the EEA's reports;
- ii) Issuing site instructions where applicable;
- iii) Communicating to the EEA any new/amended construction activities;
- iv) Informing the EEA of any infringements/accidents or incidents that have occurred on/off site;
- v) Implementing any Temporary Work Stoppages where serious environmental infringements and non-compliances have occurred; Issuing penalties as and when necessary; and,
- vi) Maintaining a record of complaints and communicating these to the Contractor and EEA.

Should the Employer's Agent be of the opinion that the environmental management measures are not being adhered to, and that the appropriate corrective action is not being implemented, the Employer's Agent, advised by the EEA, will be at liberty to instruct the Contractor to cease the related operations until the contractor complies with the relevant requirements. The contractor will not be entitled to any extension of time for such stoppages.

PA 4.2 RESPONSIBILITIES OF THE EMPLOYER'S ENVIRONMENTAL AGENT (EEA)

The role of the EEA will be to monitor, review and verify the implementation of the EMPr and liaise with the Employer's Agent and/or Employer, and DEDEAT to confirm the level of compliance achieved and make appropriate recommendations on improvements/actions required.

The responsibilities of the EEA will include, at a minimum:

- i) Advising the Employer's Agent on the interpretation and enforcement of the Environmental Specifications;
- ii) Assisting with the review of Method Statements;
- iii) Demarcating particularly sensitive areas;
- iv) Monitoring any basic physical changes to the environment as a consequence of the construction works - e.g. evidence of erosion, dust generation and littering;
- v) Undertaking monthly site inspections and submitting reports on the level of compliance to the EMPr demonstrated by the Contractor;
- vi) Undertaking quarterly audits, with reporting to the relevant authorities;
- vii) Undertaking any damage assessments with the Employer's Agent where incidents, accidents and/or serious infringements have occurred on/off site, and advising on remedial actions required;
- viii) Liaising with the relevant authorities as required; and
- ix) Updating the EMPr as and when appropriate and communicating these changes to the Employer's Agent and Contractor.

PA 4.3 RESPONSIBILITIES OF THE CONTRACTOR

The Contractor will be contractually required to undertake his activities in an environmental responsible manner. The role of the Contractor will include the following, at a minimum:

- i) To implement the EMPr (and any subsequent revisions) for the duration of the construction activities;
- ii) To provide reasonable resources for the effective control and management of environmental risks
- iii) associated with the construction activities, as per the EMPr;
- iv) To assign tasks to personnel as necessary and ensure appropriate accountability and responsibility is
- v) assigned to enable the carrying out of these duties;
- vi) To maintain incident, training and other relevant administrative records; and
- vii) To ensure all personnel, sub-contractors and other workers appointed by the Contractor are aware of the
- viii) environmental responsibilities on site.

These roles will, at a minimum, translate into the following environmental responsibilities:

- i) Be familiar with the contents of the EMPr and to comply with the EMPr;
- ii) Submit the necessary Method Statements and plans to the Employer's Agent for approval;
- iii) Review the EEA Reports and take cognisance of the information/recommendations made;
- iv) Notify the Employer's Agent immediately in the event of any accidental infringements of the Environmental Specifications and ensure appropriate remedial action is taken;
- v) Notify the Employer's Agent in advance of any amendments/changes to the proposed work activities to enable environmental impacts to be confirmed and mitigation measures identified; and
- vi) Maintain records – e.g. photographic records, complaints records, training records and incident records.

PA 5 REQUIREMENTS

PA 5.1 MATERIALS

PA 5.1.1 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.

All lay down areas for manufactured/imported material outside of the construction camp shall be subject to the Employer's Agent's approval, which shall not unreasonably be withheld.

PA 5.1.2 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.

The tanks/bowsers shall be situated on a smooth impermeable surface (plastic or concrete) base with an earth bund (plastic must have 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 110% of the total capacity of all the storage tanks/bowsers.

The bunded area shall be covered to prevent the accumulation of rainwater within the bunded area.

The Contractor shall prevent unauthorised access into the fuel storage area.

The Contractor shall have on Site all the necessary materials and equipment to deal with spills of any of the substances stored on Site.

PA 5.1.2.1 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.

PA 5.1.2.2 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.

PA 5.2 PLANT

PA 5.2.1 Ablution facilities

A sufficient number of chemical toilets shall be provided by the Contractor in the construction camp area and at appropriate locations agreed by the Employer's Agent. The ratio of toilets to site staff shall not exceed 1:30 (for each sex), and the closest toilet shall never be further than 100m away from the area where work is currently under way.

Toilets shall not be located in river courses or flood plains.

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.

All temporary/portable toilets shall be secured to the ground to the satisfaction of the Employer's Agent to prevent them toppling due to wind or any other cause.

All toilets are to be maintained in a clean, sanitary condition. The Contractor shall be responsible for cleaning, maintenance, servicing and emptying the toilets on a regular basis. The Contractor shall supply adequate toilet paper at all toilets.

Washing, whether of the person or of personal effects and acts of excretion and urination are strictly prohibited other than at the facilities provided.

PA 5.2.2 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.

PA 5.2.3 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.

PA 5.2.4 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.

The Contractor shall provide the Employer's Agent with a plan of the site camp showing the layout/positioning of all infrastructure including wash bays, fuel storage areas, materials storage areas, sewage infrastructure and buildings. The Contractor shall maintain a map of the site layout that indicates where the wash bays, fuel storage areas, topsoil sites etc are located. The Employer's Agent and EEA must approve this.

Where site camps are to be established the feasibility of removing topsoil from the site, before site establishment, shall be investigated. Removed topsoil should then be stockpiled for use in rehabilitation of the site camp

Site camps and surrounds shall be maintained in a clean, tidy and orderly condition at all times.

The Contractor shall restore the site camp to its former condition upon completion of the works. This will include removal of all rubble and foundations, loosening of compacted soils and re-establishing groundcover.

PA 5.2.5 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 Subclause 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.

PA 5.2.6 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.

PA 5.2.7 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 bowzers. The tanks/bowzers 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/bowzers. The banded 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.

PA 5.2.8 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.

PA 5.2.9 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.

PA 5.2.10 Trimming of the Site

The Contractor shall include the reinstatement of the owners verges when trimming the site.

PA 5.2.11 General Equipment and Plant

All equipment and plant brought to site shall be of good working order and shall not have any fluid leaks that may contaminate the environment. The equipment shall furthermore only be utilised for the construction activities. No equipment will be serviced on site and no fluids (oil, brake fluid, coolant, etc.) shall be disposed off on site.

Furthermore, all equipment shall be monitored for leaks on a regular basis as required by the plant inspection requirements (See health and safety specification).

PA 5.3 METHODS AND PROCEDURES

PA 5.3.1 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.
- 2) Contaminated water management system, including an indication of the source and volume of contaminated water and how this would be disposed of.
- 3) Dust control, including methods to prevent dust generation and methods to reduce dust where its generation is unavoidable.
- 4) 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.
- 5) Location of proposed site access routes and proposed traffic safety measures.
- 6) Emergency procedures for fire, and accidental leaks and spillages of hazardous materials.
- 7) 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.

- 8) Method of undertaking earthworks, including spoil management, erosion, dust and noise controls.
- 9) 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.

PA 5.3.2 Environmental awareness training

Not applicable on this Contract.

PA 5.3.3 Construction personnel information posters

Not applicable on this Contract.

PA 5.3.4 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.

Natural features, indigenous flora and fauna in the vicinity of the project works should be protected and damage or disturbance prevented or minimised; specifically:

- (i) The removal of any indigenous vegetation must be in strict accordance to the conditions as set out by the DFFE permit.
- (ii) No plant species may be removed unless agreed by the EEA or unless they are listed as alien invasive species.
- (iii) The minimum amount of vegetation must be removed. Excessive clearing of a site must be avoided. Disturbance outside of the immediate construction area must be avoided.
- (iv) No construction staff may have access to indigenous vegetation outside of the working corridor.
- (v) The use of indigenous plants as firewood is prohibited.
- (vi) Where protected or Red Data Species are encountered and require removal, the EEA should be consulted and the plant(s) then replanted in a nearby ‘safe’ area of similar habitat. Permission should be obtained from DEDEAT, Eastern Cape.
- (vii) All fauna (including domestic livestock) within and surrounding the site shall be protected; they shall not be caught, poisoned, trapped, snared or killed.
- (viii) No domestic animals shall be brought onto the site.

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.

PA 5.3.5 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.

PA 5.3.6 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.

PA 5.3.7 "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.

PA5.3.8 Conservation and stockpiling of topsoil

Topsoil shall be removed from the following areas no longer than 10 days before construction begins:

- (ix) All areas to be excavated;
- (x) Areas to be occupied by roads, including the temporary haulage road;
- (xi) Areas for the storage of fuels;
- (xii) Areas to be used for batching/mixing of concrete;
- (xiii) Areas for stockpiling of construction materials;
- (xiv) Areas for stockpiling of crushed rock; and
- (xv) Areas for spoiling material.

Topsoil shall be excavated to a minimum depth of 150 mm or to a maximum depth of 300 mm. Compaction of these topsoil stockpiles is not permitted. Where topsoil has been stored for longer than 12 months the Contractor shall turn the soils to maintain viability of the seeds and the soil properties.

The topsoil stockpiles shall be clearly demarcated and vehicle access restricted. The topsoil shall not be contaminated with any fuels, oils or other construction waste or materials.

Topsoil shall not be mixed with any other material (construction rubble, subsoil etc) and erosion of the topsoil stockpiles must be prevented.

PA 5.3.9 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.

PA 5.3.10 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.

PA 5.3.11 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.

PA 5.3.12 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.

PA 5.3.13 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.

PA 5.3.14 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.

PA 5.3.15 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.

PA 5.3.16 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.

PA 5.3.17 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.

PA 5.3.18 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.

PA 5.3.19 Community relations

Where applicable, 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.

Where applicable, 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.

PA 5.3.20 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.

PA 5.3.21 Aesthetics

The Contractor shall take reasonable measures to ensure that construction activities do not have an unreasonable impact on the aesthetics of the area.

PA 5.3.22 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.

PA 5.3.23 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.

PA 5.3.24 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 where concrete buckets are in use).

PA 5.3.25 Trenching

Trenching for services shall be undertaken in accordance with the Employer's Agenting 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.

PA 5.3.26 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.

PA 5.3.27 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.

PA 5.3.28 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.

Top material 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, Top material shall not be left for longer than six to eight months before being used for rehabilitation. If stored for longer than six months, the Top material shall be analysed and, if necessary, upgraded before placement.

PA 5.3.29 Bridges, Culverts and Watercourse crossings

The Contractor shall minimise the extent of any damage to the flood plain necessary to complete the works, and shall not pollute the river systems a result of construction activities. No construction materials shall be stockpiled on the flood plain. The Contractor shall not divert, dam or modify any watercourse or stream without the approval of the Engineer and DWS.

Rehabilitation of the disturbed areas must be carried out in consultation with Working for Water.

Bridge construction and culvert installation should, where possible, be planned to take place during periods when stream flow is low.

Avoid operating machinery in water bodies. Excavation for a bridge or a large culvert should not be performed in flowing water. The water should be diverted around the work site during construction with a cofferdam or stream diversion. Any diversion of a stream requires a separate investigation and an approval from the Department of Water and Sanitation.

Avoid channel changes and protect the embankments of streams and rivers. All rubble from the demolished structures must be removed from the riverbed and disposed of according to the waste management system. No rubble may be left in the water course.

All concrete must be allowed to fully cure prior to coming into contact with the water. Specific mitigation measures related to bridge and culvert construction, covered in detail in the specialist Estuary and Aquatic Studies undertaken as part of the EIA and summarized in the EIR, must be adhered to.

PA 5.3.30 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 Top material 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.

PA 5.3.31 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 (*Lolium multiflorum*). 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.

PA 5.3.32 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

PA 5 COMPLIANCE WITH REQUIREMENTS AND PENALTIES

PA 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.

PA 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 Subclauses 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.

PA 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. Clause 5.2.11 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.

PA 6 TOLERANCES

Not applicable.

PA 7 TESTING/QUALITY CONTROL

Not applicable.

PA 8 MEASUREMENT AND PAYMENT

PA 8.1 BASIC PRINCIPLES

PA 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.

PA 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).

PA 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.

PA 8.2 BILLED ITEMS

PA 8.2.1 Method Statements: Additional workUnit: No

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.

PA 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).

PA 8.2.3 Trimming of the SiteUnit: Sum

A lump sum shall be tendered for trimming of site. Payment shall only be effected after issuing of the practical completion certificate and under no circumstances will part payments be made while construction works is still in progress.(PA 5.2.10)

PARTICULAR SPECIFICATION: PB

PB HEALTH AND SAFETY SPECIFICATIONS

HEALTH AND SAFETY SPECIFICATION

Issued in terms of the Occupational Health and Safety Act, No 85 of 1993 and Construction Regulations 2014

Project:

INSTALLATION OF A BULK WATER PIPELINE FROM THE HUMANSDORP WATER TREATMENT WORKS TO KWANOMZAMO

For:

The Kouga Municipality



FOREWORD

This Health and Safety specification has been compiled under the guidelines of the Occupational Health & Safety Act, Act no.85 of 1993 as amended (the Act) and in particular in terms of the Construction Regulations (2014).

It must be clear that this document is a management tool and should be used and transformed by the PRINCIPAL CONTRACTOR into a **project-specific** construction Health and Safety plan for work in order to comply with the aforementioned Act and regulations.

Should there be any contradiction between the document and the Act, the Act must take preference except where explicitly stated or where requirements are more stringent than the Act. Where this document is silent on a specific Health & Safety requirement, the Act and regulations must be used as the minimum requirement.

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1. INTRODUCTION AND BACKGROUND

1.1 BACKGROUND TO THE HEALTH AND SAFETY SPECIFICATION

The Construction Regulations (2014) places the onus on the KOUGA MUNICIPALITY, to submit a sufficiently documented and coherent site specific health and safety specification, highlighting the minimum requirements which forms the framework of the health and safety plan to be developed and submitted by the PRINCIPAL CONTRACTOR to the KOUGA MUNICIPALITY, or appointed Health and Safety Agent for approval before commencement of the construction work/project.

The approved, site specific health and safety plan, in turn, needs to be successfully implemented by the PRINCIPAL CONTRACTOR and any appointed SUB-CONTRACTOR to ensure that identified health and safety risks are managed effectively and that full adherence to the minimum prescribed corporate and legal requirements (as pertained herein) are ensured at all times and are verified during regular audits by the PRINCIPAL CONTRACTOR and the KOUGA MUNICIPALITY.

These specifications cannot be seen as an exhaustive list of legal and corporate compliance requirements, as health and safety is a dynamic aspect of our working life and prevailing site conditions, possibly unknown at the time of specification development, may impact on the anticipated risk profiles and thus on these specifications. Constant assessment of risks and review of control/management measures by PP OHS Risk Consultants, the PRINCIPAL CONTRACTORS and other CONTRACTORS are vital components of effective risk control.

1.2 PURPOSE OF THE HEALTH AND SAFETY SPECIFICATION

To assist in achieving compliance with the Occupational Health and Safety Act, Act 85/1993 (OHS Act) and the promulgated Construction Regulations (2014) in order to reduce damage, incidents and injuries. These specifications shall act as the basis for the drafting of the Health and Safety plan by the PRINCIPAL CONTRACTOR and all subsequent Health and Safety plans by CONTRACTORS.

The specification sets out the requirements to be followed by the PRINCIPAL CONTRACTOR and other CONTRACTORS so that the Health and Safety of all employees and other persons potentially at risk may receive the same priority as other facets of the project e.g. cost, programme, environment, quality etc.

This specification will be applicable to all construction work during the construction, repairs and maintenance of the rock revetments on the St Francis Bay beach front.

1.3 INTRODUCTION TO THIS THE HEALTH AND SAFETY SPECIFICATION

This specification forms an integral part of the contract, and the PRINCIPAL CONTRACTOR is required to use it when compiling its project-specific Health and Safety plan.

This specification does not replace the Construction Regulations 2014, but is a supplementary specification as required in terms of the Regulations. Partial references to or quotes from the Regulations do not imply that the sections not referred to or quoted from are of lesser importance or are not applicable.

The Principal Contractor is, at all times required to and will remain responsible to fully address all requirements and standards of the Occupational Health and Safety Act (85 of 1993), and the Construction Regulations (2014).

2. HEALTH AND SAFETY SPECIFICATION

2.1 SCOPE OF WORK

This project specific health and safety specifications covers the general requirements for addressing, mitigating and controlling Occupational Health and Safety related risks, problems, incidents and injuries on projects constructed or executed for the KOUGA MUNICIPALITY.

The scope addresses legal compliance, hazard identification, risk assessment, risk control methodology and the promotion of a health and safety culture amongst those working on the Kouga Municipality projects.

The project specific health and safety specifications contains clauses that are generally applicable to building, engineering and construction and imposes controls associated with activities that impact on human health and safety.

The Principal Contractor is required to comply with the provisions of the OHS Act, all applicable Regulations and this project specific health and safety specifications.

Scope of work includes:

- Supply, installation and testing of 3145m of 315mm and 250mm Ø Class 12 water pipeline
- Supply and installation of two pressure reducing valve stations
- Four (4) provincial road crossings (1 currently planned to be completed by means of horizontal drilling)
- One (1) Transnet railway crossing
- Connection into the existing Kwanomzamo Water Reticulation Network

2.1.1 HAZARDOUS AND RISKS ADDRESSED FROM SCOPE OF WORK

From the above scope you are required to identify all activities and the safe controls towards eliminating or mitigating the hazardous or risks which may be encountered during the construction phase.

The scope also addresses legal compliance, hazard identification and risk assessment, risk control and promoting a Health and Safety culture amongst those working on the project. The specification also makes provision for the protection of those persons other than employees, thus including visitors and other members of the public.

Risks to be covered, but should not be limited to the below list:

- Site establishment
- Public safety, including excavations in the built up areas.
- Use of horizontal drilling / pipe jacking equipment
- Working in road reserves
- Use of construction and earth moving vehicles.
- Working in / near excavations.
- Exposed to hazardous material.
- Height work
- Use of lifting tackle and equipment.

2.1.2 LIMITATIONS OF LIABILITY

The KOUGA MUNICIPALITY and its agent shall not be responsible for any acts or omissions of any Contractor which may directly or indirectly result from the application of the General Health and Safety Specifications or the Project Specific Health and Safety Specifications.

Contractors must ensure that work, equipment, machinery, plant and work practices are, at all times, compliant to the legal requirements as these apply.

The KOUGA MUNICIPALITY and its agent shall limit its responsibility to the application of the Construction Regulations' KOUGA MUNICIPALITY Requirements only.

Any other potential responsibility shall be dealt with in a Mandatory Agreement, as defined in Section 37(2) of the OHS Act. The signed contract must be included in the Health and Safety File.

2.2 INTERPRETATIONS

2.2.1 APPLICATION

This specification is a compliance document compiled in terms of the South African legislation and is therefore binding. It must be read in conjunction with all relevant legislation/regulations and SABS/SANS Codes of Practice.

2.2.2 DEFINITIONS

The definitions as listed in the Occupational Health and Safety Act, Act 85/1993 (OHS Act) and the Construction Regulations (2014) thereto shall mainly apply with minimal additions. All definitions are not referred to in this version of the health and safety specification, but are included for easy reference during future reviews.

Occupational Health and Safety Act, Act 85/1993

- 1) **"chief executive officer"**, in relation to a body corporate or an enterprise conducted by the State, means the person who is responsible for the overall management and control of the business of such body corporate or enterprise;
- 2) **"danger"** means anything which may cause injury or damage to persons or property;
- 3) **"employee"** means, subject to the provisions of subsection (2), any person who is employed by or works for an employer and who receives or is entitled to receive any remuneration or who works under the direction or supervision of an employer or any other person;
- 4) **"hazard"** means a source of or exposure to danger.
- 5) **"health and safety committee"** means a committee established under section 19 ;
- 6) **"health and safety equipment"** means any article or part thereof which is manufactured, provided or installed in the interest of the health and safety of any person;
- 7) **"health and safety representative"** means a person designated in terms of section 17 (1);
- 8) **"healthy"** means free from illness or injury attributable to occupational causes;

- 9) **"incident"** means an incident as contemplated in section 24 (1);including other less serious/minor incidents and therefore used as a generic term as well;
- 10) **"plant"** includes structures, buildings, fixtures, fittings, implements, equipment, tools and appliances, and also anything which is used for any purpose in connection with such plant;
- 11) **"risk"** means the probability that injury or damage will occur;
- 12) **"safe"** means free from any hazard;
- 13) **"substance"** includes any solid, liquid, vapour, gas or aerosol, or combination thereof;
- 14) This Act" includes any Regulations;

Construction Regulations (July 2014)

- 15) **"AGENT"** means a competent person who acts as a representative for a KOUGA MUNICIPALITY.
- 16) **"Angle of repose"** means the steepest angle of surface at which a mass of loose or fragmented material will remain stationary in a pile on the surface, rather than sliding or crumbling away;
- 17) **"Bulk mixing plant"** means machinery, appliances or other similar devices that are assembled in such a manner so as to be able to mix materials in bulk for the purposes of using the mixed product for construction work;
- 18) **"Client"** means any person for whom construction work is being performed; in this instance, it is the KOUGA MUNICIPALITY.
- 19) **"competent person"** means a person who –
 - (a) Has in respect of the work or task to be performed the required knowledge, training and experience and, where applicable, qualifications, specific to that work or task: Provided that where appropriate qualifications and training are registered in terms of the provisions of the National Qualification Framework Act, 2000 (Act No.67 of 2000), those qualifications and that training must be regarded as the required qualifications and training; and
 - (b) Is familiar with the Act and with the applicable regulations made under the Act;
- 20) **"construction work"** means any work in connection with -
 - (a) the erection, maintenance, alteration, renovation, repair, demolition or dismantling of or 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, the making of an excavation, piling, or any similar type of work;

- 21) **"construction manager"** means a competent person responsible for the management of the physical construction processes and the coordination, administration and management of resources on a construction site;
- 22) **"construction site"** means a work place where construction work is being performed;
- 23) **"construction supervisor"** means a competent person responsible for supervising construction activities on a construction site;
- 24) **"construction vehicle"** means a vehicle used as a means of conveyance for transporting person or material, or persons and material, on and off the construction site for the purposes of performing construction work;
- 25) **"construction work"** means any work in connection with-
- (a) The construction, erection, alteration, renovation, repair, demolition or dismantling of or addition to building or any similar structure; or
 - (b) The construction, erection, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system; or the moving of earth, clearing of land, the making of excavation, piling, or any similar civil engineering structure or type of work;
- 26) **"construction work permit"** means a document issued in terms of regulation 3
- 27) **"contractor"** means an employer who performs construction work;
- 28) **"demolition work"** means a method to dismantle, wreck, break, pull down or knock down a structure or part thereof by way of manual labour, machinery, or the use of explosives;
- 29) **"design"** in relation to any structure, includes drawings, calculations, design details and specifications;
- 30) **"designer"** means –
- (a) A competent person who –
 - (i) Prepares a design,
 - (ii) Checks and approves a design; or
 - (iii) Arranges for any person at work under his or her control to prepare a design, including an employee of that person where he or she is the employer); or
 - (iv) Designs temporary work, including its components,
 - (b) An architect or engineer contributing to, or having overall responsibility for a design;
 - (c) A building services engineer designing details for fixed plant;
 - (d) A surveyor specifying articles or drawing up specifications;
 - (e) A contractor carrying out design work as part of a design and building project; or
 - (f) An interior designer, shop-fitter or landscape architect.
- 31) **"excavation work"** means the making of any man-made cavity, trench, pit or depression formed by cutting, digging or scooping;
- 32) **"explosive actuated fastening device"** means a tool that is activated by an explosive charge and that is used for driving bolts, nails and similar objects for the purpose of providing fixing.
- 33) **"fall arrest equipment"** means equipment used to arrest a person in a fall, including personal

equipment such as body harness, lanyards, deceleration devices, lifeline or similar equipment.

- 34) **"fall prevention equipment"** means equipment used to prevent persons from falling from a fall risk position, including personal equipment, a body harness, lanyards, lifelines or physical equipment such as guardrails, screens, barricades, anchorages or similar equipment;
- 35) **"fall protection plan"** means a documented plan, which includes and provides for –
 - (a) All risks relating to working from a fall risk position, considering the nature of work undertaken;
 - (b) The procedures and methods to be applied in order to eliminate the risk of falling; and
 - (c) A rescue plan and procedures
- 36) **"fall risk"** means any potential exposure to falling either from, off or into:
- 37) **"health and safety file"** means a file or other record containing the information in writing required by these Regulations;
- 38) **"health and safety plan"** means a site, activity or project specific documentation plan in accordance with the KOUGA MUNICIPALITY's health and safety specification;
- 39) **"health and safety specification"** means a site, activity or project specific document prepared by the KOUGA MUNICIPALITY pertaining to all health and safety requirements related to construction work;
- 40) **"material hoist"** means a hoist used to lower or raise material and equipment, excluding passengers;
- 41) **"medical certificate of fitness"** means a certificate contemplated in regulation 7(1)(8);
- 42) **"mobile plant"** means any machinery, appliance or other similar device that is able to move independently, and is used for the purpose of performing construction work on a construction site;
- 43) **"National Building Regulations"** means the National Building Regulations made under the National Building Regulations and Building Standards Act, 1977 (Act No. 103 of 1977), and promulgated by Government Notice No. R. 2378 of 30 July 1990, as amended by Government Notices No's R. 432 of 8 March 1991, R. 919 of 30 July 1999 and R. 547 of 30 May 2008.
- 44) **"person day"** means one normal working shift of carrying out construction work by a person on a construction site;
- 45) **"Professional Engineer or Professional Certificated Engineer"** means a person holding registration as either a Professional Engineer or Professional Certificated Engineer in terms of the Engineering Professions Act, 2000 (Act No. 46 of 2000);
- 46) **"Professional Technologist"** means a person holding registration as a Professional Engineering Technologist in terms of the Engineering Profession Act, 2000;
- 47) **"Provincial Director"** means the provincial director as defined in regulation 1 of the General Administrative Regulations, 2003;
- 48) **"Scaffold"** means a temporary elevated platform and supporting structure used for providing access to and supporting workmen or materials or both;

- 49) **“Shoring”** means a system used to support the sides of an excavation and which is intended to prevent the cave-in or the collapse of the sides of an excavation;
- 50) **“Structure”** means –
- a) Any structure, steel or reinforced concrete structure (not being a building), railway line or siding, bridge, waterworks, reservoir, pipe or pipeline, cable, sewer, sewerage works, fixed vessels, road, drainage works, earthworks, dam, wall, mast, tower, tower crane, bulk mixing plant, pylon, surface and underground tanks, earth retaining structure or any structure designed to preserve or alter any natural feature, and any other similar structure;
 - b) Any false work, scaffold or other structure designed or used to provide support or means of access during construction work; or
 - c) Any fixed plant in respect of construction work which includes installation, commissioning, decommissioning or dismantling and where any construction work involves a risk of a person falling;
- 51) **“Suspended Platform”** means a working platform suspended from supports by means of one or more separate ropes from each support;
- 52) **“Temporary Works”** means any false work, formwork, support work, scaffolding, shoring or other temporary structure designed to provide support or means of access during construction work;
- 53) **“The Act”** means the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993);
- 54) **“Tunneling”** means the construction of any tunnel beneath the natural surface of the earth for a purpose other than the searching for or winning of a mineral.

2.3 MINIMUM ADMINISTRATIVE REQUIREMENTS

2.3.1 APPLICATION FOR CONSTRUCTION WORK (CR3) (Not applicable)

A KOUGA MUNICIPALITY who intends to have construction work carried out, must at least 30 days before that work is to be carried out apply to the Provincial Director in writing for a construction work permit to perform construction work if the intended construction work will –

- a) Exceed 180 days
- b) Will involve more than 1800 person days of construction work; or
- c) The works contract is of a value equal to or exceeding thirteen million rand or Construction Industry Development Board (CIDB) grading level 6.

Government Notice dated 7 July 2015: 1. A Client who intends to have construction work carried out, must at least 30 days before that work is to be carried out apply to the provincial director in writing for a construction work permit to perform construction work if the intended construction work starts after the 7th of August 2015 and the works contract if of a value exceeding one hundred and thirty million rand or Construction Industry Development Board (CIDB) grading level 9.) – Must apply for a construction work permit.

2.3.2 NOTIFICATION OF INTENTION TO COMMENCE CONSTRUCTION WORK (CR4)

A contractor who intends to carry out any construction work other than work contemplated in regulation 3(1), must at least 7 days before that work is to be carried out notify the provincial director in writing in a form similar to Annexure 2 if the intended construction work will –

- a) Include excavation work;
- b) Include working at a height where there is a risk of falling;
- c) Include the demolition of a structure; or
- d) Include the use of explosives to perform construction work.

2.3.3 DUTIES OF PRINCIPAL CONTRACTOR AND CONTRACTORS (CR7)

A principal contractor must –

- a) Provide and demonstrate to the KOUGA MUNICIPALITY a suitable, sufficiently documented and coherent site specific health and safety plan, based on the KOUGA MUNICIPALITYS documented health and safety specifications.
- b) Open and keep on site a health and safety file, which must include all documentation required in terms of the Act and these Regulations, which must be made available on request to an inspector, the KOUGA MUNICIPALITY, the KOUGA MUNICIPALITY's agent or a contractor.
- c) Ensure that no contractor is appointed to perform construction work, unless the PRINCIPAL CONTRACTOR is reasonably satisfied that the contractor that he or she intends to appoint, has the necessary competencies and resources to perform the construction work safely;
- d) Ensure the CONTRACTOR is registered and in good standing with the Compensation Fund.
- e) Appoint each CONTRACTOR in writing for the part of the project on the construction site;
- f) Take reasonable steps to ensure that each CONTRACTORS health and safety plan is implemented and maintained on the construction site.
- g) Ensure that period site audits and document verification are conducted at intervals mutually agreed upon between the PRINCIPAL CONTRACTOR and any CONTRACTOR, but at least once every 30 days.

2.3.4 MANAGEMENT AND SUPERVISION OF CONSTRUCTION WORK (CR8)

A principal must in writing appoint one full-time competent person as the construction manager with the duty of managing all the construction work on a single site, including the duty of ensuring occupational health and safety compliance, and in the absence of the construction manager an alternate must be appointed by the PRINCIPAL CONTRACTOR.

A PRINCIPAL CONTRACTOR must upon having considered the size of the project, in writing appoint one or more assistant construction managers for different sections thereof: Provided that the designation of any such person does not relieve the construction manager of any personal accountability for failing in his or her management duties in terms of this regulation.

CR8(5) Due to the size of the project, the degree of danger likely to be encountered or the accumulation of hazards or risks on the site, appoint a part-time construction health and safety officer in writing to assist in the control of all health and safety related aspects on the site. The contractor must be reasonably satisfied that the construction health and safety officer he/she intends to appoint is registered with a statutory body approved by the Chief Inspector and has necessary competencies and resources to assist the contractor.

2.3.5 COMPENSATION OF OCCUPATIONAL INJURIES AND DISEASES ACT 130 OF 1993 (COIDA)

The PRINCIPAL CONTRACTOR shall submit a letter of good standing with its Compensation Insurer to the KOUGA MUNICIPALITY as proof of registration before construction work commences. CONTRACTORS shall submit proof of registration to the PRINCIPAL CONTRACTOR before they commence work on site.

2.3.6 OCCUPATIONAL HEALTH AND SAFETY POLICY

The PRINCIPAL CONTRACTOR and all CONTRACTORS shall submit a Health and Safety policy signed by their Chief Executive Officer. The Policy must outline objectives and how they will be achieved and implemented by the Company / CONTRACTOR.

2.3.7 HEALTH AND SAFETY ORGANOGRAM

The PRINCIPAL CONTRACTOR and all CONTRACTORS shall submit an organogram, outlining the Health and Safety site Management Structure including the relevant appointments / competent persons. In cases where appointments have not been made, the organogram shall reflect the intended positions. The organogram shall be updated when there are any changes in the site management structure.

2.3.8 RISK ASSESSMENT FOR CONSTRUCTION WORK (CR9)

The PRINCIPAL CONTRACTOR must, before the commencement of any construction work and during such construction work, have risk assessments performed by a competent person appointed in writing, which risk assessments form part of the health and safety plan to be applied on the site, and must include –

The baseline risk assessment must be included in the health and safety plan.

All risk assessments shall be conducted in terms of an acceptable and documented methodology, prior to commencement of work and in accordance with the provisions of the Construction Regulations.

Issue based risk assessment, risk monitoring and risk review shall be done during the Daily Safe Task Instructions (DSTI) which require:

- a) A daily documented listing of hazardous events;
- b) A daily documented listing of controls;
- c) Proof of communication of the above to all employees.

A CONTRACTOR must ensure that that all employees under his or her control are informed, instructed and trained by a competent person regarding any hazard and the related work procedures and or control measures before any work commences.

2.3.9 HEALTH AND SAFETY REPRESENTATIVE(S) (OHS Act Section 17)

The PRINCIPAL CONTRACTOR and all CONTRACTORS must ensure that for any workplace where more than 20 employees work, the minimum legislative prescribed number of Health and Safety Representatives in a ratio of 1:50 employees be nominated, elected, designated in writing and trained to carry out his/ her functions in his/ her area of responsibility. In addition it is required that in areas where twenty (20) or less employees are engaged in an activity, at least one Health and Safety Representative be designated in writing in the same manner.

The PRINCIPAL CONTRACTOR /CONTRACTOR must consult in good faith, with registered trade unions where applicable, prior to elections and conclude an agreement on procedures outlined in General Administrative Regulations 6 (1) (a-e).

The PRINCIPAL CONTRACTOR / CONTRACTOR must ensure that all Health and Safety Representatives carry out their functions in their area of responsibility, in accordance with Section 18 of the Occupational Health and Safety Act, Act 85 of 1993.

Health and Safety Representatives shall be required to conduct monthly inspections within their area of responsibility; the records must be kept for KOUGA MUNICIPALITY auditing purposes. All deviations recorded must immediately be reported to the appointed Construction Supervisor and Safety Officer, where applicable, within the designated person's area. Appropriate action must immediately be taken to eliminate the identified health and safety hazard.

2.3.10 HEALTH AND SAFETY COMMITTEES

The PRINCIPAL CONTRACTOR shall ensure that Health and Safety meetings are held monthly and meetings must be organized and chaired by the PRINCIPAL CONTRACTOR'S Responsible Person.

All CONTRACTOR'S Responsible Persons and Health and Safety Representatives shall attend the monthly Health and Safety meetings. CONTRACTORS shall also have their own internal Health and Safety committees in accordance with the OHS Act 85/1993 and minutes of their meetings shall be forwarded to the PRINCIPAL CONTRACTOR on a monthly basis.

The number of persons nominated to serve on the Health and Safety Committee may not exceed the number of Health and Safety Representatives on that Committee.

All members required to be in attendance shall be notified of such meeting by means of a formal agenda that must be made available to the KOUGA MUNICIPALITY upon request. The PRINCIPAL CONTRACTOR / CONTRACTOR shall ensure an attendance register and minutes are kept for auditing purposes by the KOUGA MUNICIPALITY. A copy of all minutes must be forwarded to the KOUGA MUNICIPALITY monthly.

2.3.11 MEDICAL CERTIFICATES OF FITNESS

All employees on site, must have a valid medical certificate of fitness applicable to the specific construction work being performed on site. Medical certificates to be signed by an Occupational Health Practitioner in the form of Annexure 3.

2.3.12 HEALTH AND SAFETY TRAINING

2.3.12.1 Induction

The PRINCIPAL CONTRACTOR and subsequent CONTRACTORS must provide site specific, risk based health and safety induction training on commencement of work on site. The KOUGA MUNICIPALITY in turn may offer induction on the legislative overview as it relates to generic health and safety principles and requirements, which complements the required induction training by the PRINCIPAL CONTRACTOR and by no means replaces it.

A record of attendance shall be kept in the Health and Safety file. A suitable venue must be supplied to house this training.

2.3.12.2 Awareness

The PRINCIPAL CONTRACTOR shall ensure that, on site, periodic toolbox talks take place at least once per week and before hazardous work is carried out. These talks should deal with risks relevant to the construction work at hand. A record of attendance shall be kept in the Health and Safety file. All CONTRACTORS have to comply with this minimum requirement and records must be made available to the KOUGA MUNICIPALITY on request.

Daily Safety Task Instructions (DSTI's) to be communicated to employees.

2.3.12.3 Competency

All competent persons shall have the knowledge, experience, training and qualifications specific to the work they have been appointed to supervise, control, and carry out. This must be assessed on a regular basis (e.g. periodic audits by the KOUGA MUNICIPALITY, progress meetings, etc). The PRINCIPAL CONTRACTOR is responsible to ensure that competent CONTRACTORS are appointed to carry out construction work.

The typical training courses include:

- SAMTRAC / Health and Safety Management Course
- First Aid Level 1 Course
- Basic- Fire Fighting Course
- Safety Representative Course
- Risk Assessment Course
- Construction Supervisor Safety Course
- At least half a day of Management Health and Safety training (compulsory for “responsible persons” appointed relevant to corresponding level).

2.3.13 GENERAL RECORD KEEPING

The PRINCIPAL CONTRACTOR and all CONTRACTORS must keep and maintain Health and Safety records to demonstrate compliance with this Specification, with the OHS Act 85/1993, and with the Construction Regulations (July 2003).

The PRINCIPAL CONTRACTOR shall ensure that all records of incidents / accidents, emergency procedures training, inspections, audits, etc. are kept in a Health and Safety file kept at the site office.

The PRINCIPAL CONTRACTOR must ensure that every CONTRACTOR keeps its own Health and Safety file, maintains the file and make it available on request (The file must include the CONTRACTOR'S health and safety plan). These records are crucial for inclusion in the PRINCIPAL CONTRACTOR'S consolidated health and safety file for handover to the KOUGA MUNICIPALITY on completion of construction work.

Checklists and Registers to be maintained:

- Daily Safe Task Instructions (daily)
- Daily excavations checklists
- Daily traffic accommodation checklists
- Construction vehicles and mobile plant (daily)
- Portable electrical tools (daily)
- Hand tools (monthly)
- PPE checklist (monthly)
- Lifting equipment/tackle inspection checklists.

2.3.14 HEALTH AND SAFETY AUDITS, MONITORING AND REPORTING

The KOUGA MUNICIPALITYs appointed Health and Safety Agent (PP OHS & Risk Consultants) shall conduct monthly Health and Safety compliance audits of the work operations including two site inspections of physical site activities on site.

The PRINCIPAL CONTRACTOR / CONTRACTOR must ensure a copy of all Health and Safety records generated during the course of construction, are handed over to the KOUGA MUNICIPALITY upon completion of construction, which should include design drawings of formwork, false work and other permanent and temporal structures.

2.3.15 EMERGENCY PROCEDURES

The PRINCIPAL CONTRACTOR shall submit a detailed Emergency Procedure for approval by the KOUGA MUNICIPALITY prior to commencement on site. The procedure shall detail the response plan including the following key elements, which needs to be reviewed on a monthly basis:

- List of key competent personnel,
- Details of emergency services envisaged to be used to be available on file and on display. *Liaison with the relevant service providers responsible for emergency procedures essential to ensure that PRINCIPAL CONTRACTOR/CONTRACTORS plan is aligned with the overall emergency plan of the KOUGA MUNICIPALITY,*
- Actions or steps to be taken in the event of the specific types of emergencies,
- Information on hazardous material / situations.
- Information on evacuation routes, periodic drills and assembly points to be displayed and

otherwise documented and implemented.

Emergency procedure(s) shall include, but shall not be limited to fire, spills, accidents to employees, use of hazardous substances, bomb threats, major incidents / accidents, etc. The PRINCIPAL CONTRACTOR shall advise the KOUGA MUNICIPALITY in writing forthwith, of any emergencies, together with a record of action taken. A list of all services providers (Fire Department, Ambulance, Police, Medical and Hospital, etc) must be maintained and displayed to site personnel.

2.3.16 FIRST AID BOXES AND FIRST AID EQUIPMENT

The PRINCIPAL CONTRACTOR and all CONTRACTORS must ensure that all working areas are adequately provided with first aid attendants, appointed in writing, whether there are ten (10) employees or less engaged on the contract. The First Aid attendants must be trained in accordance with the requirements set out in the Act with a recognized and accredited service provider. Valid first aid certificates are to be kept on the site safety file.

The PRINCIPAL CONTRACTOR / CONTRACTOR must ensure that first aid boxes are adequately filled as per the annexure listing of General Safety Regulation 3 of the Act and checked monthly of which record must be kept. This is the *minimum* requirement and additional needs be considered in terms of prevailing risk/activities and the first-aid equipment to be available at all times and accessible to all. The KOUGA MUNICIPALITY shall inspect the contents of the first aid box and dressing record from time to time.

2.3.17 ACCIDENT / INCIDENT REPORTING, INVESTIGATION AND STATISTICS

Injuries are to be categorized into first aid, medical, disabling and fatal. The PRINCIPAL CONTRACTOR must stipulate in its Health and Safety plan how it will handle each of these categories.

The appointed investigators of the PRINCIPAL CONTRACTOR or CONTRACTORS must investigate and report on all incidents to the PRINCIPAL CONTRACTOR at least monthly. However, the PRINCIPAL CONTRACTOR and all CONTRACTORS must ensure that incidents are fully investigated within seven days of the incident in the form on Annexure 1 (General Administrative Regulations) and immediately forward a copy of the completed investigation report to the KOUGA MUNICIPALITY, with the original report to be kept on the site Health and Safety file, where it may be accessed by an Inspector of the Department of Labour, Health and Safety Representatives or other interested parties.

All serious incidents reportable in terms of the provision of Section 24 of the OHS Act, 85/1993 must be reported to the local Department of Labour and to the KOUGA MUNICIPALITY in the prescribed manner ***without delay and before disturbing the scene of the accident***. Injured persons may however be removed by qualified emergency personnel. Photographs and witness statements need to be taken and sketches made to gather as much information possible during such an emergency and the PRINCIPAL CONTRACTORS must make this available to the KOUGA MUNICIPALITY, who must also be ***notified immediately*** of such an event and the KOUGA MUNICIPALITY reserves the right to participate in all investigations of incidents.

The PRINCIPAL CONTRACTOR and CONTRACTORS must keep updated statistics reflecting on their Disabling Incident Frequency Rate *(DIFR) and Disabling Injury Severity Rate (DISR) and number and type of injury. Record of all injuries other than lost time injuries, such as near misses, first aid and medically treated incidents are also to be kept.

*DIFR (Disabling Injury Frequency Rate) DI's x 1 000 000

Man-hours

DISR (Disabling Injury Severity Rate) Days Lost x 1 000 000

Man-hours

2.3.18 HAZARDS AND POTENTIAL SITUATIONS

The PRINCIPAL CONTRACTOR shall immediately notify the resident engineer of any hazardous or potentially hazardous situations that may arise during the performance of construction activities, which include the placement of warning signs. PRINCIPAL CONTRACTORS shall notify the KOUGA MUNICIPALITY of such situations.

2.3.19 PERSONAL PROTECTIVE EQUIPMENT (PPE) AND CLOTHING

The PRINCIPAL CONTRACTOR must comply with the requirements of the OHS Act's General Safety Regulation 2, to provide PPE and must identify the specific PPE needs per activity and then issue the PPE accordingly. PPE must be provided to visitors as well by the PRINCIPAL CONTRACTOR and adequate quantities of SANS approved PPE must be available on site at all times.

The PRINCIPAL CONTRACTOR must ensure that adequate training in the use of PPE is provided to all employees, and proof of training shall be kept on the Health and Safety file for auditing purposes.

THE PRINCIPAL CONTRACTOR shall clearly outline procedures to be taken when PPE or clothing are:

- Lost or stolen,
- Worn out or damaged

Replacements must be made immediately and in line with the requirements of the Act. The above procedure applies to CONTRACTORS and their SUB-CONTRACTORS, as they are all Employers in their own right.

PPE required: (but not limited to)

- Hard Hats
- Overalls
- Safety shoes
- Hearing protection
- Eye protection
- Reflective vests
- Dust masks

.3.20 OCCUPATIONAL HEALTH AND SAFETY SIGNAGE

The PRINCIPAL CONTRACTOR must provide adequate on-site health and safety signage, as per risk identified, including **but not limited** to the following signs

- Name of company and project
- Emergency contact telephone numbers
- Names of Supervisor, Health and Safety Representative and First Aider
- no unauthorized entry
- report to site office
- required PPE on site
- site office
- beware of overhead work
- hard hat area
- deep excavations
- “construction work” signage
- Traffic accommodation signage

Signage shall be posted up at all entrances to site as well as on site in strategic locations. The PRINCIPAL CONTRACTOR and CONTRACTORS shall also maintain the signage to ensure its effectiveness at all times and under all conditions. Signage, which cannot be repaired or are lost/stolen, must be replaced.

2.3.21 CONTRACTORS AND SUB-CONTRACTORS

- The PRINCIPAL CONTRACTOR shall ensure that all CONTRACTORS appointed by him/her comply with this Specification, the OHS Act 85/1993, Construction Regulations (July 2003), and all other relevant legislation that may relate to their activities directly or indirectly. The CONTRACTOR, when appointing other CONTRACTORS as 'SUB-CONTRACTORS', shall mutatis mutandis ensure compliance as if it was the PRINCIPAL CONTRACTOR.
- The PRINCIPAL CONTRACTOR may only appoint a CONTRACTOR after approving the CONTRACTOR'S health & safety plan. The PRINCIPAL CONTRACTOR must audit each of its CONTRACTORS on a monthly basis, with audit reports filed in the health & safety file on site. The audit must include an administrative assessment as well as a physical inspection of the CONTRACTOR'S health & safety system.
- The PRINCIPAL CONTRACTOR must stop any CONTRACTOR from carrying out construction work that is not in accordance with the PRINCIPAL CONTRACTOR'S or CONTRACTOR'S health & safety plan or if there is an immediate threat to the health and safety of persons.
- The PRINCIPAL CONTRACTOR shall take all reasonable steps necessary to ensure co-operation between all CONTRACTORS to enable each of those CONTRACTORS to comply with the provisions of these regulations;
- The PRINCIPAL CONTRACTOR shall take all reasonable steps to ensure that each CONTRACTOR'S health and safety plan is implemented and maintained on the construction site: Provided that the steps taken shall include periodic audits at intervals mutually agreed upon between the PRINCIPAL CONTRACTOR and CONTRACTORS, but at least once every month;
- The PRINCIPAL CONTRACTOR must ensure that where changes are brought about to the design and construction, that sufficient health and safety information and appropriate resources are made available to CONTRACTORS so as to allow them to execute the work safely;
- The PRINCIPAL CONTRACTOR must ensure that every CONTRACTOR is registered and in good standing with a recognized compensation fund or with a licensed compensation insurer prior to work commencing on site;
- The PRINCIPAL CONTRACTOR must ensure that potential CONTRACTORS submitting

tenders have made separate provision for the cost of health and safety measures during the construction process; The PRINCIPAL CONTRACTOR shall discuss and negotiate with the CONTRACTOR the contents of the health and safety plan and shall finally approve that plan for implementation;

- The PRINCIPAL CONTRACTOR shall hand over a consolidated health and safety file to the KOUGA MUNICIPALITY upon completion of the construction work and shall include a record of all drawings, designs, materials used and other similar information concerning the completed structure;
- The PRINCIPAL CONTRACTOR shall not appoint a CONTRACTOR to perform construction work unless the PRINCIPAL CONTRACTOR is reasonably satisfied that the CONTRACTOR he or she intends to appoint has the necessary competencies and resources to perform the construction work safely.
- The PRINCIPAL CONTRACTOR must co-operate with the KOUGA MUNICIPALITY at all times and incorporate in the health and safety plan any additional requirements/ precautionary measures that may become necessary in the interest of health and safety of employees, visitors, members of the public or other affected parties. The anticipation of new or potential risks may therefore necessitate the immediate review of the health and safety plan on realization of such need by the PRINCIPAL CONTRACTOR, subsequent CONTRACTOR or by the KOUGA MUNICIPALITY.

2.3.22 CONSTRUCTION SAFETY OFFICER

The Principal Contractor is to appoint a **full-time construction safety officer** in writing to assist in the control of all safety related aspects on site. It is compulsory to provide the name and CV of your appointed, competent construction safety officer to the KOUGA MUNICIPALITY, prior to work commencing on site. The Safety Officer shall have a minimum qualification of SAMTRAC and/or NEBOSH IGCC and relevant site experience.

Full-time Construction OHS Officer CR 8(5)

The successful principal contractor shall appoint a full-time Construction OHS Officer to the contract for its duration.

The candidate needs to have a competency profile that is at least equivalent to the following:

Education: Grade 12 (Matric) + 3 years further study (360 NQF credits in OHS).

Alternatively, Grade 12 (Matric) + all of the following accredited courses:

- OHS Representative (SAQA U/S 259622)
- Risk Assessment (RA) (SAQA U/S 120330)
- Incident Investigation (SAQA U/S 120335)
- OHS Act Training (SAQA U/S 120344)
- Planned Task Observations (SAQA U/S 120337)
- SAMTRAC or equivalent (minimum SAQA U/S 244283)
- OHSAS 18000 training (SAQA U/S 116785)
- Advanced RA Training (SAQA U/S 244287, 244508)
- Advanced Incident Investigation training (SAQA U/S 244518)
- Advanced Legal Training (SAQA U/S 244514)
- Management Training (SAQA U/S 15231 or similar)

Experience: 5 (five) years of relevant work experience in construction OHS practice.

Professional Registration: In the Construction Health and Safety Officer category, as contemplated in the Construction Regulations, 2014, Government Notice No. R. 85, Item 3, and, as to be demonstrated by contractors by the 07 August 2014.

The construction safety officer must assist with the control of all safety related aspects on site and be utilised to provide input at early stages of the project, to assist in compiling the health and safety plan. In addition his/her duties to include:

- a) **Health and safety audits and inspections including administrative and physical audits of all CONTRACTOR'S health and safety plans, files and activities, and record findings in the form of audit reports that are to be kept in the health and safety file;**
- b) **Maintain the PRINCIPAL CONTRACTOR'S health and safety plan and file and make documents available on request of the KOUGA MUNICIPALITY;**
- c) **Assist with investigations of near misses, incidents and injuries;**
- d) **Co-ordinate the function of reviewing the hazard identifications and risk assessments;**
- e) **Assisting with method statements (safe work procedures) and checking that the responsible persons follow these procedures.**

- f) **Assist with the implementation, monitoring and enforcement of occupational health and safety control measures in order to minimize all risks.**

g) Medical Examinations and Certificates of Fitness

It should be noted that all contractor's must ensure that all his or her employees have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner in the form of Annexure 3 to the Construction Regulations, 2014.

2.4 PHYSICAL REQUIREMENTS

2.4.1 PRACTICAL MATTERS THAT IMPACT / MAY IMPACT UPON OHS

The items mentioned below are indicative of the concerns to the client – with regards to the health and safety of contractor's employees, client's employees and those people who are not involved with this contract, but may be affected by the execution of the works – and include:

- 3.1. Installation of new equipment (Pumps, electrical and measuring equipment) – These activities will require use of heavy equipment, power tools, as well as working with electricity. Supply methods of ensuring that proper safety practices and supervision is exercised during these activities.
- 3.2. Working in confined spaces – The removal/installation of mechanical equipment in the pump station sumps will require working in confined spaces, as well as working at heights. Supply method statements for these activities.
- 3.3. Installation of standby generators – This activity will involve the use of crane trucks and lifting equipment such as belts and cranes. Supply method statements of this activity for the various pump stations
- 3.4. Construction of pump station top structures – This activity will involve working at heights (construction of the roof) – Provide method statements for this activity at the various pump stations.
- 3.5. Statistics show that over the last two years over 50% of fatalities in construction have occurred in transportation of workers. Supply method of transportation of employees on and off site.
- 3.6. Location and accessibility for emergency service. Confirm arrangements for emergency services to the site.

2.4.2 EXCAVATION, SHORING, DEWATERING OR DRAINAGE (CR13)

The PRINCIPAL CONTRACTOR shall make provision in the tender for adjacent barricading, shoring within, and dewatering or drainage of any excavation that requires it, unless otherwise stipulated elsewhere in the contracts. If an excavation is more than 1 meter deep, a safe working procedure shall be submitted to the KOUKA MUNICIPALITY and a permit will be issued to the CONTRACTOR to proceed with the excavation work. The CONTRACTOR shall make sure that:

- (1) A contractor must –
 - (a) Ensure that all excavation work is carried out under the supervision of a competent person who has been appointed in writing for that purpose; and
 - (b) Evaluate, as far as is reasonably practicable, the stability of the ground before excavation work begins.
- (2) A contractor who performs excavation work –
 - (a) Must take reasonable and sufficient steps in order to prevent, as far as reasonably practicable, any person from being buried or trapped by a fall or dislodgement of material in an excavation;
 - (b) May not require or permit any person to work in an excavation which has not been adequately shored or braced: Provided that shoring and bracing may not be necessary where –
 - (i) The sides of the excavation are sloped to at least the maximum angle of repose

- measured relative to the horizontal plane; or
- (ii) Such an excavation is in stable material: provided that –
- (aa) permission has been given in writing by the appointed competent person contemplated in subregulation (1) upon evaluation by him or her of the site conditions; and
 - (bb) where any uncertainty pertaining to the stability of the soil still exists, the decision from a professional engineer or a professional technologist competent in excavations is decisive and such a decision must be noted in writing and signed by both the competent person contemplated in subregulation (1) and the professional engineer or technologist, as the case may be;
- (c) Must take steps to ensure that the shoring or bracing contemplated in paragraph (b) is designed and constructed in a manner that renders it strong enough to support the sides of the excavation in question;
- (d) Must ensure that no load, material, plant or equipment is placed or moved near the edge of any excavation where it may cause its collapse and consequently endangers the safety of any person, unless precautions such as the provision of sufficient and suitable shoring or bracing are taken to prevent the sides from collapsing;
- (e) Must cause convenient and safe means of access to be provided to every excavation in which persons are required to work, and such access may not be further than six meters from the point where any worker within the excavation is working;
- (f) Must ascertain, as far as is reasonably practicable, the location and nature of electricity, water, gas or other similar services.
- (g) Must ensure that every excavation, including all bracing and shoring, is inspected –
- Daily, prior to the commencement of each shift;
 - After every blasting operation;
 - After an unexpected fall of ground;
 - After damage to supports; and
 - After rain.
- By the competent person.
- (h) Must cause every excavation which is accessible to the public or which is adjacent to public roads or thoroughfares, or whereby the safety of persons may be endangered, to be –
- Adequately protected by a barrier or fence of at least one meter in height and as close to the excavation as is practicable; and
 - Provided with warning illuminants or any other clearly visible boundary indicators at night or when visibility is poor.

All excavations to be closed as soon as possible. Detailed planning is required by the Principal Contractor.

2.4.2 TUNNELLING (CR15)

No person may enter a tunnel, which has a height dimension of less than 800 millimetres.

2.4.3 STACKING OF MATERIALS

The PRINCIPAL CONTRACTOR and other relevant CONTRACTORS must ensure that all stacking will be supervised by a competent person that is appointed in writing to supervise over the activities, and that clearly defined and allocated storage areas are provided for and identified. All materials being stored within this area must be stacked in accordance with sound stacking principles of sort-by-sort, maintained access, level surfaces, and a height to base ratio of no more than three. Double handling of material should be avoided and for this purpose, pallets and other stacking options should be used.

Housekeeping must also be maintained at all times as this will be inspected and evaluated by the KOUGA MUNICIPALITY during monthly audits.

2.4.4

SPEED RESTRICTIONS AND TRAFFIC ACCOMODATION

The PRINCIPAL CONTRACTOR must develop a detailed traffic management plan which must work in correlation with the South African Road Traffic Manual. The traffic management plan and applicable drawings must be approved by the local traffic department and KOUGA MUNICIPALITY's Agent.

The PRINCIPAL CONTRACTOR shall ensure that all persons in its employ, all CONTRACTORS and all those that are visiting the site are aware and comply with the speed regulations.

Contractor to ensure a traffic management plan be submitted to the OHS Agent to ensure that construction vehicles adhere to the required speeds and access routes.

2.4.5

HAZARDOUS CHEMICAL SUBSTANCES (HCS)

The PRINCIPAL CONTRACTOR and other relevant CONTRACTORS shall provide the necessary training and information regarding the use, transport and storage of HCS. The PRINCIPAL CONTRACTOR shall ensure that the use, transport and storage of HCS are carried out as prescribed by the HCS Regulations. The CONTRACTOR shall ensure that all hazardous chemicals on site have a Material Safety Data Sheet (MSDS) on site and that the users are made aware of the hazards and precautions that need to be taken when using the chemicals. The first aiders must be made aware of the MSDS and how to treat HCS incidents appropriately. The KOUGA MUNICIPALITY must be afforded access to HCS records and MSDS's at all times.

Fuel / Diesel

- Bulk storage areas must be demarcated, secured and signage displayed with the relevant warning pictograms.
- Bulk storage areas must be adequately bunded to ensure containment of 110% of the stored product.
- Re-fuelling must be conducted in designated re-fuelling areas only.
- Receptacles must be earthed during decanting.
- Spill-kits must be available at all times in these designated areas.
- The surface of the bunded areas and walls must be of impermeable material.
- The bunded area must be sloped towards a collection pit.
- Adequate firefighting equipment must be provided at such areas.

2.4.6

STRUCTURES (CR11) AND EXISTING STRUCTURES

- (1) A PRINCIPAL CONTRACTOR must ensure that –
- (a) All reasonably practicable steps are taken to prevent the uncontrolled collapse of any new or existing structure or any part thereof, which may become unstable or is in a temporary state of weakness or instability due to the carrying out of construction work;
 - (b) No structure or part of a structure is loaded in a manner which would render it unsafe; and
 - (c) All drawings pertaining to the design of the relevant structure are kept on site and are available on request to an inspector, other contractors, the KOUGA MUNICIPALITY and the KOUGA MUNICIPALITY's agent for employee.

Any adjacent structures that may be affected by work must be considered in the planning process. The health and safety of occupants must be regarded. Precautionary measures must be detailed and applied to prevent damage and/or loss to property and persons during the entire construction phase. Where a serious risk of damage to existing structures is likely, an assessment by means of a structural inspection and report shall be compiled by a competent person and forwarded to the KOUGA MUNICIPALITY and PRINCIPAL CONTRACTOR before any persons are exposed to the risk. Inspections of these existing structures must be conducted in compliance with the recommendations of the same competent person. All relevant health

& safety information must be brought to the attention of the PRINCIPAL CONTRACTOR and CONTRACTORS forthwith.

2.5 **PLANT AND MACHINERY**

2.5.1 **CONSTRUCTION PLANT**

Construction Plant includes all types of plant including but not limited to cranes, piling rigs, excavators, road vehicles and all lifting equipment.

The PRINCIPAL CONTRACTOR must ensure that all such plant complies with the Requirements of the OHS Act 85/1993, Driven Machinery Regulations and Construction Regulations (2014) in relation to its operation and maintenance thereof.

- Records of service and maintenance of the vehicles must be of a high standard at all times.
- All plant shall, subject to design, be fitted with back-up alarms and audible indicating devices.
- The PRINCIPAL CONTRACTOR and CONTRACTORS shall ensure that all construction plant's moving parts are adequately protected.
- Pre-start inspections shall be conducted on all motorised equipment daily: deviations of such inspections shall be recorded.
- Construction plant identified for use shall only be operated by a trained and authorised operator.
- All construction plant shall be operated under the direct supervision of a person competent to identify potential hazards involved in the work he/she is conducting.
- Work involving the use of construction plant shall be conducted in accordance with an approved Risk Assessment.
- The PRINCIPAL CONTRACTOR and CONTRACTORS shall ensure all operators are equipped with the necessary PPE namely; safety shoes, overall, safety glasses, gloves and additional equipment identified as per risk assessment.
- All Plant shall be fitted with an extinguisher where practicable.
- Washing shall be conducted in the designated washing areas.
- The PRINCIPAL CONTRACTOR and CONTRACTORS shall ensure that all equipment moving to and from site is adequately secured.
- Load test certificates of all lifting equipment must be available on site.

The PRINCIPAL CONTRACTOR and all relevant CONTRACTORS shall inspect and keep records of inspections of the construction plant used on site. Only authorized / competent persons are to use machinery under proper supervision and The PRINCIPAL CONTRACTOR and all relevant CONTRACTORS must provide proof of ***medical and psychological fitness including training of all operators*** engaged in the construction activity. Appropriate PPE and clothing must be provided and maintained in good condition at all times, as legally required.

2.5.2 **PRESSURE EQUIPMENT AND GAS BOTTLES**

The PRINCIPAL CONTRACTOR and all relevant CONTRACTORS shall comply with the Pressure Equipment Regulations, including:

- Ensuring all vessels owned and hired, comply with the 36-month pressure vessel inspection requirement, and a certificate of testing is available on site for inspection by the KOUGA MUNICIPALITY.
- Ensuring that all personnel who shall use this equipment are competent and trained.
- Ensuring the users of this equipment are issued with the required PPE.

- Ensuring the area is adequately identified as a noise area and warnings are posted.
- Ensuring daily pre-start inspections are carried out on all the equipment and the findings recorded.
- Ensuring the correct fire prevention and fighting equipment is available at all times.
- Noise levels where possible shall be kept within reasonable operating norms.
- Ensure proper use and storage of gas during construction, which may include trolleys upon which bottles are moved and chains to prevent bottles falling over.
- Ensure that flash back arrestors are affixed where applicable.

The inspection of these activities must be included in the PRINCIPAL CONTRACTOR'S monthly safety inspections/audits.

2.5.3 FIRE EXTINGUISHERS AND FIRE FIGHTING EQUIPMENT

The PRINCIPAL CONTRACTOR and relevant CONTRACTORS shall provide adequate and serviced firefighting equipment located at strategic points on site. The appropriate notices and signs must be displayed as required.

The PRINCIPAL CONTRACTOR / CONTRACTOR shall ensure that all fire equipment to be used on site comply with the following:

- Extinguishers shall be placed in positions to ensure that fast and easy access is maintained at all times.
- Placement of all extinguishers shall be depicted with the required pictograms.
- Extinguishers specific to the classes of fire likely to occur to be installed.
- Extinguishers shall be inspected monthly and serviced once annually, and after discharge or visible signs of depressurizations.
- The PRINCIPAL CONTRACTOR / CONTRACTOR shall ensure all employees are adequately trained in the safe use of the extinguishers and proof of training is kept on site for inspection by the KOUGA MUNICIPALITY.
- The PRINCIPAL CONTRACTOR / CONTRACTOR shall ensure a person is appointed to inspect the extinguishers on a monthly basis and the results of which are to be entered into a register designed for that purpose.

2.5.4 CONSTRUCTION VEHICLES AND MOBILE PLANT (CR23)

The PRINCIPAL CONTRACTOR shall ensure that any hired plant and machinery used on site is safe for use. The necessary requirements as stipulated by the OHS Act 85/1993 and Construction Regulations 23 (2014) shall apply. The PRINCIPAL CONTRACTOR / CONTRACTOR shall ensure the following criteria is adhered to when considering the use of Construction Vehicles and mobile plant:

A contractor must ensure that all construction vehicles and mobile plant –

- (a) Are of an acceptable design and construction;
- (b) Are maintained in a good working order;
- (c) Are used in accordance with their design and the intention for which they were designed, having due regard to safety and health;
- (d) Are operated by a person who –
 - (i) Has received appropriate training, is certified competent and in possession of proof of competency and is authorized in writing to operate those construction vehicles and

- mobile plant;
- (j) Has a medical certificate of fitness to operate those construction vehicles and mobile plant, issued by an occupational health practitioner in the form of Annexure 3.
- (e) Have safe and suitable means of access and egress;
- (f) Are properly organized and controlled in any work situation by providing adequate signaling or other control arrangements to guard against the dangers relating to the movement of vehicles and plant, in order to ensure their continued safe operations;
- (g) Are prevented from falling into excavations, water or any other area lower than the working surface by installing adequate edge protection, which may include guardrails and crash barriers;
- (h) Are fitted with structures designed to protect the operator from falling material or from being crushed should be vehicle or mobile plant overturn;
- (i) Are equipped with an acoustic warning device.
- (j) Are equipped with an automatic acoustic reverse alarm; and
- (k) Are inspected by the authorized operator or driver on a daily basis using a relevant checklist prior to use and that the findings of such inspection are recorded in a register kept in the construction vehicle or mobile plant.

2.5.5 TEMPORARY WORKS (CR12)

The PRINCIPAL CONTRACTOR must appoint a temporary works designer in writing to design, inspect and approve the erected temporary works on site before use.

The PRINCIPAL CONTRACTOR must ensure that the provisions of section 12 of the Construction Regulations (2014) are adhered to. These provisions must include, but not be limited to, ensuring that all equipment used is examined for suitability before use, that all formwork and support work is inspected by a competent person immediately before, during and after placement of concrete or any other imposed load and thereafter on a daily basis until the formwork and support work has been removed. Records of all inspections must be kept in a register on site.

All temporary works structures are done with close reference to the structural design drawings, and where any uncertainty exists the structural designer should be consulted.

Detailed activity specific drawings pertaining to the design of temporary works structures are kept on the site and are available on request to an inspector, other contractors, the KOUGA MUNICIPALITY, the KOUGA MUNICIPALITY's agent or any employee.

All persons required to erect, move or dismantle temporary works structures are provided with adequate training and instruction to perform those operations safely.

All equipment used in temporary works structure are carefully examined and checked for suitability to a competent person, before being used;

2.5.6 LIFTING MACHINES AND TACKLE

The PRINCIPAL CONTRACTOR and all CONTRACTORS must ensure that lifting machinery and tackle is inspected before use and thereafter in accordance with the Driven Machinery Regulations and Construction Regulation 22 (2014). There must be competent lifting machinery and lifting tackle inspectors who must inspect the equipment daily or before use, taking into account that:

- All lifting machinery and tackle must carry a load test certificate renewed annually and must have an inspection register.
- All lifting machinery and tackle has a safe working load clearly indicated,
- Monthly inspection and servicing is carried out and daily pre-start checks shall also be conducted

on all Lifting Machinery and Tackle,

- There is proper supervision in terms of guiding the loads that includes a trained banks man to direct lifting operations and check lifting tackle,
- The tower crane bases have been approved by an engineer,
- The operators are competent as well as physically and psychologically fit to work and in possession of a medical certificate of fitness which shall be available on site.
- A valid logbook shall be maintained for all lifting machinery, which will comply with a minimum six-monthly service and maintenance.

2.5.7 LADDERS AND LADDER WORK

- The PRINCIPAL CONTRACTOR shall ensure that all ladders are clearly numbered, inspected and reflected on a register.
- A competent person shall be identified and appointed as the ladder inspector.
- Where aluminium ladders cannot be used, then wooden ladders shall be straight grained and unpainted to allow for proper inspection of the grain for cracking.
- Ladders shall be secured at the top and chocked at the base to prevent slipping.
- Where chocking of the base is not possible, then the user shall ensure that the ladder is held in position by another employee when ascending the ladder.
- Ladders shall be inspected daily before use and once per month by the person appointed as the ladder inspector, and a record kept.
- Proper storage shall be provided for all ladders when not in use.
- Ladders must be of the correct height for the task, extended at least 1m above the landing, fastened and secured, and at a safe angle.

2.5.8 GENERAL MACHINERY

The PRINCIPAL CONTRACTOR and relevant CONTRACTORS shall ensure compliance with the Driven Machinery Regulations and General Machinery Regulations which include inspecting machinery regularly, appointing a competent person to inspect and ensure maintenance, issuing PPE or clothing, and training those who operate machinery.

In accordance with General Machinery Regulation 2(1), The PRINCIPAL CONTRACTOR /CONTRACTOR must:

- Ensure a competent person be appointed as defined in the above clause from the Occupational Health and Safety Act, Act 85 of 1993 and Regulations, to service and maintain all machinery in use on site.
- The PRINCIPAL CONTRACTOR / CONTRACTOR shall appoint additional competent persons to assist the competent person mentioned above in accordance with General Machinery Regulation 2(7)(a), as and when required.
- The PRINCIPAL CONTRACTOR / CONTRACTOR shall ensure that records are maintained of all services conducted.
- The PRINCIPAL CONTRACTOR / CONTRACTOR shall provide to the KOUGA MUNICIPALITY a copy of the above appointments prior to work commencing on site.

2.5.9 PORTABLE ELECTRICAL TOOLS, EXPLOSIVE POWER TOOLS, HAND TOOLS

The PRINCIPAL CONTRACTOR / CONTRACTOR must ensure the following procedure is adhered to regarding Portable Electrical Tools and Hand tools:

- Minimum compliance with legislation;
- Power tools to be well guarded, not over loaded and earthed.
- No work under wet conditions allowed with power tools.
- Only competent persons shall be permitted to conduct routine and monthly inspections on the equipment.
- Persons competent to inspect the equipment must be appointed in writing.
- Persons must be trained to operate such equipment and must be appointed and shall be the only authorised person to operate the equipment.
- The PRINCIPAL CONTRACTOR / CONTRACTOR must ensure operation of the equipment is in accordance with an approved Risk Assessment and Safe Working Procedure.
- All users must undergo regular awareness training to ensure compliance.
- The PRINCIPAL CONTRACTOR / CONTRACTOR must ensure the required PPE and clothing is provided and maintained.
- No privately owned or home- made hand tools to be used on site.
- All hand tools to be kept in a clean and sound condition.
- The right tools for the task to be used.

2.5.10 ELECTRICAL EQUIPMENT AND INSTALLATIONS (CR24)

If high voltage electrical lines are present on the site perimeter, the PRINCIPAL CONTRACTOR must be aware of the location and have to demarcate their position. These demarcations must be maintained throughout the duration of the construction work. The minimum safety clearances as per Electrical Machinery Regulation 15 must be adhered to. All installation must comply with SANS 10142 and the regulations of the OHS Act 85/1993.

The PRINCIPAL CONTRACTOR / CONTRACTOR must ensure lighting circuits and power circuits are fitted with suitable earth leakage protection systems and installed by an approved authority.

The PRINCIPAL CONTRACTOR / CONTRACTOR must ensure that

- Earth leakage system will be tested monthly.
- A temporary certificate of compliance is obtained.
- All existing services must be assumed live at all times.
- Malfunctions shall be repaired immediately or replaced.
- Lighting shall be so positioned as not to interfere with construction activities.
- Lighting shall be provided to ensure adequate visibility under all conditions.
- Lighting and electrical installations shall be weatherproof.
- The PRINCIPAL CONTRACTOR / CONTRACTOR must ensure operation of the equipment is in accordance with an approved Risk Assessment and Safe Working Procedure.
- All users must undergo regular awareness training to ensure compliance.
- The PRINCIPAL CONTRACTOR / CONTRACTOR must ensure the required PPE and clothing is provided and maintained.
- The PRINCIPAL CONTRACTOR / CONTRACTOR must ensure the use of flameproof equipment when entering confined spaces where volatile gasses may be present.

2.5.11 PUBLIC AND SITE VISITOR HEALTH AND SAFETY

The PRINCIPAL CONTRACTOR shall ensure that every person working on or visiting the site, as well as the public in general, shall be made aware of the dangers likely to arise from site activities, including the precautions to be taken to avoid or minimise those dangers.

Appropriate Health and Safety notices and signs shall be displayed, but shall not be the only measure taken. The PRINCIPAL CONTRACTOR has a duty in terms of the OHS Act 85/1993 to do all that is reasonably practicable to prevent members of the public and site visitors from being affected by the construction activities. Site visitors must be briefed on the hazards and risks they may be exposed to and what measures are in place or should be taken to control these hazards and risks. A record of these inductions must be kept on site in accordance with the Construction Regulations. The PRINCIPAL CONTRACTOR to ensure that no unauthorized persons enter the construction area.

The contractor to ensure that the public's safety is of the utmost importance. The public must be informed of all expected risk during the construction period. All warning signage and barricading to be in place. Photographic evidence to be maintained of barricaded excavations.

2.5.12 NIGHT WORK

Night work shall only be conducted upon approval of the KOUGA MUNICIPALITY, with the same safety standard being applied for these activities as required for day work activities.

The PRINCIPAL CONTRACTOR must ensure that adequate lighting is provided to allow for work to be carried out safely and to safeguard the health and safety of persons other than employees, e.g. visitors and members of the public. Adequate warning signs e.g. flashing lights and reflectors to be provided to ensure visibility and to serve as warning to employees and other persons in the area of the construction site after dark. In the event where night work is not performed, the construction site may still pose a danger under poor visibility conditions and such warning signs shall then also be displayed.

2.5.12 TRANSPORT OF WORKERS

No worker may be transported in, or on the rear of a construction vehicle (bakkie included), or with plant and materials to, on, or from site. The number of passengers in any vehicle is limited to what is stated on the license disc.

2.6 OCCUPATIONAL HEALTH

2.6.1 OCCUPATIONAL HEALTH AND HYGIENE

As per CR(8) A CONTRACTOR must ensure that all his employees have a valid medical certificate of fitness to the construction work to be performed and issued by an occupational health practitioner in the form of Annexure 3.

Exposure of workers to occupational health hazards and risks is very common in any work environment, especially in construction. Occupational health hazards must also be considered during risk assessments as occupational exposure is a major problem and PRINCIPAL CONTRACTORS and CONTRACTORS must ensure that proper health and hygiene measures are put in place to prevent exposure to these hazards. Prevent inhalation, ingestion, absorption and noise.

2.6.2 ALCOHOL AND OTHER DRUGS

The PRINCIPAL CONTRACTOR must not permit any person who is under the influence of an intoxicating liquor or drugs, to enter or remain on site. The PRINCIPAL CONTRACTOR must ensure that no person on site partakes or offer another person the same or is in possession of such intoxicating liquor or drugs.

Any person suspected of being under the influence of alcohol or other drugs must be refused entry and the prescribed disciplinary procedure must be followed by the PRINCIPAL CONTRACTOR and the KOUGA MUNICIPALITY must be informed. Records of such proceedings must be kept and made available to the KOUGA MUNICIPALITY on request.

An alcohol tester to be available on site.

ANNEXURE A - (Example)**Contents and numbering system for the health and safety plan and file**

No.	Content			Approved	
				Yes	No
1	Index to H&S Plan/File				
2	Scope of Works				
3	Notification to Commence Construction Work				
4	H&S Agreement Section 32(2)				
5	Letter of Good Standing				
6	H&S Plan	6.1	Refer to H&S Specification		
		6.3	Environmental Management Plan (Process waste management/spillage control/disposal certificates)		
7	Hazard Identification Risk Assessment & Applicable Method Statements	7.1	Baseline Risk Assessment		
		7.2	Issue Based Risk Assessment		
		7.3	Risk Register		
8	Method Statements				
9	Safe Working Procedures				
10	Traffic Management Plan				
8	Emergency Plan and Response				
9	H&S Policy	9.1	Signed by CEO		
10	Organisational Chart				
11	Appointment Letters	11.1	Signed		
12	Medical Certificates	12.1	Mobile plant & equipment		
		12.3	Confined Space entry		
		12.4	All employees involved with construction work.		
13	Training and Competency Management	13.1	CV's		
		13.2	Competency Certificates		
		13.3	Induction		
		13.4	Safety/Tool Box Talks		
		13.5	Safety Awareness Posters		

14	Accident / Incident Management including First Aid Facilities	14.1	Section 24 Procedures – Annexure 1 & WCL2	
		14.2	Injury recording	
		14.3	Incident investigation	
		14.4	Non compliance reporting	
		14.5	Preventative & corrective action	
15	Construction Plant, Machinery & Equipment Management	15.1	Vehicles/ Mobile Crane/ Skyjacks & Material Hoist / Compactors / TLB's / Batch plant etc	
16	Access, Traffic Control & Public Safety Management	16.1	Security	
		16.2	Employee / Visitors / Public	
		16.3	Vehicular	
17	Hazardous & Flammable Substance Management	17.1	MSDS	
		17.2	Storage	
		17.3	Demarcation	
		17.4	Signage	
		17.5	Handling & Decanting	
		17.6	Disposal	
18	Hazardous & Dangerous Work Management & Control	18.1	Confined Spaces	
		18.2	Demolition Work	
		18.3	Electrical Installations, Equipment & Machinery	
		18.4	Explosive & Blasting	
		18.5	Explosive Powered Tools	
		18.6	Excavation / Trenching	
		18.7	Energy Source & Lockout	
		18.8	Elevated Working at Heights	
		18.9	Formwork & Support work	
		18.10	Hot Work	
		18.11	Hazardous Chemical Substances	
		18.12	Moving Equipment	
		18.13	Scaffolding	
19	Facilities Management (male / female)	19.1	Washing	
		19.2	Sanitary	

		19.3	Change Rooms	
		19.4	Sheltered Eating	
		19.5	Accommodation / Transportation	
20	PPE Management	20.1	PPE Needs analysis	
		20.2	PPE Issue	
21	Sub Contractor Management	21.1	H&S Agreement Section 37(2) Signed	
		21.2	Appointments signed	
		21.3	H&S Plan	
		21.4	Letter of Good Standing	
22	H&S Committee Meeting minutes			
23	Work Procedures			
24	Work Instructions			
25	Audits & Inspections		Internal & External	
26	Record keeping management		Completed Audit / Inspections / Registers / Checklists	

ANNEXURE B**APPOINTMENT LETTERS REQUIRED (Example)**

No.	DESIGNATION	LEGAL REFERENCES	TYPE OF CONSTRUCTION WORK
1	Assigned Responsibility Designation	OHS Act 16(2) & CR5.3(b)	All construction work
2	Construction Manager	CR8(1)	All construction work
4	Assistant Construction Manager	CR8(2)	All construction work
5	Contractor	CR5(1)(k)	When using a sub contractor
6	Emergency Evacuation Controller	CR29(1)	All construction work
7	Fire extinguisher inspector	CR29(h) – VUPR11	All construction work
8	Fire team member	CR29	All construction work
8	First Aider	GSR3	All construction work
9	Health and Safety Officer	CR8(5)	All construction work
10	Health and Safety Reps	OHS Act Section 17	When more than 20 persons on site for more than 3 months
11	H&S Committee Members	OHS Act Section 19	When more than 20 persons on site for more than 3 months
12	Incident Investigator	GAR9	All construction work
13	Excavation work supervisor	CR13	When excavating
14	Risk Assessor	CR9	All construction work
15	Demolition work supervisor	CR12	When demolishing
16	Explosives Manager	Exp R 12(1)	When using explosives for blasting
17	Explosives Supervisor	Exp R 12(3)	When using explosives for blasting
18	Fall Protection Plan developer	CR8(1)(a)&(b)	When there is a risk of persons falling
19	Fall Protection Plan supervisor	CR8(1)(a)&(b)	When there is a risk of persons falling
20	Bulk Mixing Plant Supervisor	CR20(1)	When operating a batch plant
21	Batch Plant operator	CR20(1)(2)	When operating a batch plant
22	Construction Vehicle & Mobile Plant Inspector	CR23(1)(k)	When using construction vehicles; and when using mobile plant
23	Construction Vehicle & Mobile Plant Operators	CR23(1)	When using construction vehicles; and when using mobile plant
24	Electrical Installation Inspector	CR24	When any electrical installations are brought to site or used on site or installed on site

25	Explosive Powered Tools Inspector	CR21	When explosive powered tools are used
26	Explosive Powered Tools Controller / Issuer	CR21	When explosive powered tools are used
27	Explosive Powered Tools Operator	CR21	When explosive powered tools are used
28	Temporary Works Inspector	CR12(3)(f)	When form work is used; and when support work is used
29	Temporary Works Supervisor	CR12(2)	When formwork and support work is being used.
29	Ladder Inspector	GSR13A	When ladders are used
30	Lifting Machine & Equipment Inspector	DMR18(5)	When cranes, block and tackle, gantries or A frames are used for lifting; or when riggings is done
31	Lifting Machine Operator	DMR18	When cranes, block and tackle, gantries or A frames are used for lifting; or when riggings is done
32	Material Hoist Operator	CR19	When material hoist is used
33	Mixer Operator	CR120	When a concrete mixer is used
34	Portable Electrical Equipment Inspector	EMR9	When portable electrical equipment is used
35	Pressure Vessel Inspector	VUPR 17	When compressors with pressure vessels are used
36	Scaffold Erector	SANS 10085-1:2003 Item 16.1(a)	When scaffolds are used / different person to be inspector
37	Scaffold Inspector	SANS 10085-1:2003 Item 16.1(c) CR16(1)	When scaffolds are used / different person to be the erector
38	Scaffold Supervisor	CR16(1)	When scaffolds are used
39	Scaffold Team Leader	SANS 10085-1:2003 Item 16.1(b) and 10.11	When scaffolds are used
40	Suspended Platform Operational Compliance Plan Developer	CR15(2)(c)	When suspended platforms are used
41	Suspended Platform Erector	Cr15(2)	When suspended platforms are used
42	Suspended Platform Inspector	CR15(10)	When suspended platforms are used
43	Stacking & Storage Supervisor, including chemicals	CR28	All construction work
44	Hazardous & flammable chemical substances controller	CR25(a)	All construction work
44	Tower Crane Operator	CR22	When tower cranes are used
45	Tower Crane Inspector	DMR18 and CR22	When tower cranes are used

ANNEXURE C

DESIGN RISK ASSESSMENT

	Task	Hazard	Risk	Suggested mitigation
1	Sewer pump station and inlet screening chamber			
2	Excavation of sump	Depth of excavation	Collapse, water, falling-both employees, public and animals	- Erect barricading 2m high around pump station site with lockable gate. As per SANS 10400.Part F - Batter excavation to angle of repose. - Access to water pump. - Supply ladders.
3	Placing of layer works	- Vibration - Moving material into excavation	Collapses	- Monitor. - Specify safe distance for plant and material.
4	Moving compaction equipment in to and out of the excavation	Use of crane close to edge of excavation		Specify safe distance.
5	Spoil	Close to edge of excavation	Collapse	Specify safe distance from edge.
6	Installation of Reinforced steel	Awkward material handling leading to ergonomic issues	Injury-sprains and strains Cuts and bruise	- Training. - Consider the use of crane.
7	Access to excavation and egress	Falls	Injury	Supply enough ladders.
8	Work in confined spaces	- Access restriction - Dust	Poor air quality	Confined entrée procedure.
9	Installation of temporary works including support work shuttering, propping and scaffolding	Injury-struck by	Failure	Appoint temporary works designer

				and inspector, scaffolding personnel.
10	Casting of concrete	Noise	N.I.H.L.	• Check silencer on drive unit.
		Working at heights	Falling	• Train employees and ensure work at height is noted on medical certificates.
11	Backfilling	Vibration	Collapse	• Monitor edge of excavation.
	Building			
12	Excavation and casting of foundations	Trench collapse	Trapped in excavation	• Excavation inspector.
13	Building wall below NGL	Trench collapse	Trapped in excavation	• Excavation inspector.
14	Construction of wall above NGL	Working at heights	Falling	• Scaffold erector and inspector, Training employees for at working at heights and medicals.
15	Casting of floors	• Awkward material handling leading to ergonomic issues	Injury-sprains and strains	• Training.
16	Installing of Shukuma "Slabs"	• Working at heights • Crane work	Falling collapse	• Work from scaffold, Training employees for working at heights and note on medical certificate of fitness.

				Competent crane operator, load test inspections.
17	Waterproofing of Shukuma Slabs	Working at heights	Falling	Instal anchor points and lifelines and harness that does not allow employees to fall off the edge.
	Mechanical & Electrical			
18	Installation of pumps & generator	- Lifting of pumps & generator - Weights of umps and generator	Falling Collapse Crane mechanical failure	- Competent operator. - Crane load test and Inspections. - Allow for 2 ton.
19	Electrical installation	Live power	Shock	Isolation and lock-out.
20	Mounting of various fittings	Use of electric tool and hand tools	Shock Cuts and bruises	Check tools before use.
	Rising main			
21	Tie in at sewage plant	Work with raw sewage	Hepatitis	- Get medical advice. - Supply antiseptic soap.
22	Excavations in a built-up area	Excavation & spoil	Injury to public, employees and animals	- Barricade excavation. - Sequence excavation installations of pipes and backfilling to ensure minimal excavations are open during the night and over weekends.
23	Excavations next to an existing gravel road	Public, road users, staff & animals	Fall MVA	Barricade excavations.

				Warn traffic and daily traffic management records kept.
24	Excavation at road crossing	Traffic	MVA	- Traffic management. - Traffic management to be approved by engineer. - Install in half width.
25	Laying of bedding	- Compacting -use of machines. - Ergonomics	Collapse White knuckle disease Sprains and strains	- Check excavation. - Rotate staff. - Use TLB where possible.
26	Laying of pipes (129.29 kg/6m length)	Weight of pipe and change in level	Sprains and strains	- Use crane to lower into trench. - Train in manual handling.
27	Back filling	Vibration	Collapse	Monitor edge of excavation.

PARTICULAR SPECIFICATION: PC

PC

PUMP STATION MECHANICAL

PC **PUMP STATION MECHANICAL**

PC1 **SCOPE**

This specification covers the requirements for the installation of new pump sets at the proposed Geelhout Sewerage Pump Station complete with pumps and all internal steel pipework and fittings.

The specification for associated electrical works i.e. the panels, switchgear, standby generator and telemetry is separately covered in the **Particular Specification PD** of the Tender document.

The civil work for this Contract mainly comprises construction of the new pump station sump, rising main pipeline, as well as the top structure building. The specifications in this regard are included in **Particular Specification PE**

PC2: **MATERIALS AND WORKMANSHIP**

PC2.1 **GENERAL**

All materials and components used in the manufacture and fabrication of plant to be supplied under this Contract shall be good quality and suitable for the purposes for which they are intended. Note, all materials used shall be to the relevant codes and applicable standards.

PC2.2 **STANDARD SPECIFICATIONS**

Reference made hereinafter of specifications of the South African Bureau of Standards (SABS) or the British Standards Institute (BS) shall be deemed to include all revisions of and /or additions to such specifications ruling at the closing date of tenders.

PC2.3 **CORROSION PROTECTION**

All the new steel pipework shall be stainless steel grade 304 with pipe wall thickness of 4,5mm.

Where corrosion of metal may be expected, the Contractor shall supply materials that are resistant to corrosion. Any material showing signs of corrosion, tuberculation or pitting before expiry of the Defects Liability Period must be replaced by the Contractor. The tenderer's prices will include the cost of all painting of other surface treatment which is not separately specified or scheduled, but which is nevertheless necessary for the protection of surfaces against corrosion.

All other steel components e.g., the bases for the secondary pumps and their electrical motors, support brackets, etc., shall be heavy duty hot dipped galvanised. Should any changes/alterations be made to components that required cutting or welding after they have been galvanised the component will be re-galvanised and not touched up with cold galvanising.

New guide bars for submersible pumps shall be stainless steel pipes too and the pump lifting chains shall also be of stainless steel, including all brackets, nuts and bolts used for the installation.

The existing steel pipework, valve, pipe specials and support bracket in the Pump stations shall be painted in accordance with the NOSA safety regulations colour code. The rate shall include surface repair, priming with a base coat and the application of two final colour codes.

PC2.4 STRUCTURAL STEELWORK

The design of structural steelwork and the materials and workmanship used in the construction of same shall comply with the requirements of Part B of The National Building Regulations (Act 103 of 1977 as amended).

In the case of welded connections, in addition to welds required for structural strength, a sealing weld shall be carried right around the connection to facilitate protection against corrosion.

For lifting beams, the anchor bolts and washers used for fixing the beam's support column base plate and the wall mounting as well as other brackets for fixing the beam shall be stainless steel.

PC2.7 CAST IRON PIPES AND FITTINGS

All cast iron pipes and fittings shall comply with the requirements of BS 2035 and unless otherwise specified, shall be of Class D quality for straight pipes and of Class CD quality for fittings. Materials used shall comply with the requirements of BS 1452 Grade 14 for "Grey Iron Castings".

Before leaving the foundry all cast iron pipes and fittings shall be thoroughly cleaned internally and externally and immediately thereafter given the following treatment:

Internally: (including end of plain ended pipes and fittings): one coat bitumen paint to give an average dry film thickness of 50 microns.

Externally: one coat zinc chromate primer to SABS 679 Type 1 applied at the factory plus a further coat of approved gloss enamel applied after erection. The total dry film thickness of the system shall be an average of at least 200 microns.

(See Clause PC2.14 for treatment of mating faces of flanges)

PC2.8 PIPES, FITTINGS, VALVES AND OTHER STEELWORKS

All the pipework and fittings at the Pump stations shall be flanged.

Valves (including check valves) and fittings that are not manufactured of stainless steel shall have a sinter epoxy powder coating applied to the interior and exterior surfaces.

All steel fittings shall comply with BS 534.

Stainless steel pipes with nominal diameter of 150mm or larger shall be grade 304 stainless with a wall thickness of 4.5mm.

(See Clause PC2.14 for treatment of mating faces of flanges)

Gate valves shall be double flanged with non-rising spindle and shall be fitted with gun metal seats and bronze spindles with gun metal nuts. The direction of closing shall be clockwise when viewed from above, which must be clearly indicated on the hand wheel. Valves are to be equipped with resilient seal gates. Gate valves shall be of standard waterworks pattern complying with the requirements of SABS 664 for working pressures as required for each application. The valves shall be rated for 1600 kPa working pressure and positioned as to facilitate ease of opening and closing.

Non-return valves (reflux valves) shall be double flanged and operate with an external counterweight. Reflux valves shall comply with the requirements of SABS 144 for working pressures not less than 16 bar.

Air Valves (VENT-O-MAT Series RGX or equivalent) shall be flanged and rated for 1600 kPa working pressure. Air Valves shall be installed together with an isolating flanged gate valves on the air valve tee-

pieces as indicated on the detail for the different locations on the rising main (where applicable to the project).

Treatment of Gate Valves and Non-return Valves

Before leaving the factory, valve bodies shall be treated with one bitumen coat on inside and outside or one coat zinc chromate primer to SABS 679 type I outside and Copon EP 2300 having a 225-micron average dry film thickness inside.

(See Clause PC2.14 for treatment of mating faces of flanges)

After installation, valves treated with zinc chromate primer when leaving the factory shall be further treated with one coat of undercoat and one coat of bituminous aluminium paint.

PC2.9 FLANGES

The drilling of standard flanges shall comply with the requirements of BSS 4504/16/3 for a working pressure as specified for each application, but not less than 1600 kPa. Flanges shall be machined flat, i.e. without a raised joint face.

Puddle flanges shall have the same dimensions as standard flanges but shall be undrilled. Faces of flanges which will be in contact with jointing gaskets shall receive a protective coating of such thickness and consistency as will not impair the air/gas/water tightness of the joint.

PC2.10 JOINTING MATERIAL FOR FLANGED JOINTS

Bolts for flanges shall comply with the requirements of SABS 1123 for the working pressures specified together with the nuts and washers used in conjunction therewith. The jointing gaskets shall comply with the requirements of BS 3063 and shall be cut to the full width of the flange. All flanges are to be fastened by installing bolts, washers and nuts through all the holes of the flanges.

PC2.11 BOLTS, NUTS AND WASHERS

All nuts and bolts shall be provided with washers that shall be of Stainless Steel. Single coil square section spring washers shall be fitted with all nuts subject to vibration.

All jacking bolts and holding down bolts to be built into concrete work as well as bolts to be installed under water shall also be of stainless steel grade 304.

Other than jacking bolts, all bolts shall project not less than 3mm and not more than 10mm from the heads of the nuts after tightening.

PC2.12 FLEXIBLE AND DISMANTLING COUPLINGS

The Mechanical subcontractor who will manufacture and install the pumps and pipework shall produce shop drawings for submission to the Engineer prior to manufacturing. Full design detail must be provided with these drawings to show the proposed final pipe layout and how the pipework will be assembled and also be able to be disassembled for maintenance purposes at a future date.

Flexible and dismantling couplings are to be of the "KLAMFLEX" type and are to be treated with three coats of approved epoxy paint having an average total dry film thickness of 250 microns (and a minimum of 200 microns). Nuts, bolts and washers shall be electro-galvanised. The ends of the steel pipe and specials shall be properly prepared to accept the couplings. Special anchoring "KLAMFLEX" adaptor joints for connecting plain ended steel pipes to flanged joints are to be supplied complete with bolts and nuts for connecting flanged joint to anchoring flange situated approximately 300mm from plain end of pipe.

PC2.13 TOOLS, SPARES AND LUBRICANTS

Tenderers must submit in the appropriate Schedule in the Data Sheets a list of spare parts which it is recommended should be kept by the Employer for maintenance of the plant. All spares must be new, unused and packed separately and the cases appropriately marked.

In addition to the lubricating oil to be provided for commissioning the plant an additional quantity of oil adequate for at least two complete refills of such plant must also be provided.

The Tenderer must provide a suitable grease gun and at least 5 kg of the appropriate grease.

PC2.14 GALVANISING

Galvanising shall be carried out strictly in accordance with the requirements of SABS 763 (hot-dip zinc coatings) for heavy duty applications.

After delivery of the material to the galvanising plant, the Contractor shall inform the Engineer, who will arrange for inspection of the equipment, should he so require to ensure compliance with SABS 763.

After galvanising, the equipment shall be loaded, making use of wooden spacers to prevent damage to the galvanised surface. Equipment with extensive damage to the galvanised surface will be accepted only after satisfactory re-galvanizing.

PC2.15 SUMP COVER PLATES

The sump covers as detailed on the drawings (if applicable to the project) shall be Maverick Polymer Concrete Covers (or similar approved). The rate for each type of cover shall include the full cost of manufacturing, delivery to site and the installation with stainless steel anchor bolts or cast into concrete (whichever is suitable).

PC3: PUMPING PLANT AND EQUIPMENT

PC3.1 SCOPE

This section of the Contract covers the supply, delivery, transport, handling, double handling (if required) storage, erection, removal of equipment (if required), installation, commissioning, testing, adjustment, handing over in complete working order and upholding during the Defects Liability Period of all the mechanical equipment as well as pipework and fittings.

Note: The electrical equipment is covered in **Particular Specification PD** of the tender document.

Pumps and Pipework

Proposed Geelhout Sewerage Pump Station:

The mechanical work in the proposed pump station includes the supply, installation, testing, commissioning of the following components:

- (a) Installation of two (2) aboveground sewerage pump (Gorman-Rupp VS6 or similar approved) installed in the dry well and coupled to a 55kW high efficiency motors
- (b) Supply and installation of all stainless steel suction and delivery pipework as detailed on the drawings. (Please refer to the section regarding shop drawings elsewhere in the document)

PC3.2 PUMP INSTALLATION

Pumps - General

See section 3.11 - Pumping Criteria for the pump specifications.

Proposed Geelhout Sewerage Pump Station:

The pump station shall be equipped with two (2) pump sets.

Impellers and wear plate

The impellers and wear plate installed in the pumps should be of the following kind:

Gorman-Rupp VS6 CV or similar improved:

- (a) One continuous vane leading from the edge of the impeller rising to one single point at the centre of the eye
- (b) Notched/grooved wear plate
- (c) Wear plate to comprise of multiple flow interruptions in the form of multiple recesses and notches
- (d) Reduce clogging between the vanes or hub and the space between the impeller and housing
- (e) Should reduce the degree of influencing the efficiency of the pump as compared to regular impellers.
- (f) Should reduce maintenance periods and have lower energy costs than standard impellers.

PC3.3 BED PLATES

The dry well pumps are each to be mounted on a galvanised fabricated channel iron bed plate of rigid construction provided with suitable openings for grouting and all necessary holding down bolts for securing the frame/bed plate to the concrete plinth/foundation. The motor of the dry well pump set shall be mounted and properly aligned on the bedplate in the pump manufacturer's workshop. The proof alignment of direct coupled pumps in the works shall be within a tolerance of 0,15 mm T.I.R. and is to be inspected and recorded by the Engineer's Representative Inspector prior to despatch. Rigid steel guards shall be provided as necessary and bolted to the bedplate in such a manner as to ensure complete protection of the operator from all moving parts.

The concrete work to the foundations will be finished off to approximately 25 mm below the underside of the bedplate and in erecting the pump and motor the Contractor shall arrange for the setting of each unit to exact line or level by means of steel wedges. After the civil contractor has grouted up the mounting system and finished off the foundations around some with chamfered or rounded edges, the alignment shall be checked and adjusted as necessary. Final alignment of direct coupled pumps shall be within a tolerance of 0,10 mm T.I.R.

PC3.4 LUBRICATION

Efficient means of lubrication shall be provided for all bearings, full details of which shall be submitted at the time of tendering.

PC3.5 EQUIPMENT AND SPARES

Tenderers must submit in the appropriate schedule in the Data Sheets a list of all spare pump, motor and other parts which are not regularly kept in stock by the supplier, and which he considers to be necessary for the replacement of wearing parts.

PC3.6 MAINTENANCE TOOLS

All the plant supplied under this Contract shall be provided with the tools, spanners, keys, etc., necessary to undertake routine maintenance work as well as the dismantling, overhauling and adjustment of the plant. Tools are to be in sturdy metal toolbox which is to be handed to the Municipality.

PC3.7 GLAND SEALING

The method of gland sealing of pumps, either by gland packing or mechanical seal, is to be clearly stated at the time of tendering. Any special requirements such as a clean water supply at high pressure for sealing glands or flushing casings must be stated at the time of tendering. If sealing is to be effective by glands or flushing casings must be stated at the time of tendering. If sealing is to be effected by gland packing, sufficient spare packing shall be provided with each pump to re-pack each gland completely three times.

PC3.8 PERFORMANCE GUARANTEE

The Contractor shall submit the following characteristic performance curves:

- (a) **Pump:**
 - 1. Head vs. Delivery curve
 - 2. Efficiency curve
 - 3. Power curve
 - 4. NPSH curve
- (b) **Motor:**
 - 1. Efficiency curve
 - 2. Power curve

PC3.9 TESTING ON SITE

On completion of installation and running of the plant, the Contractor will be required to make suitable arrangements for the testing of the plant and equipment supplied under this Contract in the presence of the Engineer or his representative.

During the test of each pumping unit, careful records are to be kept of the power consumed, the power factor, the quantity delivered and the head against which the pump operates.

The pumping head is to be determined from pressure gauges on the delivery and suction branches of the pump. The deliveries of the pumps are to be measured by means of ultra-sonic meters clamped to the delivery pipework and recorded with photographic evidence. The power consumed is to be determined by the kilowatt hour meter while the power factor is to be recorded by means of a suitable mechanism. The quantity delivered is to be measured by displacement in the sump. Subject to the approval of the Engineer, the permanent installed gauges and metres may be used instead.

From the records kept, the capacity, efficiency and power input for the pumping unit shall be calculated to determine whether these are in compliance with the guaranteed figures submitted by the Contractor at the time of tendering.

The tendered amount shall include all the cost of commissioning and properly testing of all the plant offered.

PC3.10 PIPEWORK AND VALVES

The Contractor shall supply under this section of the contract, the following:

All stainless steel suction and delivery pipework, including valves, non-return valves, air-release valves complete between the sump and the connection to the proposed u-PVC rising main as detailed on the drawings.

The general arrangement of pipework is shown on the Drawings and the Tenderer must submit drawings with his tender showing full details of the proposed pipework layout including the valves and special fittings.

The Tenderer is at liberty to submit alternative layouts, but such layouts shall be subject to the Engineer's approval. In any case, the completed installation shall have a neat and tidy and skillful appearance, and all valves, pipes and fittings shall be suitably arranged so that no unnecessary obstruction is caused or safety hazards created. Notwithstanding the implied approval of pipework layout on acceptance of the Contractor's tender, the Engineer shall have the right to reject any workmanship, which in his option appears to be untidy or substandard.

Prior to manufacturing, the successful tenderer/contractor will be required to **submit a full set of shop drawings** that show manufacturing detail and all the dimensions for the Engineer's approval.

The following basic requirements for suction and delivery pipework shall be strictly observed by the Contractor:

- (a) All pipework shall be stainless steel grade 304. All pipework sections passing through concrete shall have a wall thickness of 1,5 mm greater than elsewhere.
- (b) All pipework and valves are to be sized to give suction velocities of 0,6 to maximum 1,5 m/s and delivery velocities of 0,6 to maximum 2,5 m/s under all conditions of pumping.
- (c) Delivery pipes must include a reflux valve, isolating gate valve, reducer, and shall terminate outside the building with a flange adaptor suitable for connection to the diameter of the rising main and generally be as per the Drawings, unless otherwise specified or scheduled.
- (d) All pipes, valves and fittings shall be adequately supported by brackets, beams, piers, etc., to the satisfaction of the Engineer. Anchors shall also be provided to resist all stresses created by static and dynamic forces, including recoil shock.
- (e) Any crotch plates or other forms of reinforcement needed for pipe specials are to be welded onto the specials during fabrication and shall be of the same material as the pipe. The Contractor is to be responsible for establishing the need for such reinforcement and its design.
- (f) Suitable switches shall be supplied and installed to stop the pumps under no-flow conditions. Details of the switches offered must be included with the tender. Switches must also have the necessary electrical entry ports.

PC3.11 PUMPING CRITERIA

Criteria	Proposed Geelhout Sewerage Pump Station
Pump type and amount	<u>Pumps and motors</u> 2 x Gorman Rupp VS6 CV pumps or Similar Approved <i>coupled to 55kW high efficiency 4-pole motor</i> <i>Motor to drive the pump between 1430 and 1550 RPM(As per Gorman-Rupp curves)**</i> **Contractor to supply RPM range for tendered pumps *CV – Continuous Vane Impeller
Origin of suction line/Destination of delivery line	Proposed Reinforced Concrete Sump / Proposed rising main connection outside of pump station top structure
Minimum water level at pump sump (m MSL)	78 mMSL
Maximum static head	37
Length of delivery line	1615 m
Diameter of delivery line	250 mm Ø Class 12 and Class 9 u-PVC
Delivery (duty point) of one pump set (achievable with VSD)	50 l/s at 50 m head
Combined delivery duty point if two series pump sets working in parallel	Not required – Duty and standby operational philosophy

PC3.12 PUMP DATA

Each pump and motor shall be capable of efficient operation over the range specified and full details of pumping rates under all conditions shall be submitted with the tender. System curves for the pumps offered shall be submitted with the tender.

Clear and accurate performance curves must be submitted on a legible scale.

PC3.13 BOLTS

Holding down bolts which are to be cast or grouted into concrete for securing the pumps and pipework included under this Contract are to be supplied under this section of the Contract and cast or grouted in by the civil contractor. All bolts, nuts and washers used shall be of stainless steel material.

Where it is possible for anchor bolts to be drilled, the supply and installation of these bolts will be carried out under this Contract.

TECHNICAL DATA TENDERED FOR PUMPING PLANT IN TERMS OF SPECIFICATION PC 3

	Proposed Geelhout Sewerage Pump Station
Pumps	
Manufacturer	
Place of Manufacture	
Model No	
Speed of rotation (rpm)	
Suction diameter (mm)	
Discharge diameter (mm)	
Impellor type	
Impellor diameter	
Type of bearings	
Materials of construction	
Casing	
Wear Rings	
Shaft	
Method of lubrication	
Method of gland sealing	

MOTOR	
Manufacturer	
Place of Manufacture	
Type	
Protection	
Speed of rotation (rpm)	
Supply voltage (50HzAC)	
Rated power at site (kW)	
Starting current (A)	
Maximum allowable number of starts per hour	
Efficiency at full load	
Efficiency at $\frac{3}{4}$ load	
Efficiency at $\frac{1}{2}$ load	

PUMP SET PERFORMANCE DATA	Proposed Geelhout Sewerage Pump Station
At bottom end of duty range	
(i) Delivery (l/s)	
(ii) Head (m)	
(iii) Efficiency (%)	
(iv) Absorbed power (kW)	
(v) NPSH required per pump (m)	
(vi) RPM	
Maximum delivery head at no flow condition (m)	
At top end of duty range	
(i) Delivery (l/s)	
(ii) Head (m)	
(iii) Efficiency (%)	
(iv) Absorbed power (kW)	
(v) NPSH required per pump (m)	
(vi) RPM	
Maximum delivery head at no flow condition (m)	

<u>Guaranteed tolerances:</u>	
	Proposed Geelhout Sewerage Pump Station
(i) tolerance of delivery rate at the tendered duty head (%)	
(ii) tolerance of head at the tendered duty/delivery rate (%)	
(iii) tolerance of pump efficiency at tendered duty point (%)	
Length: (mm)	
Width: (mm)	
Height: (mm)	
Overall mass of pump, motor and (kg)	

PIPING AND VALVES	
Stainless Steel Grade 304 piping offered	
Name of manufacturer	
Make and class of gate valves	
Make and class of reflex valves	
Make and class of Air Valves	

FLOW CONTROL EQUIPMENT	
Suitable stop switches for no flow conditions	
Ultrasonic water level sensor make and model	
Telemetry & alarm systems offered	

PARTICULAR SPECIFICATION: PD

PD

ELECTRICAL INSTALLATION

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1 GENERAL

1.1 SCOPE OF WORKS

The Scope of Works shall be the supply, installation and commissioning of the following electrical services:

- MCC with VFDs, PLC and associated control infrastructure
- Backup Generator
- LV cabling
- Control cabling
- Wireways and conduit
- Small power and lighting installation.
- Telemetry system
- Overhead line construction and transformer installation

1.2 SITE CONDITIONS

Motor manufacturers, switchboard manufacturers, electrical equipment manufacturers, are all warned that the MCC, motor and associated control equipment are to be installed in an extremely corrosive and often damp environment. The motor and allied equipment shall therefore be adequately protected.

2 STATUTORY REGULATIONS PERTAINING TO ELECTRICAL WORK

Except where otherwise specified or implied the contract work and equipment supplied shall comply with the latest revisions of the standard specifications listed, including generally:

- | | |
|---|---|
| <ul style="list-style-type: none">• SANS 10142-1:2012 (Edition 1.8)• SANS 10400-A:2010 (Edition 3) | <p>The wiring of Premises, Part 1: Low voltage installations</p> <p>The Application of the National Building Regulations, Part A: General principles and requirements</p> |
|---|---|

Where a SANS Standard does not exist or if not applicable, the relevant IEC or BS Standard shall be applicable.

The equipment supplied and work carried out shall fully meet and comply with the requirements of the Occupational Health and Safety Act (Act 85 of 1993) and the Construction Regulations 2003 issued in terms of Section 43 of the Act, Standards South Africa (a Division of the South African Bureau of Standards {SABS}) and all other statutory regulations and laws insofar as they may apply to an electrical installation of the type contemplated.

In the event of discrepancy between any of the specifications, regulations and codes of practice, the SANS 10142-1 Code of Practice for Wiring of Premises shall take precedence.

All references to "SABS" specifications shall be read as "SANS" in light of the recent changes by the South African Bureau of Standards.

Additionally, the following specifications, whether specifically mentioned within the tender document or not, shall also apply:

- | | |
|--|--|
| • SANS 156:2007 (Edition 3.3) & VC8036:06 Oct 2006 (Edition 3) | Moulded case circuit breakers
Compulsory specification for circuit breakers |
| • SANS 60269-1:2010 (Edition 3.1) requirements | Low-voltage fuses, Part 1: General |
| • SANS 60269-4:2012 (Edition 3.1) | Low-voltage fuses, Part 4: Supplementary requirements for fuse-link for the protection of semiconductor devices |
| • SANS 950:2014 (Edition 2.3) and fittings for | Unplasticised polyvinyl chloride rigid conduit use in electrical installations |
| • SANS 1507-1:2007 (Edition 1.1) | Electrical cables with extruded solid dielectric insulation for fixed installations (300/500V to 1900/3300V), Part 1: General |
| • SANS 1195:2010 (Edition 1.3) | Cover plate |
| • SANS 60439-1:2004 (Edition 3.1) | Low voltage switchgear and control gear assemblies, Part 1: Type-tested and partially type-tested assemblies |
| • SANS 60439-2:2006 (Edition 2.1) | Low voltage switchgear and control gear assemblies, Part 2: Particular requirements for busbar trunking systems (busways) |
| • SANS 1973-1:2007 (Edition 1) | Low voltage switchgear and control gear assemblies, Part 1: Type-tested assemblies with stated deviation and a short-circuit withstand strength above 10kA |
| • SANS 1973-3:2008 (Edition 1) | Low voltage switchgear and control gear assemblies, Part 1: Safety of assemblies with a rated protective short-circuits up to and including 10kA |
| • BS 4070 | Performance of A.C. control gear equipment |

rated up to 660 V for use on high prospective fault-current systems

- BS 587 Motor starters and controllers
- SANS 60947-1:2012 (Edition 5.1) Low voltage switchgear and control gear assemblies, Part 1: General rules
- SANS 60947-2:2014 (Edition 4.2) Low voltage switchgear and control gear assemblies, Part 2: Circuit-breakers
- SANS 60947-3:2012 (Edition 3.1) Low voltage switchgear and control gear assemblies, Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units
- SANS 60947-4-1:2013 (Edition 3.1) Low voltage switchgear and control gear assemblies, Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters

• SANS 60947-4-2:2012 (Edition 3)	Low voltage switchgear and control gear assemblies, Part 4-1: Contactors and motor-starters - AC semiconductor motor controllers and starters
• VC8011: 9 July 1999	Compulsory specification of Lamp holders
• SANS 475:2013 (Edition 1.2)	Luminaires for interior lighting, streetlighting and floodlighting - Performance requirements
• SANS 10114-1:2005 (Edition 3)	Interior lighting, Part 1: Artificial lighting of interiors
• SANS 10222-5-1-3:2007 (Edition 1.1)	Electrical security installations, Part 5-1-3: CCTV installations - CCTV surveillance systems for use in security applications - Installation, planning and implementation requirements.
• SANS 60793-1-1:2008 (Edition 3)	Optical fibres, Part 1-1: Measurement methods and test procedures - General and guidance
• SANS 60794-1-1:2001 (Edition 2)	Optical fibres cables, Part 1-1 General specification - General
• SANS 675:2011 (Edition 4.1)	
• SANS 1373:2008 (Edition 1.1)	Zinc-coated fencing wire
• SANS 10131:2004 (Edition 1)	Chain-link fencing and its wire accessories
• SANS 780:2009 (Edition 1)	Above-ground storage tanks for petroleum products
• SANS 1084-1/2: 2014	Transformer Testing Electric
• SANS 10131:2004	Motor Standards
• SANS 1200:2014	Fuel Tank Design and Construction Painting Requirements
• SANS 10198:2014	Cable Trenching

3 **DRAWINGS**

3.1 **LIST OF GENERAL SPECIFICATIONS STANDARD DRAWINGS**

3.2 **ENGINEER'S DRAWINGS**

The Engineer's drawings include the following:

2299/11/01	Power Layout
2299/12/01	Lighting Layout
2299/14/01	Sleeves & Data Layout
2299/20/01	MCC A Schematic Sheet 1
2299/20/02	MCC A Schematic Sheet 2

3.2.1 **Contractor's Drawings**

Workshop drawings of proposed Motor Control Centres, Field Control Stations, Local Distribution Boards, Generator as well as any other switchboards are required for approval by the Engineer prior to fabrication.

Record drawings (previously termed "as-builts") of the installation indicating cable routes, sleeve positions and circuit wiring details are required on completion. All these record drawings must be checked and signed by the sub-contractor before submission to the Engineer.

A full set of schematic drawings and wiring diagrams shall be handed over at the end of the Contract; including all switchboards, motor control centres, distribution boards, field control stations etc.

The Contract will be deemed incomplete until the Contractor has handed all these drawings over to the Engineer who shall provide his final acceptance in writing.

4 **PERMISSIBLE VOLTAGE DROP**

Unless otherwise stated, the permissible voltage drop within low voltage installations from the Point of Common Coupling (PCC) shall be calculated as follows:

"1v plus 2% of the voltage at the end of the circuit when the entire circuit is fully loaded".

The PCC on low voltage installations shall be the respective transformer low voltage terminals.

5 **CONTROL VOLTAGES**

Control Voltages within Switchboards shall be deemed to be 110 - 240 V AC / 24V DC (Or as detailed in Project specification). Control voltages for remote field equipment, for example Start/ Stop stations, shall be 230V AC. If an existing installation is to be expanded, the existing control voltage shall remain.

6 **SWITCHBOARD STANDARDS**

(2) **(MOTOR CONTROL CENTERS, DISTRIBUTION BOARDS, TRAYS, BOXES, ETC.)**

6.1 **GENERAL**

The manufacture of LV Switchgear and Control gear ASSEMBLIES also referred to as motor control centres (MCC's) and distribution boards (DB's) {both collectively referred to as in this specification as "ASSEMBLIES" or "switchboards"}, shall be "Type Tested" modular type distribution boards and shall strictly comply with the latest revisions of the following standards:

SANS 60439-1 'LV Switchgear and Control gear ASSEMBLIES Part One: Type- tested, Partially Type-tested ASSEMBLIES'.

SANS 60439-2 'LV Switchgear and Control gear Part Two: Busbar Trunking'

SANS 1973-1 'LV Switchgear and Control gear ASSEMBLIES Part 1: Type-tested, ASSEMBLIES with stated deviations and rated short-circuit withstand strength above 10kA.

SANS 1973-3 'LV Switchgear and Control gear Part 3: Safety of ASSEMBLIES with a rated prospective short-circuit current of up to and including 10kA.

For ASSEMBLIES equal to or greater than a 10kA rating, switchboard manufacturers shall be in possession of a minimum of the test reports required as defined in SANS 1973-1.

Only authorized holders of these test reports may design and construct the ASSEMBLIES.

Copies of relevant test reports shall be made available to the Engineer immediately upon request.

Should this information not be presented to the Engineer upon request, Engineer reserves the right to call for another manufacturer to supply equipment that complies with this requirement and no compensation in any form shall be granted to the non-compliant party.

Notwithstanding any requirements of SANS 1973-1, the manufacturer of the ASSEMBLY (including the busbar assembly and mounting), shall re-torque the busbars onsite once fully populated and connected-up, prior to switch-on, and shall issue a certificate to the Engineer detailing that the busbar arrangement is still to the same standards as at the time of initial construction and is safe for operation.

6.1.1 MCC Preferred Design Requirements

The following switchboard requirements shall be assumed as correct unless altered in the Project Specification:

Mounting: Access:	Floor standing
Sectioning:	Front
Manufacture:	Multi-section, Form 3b or Form 4 to SANS IEC 60439
Finish:	2.0 mm 3CR12 (see Fabrication below)
Cable Entry:	Painted Orange - B26 (SANS 1091:2012) external, Red internal (see Painting and Finishing below)
Base:	Incoming & Outgoing – Bottom and Top entry MCC gland plates shall be 3CR12 sheet steel, unpainted
Doors:	Single 100x50x6mm thick channel iron base with mitred corners and cross-bracing between every 2nd tier, hot-dipped galvanised. Lockable (see Doors and Covers below)
Protection:	IP44 (panels fixed); IP12 (panels removed)
Functional Units:	Removable but not fully withdrawable
Electrical Details:	400V, 50Hz, 3 Phase with full Neutral (see Busbars and Wiring below).
Earthing Details:	Full length, rear of switchboard (see Earthing below). All earthing bars to be tinned copper .
Electrical Ratings:	MCC Fault level to be to Transformer Secondary Output Symmetrical fault level, 3 second rating, applicable to Main and Distribution busbars.
Dimensions:	Height: 2100mm (max) Depth: 600mm Cubicle Size: 600mm (width) x 400mm (height) (MINIMUM) Cubicle/Door Panel Spacing: 40mm horizontal

Note that cubicle height may be 385mm provided that the width is greater than 600mm.

An 800mm wide cubicle may be divided into 2 x 400mm cubicles (minimum 600mm cubicle height).

(Cubicle sizes may vary but only subject to written approval by the Engineer)

Positioning and Clearances: Switchboards (free standing) are to be positioned within existing or proposed switch rooms such that the following

Clearances are maintained:

At rear of switchboard = 50mm

At each end of the switchboard = 600mm In

front of switchboard= 1500mm

On top of switchboard = 900mm (top entry panels)

The Engineer shall be the sole arbitrator in disputes relating to adherence to these and the general technical specification standards.

6.1.2 Hold Points During Manufacture

The following hold points require action and shall be adhered to prior and during the manufacturing process. Each step shall be completed in turn, requiring an inspection of the switchboard at the manufacturer's premises and requiring the written acceptance of the Engineer for each step, prior to acceptance:

- Distribution Board Design
- After manufacture of metal work, prior to painting
- After painting, prior to installation of equipment (switchgear etc.).
- Prior to delivery to site (at the sole discretion of the Engineer who may call for on-load testing in the manufacturer's workshop)

Should these points not be followed and the item in question proves to be incorrect, it shall be for the manufacturer/tenderer/contractor to undertake to repair the situation at his own cost.

6.1.3 Switchboard Preferred Tier Arrangement/Layouts

- Switchboards are to generally comply with the following, but these guidelines may be altered due to the specifics of the installation:
- For switchboards with a single incomer, this cubicle and tier shall be positioned on the entrance side of the switch room
- For switchboards with a single incomer and a generator incomer, these cubicles and tiers shall be positioned in the middle of the switchboard.
- For switchboards with two incoming mains feeders as well as optional and generator supplies, these cubicles and tiers shall be position in the middle of the switchboard.
- PLC and Instrumentation dedicated Tiers shall be positioned within the switchboard on the side furthest from the entrance.
- Bus-section switches shall be position in the middle of the switchboard adjacent to incomer tiers and cubicles.
- Redundant/duplicated equipment shall be positioned on either side of a bus-section where practical.

6.1.4 Grouping of Equipment

Each motor circuit shall be individually protected by a circuit breaker dedicated to the respective motor circuit. A single circuit breaker protecting multiple motor circuits will not be permitted.

Only one motor drive per cubicle is required. Where motors operate as a single group, these shall be controlled as a single motor.

A motor drive cubicle which houses multiple motor drives shall only be permitted, when all the motor drives in the group are dedicated to a single item of equipment and all the motors operate as a group. When a single motor, within any one group of motors which has been selected for automatic operation, trips or is isolated, all the motors within the group shall stop and shall be prevented from being restarted by electrical interlocking.

6.1.5 Door Interlocking on Switchboards

A circuit breaker shall provide the means of isolation to each motor drive cubicle, or a cubicle housing a group of motor drives which forms part of the MCC. The operating lever, of the circuit breaker mounted within the cubicle, shall be coupled to an operating handle fitted to the cubicle door and interlocked such that the door may not be opened with the circuit breaker in the "on" position. The operating handle shall be padlockable in the "off" position. Auxiliary contacts shall be provided, on the circuit breaker, to isolate the control circuit.

Refer to OHS Act (Act 85 of 1993), Section 14" Electrical Machinery Regulations," Clause 6(3) "Electrical Control Gear", which states:

"The user shall, whenever reasonably practicable, provide switchgear with an interlocking device so arranged that the door or cover of the switch cannot be opened unless the switch is in the "off" position and cannot be switched on unless the door or cover is locked".

6.1.6 Fabrication

All electrical motor control centres (MCC's), distribution boards (DB's), sub-distribution boards (SDB's), boxes, trays, covers or any other enclosure housing electrical apparatus supplied, shall be fabricated from AISI SX 3CR12 sheet steel only unless stated to the contrary. The tenderer/contractor/manufacture shall take cognisance that MCC's and DB's shall in their entirety be manufactured from 3CR12 sheet steel. This shall include all framework used to form the structure of the panel. Angle iron or tubular structures shall not be permissible.

Outer panels, doors, covers, rails, distribution board framework etc. shall be manufactured from 2mm thick 3CR12 sheet metal and 1.6mm thick 3CR12 sheet metal for internal partitions.

The sheet steel shall be suitably bent, braced and welded where necessary to form a rigid structure (this sheet metal shall be 3CR12 only). Holes, doors, covers, rails, framework, etc. shall be accurately formed to present a true to line and plumb structure when completed.

Where welding is necessary the inevitable excess material shall be ground down to the parent surfaces to present a blemish free surface for painting.

All screws employed in the manufacture of the electrical cubicles shall be in AISI 316 material with machine threads. No self-threading screws or self-setting rivets (pop rivets) will be permitted. Where the thickness of material for screw tapping is less than 5 x screw pitch, an externally knurled, threaded insert shall be installed to accept the machine screw. The insert shall be fitted with a hydraulically operated tool, and properly clinched, to ensure it will not rotate in the sheet steel, even when subjected to a torque of 200% of the torque required to shear the fitted screw. The inserts shall also be manufactured from AISI 316 stainless steel.

Alternative methods of providing suitable screw anchorages in sheet steel may be considered, such as captured or welded nuts, but the detailed alternatives shall be submitted for consideration at the time of tendering.

Each tier shall be divided into compartments to accommodate equipment for motor drives, instrumentation, and switch gear for main and sub-main feeder switches.

Each compartment of MCC's or larger DB's shall be totally separated from adjacent compartments with 1.6mm sheet steel (3CR12) barriers welded or bolted into position and where wiring is required to pass through these barriers, brass brushed holed shall be provided.

Panel tiers to be bolted together and not welded.

Accessible PVC wire ways shall be provided to afford routes for conductors between the various compartments of each switchboard/MCC. Internal wiring shall be kept separated from external wiring and as far as possible the internal serving of PVC SWA cables entering the switchboard/MCC shall be left around the conductors until the cable enters the compartment to which it is to be connected.

Low current and instrumentation/signal cables shall be kept separate from other cables right up to the point where the conductors are connected to the required terminals on the apparatus. Accordingly, where required, separate sheet steel (3CR12) wire ways shall be provided in each board to ensure this separation.

All instrumentation and signal cabling shall be routed via galvanised conduit within the MCC.

6.1.7

Busbars and Busbar Chambers

Totally enclosed busbar chambers shall be provided through out the length of the MCC or DB. The busbar chamber shall have front, back, top and end covers.

The front and back covers shall be secured with square hatch keys, with one catch per cover lockable by padlock. The top and end covers shall be bolted.

The busbar chambers shall be so positioned in the MCC or DB at the top that each and every connection is easily accessible and sufficient space is provided to easily operate a torque wrench on each and every bolt/nut.

Dielectric barriers shall be provided in the busbar chamber at 2 x tier module. The dielectric may not be split and offered into position as separate parts but shall instead be slotted to allow the busbars to pass through. The slotted holes shall be fitted with U-shaped rubber gasketing to ensure the busbar is snugly fitted to the dielectric. These dielectric barriers may not be employed to support the busbars. The dielectric shall be bolted to the sheet metal at the periphery of the busbar chamber.

The penetrations for circuit into or out of the busbar chamber shall also be provided with dielectric material at the point of penetration, as for the busbar chamber barriers.

Busbar supports shall comprise moulded epoxy insulators mounted on robust steel brackets arranged in stepped formation with the red-phase busbar at the top rear of the chamber and the neutral busbar at lower front position.

All busbars shall **be tinned over the full length** using only resin-based flux and fitted with phase colour co-ordinated identification markings.

Joints in busbars shall be avoided as far as possible, but where they are necessary the joint shall be formed by offsetting one of the bars, by an amount equal to its own thickness, to overlap the other. The length shall be equal to twice the width of the bar, and the joint shall be secured with a minimum of 4 Hexagon headed set screws nuts and washers (plain and spring).

All busbar joints shall be torque tightened before the switchboard (MCC or larger DB) is delivered, and torque checked (and tightened if necessary) just prior to commissioning.

Each joint or point of connection shall be properly tinned. Only resin based fluxes shall be employed during the tinning process.

The busbar riser sections, onto which cables terminate, shall be considered as part of busbar system as a whole and shall be equally subject to all the specifications detailed.

Busbars shall be capable of carrying the full rated current along their entire lengths. Reduced section busbars will not be permitted. Busbars shall be designed for a maximum temperature of 70°C (ie a 40°C temperature rise in an ambient of 30°C). Where a transformer feeds directly to the busbar (via a main circuit breaker), the copper busbar shall be designed for 125% of the transformer output (in kVA) and shall be rated to withstand an internal or external fault for 3 seconds without incurring any damage.

The neutral busbar in the MCC or any DB shall be equal in size to the busbars and shall be considered as part of the busbar system.

Busbars shall be manufactured from 99% electrolytic copper that has been hard drawn to the finished sizes. The copper shall be rectangular in cross section, shall be solid, and the cross section shall be maintained throughout the busbar system. Where the copper is delivered with rounded corners the copper shall be suitably de-rated for thermal emissivity. The copper shall be supported on SANS approved insulators at centres which are commensurate with the fault level to which the busbar system has been designed, but in no instance shall they be greater than 500mm apart. Where it becomes necessary to employ more than 1 copper bar per phase the copper bars shall be of equal cross section and shall be properly spaced by an equal thickness spacer between the copper bars. Only copper having a cross section of 100mm x 6mm, or greater, may be employed in parallel, per phase.

The spacers shall be bolted into position at points of attachment for lugged conductors or droppers. Where joints in the copper bar are inevitable they shall be made by offsetting one bar by the thickness of the copper such that the copper bars overlap one another, at the joint, by the width of the copper. Joints shall be properly fastened together with hexagon headed bolts, full size nuts, spring and flat washers. At least 2 and not more than 3 threads shall be visible beyond the nut once the final torque has been applied to each fastener. Where copper is punched or drilled the inevitable burr shall be removed and the copper shall be lightly chamfered at each hole.

The busbars shall be provided with holes at either end of the switchboard to allow for an extension to the copper bar at some future time, together with centrally located holes in the copper bars, between the insulating supports to allow for future loads to be added where required. At least two such sets of holes shall be provided, between consecutive supports along the busbar length. If more than one copper bar per phase is being employed then a copper spacer shall be provided between the copper bars and a bolt shall be provided to secure the spacer at each of the "spare hole" positions. All copper shall be tinned with S6 solder using resin based flux, after all the drilling, bending and cutting has been completed. The finished, tinned copper, shall be free of solder lumps and shall be as smooth as the copper under the solder.

6.1.8 Wiring, Cable Terminations and Glanding

All wiring within panels may be enclosed in PVC slotted ducting. The exception is signal and instrumentation cabling passing through power compartments or cubicles, which shall be in galvanised screwed conduit. Wiring outside of panels and switchboards shall be run within galvanised ducting or conduit.

Alternatively, signal and instrumentation wiring may be run in a channel at either the front or the rear of the busbar chamber, accessible from that respective side of the switchboard within the busbar chamber. The channel shall be manufactured of 3CR12 and shall be welded into position. The channel shall contain a cover that is screwed into position.

All wiring and terminations shall be labelled with identification tags corresponding to the wiring diagrams. Cable terminations shall be marked with an identification label externally to the switchboard indicating the source of supply as well as the equipment being fed for feeder cables. For example: "FED FROM MCC 1" and "SUPPLY TO SUMP PUMP".

All glands for cable shall be nickel-plated brass, and fitted with waterproof neoprene shrouds.

6.1.9 Earth Bars

The earth bar shall be mounted at the rear of the MCC or DB and shall be accessible along its length from all tiers (where applicable). The earth bar cross-section shall be as specified, or, where not specified, shall be installed as per the minimum specified in SANS 10142-1 or SANS IEC 60439. Notwithstanding these requirements, the earth bar shall be not less than 70mm x 8mm in cross-section.

A one-piece copper earthing bar shall be installed from one end of the board to the other and shall be provided with earthing studs (nuts, bolts and washers) in each tier

The copper bar shall be bolted to the framework of the board in at least 10 positions with 10mm bolts. The copper bar shall be mounted 100mm above the top edge of the channel iron base and approximately 100mm from the backplate. Holes shall be provided in the copper bar in each cubicle along the length, for the termination of the earthing conductors associated with the circuits deriving a supply from the respective cubicles. Spare studs amounting to 10% of the Contractors requirements, shall also be provided. Bunching of earthing conductors on a single stud will not be permitted.

6.1.10 MCC and DB Bases

The floor mounted MCC or DB, shall be mounted to a hot dipped galvanised channel iron base, located at the position indicated in the transformer room. The base shall be fabricated from 100 mm x 50 mm x 6 mm (10,57 kg/m) channel iron. The corners of the base shall be mitred and welded whilst cross bracing shall be provided on centres coincident with the cubicle modules along the length of the base.

Each cubicle shall be secured to the base with at least four 10 mm diameter bolts, washers and nuts whilst the base shall be anchored to the concrete with a bolt in each corner and two bolts at every even numbered cubicle module. (One at the front of the base and one at the rear). The anchor bolts shall be 12 mm diameter and shall be entered at least 80 mm into the concrete. The widths shall be uniform throughout their heights and the plan view of the switchboard shall be uniformly rectangular in shape.

6.1.11 Paint and Finishing

All metalwork in excess of 5 mm thick shall be sandblasted to a profile of 40-80 microns, prior to painting. This finish shall be carried out carefully to provide the necessary "key" for the paint coats.

Where the material is less than 5 mm thick, it shall be, lightly sanded, de-greased, washed and forced air dried prior to painting.

The paint coat shall be a high quality polyurethane based powder coat to the acceptance of the Engineer. The sprayed powder coat shall be baked in an oven at a temperature of approximately 200°C for a period of 10 min or as specified by the paint manufacturers.

The dry film coat shall be as uniform as possible but shall not be less than 40 microns nor more than 90 microns. The finish shall be high gloss with a minimum of surface defects.

Distribution boards, boxes, trays, covers, ducts, or any other enclosure housing electrical apparatus shall be coloured white internally, whilst externally the colour shall be Light Orange to SANS 1091 or to the approval of the Engineer.

Switchboards connected for dedicated emergency supplies shall be coloured red externally.

6.1.12 Glanding Sections and Cable Gland Plates

Gland plates shall be fitted in cubicles for termination of cables and shall be mounted 400mm above the final floor level. The cables shall be fitted with glands anchored to the respective gland plates. The glands shall be adequately spaced to permit the locknuts to be tightened with normal tools.

The gland plates shall be at least 2mm thick, 3CR12 sheet steel or aluminium and shall be bolted to robust brackets welded to the framework of the board.

At positions where single core cables are employed the cable gland shall be fabricated from non-ferrous material of adequate thickness to support the cables i.e. 15mm thick TUFNOL, 5mm 316 stainless steel or 8mm aluminium.

6.1.13 Doors and Covers

A door shall enclose the front of each compartment, unless stated otherwise in the project specification.

Enclosures for outdoor or moist environments shall be provided with a weatherlip angled at 45° to the face of the enclosure framework, together with a door enclosing the cubicle and enveloping the weatherlip. The top of the outdoor enclosure shall be fitted with a full width canopy projecting at least 100 mm from the enclosure face.

All doors shall be arranged to stand off from the face/rear of the board, cubicle, compartment or enclosure. Each door shall be properly stiffened and shall be twice returned at the periphery. The second return shall be gusseted in the corners to further brace the door.

Large doors (e.g. those fitted to the rear of individual switchboard/MCC tiers) shall be further stiffened with "top hat" section channels welded to the inside of the door.

Each door shall be mounted on pin type hinges and shall be secured by means of a lever operated tapered tongue catch or catches (Hinges and catches shall be Barker Nelson or equal to approval).

The lever shall be provided with an external stop to prevent rotation in excess of 360° and to provide a padlocking facility. (A hole in the stop and a hole in the lever).

A minimum of two square hatch keys catches are required per door or rear panel, installed in conjunction with the tapered tongue catch at the top and bottom edges of the door on the opposite side of the hinges. For rear panels, one or both of these square hatch key catches shall be padlockable by having an extended section that encloses the latching mechanism and will allow a standard lock to prevent operation of the catch while in place.

For covers over busbar chambers, four square hatch key catches are required, with a minimum of one catch required to be lockable.

Where doors are mounted adjacent to one another the spacing shall be arranged to permit each door to open through at least 150°, without fouling the adjacent door. A stop shall be provided which shall prevent the door from opening further to obviate damage to paintwork.

Doors fitted with flush mounted equipment shall be properly braced and stiffened to support the equipment. The hinges shall be easily able to support the mass added to the door when the flush fitted equipment is installed.

The space between the back of the door and the face of the coverplate shall be nominally 80mm.

Where coverplates are provided behind the doors, the coverplates shall be adequately recessed into the cubicle to permit the spindle on the lever to drive the tapered tongue catch into a slot in the framework of the board without fouling the coverplate.

Coverplates shall be fabricated as for the doors and shall be further stiffened to compensate for the machine punches circuit breaker slots. The coverplates shall be secured at the top edge with at least two square key driven catches, whilst at the lower edge they shall be located with two 6mm diameter tapered dowel pins located in holes drilled in the architrave. Each pin shall be fitted with a 1.2mm thick spacer washer. Both the pins and the washers shall be welded to the cover.

The end, rear and top coverplates shall be removable to permit access to the equipment. The coverplates shall be lockable in the closed positions.

6.1.14 Space Requirements

In arranging the chassis layouts a minimum clearance of 80mm between equipment and framework, side panels or internal divisions is required. This minimum space is required on the top, bottom and sides of equipment.

A minimum of 50 mm is required between equipment and wire trunkings. The spacing between equipment shall be sufficient to allow for the installation of conductors (taking in account the minimum permitted bending radii of conductors and cables).

A minimum of 80mm is required between power equipment (circuit breakers, contactors, etc.) and any auxiliary control devices.

6.1.15 General Mounting Requirements

No special tools shall be required to remove and re-install any equipment.

6.1.16 Switchboard Standard Colours

The following colours shall be utilised for electrical switchboards as SANS 1091:2012:

11kV to 400V Mains Supply	EXTERNAL	B26 (Light Orange
400V Mains Supply	INTERNAL	INTERNAL: A11 (Signal Red)
Emergency Supply	EXTERNAL	INTERNAL: A11 (Signal Red)
Uninterruptable Power supply	EXTERNAL	F01 (Royal Blue)

6.1.17 Switchboard Construction Drawings - Standard Requirements

All Construction Drawings for switchboards (MCCs, DBs, Field Control Stations and Instrumentation Panels etc.) shall contain the following information:

- Project Name and Contract Number
- Manufacturer/Supplier
- Consulting Engineer and contact person
- Client details
- Drawing Number and Revision
- Drawing to be Signed
- Source of Supply - MCC or transformer name etc.
- Switchboard General Description
- Fault level (kA and time rating)
- Form factor/Sectioning
- Busbar Details (cross-section, material type, tinned etc.)
- Busbar Support Details - type, manufacturer
- Earth bar details (cross-section, full-length, front or rear etc.)
- Switchboard Material type, grade, thickness etc.
- Gland Plate details - material type, thickness, mounting etc.
- Colour - internal and external
- Switchboard Dimensions
- Base Dimensions and bolting arrangements
- Front door details - hinge and padlock requirements
- Rear door details - hinge and padlock requirements
- End panel details - removable cover details
- Door details - Stiffeners and restrainers installed etc.
- Hinge Details
- Locking Details
- Handle Details
- Cable Entry Details
- All bolts, nuts, screws material type (i.e. 316 Stainless Steel)
- Equipment details - CB ratings, fault levels, type, manufacturer etc.
- Equipment Layout details - Cubicle name, function, equipment function etc.
- Indication Light colours
- Section to be provided through switchboard

6.1.18 Switchboard Schematic - Standard Requirements

All Schematic Drawings for switchboards (MCC's, DB's, Field Control Stations, Instrumentation Panels etc.) shall contain the following information:

- Project Name and Contract Number
- Manufacturer/Supplier
- Consulting Engineer and contact person
- Client details
- Drawing Number and Revision
- Revision details to be listed
- Drawing Page Number
- Drawing to be Signed
- Reference Grid required on each schematic page
- Source of Supply - MCC or transformer name etc.
- Fault level (kA and time rating)
- Voltages for all circuit to be clearly indicated
- All devices to have reference number i.e. relays

- Equipment ratings to be given i.e. motor ratings
- All indication lamps to be labeled including required lamp colour
- Legend to be provided
- Equipment Tag Numbers as per P&ID and Water Services Plant Numbering System to be provided

7 SWITCHGEAR AND CONTROL EQUIPMENT FOR SWITCHBOARDS

7.1 GENERAL

All equipment shall be of sizes, ratings and specification as detailed and as shown on the Single Line Diagrams. Where feeders or cables have to be revised because of equipment selection by the Principal Mechanical Contractor, these shall be done subsequent to the award of the Tender.

All equipment shall be approved by the Engineer in writing before acceptance for use on the project, and shall bear the SANS mark.

7.2 CIRCUIT BREAKERS

The circuit breakers shall comply with SANS 156 and VC 8036.

Cascading of circuit breakers is not permitted unless specified in the detailed Project Specification.

All equipment shall be of sizes, ratings, and specification as detailed in on the single line diagrams. All equipment shall be approved by the Employer in writing and shall bear the SANS mark.

Where cascading of circuit breakers is allowed, all equipment shall be coordinated and discrimination shall be taken into account.

Circuit breakers shall preferably be from the same supplier in one application.

Circuit breakers shall be equipped with an instantaneous magnetic release and a thermal release.

Circuit breakers for motor circuits shall be suitably rated.

Circuit breakers handles shall provide a clear indication of "ON", "OFF" and "TRIP" status.

Circuit breakers shall be installed vertically with the upstream terminal on top. Minimum clearances shall be maintained.

All circuit breakers shall be pad lockable in the "off" position or be supplied with means that will enable pad locking.

Circuit breakers shall be supplied and fitted with all supplementary equipment e.g. shrouds, mounting bolts, clips, adaptor plates etc.

7.3 MOULDED CASE CIRCUIT BREAKERS (MCB'S)

Moulded case circuit breakers shall be suitable for use in 1000V distribution systems at 50Hz. The circuit breakers shall comply with SANS 156:2007 and VC 8036.

MCCB's of the same frame size and the same fault level shall be from the same manufacturer.

Circuit breakers for feeders to lighting and small power sub-distribution boards and motors shall be equipped with an instantaneous magnetic release and a thermal release.

Discrimination shall be provided in the feeder circuit breaker arrangement. An adjustable release shall be provided where deemed necessary.

MCCB's employed for motor-starting circuits shall be rated in such a manner as to avoid 'nuisance tripping'.

Feeder breakers to motor control centres shall be equipped with a thermal release and a time and value adjustable release. These MCCB's shall be selective towards the upstream and downstream circuit breakers.

MCCB's of the same frame size, where in one application an instantaneous magnetic release is employed and in another application a time lagged release is used, shall have plug-in type trip units.

The operating handles of the MCCB's shall provide a positive "ON" "TRIP" "OFF" indication of the breaker status.

MCCB's shall be installed vertically. Horizontal mounting will not be accepted.

Minimum clearances and distances between the enclosure and the arc chutes shall be strictly observed.

8 MOTOR STARTING AND DRIVE SYSTEMS

8.1 GENERAL

Direct-on-line motor starter contactors shall be equipped with three pole thermal overload relays according to the rating of the motor. This shall be a combination unit with the door-interlocked circuit breaker.

The thermal overload relay shall be provided for single-phase protection, it shall be equipped with an electrical/electronic reset facility.

Drives to high gear ratio motor (such as the screen drive, screw conveyor and compactor) shall be equipped with an electronic shear-pin device. This protection relay will disregard the motor starting current, but trip the drive, should the current rise above a set threshold during running.

Should a phase failure or imbalance relay be incorporated in the design, this trip mechanism shall be manually reset along with the thermal overload relay.

8.2 DOL MOTOR STARTER COMPARTMENTS

Motor starter compartment shall include for a minimum of:-

- i. Circuit-breaker (back plate mounted and arranged vertically).
- ii. Mechanical operating handle for circuit-breaker, including door interlock, self aligning spindle and padlocking facility (door mounted).
- iii. Current transformer class 1,5 (backplate mounted).
- iv. Ammeter.
- v. Run Hour meter.
- vi. Contactors for DOL starting or contactors for alternative methods of starting (backplate mounted).

- vii. Thermal overload device operating on single phase / three phases (usually mounted on contactor).
- viii. Electrical/electronic reset push button for thermal overload (via door mounted pushbutton)
- ix. Selector switches MAN, OFF, AUTO (door mounted).
- x. Stop / emergency stop push buttons (door mounted).
- xi. Start push button (door mounted).
- xii. Relays for stop : start and other controls where required (back plate mounted).
- xiii. Pilot lights for:
 - + motor stopped but power available (red)
 - + motor running (green)
 - + motor tripped (amber)
- xiv. Din rail mounted terminals.
- xv. Lamp Test (black push button)
- xvi. Submersible motor application

8.3

8.4

VARIABLE FREQUENCY CONVERTORS

8.4.1

General

The "Varispeed or WEG" 55kW or equal to approval variable frequency converters (motor starter/controller) shall be capable of driving a motor to its full, rated, nameplate output, at frequencies as specified, for an indefinite period. Short time ratings may not be considered.

(a) Technical requirements for variable frequency converter

The variable frequency converter shall be designed to the following technical requirements:

Type:

Indication:

Operation:

Line frequency:

Power switching:

Efficiency:

Overload factor:

Load side Voltage:

The drive shall be of the de link pulse width modulated type and shall be fully digital, to the approval of the Engineer. The VFD shall include line chokes for filtering line harmonics to 2% or THD or less and shall be supplied by the same manufacturer of the VFD. Line chokes that are not from the same VFD manufacturer will not be accepted.

Speed control through frequency variation with minimal losses. The desired operating speed shall be a measure of the

frequency set point.

50 Hz $\pm$ 2,5 %

Power switching elements shall be Insulated Gate Bi-polar transistors. Shall exceed 96 %.

120 % for 50 s

(3) 400V

The following indication shall be provided and mounted on the VSD door or behind a suitable window in the door.

Ammeter (measuring motor current) Motor
 Speed (in r/min)
 Running Hour meter (motor running hours) Motor
 running indicator lamp (LED) (Green) Fault
 indicating lamp (LED) (Amber)
 Starter healthy indicating lamp (LED) (Red)

(b) Selection functions and facilities of variable frequency converter

The selection of functions and the setting of parameters shall be accomplished through the use of menu driven software and a control pad. The control pad shall be a membrane covered keypad with LED display unit and shall be mounted on the front door of the enclosure and cabled to the converter. The control pad shall be lockable and shall not be available to the operator for normal operations. The LED display shall, however, be visible.

The converter shall be capable of providing the following minimum control functions:

Skip frequencies:- Auto	A minimum of three programmable skip frequency ranges
restarts:-	A programmable number of restarts with a programmable delay.
Ramp functions:	Individually programmable start up and slow down ramp functions.
	Running hour meter:
	Communication interface:
	Analog control inputs: Local speed
	Digital control inputs
	Control outputs:
	Protection:
	Frequency:
	Range of Speed Adjustment:
	Start/Emergency stop:
	Auto, Off, Manual:
	Manual Speed Control:

The variable speed controller shall give the total running time for the connected motor.

RS 485 (capable of communicating over a 10 m length of cable)

Remote speed reference (0-10 V). Thermistor (motor) (0-10 V).

Low speed relay
Motor current (0-20 mA

and/or 0-10 V) Motor frequency (0-20 mA and/or 0-10 V)

Thermal
Current limit
Instantaneous over current trip
Individual drive protection Earth fault detection
Phase imbalance detection or loss of output phase or phases.

Adjustable in the range 2 000 Hz to 5 000 Hz.

0 - 70 Hz

Start/Emergency stop push buttons shall be mounted on the front door of the respective enclosure and wired accordingly.

An auto, off, manual switch shall be provided on the front door of the cubicle and wired accordingly.

A potentiometer shall be provided inside the enclosure.

The variable frequency converter shall incorporate simple controls for adjusting the ramp-up time and regulating the starting current.

The Contractor shall wire the following variable frequency converter status signals back to the Telemetry cubicle:

- i. Motor running and / or motor tripped,
- ii. Flow rate of pump,
- iii. Power failure conditions.

8.4.2 **Technical Requirements for variable frequency converter**

The variable frequency converter shall be designed to the following technical requirements:

Type:	The controller shall be of the de link pulse width modulated type and shall be fully digital, to the approval of the Engineer.
Operation:	Speed control through frequency variation with minimal losses. The desired operating speed shall be a measure of the frequency set point. Constant flux shall be supplied over the entire speed range. The inverter shall be the final controlling element for the converter voltage and frequency, in accordance with pre-set selections. The modulated output voltage shall ensure smooth running of the motor with minimal losses and noise down to the minimum speed.
Line frequency:	50 Hz± 2,5 %
Power switching:	Power switching elements shall be Insulated Gate Bi-polar transistors. Shall exceed 96 %.
Efficiency:	120 % for 50 s
Overload factor:	(4) 400V
Load side voltage:	
Indication:	The following indication shall be provided and mounted on the door or behind a suitable window in the door. Ammeter (measuring motor current) Motor Speed (in r/min) Running Hour meter (motor running hours) Motor running indicator lamp (LED) (Green) Fault indicating lamp (LED) (Amber) Starter healthy indicating lamp (LED) (Red)
Harmonic suppression	Chokes to be installed on the source side of the VFD to limit harmonic distortion caused by the VFD.

8.4.3 **Control Functions and Facilities**

The converter shall be capable of providing the following minimum control functions:

Skip frequencies:-	for the connected motor.
Auto restarts:- delay.	Communication interface: cable)
Ramp functions: functions.	Analog control inputs:
Running hour meter:	

A minimum of three programmable skip
frequency ranges. A programmable number
of restarts with a programmable

Individually programmable start up and
slow down ramp

The variable speed controller shall give the
total running time

RS 485 (capable of communicating over a
10 m length of

Local speed reference (0-10 V). Remote
speed reference (0-10 V). Thermistor
(motor) (0-10 V).

Digital control inputs: Local start/stop, remote start/stop, Auto;Off;Manual switch, Fault, Reset.	External trip,
Control outputs:	Fault relay Run relay Low speed relay Motor current (0-20 mA and/or 0-10 V) Motor frequency (0-20 mA and/or 0-10 V)
Protection:	Thermal Current limit Instantaneous over current trip Individual drive protection Earth fault detection Phase imbalance detection or loss of output phase or phases.
Switching Frequency:	Adjustable in the range 2 000 Hz to 5 000 Hz.
Range of Speed Adjustment:	0 - 70 Hz
Start/Stop:	Start/Stop push buttons shall be mounted on the front door of the respective enclosure and wired accordingly.
Auto, Off, Manual:	An auto, off, manual switch shall be provided on the front door of the cubicle and wired accordingly.
Manual Speed Control:	A potentiometer shall be provided inside the enclosure.

The variable frequency converter shall incorporate simple controls for adjusting the ramp-up time and regulating the starting current.

8.5 ACTUATED VALVE STARTER CUBICLES

The following equipment mounted behind the front door of the cubicle:-

- i. Moulded case circuit-breaker [for motor applications] (cradle mounted and arranged vertically behind the door at the second architrave level).
- ii. Mechanical operating handle for circuit-breaker, including door interlock, self aligning spindle and padlocking facility (door mounted).
- iii. Hour meter
- iv. Electronic reset push button for overload (door mounted).
- v. Selector switch **MAN**, OFF, AUTO (door mounted).
- vi. Door mounted pilot lights for:-
 - motor stopped but power available (red) motor
 - running (green)
 - motor tripped (amber).
- vii. Siemens Logo Controller (or equal to approval by the Engineer)
- viii. Din rail mounted terminals.
- ix. Lamp Test (black push button)

- x. Key Switch, back plane mounted, to enable/disable actuated valve controls (i.e. actuated valve controls must be in the "enable" position in order to control the actuated valve from the cubicle door)

WIRING, CABLE TERMINATIONS AND GLANDING

All wiring within panels may be enclosed in PVC slotted ducting. The exception is signal and instrumentation cabling passing through power compartments or cubicles, which shall be in galvanised screwed conduit. Wiring outside of panels and switchboards shall be run within galvanised ducting or conduit.

All wiring and terminations shall be labelled with identification tags corresponding to the wiring diagrams. Cable terminations shall be marked with an identification label externally to the switchboard indicating the source of supply as well as the equipment being fed for feeder cables or example: "FED FROM MCC 1" and "SUPPLY TO SUMP PUMP".

STANDARD COLOURS- INDICATION LAMPS AND BUTTONS

The suitability of colours employed is generally based on IEC 60073 (No SANS version/ To be updated with latest Standard).

Due to colour schemes on existing plant and user/operator familiarity, the application of certain colours differs from IEC 60073 (To be updated with latest standard). For clarification, the lamp colours are a reflection of the status of the particular control system (front of panel towards equipment to be controlled).

The following colours shall in general be employed on switchboards for indication lamps, push buttons and selector switches:

COLOUR	Condition/ Meaning/ Application
RED	System stopped/not running or CLOSED
AMBER/YELLOW/ORANGE	Any warning/trip/abnormal condition
GREEN	System running/healthy/normal/ SAFE Condition or OPEN
BLUE	Step/Process change condition
WHITE	Mode indication or other indication (where doubt exists about applicability of Red, Yellow or Green)

Specifically, the application of colours shall be as follows:

INDICATION LAMP COLOURS			Examples/Specifics
Local/Auto/SCADA Mode	Indication Lamp	WHITE	
Bus Bar Alive	Indication Lamp	WHITE	
Capacitor Bank Discharged	Indication Lamp	GREEN	Power Factor Equipment
Closed	Indication Lamp	RED	Valves, penstocks
Differential Pressure - HIGH	Indication Lamp	AMBER	
Differential Pressure - NORMAL	Indication Lamp	GREEN	
Earth Fault	Indication Lamp	AMBER	MV Equipment
Emergency Stop	Indication Lamp	AMBER	
Mechanical Seal Failure Warning	Indication Lamp	AMBER	Sub/ Immersible Pumps
Moisture in Coolant	Indication Lamp	AMBER	Sub/ Immersible Pumps
Moisture/Water Ingress	Indication Lamp	AMBER	
Motor Winding Over Temperature	Indication Lamp	AMBER	May be flashing AMBER

Open	Indication Lamp	GREEN	Valves
Overload	Indication Lamp	AMBER	
PFC Fault	Indication Lamp	AMBER	Power Factor Equipment
Running	Indication Lamp	GREEN	
Starter Alive (Circuit Healthy)	Indication Lamp	GREEN	
Stepped Function	Indication Lamp	BLUE	Power Factor Equipment
Stopped & Power Available	Indication Lamp	RED	
Tripped	Indication Lamp	AMBER	

PUSH BUTTON/SELECTOR SWITCH COLOURS			Examples/Specifics
Emergency Stop	Push Button	RED	With yellow backing
Lamp Test	Push Button	BLACK	
Reset	Push Button	BLUE	
Start	Push Button	GREEN	
Stop	Push Button	RED	
Up/Down/Left/Right/Forward/Reverse	Push Button	BLACK on WHITE	
Selector Switches/Knobs		BLACK	with Black back plates with white lettering

Note: AMBER=YELLOW=ORANGE

For All new equipment installed shall match the existing plant equipment (lamp/pushbutton etc.) All indication lamps to be accompanied with engraved backing plates.

The Engineer shall provide the final confirmation/approval of ALL colours to be employed on existing or new plant.

11 **SWITCHBOARD ACCESSORIES**

11.1 **GENERAL**

Refer to the switchboard equipment schedule in the Project Specification as well as the proposed Motor Control Centre layout drawing in the Project Specification for additional details. All manufacturers/ suppliers of switchboard accessories shall ensure that the equipment is SANS certified. All systems providing starting and control shall provide full protection from the effects of internal and external faults.

11.2 **INSTRUMENTATION IN GENERAL**

Instruments shall generally be designed for an accuracy of 1% (Class 1) of the full-scale reading. (Assume the frequency remains constant at 50 Hz). Instrument faces shall be either 96mm x 96mm on large panels or 76mm x 76mm on smaller panels. The faceplates shall be painted white with black paint for the lettering and scale divisions. A thumbnail operated adjuster shall be provided to zero the pointer at any given time. A clear glass window that is positively located by the framework of the instrument shall enclose the pointer and faceplate. The glass shall be mounted on a gasket that will seal the space between the faceplate and the inside surface of the glass against the ingress of moisture and dust. Terminals shall comprise nuts on a moulded in stud at the rear of the instrument. The terminals shall be fitted with two washers and a colour coded rubber shroud. The shroud shall allow the wire, fitted with a lug, to approach the stud at 90° and shall be moulded accordingly.

Instruments shall be provided with a scale not less than 20% above the normal operating value of the

function being measured, then rounded up to the nearest standard scale provided by the manufacturers.

11.3

VOLTMETERS

Volt meters shall be of two sizes 96mm x 96mm on the large panels and 72mm x 72mm on the smaller panels. The meters shall be of the moving iron type and the movements shall be mounted on shockproof suspensions. The accuracy shall meet class 1.5 i.e. 1,5% of full scale value at each reading.

The main incoming section of the Switchboards (Motor Control Centres in particular) shall have a Voltmeter of 96 mm x 96 mm size, equipped with coloured surrounds representing each phase, i.e. Red, White and Blue and equipped with a phase selector switch. The switch shall permit the indication of all phase to phase and phase to neutral voltages on the voltmeter. The phases shall be noted as "R", "W" and "B".

Where a voltmeter is connected to the main busbar and a selector switch is provided for the operator to monitor the voltage between any two phases or between any phase and neutral, then two sets of HRC fuses shall be provided. One set mounted on the respective phase bars and the second set mounted adjacent to the voltmeter on the back of the door. The fuses mounted on the cover plate shall each be provided with an element that affords protection for the conductors run between the two sets of fuses. The second set of fuses shall be fitted with elements that afford protection for the selector switch and instrument, besides being a convenient (and safer) point of disconnection for the maintenance staff. The minimum wire size for a voltmeter circuit shall be 2,5mm².

11.4

AMMETERS

Digital Indicators

Indicators shall conform to the following:-

- Digital with relay outputs
- Microprocessor based
- LED display
- Measurements 96mm x 48mm
- Unit must be pluggable
- Inputs:
 - -ACV
 - -DCV
 - Pt100

Process signals

At least 2 relays
Isolated retransmit
Current limiting for power and retransmit signals
Programmable from front

Panel Basic specifications:-

Power Supply	115V 50/60Hz 230V 50/60Hz 24V 50/60Hz 24VDC Isolated
Power consumption	3~6VA
Display reading	User programmable from

	-999 to +999
Input	Thermocouple J,K,N,R,S,T, Pt100 0/4~20mA, 0/1~5V 0/2~10V, 0~1mA AC Volts true RMS AC Amps true RMS
Accuracy	±0,25% of span ± 1 digit
Repeatability	±0,2% of span ± 1 digit
Operating temperature	-5 to +65°C
Operating Humidity	0 to 95% RH Non-Condensing
Relays-SPOT	AC 5A 250V 1250VA DC 5A 30VDC

Ammeters shall be of two sizes 96mm x 96mm on the large panels and 72mm x 72mm on the smaller panels. The meters shall be of the moving iron type and the movements shall be mounted on shockproof suspensions. The accuracy shall meet class 1.5 i.e. 1,5% of full scale value at each reading.

The main incoming section of the Switchboards (Motor Control Centres in particular) shall be equipped with instantaneous and maximum demand ammeters of 96 mm x 96 mm size, equipped with coloured surrounds representing each phase, i.e. Red, White and Blue.

Each individual starter/drive cubicle shall be equipped with a 76 mm x 76 mm logarithmic scale instantaneous ammeter, with a label above the ammeter indicating the full load current for the respective drive.

Ammeters for ac applications shall be of the type suited to motor drives and shall provide a substantive over-range to allow for the motor starting current. The faceplate shall be marked, with a red line, at the point on the scale where the absorbed motor current occurs. Ammeters shall be arranged in circuit for direct reading or indirect reading (CT operated), as required.

Direct reading devices shall be employed up to a maximum of 40 A. Where multiple CT's are installed to permit a single instrument to indicate the load on each phase, in sequence, a rotary selector switch shall be provided which will permit the operator to select the phase he wishes to monitor. The CT's shall be connected in a star configuration and the star point shall be directly connected to the main earthing bar in the MCC. The minimum wire size for a CT and Ammeter circuit shall be 2,5mm².

11.5 **RUN-HOUR METER (RHM)**

Run-hour meters in general shall be 72mm x 72mm in size and shall be installed for all motor starting and controlling applications. Run-hour meters shall be mounted on access doors with the face of the meter visible from the front of the board.

Run-hour meters shall be suitable for 230V 50Hz applications and arranged to operate directly from the control voltage but shall be controlled by the motor starter. The dial shall be cyclic and shall count to 99999,9 before returning to 0. A reset facility is not required.

Run-Hour meters shall however be the same physical size as the Ammeter on the same panel. Enlarged bezels that make the run-hour meter appear the same size as the Ammeter, will not be accepted.

11.6 **TIME SWITCHES**

The time switches shall be of the 24 hour type, operating on a 230 V 50 Hz supply with an electrically wound 9 hour spring reserve. The time switches shall be mounted behind the hinged access doors. Each time switch shall be fitted with fifteen "on" stops and fifteen "off" stops thereby providing 30 selective operations per 24 hours.

11.7 **TIMERS**

The timers shall be of the electronic plug-in type operating on a 230 V 50 Hz supply. The timers shall be adjustable by turning a knob. They shall be mounted facing the front of the board but behind the access door.

11.8 **FUSES**

The fuses shall comply with SANS 60269-1 and SANS60269-4 and shall be adequately rated for the circuit currents. All fuses shall be positioned so as to be accessible.

11.9 **FUSE HOLDERS**

All fuse holders shall comply with the latest SANS Standards and shall be adequately rated to cater for the load currents.

11.10 **SELECTOR SWITCHES**

Selector switches shall be of the rotary pattern and shall be mounted on the cubicle doors or on the door to the panel above the circuit breaker. All selector switches shall have a minimum rating of 15 A.

These shall preferably be of the same manufacturer as the push buttons and indicators lamps.

Selector switches shall allow contacts arranged in wafer housings that permit stacking along, and positioning about, the centrally mounted spindle driven by the operating knob. The escutcheon plate mounted on the door of the motor drive, or other, cubicle shall be secured with screws secreted from view by the 'snap on' plastic cover which shall be engraved in accordance with the circuit requirements (ie ON - OFF . REMOTE - OFF - LOCAL . MANUAL - OFF - AUTOMATIC) etc. The spindle shall be splined to allow the contacts within the wafer housings to be 'timed' for early or late, make and brake contacts, as required.

11.11 **RELAYS**

The relays shall be general purpose plug-in relays with octal or 11 pin bases. Soldered connections to bases will not be accepted. Each relay shall be tightly sealed with a clear plastic cover. All relays shall operate on a 230 V 50 Hz supply.

11.12 **OVERLOAD RELAYS**

The overload relays shall be of the thermal type with an element in each phase and shall conform to the characteristic curve held by the manufacturer with a tolerance of+ 10% of the values as specified in the SANS/IEC 60947-4-1.

11.13 **CONTACTORS**

The contactors shall be operated electro-magnetically. The control voltage shall be 230 V, except for the de emergency lighting contactor, which shall be 110 V de. Contacts shall be capable of carrying 125% of the full load circuit current continuously. The contactors shall be suitable for "Intermittent Duty" 15 operations per hour.

CONTROL PUSHBUTTONS

In conjunction with the Clause entitled "STANDARD COLOURS- INDICATION LAMPS AND BUTTONS", the Control Pushbuttons shall be of the round, flush, spring-loaded type, 22,5 mm in diameter, coloured in accordance with the duty as follows:-

START	=	Green
STOP	=	Red
LAMP TEST	=	Black
RESET	=	Blue

For field mounting of Control Pushbuttons, these shall be mounted and positioned as indicated on drawing No.EAM-EE-GS-008 depicting a general arrangement of a Field Control station.

INDICATING LAMPS

Indicating lamps shall comprise a cluster of four light emitting diodes arranged in a common housing. Each lens shall be coloured as required for stop, start, alarm, trip, etc. shall be at least 20 mm diameter and shall be clearly visible through an angle of 180° in a brightly lit room (500 - 600 Lux) and the contrast between an energized condition and a de-energized conditions shall be clearly visible from all sides as well as in front.

The indicators shall be suitable for use on either 230V AC/ 24V DC supply as per project specification. If the LED is not able to operate direct from the control voltage called for then a separate controller shall be provided with each LED to ensure that all LED's are fully interchangeable with those adjacent or on a separate panel some distance away.

The housing shall be fitted through a hole in the door of the cubicle and shall be secured with a separate screwed ring or a bayonet plate that is tightened into position with grub screws. The housing body shall be provided with a key to locate in a groove in the door cut-out to prevent the housing from rotating.

In conjunction with the Clause entitled "STANDARD COLOURS - INDICATION LAMPS AND BUTTONS", the lens shall be coloured in accordance with the duty as follows:-

Red	=	System stopped and power available. System
Green	=	running.
Amber	=	System tripped.
Amber	=	Water ingress detected (Submersible/ Immersible machines). Busbar
White	=	alive.

11.16 **STOP PUSHBUTTONS**

Stop push buttons shall comprise two main components namely a front mounted operator and a rear mounted contact block. The front mounted operator shall be fitted with a cylindrical housing, which is attached and keyed to the mounting panel. The cylindrical component shall house a spring returned, flush mounted button. The rear mounted contact block shall be arranged with a bayonet feature that attaches to the front mounted component and is secured with grub screws or a locking ring. The push button shall actuate a silver alloy bar contact rated at not less than 15A. Conductors shall be fitted with a crimping ferrule to be secured by a screw adjusted clamping terminal mounted in the contact block. The complete assembly when mounted and connected shall provide protection against the ingress of dust or vapours to IP66. Once access is gained to the rear of the device the Technician shall still be protected from accidental contact to IP4x. The unit shall be maintenance free and shall provide at least 1 million operations before failure. The front mounted operator shall be coloured RED and shall be engraved with the word STOP. The contact block shall be provided with locators and screw anchors or clips, to accommodate an additional contact block mounted "piggy back" on the first contact block.

11.17 **START PUSHBUTTONS**

Start push buttons shall be arranged as for stop push buttons with the exceptions that the contacts in the contact block shall be normally open and the front mounted operator shall be coloured GREEN and engraved with the word START.

11.18 **RESET PUSHBUTTONS**

Where required, reset push buttons shall be spring loaded mechanical devices, mounted immediately in front of the electrical overload. The outer appearance of the housing for the reset push button shall be similar to the start or stop push buttons on the same panel. The rod attached to the push button shall be adjustable to suit the depth of the drive cubicle, as required. The push button housing shall be of sufficient depth to provide proper support for the extension rod. The front mounted operator shall be coloured BLACK and engraved with the word RESET. To achieve a pleasing layout of equipment on the door to the motor drive cubicle it may be necessary to adjust the position of the overload device within the cubicle.

11.19 **EMERGENCY STOP PUSHBUTTONS**

Emergency stop push buttons shall be arranged in similar fashion to the stop buttons. The operating pushbutton however shall be at least 50mm in diameter and shall be knurled at the periphery. The mushroom head shall be mechanically latched when it is pressed, to prevent the contacts, within the contact block, from re-closing. To release the mechanical latch, and thus close the contacts, the operator shall be required to rotate the push button head through at least 60°.

11.20 **NAME PLATES AND LABELS**

Each component of electrical apparatus installed under this Contract shall be properly and unambiguously labelled. Components on/in a distribution board shall be individually labelled, the compartments in which these components are mounted shall be labelled as an entity. The labels on the outside of each compartment shall be operator orientated, whilst the labels inside the various compartments shall be technician orientated and shall be worded/numbered as per the wiring diagram for the respective cubicle/compartment.

All labels shall be secured to the outside and inside of distribution boards with machine screws. Self-threading screws or glue will not be permitted. The exception is equipment labels within the switchboard, which may be glued only. All screw fixed labels shall be jig drilled to provide interchange ability between compartments.

All notices and labels for warning purposes or indicating dangerous conditions shall be in English, Afrikaans and IsiXhosa. General operating and identification notices and labels shall be in English only. Labels shall have black letters on a white background for standard labels or white letters on a red background for caution, warning or danger labels.

Each label shall comprise a high quality plastic tri-laminate and the wording shall be engraved through the outer layer to expose the colour of the centre layer. All engraving shall have sharp, clearly defined edges.

Labels and character sizes shall be commensurate with the size of article being labelled, with the proviso that where a range of label sizes would thus occur on a panel, the labels/character sizes shall be of a uniform average size.

11.21 **LABELING OF DISTRIBUTION BOARD**

The source of supply need to be indicated for Circuitbreakers.

Circuit breakers shall be numbered with suitable engraved two layer "Trefolite", black lettering on white. The labels shall slide into an aluminium bracket as per attached drawing. Each circuit breaker shall have a unique number and the number shall not be repeated on the same board. However the numbering on each board shall start at 1. Multi-phase breakers shall have a number for each pole.

Boards shall be numbered in "levels" e.g. the boards supplied by the transformer, mini substation or municipal kiosk shall be numbered MAIN DB1, MAIN DB2, etc. The sub boards supplied by these boards shall be numbered SUB DB1.1, SUB DB1.2, SUB DB2.1, etc.

The numbers shall be repeated on a legend card that is displayed on the inside of the board. The card shall indicate the following:

- Circuit breaker number
- Type of circuit e.g. power points, lights, etc.
- Rooms numbers supplied
- Number of lights, power points, etc. in brackets

The proposed numbering shall be submitted to the Employer for approval prior to manufacturing of the labels. Labels that are manufactured incorrectly shall be for the contractor account.

11.22 **SUB-DISTRIBUTION BOARDS**

A separate earth continuity conductor shall be supplied between the earth busbar in each sub-distribution board and the earth busbar in the Main Switchboard. The earth continuity conductor shall consist of insulated stranded copper conductor installed along the same routes as the supply cables or in the same conduit as the supply conductors.

12 **EARTHING AND LIGHTNING PROTECTION**

12.1 **EARTHING**

The earthing installation shall comply with the requirements of the latest revision of the Wiring Code of Practice (SANS 10142-1) as well as the requirements of the Local Supply Authority.

Earthing shall be undertaken as detailed on in the Project Specification.

The Neutral shall not be bonded to the Earth in the Motor Control Centre, but at the source of supply, namely the transformer.

All metallic cable support systems, handrails, ladders and access platforms shall be connected to the earthing system.

The resistance measured between the consumers earth terminal and any exposed conductive part of the installation or any other conductive part that needs to be bonded to the earth continuity conductor shall not be more than 0,2 ohms.

12.2 **LIGHTNING PROTECTION**

Lightning protection for this installation shall be limited to surge arrestors on the main board and suitable voltage protection on the instrumentation cables and equipment.

The surge arrestors shall be of an approval manufacture and shall bear the SANS mark of approval.

13 **CABLE TRAYS**

13.1 **GENERAL**

All proposed cable tray installations shall be neatly sketched and submitted to the Engineer for approval before any cable tray work is commenced. The sketch shall include principal dimensions and show the proposed cable tray routes.

Cable trays shall be wide enough to accommodate the cables required in terms of this contract plus 15% spare capacity for future additions.

13.2 **MATERIAL AND MANUFACTURE**

Cable tray shall be of the heavy-duty type manufactured from 2,0mm thick sheet steel and hot dipped galvanised after manufacture, designed for internal and external use.

Cable trays shall be plumb and true to line and shall be arranged either vertically or horizontally. Trays fixed to brickwork or concrete shall be mounted on 90° Z section spacer brackets, manufactured from 3 mm thick material, to space the back of the tray 30 mm from the structure. The brackets shall be full tray width and shall be provided along the cable tray route at approximately 500mm centres. Brackets shall be provided where cable trays terminate.

Each bracket shall be fixed to the wall with two 8mm anchor bolts entered at least 70mm into the wall whilst the tray shall be secured to each bracket with two 6mm galvanised steel set screws with nuts and washers.

A sample of the spacer brackets shall be submitted to the Engineer for approval, before proceeding with the manufacture of the remaining brackets.

Joints in the tray shall be kept to a minimum and shall only occur coincident with a spacer bracket position or cross brace position.

Bends and tees in the cable tray shall be factory made by the same manufacturer as the cable tray. Joints in the cable tray shall be kept to a minimum and shall be arranged to occur coincident with a support bracket.

Nylon washers may be employed to prevent galvanic reaction between galvanised steel and 3CR12

or 316 steel (for specialised installation), but careful consideration shall be given to ensure earthing continuity of all metallic items employed.

Should the environment be considered corrosive (for example Wastewater Treatment Plants or near the coast) the Engineer may call for all brackets, straps, cable tray, bolts, nuts, washers, etc. employed for the cable tray system to be manufactured from AISI 316 stainless steel.

13.3 CABLE POSITIONING AND FASTENING

All cables shall be neatly fastened to the tray with PVC cable straps at 300mm centres.

Where cable trays are run Vertically, Power Cables shall be installed at the bottom of the cable tray and instrumentation and signal cables at the top.

Where cable trays are run horizontally, Power Cables shall be installed closest to the supporting surface i.e. wall, and instrumentation cable to the front.

All cables shall be run and cleated in accordance with the wiring regulations and shall be run in the ground or on cable trays secured to concrete, brick or steel structures.

14 BUILDING SERVICES INSTALLATION

14.1 GENERAL

All equipment supplied shall be suitably rated to the identified fault level in the Project Specification.

All electrical components supplied and installed, shall bare labels indicating its supply source. These labels will be secured to the outside and or inside of each electrical component with machine screws. Self-threading screws or glue will not be permitted. All screw fixed labels shall be jig drilled to provide interchangeability between compartments.

14.2 LIGHTING FITTINGS

The preferred lighting fittings for use in installations are as follows:

A	341mm x 195mm diameter surface mounted bulkhead lighting fitting with silver die-cast aluminum alloy body and diffuser, stainless steel securing screws, clear prismatic diffuser, ballast and holder to accommodate one 13 W LED lamp to
B	1200 mm x 172 mm, 40W integrated LED, totally enclosed, corrosion, dust and vapour- proof surface mounting fluorescent lighting fitting with one piece injection moulded, clear UV stabilised, polycarbonate diffuser with anti-tamper clips.
C	125 mm x 60 mm x 85 mm, 20 W LED, totally enclosed, corrosion, dust and vapour-proof surface mounting die-cast aluminum alloy body flood light with, clear UV stabilized glass cover. Fitting to be equipped with motion and day/night sensor.

(5)

14.3 LIGHTING SWITCHES

The preferred switches for use in installation are as follows:

Type	Description
A	16 A - One lever one way rocker type flush mounted switch, with 100% polycarbonate construction, modular design, removable clip on surround which covers the fixing screws and plates complete with standard fixing screws. To Lumex Series 2000 Code S2031/1/2AWE, or equivalent. Colour Black.
B	16 A- One lever two way rocker type flush mounted switch, with 100% polycarbonate construction, modular design, removable clip on surround which covers the fixing screws and plates complete with standard fixing screws. To Lumex Series 2000 Code ST2031/2/3AWE-ST2031IWE, or equivalent. Colour Black.

14.3.1 Lighting Switches General

14.3.2 Non-Uniform Wall Finishes

Switches located on walls near change of wall finish, e.g. on tiled, face brick, or wood panelled dadoes, must be arranged so that the cover plates fall completely within one or other of the surfaces and not on the junction line of the different finishes. The Contractor must collaborate with the Principal Contractor and other trades to ensure that switches on such surfaces present a neat appearance.

14.3.3 Lighting Switches in Demountable Partitions or Mullions

Where these are specified they must be of the special narrow type, nominally 25mm wide and mounted flush in vertical hollow mullions or similar hollow metal clad partition members. The opening in the mullions and the holes for reception of the switch-cradle and its fixing screws must be provided by the Contractor. The Contractor must provide the fixing screws, which may be self-tapping and provide and fit an overlapping cover plate, finish as specified, to match the special narrow switch.

14.3.4 Lighting Wiring to Switches in Hollow Mullions and Demountable Partitions

The wiring to these switches may be run within the hollow mullion or other hollow metal structural members of the partitioning, but must be run in conduit from the lighting outlet, terminating with a bush at the point where wiring enters the hollow mullion. Where the wiring for lighting circuits is run in a ceiling channel which is situated directly over the hollow mullion or other wire carrying member, then the wiring to switches may be taken directly into the latter without the use of conduit or lead in tubes. Under no circumstances must the wire pass over sharp edges and suitable provision must be made to shield the wiring accordingly.

14.3.5 Lighting Wiring of Lighting Circuits

Lighting circuits shall be wired with not less than 1.5mm² conductors. Lighting circuits shall be adequately rated to accommodate inrush currents.

14.3.6 Lighting Photo Cells

Photo Cells shall be mounted external to a building and at least at the same height of the luminaires it controls. Care shall be taken that the light spill from the controlled luminaires or any other luminaire does not affect the photo cell adversely. Fitting of light reflecting covers will not be permitted.

A rotary type switch mounted within the distribution board, shall be wired in the control circuit, to bypass the photo electric light sensing cell for testing purposes. A single pole circuit breaker shall be provided for the control circuit and connected to the load side of the triple control circuit breaker protecting the contactor.

14.3.7 Lighting Dimmers

Dimmers shall be as rated and selected to suit the application.

14.3.8 Lighting Low Voltage Transformers

Low voltage transformers shall be WACO Code: V1P/TRAY-ET60, Voltage: 240V / 50Hz, Rated current (Primary): 0.26A, Secondary voltage (V): 11.65V Max 5.3A AC, Rated load (W): 20W - 50W, Short circuit protection -Auto reset on start, Thermal protection - Single shot, Surge protection: 1 KVP, Input terminal: 2.5mm, Output terminal: 2.5mm, Dimmable - To be used with a trailing edge dimmer only, Length: 125mm, Width: 35mm, Height: 30mm, Class: 11, IP: 20 or similar and approved.

14.3.9 Lighting Isolators

Flush mounted isolators shall be installed for all domestic applications i.e. stoves, hot water cylinders, boiling water installations, etc.

Industrial pad lockable isolators shall be installed for air conditioning units, gate motors, extractor fans, etc. Isolators shall be IP65 rated.

14.4 SWITCHED SOCKET OUTLETS

The preferred power outlets for use in installation are as follows: Type

Description

A	16 Ampere, double, switched socket outlet, on yoke, to fit 100 mm x 100 mm wall box, with cover plate. To Lumex Series 2000 Code ST2025WE, or equivalent and approved. Colour Black.
B	3 phase neutral and earth, switched socket outlet, 32 A. To Clipsal Code 76252-6 complete with plug, or equal to approval, or equivalent and approved. Colour Black.

14.4.1 Switched Socket Outlets General

All power socket outlets shall conform to the types set out in the Project Specification Annexures or Single Line Diagrams.

All power socket outlets shall be at a height of 500mm above finished floor level, or as otherwise specified in Project Specification or on Drawings.

Where the socket outlet position would interfere with dado lines or other finishes the final position shall be decided on site by the Engineer.

14.4.2 Surface Mounted Switched Socket Outlets

Where conduit or cable is surface run or where specified, switched sockets of the surface mounted metal clad type must be used.

14.4.3 Waterproof Switched Socket Outlets

Switched socket outlets installed in positions or situations exposed to the atmosphere or damp surroundings or where specified, supplied shall have an IP65 rating.

14.4.4 Industrial Switched Socket Outlets

Industrial switched socket outlets shall be five pin type as specified, with mechanical interlock and pad lock facility. Sockets shall be rated IP65.

14.4.5 Mounting Heights

Where no other mounting heights are indicated in the Scope of Works, switched socket outlets will be mounted at the following heights from finished floor level to the bottom of box:

Flush switched sockets, Offices	- 500mm
Workshops, Garages, Kitchens	- 1300mm

14.5 SWITCHED SOCKET OUTLETS CIRCUITS

14.5.1 Single phase socket outlet circuits

Circuits to single phase power socket outlets shall comprise two conductors not less than 4,05mm² in cross sectional area drawn into 20mm or 25mm diameter conduit run between the switchboard and the socket outlet.

Circuits shall be arranged as detailed in the Project Specification.

14.5.2 Three Phase Socket Outlet Circuits

Three phase socket outlet circuits, rated up to 32 A, shall comprise 4 conductors not less than 6mm² in cross sectional area drawn into a 32mm diameter conduit run between the distribution board and the respective socket outlet position.

Circuits shall be arranged as detailed in the Project Specification. All

three phase socket outlet circuits will be earth leakage protected.

14.6 GENERAL LABELLING

The Contractor shall label all power outlets, isolators and light switches.

The prefix capital letter(s) of any outlet refers to the distribution board from which it is fed. The next numeral after the letter(s) indicates the circuit, e.g. Circuit No. 2 fed from Distribution Board 1 = SUB DB 1.1/CB.

14.7 WET WELL LIGHTING

14.7.1 Introduction

Wet wells require cleaning from time to time to prevent damage to the pumps. Cleaning is manually done. Cleaning staff require sufficient lights in order to properly clean wet well.

Furthermore, their safety is a non-negotiable. In a sewage system, hydrogen sulphide and volatile organo-sulphur compounds are considered to have the greatest potential of creating health risks, apart from the odour nuisance. Even low concentration of them can cause significant health problems.

This specification seeks to specify appropriate light fitting along with other ancillary parts under such conditions as may be suitable for workmen.

14.7.2 Scope

Design, manufacture, testing and delivery of the complete units of portable lights, portable gas monitors or permanent fixed gas monitors; cables, glands and joint boxes for various sites of the municipal sewage pump stations.

14.7.3 Supply

The supply to the light fitting shall be made available from locally manufactured sockets. The supply voltage to the portable light shall be 230V, 50Hz single phase-to-neutral supply voltage. switched sockets shall be of construction specified by EAM D&C general specification (16.4.2).

14.7.4 Selection of equipment

In order to select the appropriate electrical equipment for hazardous areas, the following information is required:

Classification of the hazardous areas including the equipment protection level requirements where applicable, external influences and ambient temperature.

14.7.5 Cables

The cable shall be a minimum length of 10 meters; extra meters shall be site specific. The cable or cables to be used shall be IP 65 rated and classified for zone 1 use. Cable from the MCC to junction box or distribution board shall be a minimum of 1mm², 3C Cu cable SWA Cable.

Cables for fixed installations

Cables used for fixed installations in hazardous areas shall be appropriate for the ambient conditions in service. Cables shall be:

- a) sheathed with thermoplastic, thermosetting, or elastomeric material. They shall be circular and compact. Any bedding or sheath shall be extruded. Fillers, if any, shall be non- hygroscopic; or
- b) mineral insulated metal sheathed; or
- c) special, e.g. flat cables with appropriate cable glands. They shall be compact and any bedding or sheath shall be extruded. Fillers, if any, shall be non-hygroscopic.

Cable Terminations

If multi-stranded and, in particular, fine-stranded conductors are employed, the ends shall be protected against separation of the strands, for example by means of cable lugs or core end sleeves, or by the type of terminal, but not by soldering alone.

14.7.6 Light fitting

Selection of luminaires;

It shall be IP 65 rated and classified for zone 1 use. It must give sufficient light intensity prevent straining the eyes of the maintenance and operational staff.

Shall take into account the possibility of changes of the temperature class, if lamps with different wattages can be used.

Low-pressure sodium lamps shall not be transported unprotected through a hazardous area owing to the risk of ignition due to free sodium from a broken lamp. (*SANS60079-14 Electrical installations design*)

Hand held Luminaires Classification

Luminaires shall be classified in accordance with the provisions of Section 2 of IEC 60598-1: Type of protection against electric shock - class II or class III.

Method of connecting the cable or cord: re-wire-able hand lamps, or Non-re-wire-able hand lamps.

Construction shall be according to provisions of SANS 60598-2-8 Luminaires - Hand Lamps, paragraph 8.7

Adequate means shall be provided to prevent impairing of safety due to unintended short- circuiting of uninsulated accessible SELV conductors of opposite polarity.

Electrical connections to supporting conductors shall not be subject to mechanical tension. Lamp holders shall comply with the relevant IEC specifications

Connectors for luminaires may be connected to the supporting conductor by means of pin contacts

Protection against electric shock 8.12

14.7.7 Glands

Selection of cable glands

They shall be IP 65 rated and classified for zone 1 use.

The cable gland shall be selected to match the cable diameter.

The use of sealing tape, heat shrink tube or other materials is not permitted to make the cable fit to the cable gland.

If a cable gland is to be used at an ambient temperature range different from -20 °C to 40 °C and/or an operating temperature higher than 80 °C this shall be covered by certification documentation.

The cable gland shall be selected to match the cable diameter. SANS10108_2017_Ed6Am1 (Hazardous Locations)10.6.2

14.7.8 Joint Boxes

It must be Ex & IP 65 rated and classified for zone 1 use.

14.7.9 Gas monitors

It must be Ex & IP 65 rated and classified for zone 1 use.

14.7.10 Cable hooks

It must be Ex & corrosion proof and classified for zone 1 use.

14.7.11 Stakeholder Competency

Responsible persons; Operators/technicians; Designers; shall have understanding of the general principles of types of protection and marking and of explosion protection; inspection and maintenance requirements of IEC 60079-17; equipment design aspects affecting protection concept.

14.7.12 Plugs and sockets used for external connections

Plugs and sockets used for the connection of external intrinsically safe circuits shall be separate from, and non-interchangeable with, those of circuits which are not intrinsically safe (Pg. 87)

14.8 SECURITY ALARM SYSTEMS

14.8.1 Pepper Spray System

- The master and slave enclosures must be manufactured from mild-steel with powder-coating and a minimum thickness of 1.6mm, unless otherwise approved by the CCT.

- The enclosure must be electric red, unless otherwise approved by the CCT.
- The mounting bracket must be a U, L or flat shape unless otherwise approved by the CCT
- The system must be powered by a dedicated single phase 220V/AC supply from the existing distribution board.
- The system must have a minimum of 48 hours back-up battery supply.
- The system must be capable of interfacing with the existing telemetry system, SCADA system and deep sea controller.
- The system must have a built in battery charger with short circuit protection.
- The system must have Modbus communication
- The system must have a GSM capability.
- The system must be designed in such a way to prevent tampering:
 - The enclosures must be lockable to prevent tampering.
 - lockable wire mesh cage must be fitted to prevent tampering of the units.
- The system must provide cell phone sms and email notification.
- The system must have a minimum 2 year manufacturing warranty
- The system must have its own standard siren.
- The system must be armed/disarmed via keypad/remote/SCADA/digital 10
- The gas canister must be a minimum volume of 500ml and a minimum of 65mm diameter with a minimum of 15% oleoresin capsium mixture.
- The system must have relay outputs for the actuators and siren.
- The system must allow a minimum of 15 remote programmable users.
- The system must allow a minimum of 15 users to receive SMS notifications
- The system must have PIR [passive infrared sensor] input protection, ESD [Electrostatic discharge] protection and PCB [printed circuit board] chemical protection.
- All the work must be done according to SANS 10142 & occupational health and safety regulations.
- The system must have a low power consumption to allow the backup batteries to last longer.
- The system must have high quality receivers and remotes.
- The system must have concurrent Modbus connection, Modbus communication, SCADA connectivity, USB programming, event logs, centralised configuration and expandability.
- The system must have a high quality dual rectangular element, low noise, high sensitivity PIR sensor with a minimum detection speed of 3m/s and a minimum 10.6m radius coverage.
- Each encrypted remote must have its own unique ID code in order to identify users arming and disarming the system for access control management.
- Adjustable audible siren time
- Support for External Status LED's
- Each system must have the capability to accommodate slave units. The slave unit must be controlled from the same controller that controls the master unit.
- All master and slave units will have a sensor (PIR) installed as part of the unit. Each unit must have the capability that at least two additional sensors can be installed with the unit. The additional sensors functionality will be enabled or disabled by means of configuration software.
- Sensor to be able to operate in a high vibration and heat environment without generating alarms. Supplier to submit proposals for the approval of the CCT.
- Intrusion communication must be through a GSM link to the Operations Centre.
- User armed/disarmed and alarms must be date and time stamped.
- Provide technical training.

14.8.2 System configuration

The master unit must be programmable via a laptop and dedicated software. It is required that the following parameters have the functionality to be reprogrammed should it be required:

- Spray time of both master and slave canisters

- Re-activation time of the system
- Location of the installation
- Duration of audible alarm
- Adding and removing of remotes to specific systems
- Renaming of remote ID codes for access control
- Adding and removing of SMS notifications

14.8.3 Communication

- The Master Controller shall have an integrated GSM modem expansion slot. (Note External GSM units are not preferred.)
- System must have the functionality to communicate via Modbus, RS232 or RS485 with the spectrum telemetry unit and Deep Sea Electronics controller. The spectrum unit and Deep Sea Electronics controller will utilise the GSM modem to communicate information to the Central Operation Centre.
- Data must be capable of being transferred incrementally to the server.
- Alarm to be sent through GSM SMS. Remote configuration of alarm mobile numbers must be possible.
- Connection between field laptops and the controller must be wireless (Bluetooth) for safety and reliability reason (corrosion). If a laptop is not available on-site the device must have the capability to conduct a dial up manually.
- The following alarms generated by the master controller will be communicated to TOC:
 - System status
 - Gas triggered
 - Gas stopped
 - Last user arming system
 - Last user disarming system
 - Canister gas levels
 - Battery voltage status
 - User armed/disarmed and alarms must be date stamped.
- The following alarms generated by the master controller will be communicated via sms notifications to the operators:
 - Intruder alarm.
 - Power failure alarm
 - Low gas canister level
 - Low battery voltage
- The supplier shall provide a suitable way of presenting the information in a user friendly way to the operator/s in the operations centre. The following pages must be set up:
 - Overview of installed units
 - Individual page for each unit displaying the status of the parameters as specified.
 - Be able to create alarm conditions when pre-set levels are exceeded.
 - Event page

14.8.4 SCADA

The following SCADA pages must be setup at the different area control rooms as required.:

- Overview Mimic displaying all installed pepper systems in the specified area.

- Individual Mimic page per site displaying the status of each installed unit
- Event page that log all history i.e. System Armed, System Disarmed, Alarm Status, Power Failure
- and Door tamper. All events must be date stamped.
- Remote ID register page in order to identify all remote carriers.
- Should it be required the tenderer will at his own cost demonstrate the offered system to the Council officials prior to tender award.
- Tenderer to provide details of experience and technical back up personnel situated in Port Elizabeth

14.8.4.1 SCADA Reporting

The SCADA must generate an email-based report for the following reports:

- Access Control via remote ID TAGS
- Power failure
- System Status
- Battery Status
- Pepper Gas activation Alarm
- Gas canister level

14.8.4.2 Data storage

- The system must to be capable of storing one year data for all channels at the standard 15 minute logged interval.
- The service provider is required to store data on a secure platform. The service provider needs to indicate where they will store data.

14.8.5 Installation of a pepper spray system

14.8.5.1 Master Unit

- Supply and install a prewired master pepper spray unit.
- The enclosure must be epoxy coated mild steel with a minimum thickness of 1.6mm unless otherwise approved by the CCT.
- The colour of the enclosure must be red unless otherwise approved by the CCT
- The enclosure must be $\pm 350 \times 300 \times 80$ (HxWxD).
- The unit can have a built in or externally wired PIR.
- The master unit must consist of a chemically protected pcb, canister controller, supply voltage connection, battery charger, short circuit protection fuse, battery, canister, built in siren, Modbus communication, PIR, PIR inputs, actuators, relays, ESD protection, receiver, Modbus card, serial port, SCADA connectivity and etc.

14.8.5.2 Slave Unit

- Supply and install a prewired slave pepper spray unit.
- The enclosure must be epoxy coated mild steel with a minimum thickness of 1.6mm unless otherwise approved by the CCT.
- The colour of the enclosure must be red unless otherwise approved by the CCT
- The enclosure must be $\pm 350 \times 300 \times 80$ (HxWxD).
- The unit can have a built in or externally wired high efficiency PIR.
- The slave unit must consist of a chemically protected pcb, canister controller, supply voltage connection, canister, PIR, PIR inputs, actuators, relays, ESD protection, receiver and etc.

14.8.5.3 GSM Card

- Supply and install a GSM card in the master unit.

- The operating frequency must be a quad band of between 850 and 1900MHz.
- The Tx power can either be 2W at 850/1900MHz or 1W at 1800/1900MHz.
- The Rx sensitivity can either be 850/1900MHz at 109dBm or 1800/1900MHz at 108dBm.
- The sim card can be a standard, micro or nano size.
- The data features can either be SMS: POU & text mode or SMS: cell broadcast
- The GPRS must be a class B

14.8.5.4 MODBUS Card

- Supply and install a MODBUS card in the master unit.
- The communication link can either be RS232/RS422/RS485.
- The supported speed must be between 2400 and 115200.
- Configuration must be through the main controller.

14.8.5.5 Keypad

- Supply and install an IP66 security keypad with a metal lockable enclosure.
- The keypad will be used to activate and deactivate the pepper spray system on site.

14.8.5.6 Two button remote control

- Supply encrypted two button remote control to activate and deactivate the pepper spray system on site.

14.8.5.7 Warning sign

- Supply and install weather resistant warning signs outside the property.
- The warning sign must $\pm 400 \times 400$ mm and of a high intensity reflective nature.
- The signs must be written in all eastern cape official languages.

14.8.5.8 Pepper spray canister

- Supply and install a 500ml pepper gas canister with a minimum of 15% oleoresin capsicum mixture

14.8.5.9 Circuit breaker

- Supply and install a single phase 5A mcb in the existing distribution board to power the pepper spray system.

(6) PVC conduits

- Supply and install 20mm PVC conduits with knocking nails and spacer saddles

16.8.5.11 Pad locks

- Supply and install 334 keyed alike Abus pad locks or equivalent.

16.8.5.12 Wire mesh cage

- Supply and install a $\pm 370 \times 320 \times 100$ (HxWxD) shot blasted & powder coated mild steel cage with a minimum thickness of 4mm unless otherwise approved by the CCT.
- The colour must be red unless otherwise approved by the CCT.

16.8.5.13 The cage must be pad lockable.

16.8.5.14 Power cable

- CCT will provide either 1mm x 3 core or 1.5mm x 3 core SWA copper cable depending on stock availability.
- The cable must be collected by the supplier from the nearest CCT stores and installed on site.

16.8.5.15 LED light

- Supply and install a status indication high efficiency brighter 5mm blue LED light near the entrance of the building.

16.8.5.16 PIR

- Supply and install high efficiency, high sensitivity, low noise dual rectangular element PIR with a minimum detection speed of 3ms and minimum 10.6m radius coverage.

16.8.5.17 Battery

- Supply a battery set for a master unit and replace the existing batteries on the master unit.
- The cost shall cover the installation of a battery on the unit and commissioning. This payment item covers all activities required to successfully complete the work, including transportation

16.8.5.18 Interfacing the systems

- Interface the pepper spray system with the existing Spectrum telemetry system, security alarm system, ventilation system and deep sea controller.
- The ventilation system must stop operating once the pepper spray system is triggered.
- Supply and install all required material needed to successfully interface the systems.
- Configure the communication between the systems.

16.8.5.19 ADROIT SCADA

- Set up an overview mimic of the system per control room per site.
- Setup and vent page per control room per site.
- Configure SCADA reporting via email and sms.
- Trouble shoot and repair the system when needed.
- Adroit tag database configuration.
- Configure remote ID lookup of names database per control room per site.

16.8.5.20 Training of staff on pepper spray system

- The service provider is required to train internal staff on how to install, commission, maintain, operate and troubleshoot on the system. The service providers' competent representatives will therefore be required to train a team of up to 15 internal staff on setting, commissioning and maintaining the controllers. This training includes 4 hour session. The CCT will provide the venue for the training. This payment item covers all activities required to successfully complete the work but it excludes the venue of the training and lunch.

16.8.5.21 Stripping and Repairing the pepper spray system

- The cost shall cover troubleshooting to identify any fault and conducting the repair of the system. The parts for the repairs shall be provided from another payment item.

DUCTS, CONDUITS, CONDUIT RUNS AND DRAW WIRES

All conduits and conduit accessories shall be PVC, shall conform to SANS 950 and shall be concealed in walls, concrete floors or structures, and roof spaces, as far as possible. Conduit may be galvanised steel with screwed electric thread where specified.

Every effort shall be made to obviate chasing and the Contractor shall build conduits into walls and floors as the building work proceeds.

Where chasing is necessary the chases shall be as narrow as possible and shall be carried out by machine. Once the conduits have been installed they shall be secured to prevent springing whilst the brickwork is being made good. Chasing of concrete will not be permitted.

Where conduit is installed in concrete floor slabs the conduits shall not cross one another and shall be adequately spaced to permit the satisfactory consolidation of the concrete.

The conduits installed in the concrete slabs shall be kept well clear of the underside and top of the respective slabs. The conduits shall be installed so that any condensation that may form inside the conduit will gravitate to the nearest box.

An electrician shall be standing-by whilst the Contractor is casting concrete over any conduits.

Holes, slots and cable trenches will be formed in the structure as the building work proceeds. The Contractor shall ensure that his conduits are kept well clear (at least 300 mm) from these penetrations when placing conduits for casting or building into the structures.

Conduits are run in brickwork and are required to pass through a concrete column or beam, a conduit sleeve shall be cast into the column concrete. As the brickwork is raised the required conduit shall be installed through the sleeve.

Deep concrete boxes shall be employed in preference to shallow boxes fitted with extension rings.

All conduits shall be installed to permit the wiring to be "looped in". Surface mounted conduit shall be subject to the approval of the Engineer.

All boxes shall be fitted with cover plates where they are not covered by lighting fittings or other devices. All conduit for surface mounted lighting fittings shall terminate with conduit boxes and shall be arranged to permit back entry to each lighting fitting. The conduit boxes shall be securely fixed, flush with the underside of the ceiling or wall.

All ducts, spare conduits and conduits for other services shall be clear, water and moisture free and fitted with 2,0 mm diameter galvanised steel draw wire.

All PVC pipes installed as cable sleeves shall be provided with bends, where necessary, with a minimum radius of 600 mm.

Galvanized steel conduit Bosal (similar and approved) shall be used in the following instances: where conduit and accessories are exposed to ultra violet radiation for more than an hour a day; where flame or explosion proof installations are required; and Where the conduit will be load bearing e.g. for the suspension of lighting luminaires. When specified in the Scope of Works.

Conduits shall not be installed closer than 150mm to pipes containing hot water, steam, gas or any

other material which may damage the conduits or conductors.
PVC conduit shall be secured with saddles spaced not more than 900mm apart. Metal conduit shall be secured with saddles spaced not more than 1500mm apart.

16 CABLE SUPPORT SYSTEMS

16.1 GENERAL

Cable support system shall be wide enough to accommodate the cables specified in this contract plus 25% spare capacity for future expansion.

Pricing for cable support systems on the schedule of rates shall include all supplementary materials required to form a complete installation e.g. mounting bolts and nuts, brackets, threaded rods, chemical or mechanical anchors, "unistrut" (equal and approved), canter lever arms, T-pieces, risers, droppers, horizontal bends, 4 way cross overs, "Clip-On" support channels, joiner or splice sets and hold down saddles etc.

16.2 MATERIAL AND MANUFACTURE

Cable support system shall be of the heavy duty type manufactured from mild steel and hot dipped galvanized after manufacture, designed for internal and external use.

Should the environment be considered corrosive the Employer may call for 316L stainless steel. The contractor shall confirm the type of material before ordering.

16.3 INSTALLATION

Cable support system shall be plumb and shall length wise be arranged either vertically or horizontally. Joints in the cable support system shall be kept to a minimum and shall be properly braced. Bends and tees shall be from the same manufacturer.

Cable support system fixed to brick or concrete work shall be mounted on "unistrut" brackets manufactured from 2.5mm thick material. The brackets shall be the full width of the ladder and shall be spaced 500mm centres along the length of the tray. Brackets shall be provided where cable trays terminate. Each bracket shall be fixed to the brick or concrete work with two (2) 8mm bolts entered at least 70mm into the concrete. The tray shall be secured to each bracket with two (2) 6mm galvanized steel set screws with nuts and washers.

17 POWER SKIRTING

In general, three-compartment power skirting manufactured from high impact PVC is preferred. The compartments shall be utilised for the following services:

Top compartment (80mm high)	Power cabling and socket outlets
Centre compartment (40mm high)	Computer services
Bottom compartment (40mm high)	Telephone services

All compartments of the skirting shall be approximately 35mm deep. All cover plates, end covers, elbows, bends and other fittings for the power skirting shall be provided from the same manufacturers range of equipment as the power skirting and shall match aesthetically and mechanically.

Flush mounted, round, conduit draw boxes shall be provided in the wall behind each compartment of the power skirting. A 50mm diameter hole shall be provided in the back of the top compartment and 40mm holes shall be provided in the back of the remaining compartments, at positions coincident with

the flush mounted conduit boxes, to facilitate the drawing-in of cables and conductors.

Each compartment shall be provided with its own 25mm conduit and box. The conduit coupled to the power compartment shall be run to the respective distribution board (whilst the conduits coupled to each of the remaining two compartments shall be run in accordance with Schedule

18 WATER HEATERS & CIRCUITS

18.1 INSTANT WATER HEATERS

Instant water heaters shall be Zip "Hydroboil" or similar. Units shall be designed to operate up to 400 kPa. Units shall be equipped with safety controls to protect against water or power failure. The water temperature shall be maintained within 1°C of boiling point at all times. Units shall have a white polyester powder coated finish. The 5 litre unit shall be equipped with a 1500Watt element. The Instant boiling water dispenser recovery rate shall be 1 cup per minute. The 10 litre unit shall be equipped with a 2400Watt element. The Instant boiling water dispenser recovery rate shall be 1.5 cups per minute.

18.2 GEYSERS

Geysers shall be fitted with a robust galvanized outer casement and be rated for domestic and commercial applications. The unit shall be durable in severe weather and climatic conditions. The cylinder shall be thermo fused porcelain enamel-lined, polyurethane insulated and environmentally friendly. It should be possible to install the cylinder horizontally or vertically via adjustable left and right-hand wall mounting brackets.

18.3 CIRCUITS

Water heater circuits shall comprise 4mm² PVC insulated copper conductors drawn into a 25mm diameter conduit terminating in a surface mounting box containing a 30 A double pole isolator. From the isolator a length of 25mm diameter flexible conduit (not exceeding 700mm in length) and fitted at each end with an approved adaptor shall be run to the water heater terminal box. The circuit phase conductors shall be interrupted by the isolator but the mandatory earth continuity conductor shall be run from the distribution board, through the isolator box, to the water heater earthing stud, in one continuous length without joints

19 LOW VOLTAGE CONTROL AND SIGNAL CABLES

19.1 GENERAL

All cables indicated on the drawings and schematics shall be designed and selected according to the loadings, generally as detailed in the Project Specification.

A maximum total volt drop of 2,5% is allowed across the cable from the MCC to the motor terminals under running conditions.

All conductors used in the electrical installation shall be high conductivity, annealed copper with PVC insulation and shall comply with SANS 1507.

No joints will be permitted in any low voltage cable run, except where cable lengths exceed the drum length, without prior written acceptance by the Engineer. Any damaged cable shall be replaced by the Contractor at his own cost.

All cables shall be suitably rated.

19.2 CABLE ROUTES

Control and instrument cables for the project may be run on the same cable tray as the power cables but where electromagnetic interference may upset the control signals the necessary precautions regarding screening and physical separation shall be applied.

Cable routes indicated are merely indicative of the points to be connected. The Contractor shall ascertain whether that route is the most suitable and feasible. The contractor shall order the cable accordingly.

(7)

19.3 CABLE LENGTHS

Cable lengths indicated in the Project Specification are employed for voltage drop calculations only and shall not be used as a basis for re-measurement. The onus is on the Electrical (Sub) contractor to adequately survey the site and measure and price the power and control cabling installation as an all-inclusive complete item. Should a deviation be required due to unforeseen site conditions, the Schedule of Rates for the Electrical Installation shall be applicable to calculate the difference in cost for the installation of power and control cables, but only with the approval by the Engineer.

19.4 POWER AND INDICATION CABLES (1000/600 VOLT)

All power and indication cables shall be of the multi-core stranded soft drawn copper wire PVC insulated PVC bedded, steel wire armoured type with an overall PVC sheath (preferably black) and shall be manufactured and tested in accordance with SANS 1507:2014 for general purpose duty.

The colour of the cores shall be as follows:

Twin core: one red, and one black.

Three core: one red, one white and one blue.

Four core: one red, one white, one blue and one black.

19.5 INSTRUMENTATION CABLES (24V / 220V)

Instrumentation cable shall be constructed of multiple twisted pairs of insulated stranded copper wire, PVC insulated with an overall aluminium shield, extruded PVC inner jacket, served with steel wire armour with an extruded PVC outer jacket.

The nominal conductor resistance shall not exceed 3,5 ohms per 100 m at 20°C.

The complete cable shall withstand a dielectric test conductor to conductor and conductor to shield of 1 000 V dc for one minute.

The insulation resistance of each conductor shall be not less than 8 800 meg ohms/km for 1 minute at 500 V and 20°C, measured with the remaining conductors in the cable connected to the armouring.

The minimum core size shall be 1,5 mm².

All instrumentation and signal cables (excluding optical fibre cables) shall be installed separate from power cables.

19.6 SPARE CORES IN ALL CABLES

All cables installed shall include for spare cores. The spare cores shall amount to 10% of the number

of cores used, rounded up to the nearest whole core.

19.7 CABLE IDENTIFICATION

A suitable tag, onto which the appropriate cable identification number in accordance with the Contractor's detailed cable schedule shall be stamped, shall be adequately secured just below the gland at the ends of each cable.

Where cables deviate from one route to another (e.g. at tee's, on cable trays or in trenches) additional identification tags with numbers shall be fitted to each cable, within 500 mm of the point of deviation.

19.8 CABLE SCHEDULES

The Contractor shall submit to the Engineer a detailed schedule of all cables together with drawings showing cable routes (both underground and on cable trays) for approval prior to the commencement of laying such cables.

20 OPTICAL FIBRE CABLES

The optical fibres shall comply with SANS/IEC 60793 and the optical fibre cables shall comply with SANS/IEC 60794 and shall be installed in accordance with SANS/IEC 60794.

All cables or cable lengths shall be supplied along with Factory Test Certificates. Cable ends shall be suitably made off/ protected to avoid water ingress, damage etc. while in storage.

The cables shall be of the multimode type, suitable for direct burial in the ground.

A cable shall contain 12 fibres packaged in two tubes and the fibres shall be to the following specification:

- | | |
|--------------------------|----------------------|
| • core diameter | 50 microns |
| • cladding diameter | 125 microns |
| • primary acrylic buffer | 250 microns diameter |
| • category | A2 |
| • wavelength | 850nm |
| • attenuation | 3dB/km maximum |
| • bandwidth | 400-600 MHz/km |

The cables shall be constructed to the following specification:

- tubes shall not be filled with water blocking compound
- the cable core shall be filled with water blocking compound
- the cable shall be designed with sufficient strength members to meet installation and service conditions so that the fibres are not subjected to strain of more than the limits specified by the manufacturer
- a moisture barrier shall be provided by a metallic tape applied over the cable core with a longitudinal overlap and bonded to the sheath
- the inner sheath shall be made of polyethylene
- the cable shall be armoured with Corrugated Steel Tape (CST)
- the outer sheath shall be a seamless sheath made of UV-stabilizer weather-resistant polyethylene in accordance with Clause 22 of SANS/IEC 60708-1(Tobe updated with latest Standard)
- the outer sheath shall be marked with the manufacturer's name and "Optical Fibre Cable" as a single line of marking at intervals not exceeding 1000mm
- optical elements and each fibre with a cable element shall be uniquely identified by

colours.

Cables shall be subjected to the following tests in accordance with SANS/IEC 60794-1-2:

- tensile performance
- cable bend
- crush
- temperature cycling
- water penetration

In addition, compatibility with the particular installation conditions shall be demonstrated through the following tests:

- impact
- kink
- torsion
- sheath abrasion resistance

21 MV CABLES

21.1 GENERAL

The contractor shall upon request by the Engineer present the qualifications of the cable jointer to be used, including copies of all relevant supporting documentation.

Note: The Tenderer shall have a complete toolbox with all the necessary equipment need to complete the work at hand as well as any other work that may arise due to site conditions.

Only artisans that can produce Certification to prove that the relevant Termination Manufacturer has accredited them will be accepted for the proposed work.

21.2 TERMINATIONS

Cable end terminations shall be dry type, suitable for the proposed equipment that is to be used.

The Engineer shall, before any work commencement, approve the type of cable ends proposed to be used by the contractor.

Heat shrink terminations shall be manufactured for non-tracking and U.V. stabilised for long life.

Termination or joint kits shall be packed as a complete kit, clearly marked in respect to the suitability for cable type, construction, and voltage. Each kit shall be have packed with the kit, a detailed set of manufacturer's instructions. All terminations, joints, and all associated work shall be executed with the correct tools as described by the manufacturer.

Soldered ferrules are to be used for cable joints and terminations. Cable joints shall be of the moisture blocking type for the prevention of moisture ingress from one cable to the other through the joint box.

Paper-insulated cables that are to be made *off* into cable end boxes shall have the lead covering, armouring and a correctly sized earthing conductor, finished into and consolidated by a solder wipe.

The electrical continuity of all the conductors shall be ensured and shall not be degraded by any method of cable termination, by inferior workmanship or exposure to any form of corrosion.

The Contractor shall ensure that phase rotation of the cables installed, coincides with the supply

phase rotation at all points in the installation.

Any cable ends that are to be left unattended shall have their ends capped to prevent any moisture ingress occurring.

In the event of inclement weather the Contractor shall ensure that all work on MV cables is undertaken under suitable cover.

21.3 **CABLE GLANDS**

All cable glands shall be of the adjustable pattern to secure to the wire armouring of the cable and shall be manufactured from nickel-plated brass. All cable glands shall be fitted with waterproofing neoprene shrouds.

21.4 **POWER CABLE TERMINATIONS**

Power cable terminations, connections and joints shall be facilitated by means of the use of a portable hydraulic compression tool with pre-set automatic tamperproof hydraulic unloading bypass valve, the entire equipment being either bought from, hired, or approved by the Cable Manufacturer.

Approved lugs or ferrules shall be crimped to the cable cores in all cases. No other method of termination or joint shall be allowed.

Where aluminium and copper or brass is in intimate contact and especially where the joint so formed is current carrying, "Densal" jointing paste or other approved paste or treatment shall be used.

22 **CABLE TRENCHES**

The cable trenches shall be as per project specification to suit environment, but shall generally be a minimum of 450 mm wide x 750 mm deep. The trenches shall contain no stone or sharp objects and shall be inspected by the Engineer prior to backfilling.

For the purpose of this Subcontract, only three classes of material are considered and all excavated material shall be classified according to the following:

Type (as measured) in this document	General Description	Formal Classification to SANS 1200:2014
Soft excavation	Excavation by pick and shovel in soft soil	Soft Excavation
Intermediate excavation	Possible by use of pneumatic tools and equipment	Intermediate excavation: Boulder excavation Class A Boulder excavation Class B
Hard rock excavation	Removal of material by blasting	Hard Rock excavation

The Contractor shall provide all cable trenches. The Contractor shall be responsible for any damage to any services which may exist on the site and shall cover all costs incurred for the repair of any services which are damaged during the trench excavations

Although a minimum cable trench width has been specified, the installation of two or more cables shall result in the Contractor engineering the actual cable trench width to ensure that all cables are not underrated.

Trenching that is to be undertaken within the existing MV substation shall be by hand and supervised by a competent person, approved by the Engineer. No trenching machines will be allowed within the Existing MV substation and MV equipment area.

All backfill material shall have enough moisture content so as to allow for good compaction. Backfill material shall be laid in layers to a depth of 150mm and then compacted by a compaction machine, suitable for the work at hand. The contractor shall ensure that the cable bedding sand and backfill is of a good quality to ensure that the thermal resistivity of the ground is at least improved.

All trenching shall conform to the standard as laid down in SANS 10198.

The contractor shall also ensure that the cable trenches are properly fenced off at all times until the cables have been installed and the trenches backfilled.

Danger tape shall be installed as specified.

The cable trench shall be shored with timber boards where required to ensure safety to workers and the public and facilitate ease of installation.

All trenching shall be inspected by the Engineer prior to backfilling.

23 CABLE ROUTE MARKER

Cable route markers shall be installed every 50m in straight runs and at every change of direction. These shall be of concrete pyramid type, with engraved aluminium labels.

24 LOW VOLTAGE ELECTRICAL MOTORS

Reference shall be made to the General Mechanical Specification.

25 FIELD INSTRUMENTATION

25.1 GENERAL

The specifications for equipment to be supplied are as detailed below and within the Project Specification.

The Contractor shall include for all cabling required ensuring operation of the equipment as described in the Project Specification.

(8)

25.2 ULTRASONIC LEVEL DETECTORS

Ultrasonic Level Detectors shall be Mobary MSP 900GH or Enderss Hauser (or equivalent) and shall be of robust design.

(a) Generic

Ultrasonic level detection shall be by means of a transducer and separate transmitter, with the sensor powered via the transmitter. The sensors shall be mounted on suitably sized brackets of glass fibre reinforced construction, stainless steel or similar non-corrosive material directly over the medium being monitored.

The sensor shall have a stainless steel diaphragm and shall be equipped with an integral cable of

10m length, with the complete unit of at least IP65 rating. The sensors shall be capable of measuring range as set out below.

The transmitter shall be of minimum IP65 rating, or alternately, housing in a protective enclosure providing this rating. The transmitter shall have a local display, which shall be visible with the protective housing closed, if provided.

The transmitter shall be capable of bi-directional communication via a Modbus Plus network with the programmable logic controller.

The unit shall conform to the following:

Power supply	230 VAC
Output	Isolated 4-20 mA
	Relay (discreet outputs) as detailed
Calibration	Independent adjustments for zero and span
Accuracy	1% of span or better
Repeatability	0,2% of span
Resolution Dead band	0,1% of span or 2mm, whichever is greater
Ambient temperature effect	- < 0,2% of span
	< 0,5% of maximum span per 10°C change

(b) Differential Level measurement over inlet channel

Two ultrasonic sensors with common transmitter, shall be mounted over the inlet channel for control of the screen.

The sensors shall be mounted one upstream and one downstream of the screen on suitable brackets manufactured from either 304 Stainless Steel or glass reinforced polyester.

Medium	Raw sewage
Measuring Range	0-2,0 m
Outputs	4-20 mA
	2 Relay

25.3

FLOW METERS

The flowmeter casing shall be aluminium, the flow transmitter remote from the primary element. The transmitter assembly shall be at least IP65 rating and suitable for operation with either a 24V DC or 230 V AC power.

The output of the flowmeters shall be 4-20mA and shall also include a pulsed signal.

26 UNINTERRUPTIBLE POWER SUPPLIES

26.1 GENERAL

A UPS shall be provided for each separate piece of equipment such as a SCADA computer or a PLC. Specific requirements are as detailed in the Project Specification.

The UPS shall include an alarm panel, serial connection to a SCADA server and adequate batteries for 30-min backup.

Critical alarms, warnings and readings shall be logged and displayed on all available user interfaces.

26.2 UPS SPECIFICATION

The UPS's shall be to the "RIELLO" Catalogue model Sentinel XR (or equal), comply with the following specification for high availability, high stability under varying supply and varying loads, or equivalent.

- | | |
|--------------------------|--|
| (a) Rated input voltage: | 230 V (+/-15%) at 50 Hz (+/-5%) single phase (Without having to supply a CVT line conditioner). |
| (b) Rated output: | 230 V (+/-1,5%) at 50 Hz, single phase voltage |
| (c) Inverter rating: | - Dynamic regulation at 100% load application / removal: -
Transient Recovery + 5% recovering to 1% within 10 m sec.
LOSS of AC supply:
- No change.
Total harmonic distortion: - Better than 3% (Linear load).
Overload capacity: - 120% (10 seconds). |
| (d) Power rating | 2000W Standard with 30 minutes range energy time
SCADA:
Microprocessor serial interface (SNMP)
Modbus TCP/IP open communication protocol card LCD
Status display. |
| (e) Rated stored | Riello XR |
| (f) Interfaces | Online, double conversion
Batteries for UPS to be 10 year long life units |
| (g) Preferred Equipment | |

26.3 **INSTALLATION**

UPS output shall be cabled to equipment to which it shall be supply. If Plug Socket Outlets are required, these shall be 15A red top plugs (dedicated).

27 **HUMAN MACHINE INTERFACE (HMI)**

27.1 **GENERAL**

If any Human Machine Interface (HMI's) are offered, the preferred (HMI's) shall be the android based ESA Web Panel or equivalent. The HMI for certain plants where processes and logging of data is required, shall be upgraded to include, additional dynamic memory as required for the application.

28 **PROGRAMMABLE LOGIC CONTROLLERS (PLC's)**

28.1 **GENERAL**

A standalone programmable logic controller (PLC) shall be provided for the control of the equipment as described in the "Control Philosophy". Allowance shall be made within the PLC equipment supplied for the future control of the entire existing and proposed plant as described in the specification and as detailed with the Proposed Single Line Diagram as referred to in the Project Specification.

PFC200, 2nd Generation programmable logic controllers shall be supplied and installed with single or double rack configurations. A separate Ethernet (10/100 - RJ45 - Modbus TCP) module shall be installed on the configuration rack when Ethernet Communications is used.

28.2 **EQUIPMENT SPECIFICATION**

Hardware shall be field-proven under similar conditions and shall be suitably protected against excessive temperature, electrical interface, input and output overvoltage or short-circuit, and loss of program memory.

The equipment supplied shall incorporate a non-volatile form of program memory, which does not rely on an internal or external source of power to retain program memory in the event of a loss of normal power.

The CPU and I/O modules of the PLC shall be supplied with 20% excess program memory and I/O capacity for initial operation of all specified process components. However, the specifications of the PLC shall allow for future expansion of up to 50% additional memory and I/ O capacity.

The PLC system shall be of a modular design with the mounting racks for the central controller, extension racks, power supply cards, central processing units interface cards, I/O cards, etc. interchangeable between the various nodes.

It shall be possible to code cards and slots to prevent the incorrect card being inserted into a given slot. Alternatively, the controller shall employ interrogation software, which shall detect the insertion of an incorrect module and prevent controller operation if an incorrect module is installed.

It shall be possible to change the modules without disturbing field wiring. Connection blocks shall plug into the modules and shall be coded, to prevent connection blocks being plugged into the wrong

modules. All modules shall have surge protection, which meets the IEEE-472 or similar standard.

All inputs shall have LED status indication on the modules. A maximum of 32 inputs with a single neutral shall be provided per module.

Output modules shall be of the opto-electric switched solid state relay (SSR) type. The module shall be able to withstand a peak load of 15A for one cycle and intermittent load of 9A for 3 cycles, per channel. For SSR type output modules, fuse terminals with blown fuse indicators shall be provided at the back of the PLC section of the board. Should the fuse fail to blow, then the fault shall only affect the switched output, and shall not affect the remaining outputs within the group. All outputs shall have LED indications.

For both the input and output modules, the LED's shall give a true load - side indication to and from the field devices.

Analogue input modules shall be of the multiple input range type. This may be either by means of plug-in type measuring range cards or by dip-switch selection. The input resolution of the module shall be a minimum of 12 bits. All inputs shall be individually isolated. Input modules with LED indication for "Communication Active" and "Out of Range" are preferred. Where a large number of analogue inputs with relatively slow changing values is required to be monitored, use may be made of analogue multiplexer modules. The multiplexer shall be compatible with the analogue input module and shall therefore be supplied by the same manufacturer. The input resolution of the multiplexer shall be 12 bits.

Analogue output modules need not necessarily be of the full multiple output range type. The output resolution shall be 12 bits. The outputs shall be electrically isolated from each other. Output modules with "Communication Active" indicators are preferred. Galvanic isolation in the form of opto isolators shall be provided for all inputs and outputs and the driving logic of the modules.

28.3 **PROGRAMMING AND SOFTWARE**

The Contractor shall provide his own computer hardware for programming, testing and commissioning of PLC's. The Contractor may receive, free issue for the duration of the contract, copies of the abovementioned software that he may utilise to program the proposed PLC. This software is issued on the condition that it is only utilised for this contract, may not be copied in any form and shall be returned, complete, to this Administration upon practical completion of the contract, with all installed software removed from development and programming computers.

No special passwords, dongles, or other protection shall be installed or copyrighted which may inhibit access to the software by Council's technical personnel.

28.4 **DATA COMMUNICATION**

The PLC's shall be able to interface with a Moscad RTU device (provided at a future date where applicable by the Council Administration and general plant equipment. The PLC shall be able to interface with the general plant equipment as well as a future SCADA network via a communications network.

If communication is required between PLC's this shall be achieved using "Ethernet" concept.

28.5 **PLC INPUTS/ OUTPUTS**

Although an Input/ Output (I/O) schedule may be provided in the document, this indicates the

minimum signals to be accommodated. The onus is on the Tenderer to study the proposed control of the philosophy and thus determine the precise I/O requirements and provide the necessary I/O's with spare allowance as per the requirements set out in the tender document.

28.6 **INSTALLATION**

The PLC shall be installed in the PLC and Instrumentation panel in the MCC room (within a separate tier or within the marshalling section in the MCC is preferred). The I/O's shall be wired to terminal blocks in the marshalling section of the PLC panel.

The PLC and Instrumentation panel manufacturer shall adhere strictly to the recommended mounting and earthing requirements of the PLC manufacturer. The panel manufacturer shall confirm to the Engineer that the PLC will not operate at any time outside the environmental limits published by the manufacturer. The average maximum and minimum temperatures, the humidity as well as the heat dissipation of the PLC shall be taken into consideration when designing the compartment housing and apparatus.

If forced ventilation and/or panel heaters are required to provide the climate necessary for the PLC apparatus, then this shall be included in the panel design, together with the climate monitors to inform the operator in the control room when the equipment is operating in undesirable conditions. Detectors shall be provided and wired to an input card of the local PLC to alert the operator via the alarm panel if the "climate" drifts outside the preset values.

29 **SCADA**

29.1 **GENERAL**

The Contractor shall derive the full and final Tag list from the free-issued software (if applicable) for existing PLCs and the software for new PLC's to be provided.

A complete and adequately commented Tag list shall be provided as part of the O & M Manuals at the start of the SCADA system commissioning

29.2 **SCADA MODES OF OPERATION**

The modes of operation to be provided in the SCADA system shall be the following:.. Sequence

Mode:

The SCADA system shall send a start or stop command to the Motor, Valve, Actuator or Controller in the PLC automatically, based on a general group or sequence start command from the SCADA operator. The group or sequence may be programmed in either the SCADA or preferably the PLC and shall always follow the actual process flow,

Automatic:

The SCADA system shall send a start or stop command to the Motor, Valve, Actuator or Controller in the PLC based on an individual start command by the SCADA operator. The start or stop shall be governed by process flow interlocks.

Manual (or Field):

The SCADA system shall not send a start or stop command to the Motor, Valve, Actuator or Controller in the PLC as it is controlled by Push Buttons on the MCC or Field Control Box. In this

mode, all process flow interlocks are ignored but safety interlocks still apply.

Switching from "Sequence" to "Auto" shall not stop equipment that is already running, however switching any equipment from any state to "Manual" shall stop that equipment and all related equipment via process interlocks. Switching to Manual is provided at the MCC by means of a selector switch.

29.3

COLOUR CODING

Graphic Symbols

The graphic symbols shall as possible reflect the IEC standards for Process and Instrumentation Diagrams;

Healthy (Auto/Man): White

Healthy: Flashing White

Tripped : Flashing Amber

Tripped Acknowledged Amber

Faulty: Flashing Red

Fault Acknowledged: Red Running

(Auto/Man): Green Unknown

(Comms Failure): Grey

(9) Process Flow Mimics

Mimics shall be configured to represent process flow as accurately as possible using IEC standards symbols

- Mimics shall be displayed in 16 million colours and on maximum screen resolution of 1024x768 pixels
- Mimics load time, from the selection on "Menu" or "Overview" mimic to completely loaded and dynamised, shall not exceed 3 seconds
- All mimics shall conform to the Standard screen layout and label font sizes shall be standardized throughout. Not font smaller than 10pica shall be used

(10) Equipment Display Faceplates

- All Operating equipment such as Motors, Actuators, Measured values and Controllers shall be represented by standard display faceplate
- Faceplates may be customized for specialized equipment only as agreed the client (Plant)
- Faceplates shall clearly identify the operated equipment by it's TAG Description and clearly display equipment status, Start/Stop, Auto/Man and reset commands in a common colour & common font

29.4

NAVIGATION

A system of progressive exposure and hot spots should be implemented.

- On the overview mimic the menu button, once "pressed", should pop up a navigation mimic displaying buttons to navigate to all process mimics on the system, general alarms and events

- On all other mimics, the menu button once "pressed" should pop up a navigation mimic displaying buttons to navigate to all related mimics and the overview mimic
- From the navigation pop up mimic "pressing" the desired mimic button should display a further pop up mimic to select the mimic, related alarm window or one related trend windows.
- On the pop up navigation mimic each mimic button should indicate a current alarm condition for that mimic
- Where applicable clicking on a device, such as a motor, should pop up a mimic displaying relevant data and any control functions associated with the device.
- Hot spots should be available on process mimics to navigate to the upstream or downstream process mimic.

29.5 ALARMS

- Alarms should be associated with process mimics.
- Alarm description must be understandable.
- The general alarms window, accessible from the overview mimic, should only contain alarms NOT displayed in other alarm windows.
- Alarm window should display
 Date (YYYY/MM/DD),
 Time (HH:MM:SS) 24 hour format,
 Description (from the agent); Alarm
 type (from the agent), Reported
 Data (from the agent)
- Must display a title bar with the function to close the window.

29.6 TRENDS

Trends should be associated with process mimics.

- Up to 4 trend values should be displayed on one window and only in exceptional cases can this be expanded to a maximum of 6 values.
- Trended values should be vertically separated within a trend window unless specifically indicated otherwise such as P.I.D values.
- Trended values should be displayed on a trend window with a 24 hour time scale with a 10 second resolution. The period type should be current - interval. The Labels should be at 6 hour intervals on a 1 hour grid.
- Trended values should also be displayed on a trend window with a 30 day time scale with a 300 second (5 minute) resolution. The period type should be current - interval. The Labels should be at 7 day intervals on a 1 day grid.
- Must display a title bar with the function to close the window.

LOGGING

- Data should be logged to the SCADA's proprietary database, SCADA logged values, and to a Squeal database.
- SCADA logged values should be grouped together in the same manner as for trend windows and save in a separate log file per group
- Each SCADA log value shall be logged for 60 days with a 5 second resolution.
- The file should be overwritten on a First In First Out bases thus always holding the most recent 60 days of data.
- A batch file initiated from a button a mimic should archive the SCADA log files to an archive folder on the SCADA machine.
- A separate PC connected at the Ethernet layer should be used to warehouse the Squeal database.
- Each Squeal log value shall be logged for 3 years with a 15 minutes resolution.

EVENTS

- The events log should be able to contain 1000 records
- The events log must automatically be backed up to the events archive folder at 23:55 with filename + date
- The Event window should display

Date (YYYY/MM/DD),	
Time (HH:MM:SS)	24 hour format,
Description	(from the agent);
Action	
Alarm type	(from the agent),
Reported Data	(from the agent)
Category	

SET POINT ENTRY

- There will be 3 levels of set points

Operational Set points
Critical Set Points
System Set Points
- All set point entry shall be password protected such that the relevant person must re-enter his/her password even when logged on to change a set point.
- A set point entry must be limited to the specified range.

- The new value for the set point must be displayed and confirmation requested before the value is committed to the system

29.10 **TRAINING REQUIREMENTS**

Once the system has been commissioned, the Tenderer shall provide one day's process controller training on the SCADA system.

29.11 **IMPORTANT DATES (when tasks are to be completed)**

The following milestones shall be emphasized in the proposed Project Plan;

- Start of project.
- Clarification of Owner Requirements.
- Mimic Development.
- Submission of mimics for approval.
- Commissioning and Site Acceptance Testing.
- Hand over and Training.
- Documentation and a full set of as-built back up of system on CD or DVD.

29.12 **SCADA HARDWARE AND SOFTWARE**

(11) Hardware

- The Servers will use PC architecture with an Intel mother board i-5-3470(3.10 HGz) **-Full v-Pro**
- The SCADA Servers will be fitted with minimum of 8GB Mbytes RAM
- The SCADA Servers will be fitted with a redundant power supply
- The SCADA Servers will be fitted with a 500 Gigabyte hard disk drive or greater and an equivalent mirrored hard disk drive.
- The SCADA Servers will be fitted with Media-DVD +RW.
- The SCADA Servers will be fitted with 4 X USB Memory Slots
- The monitors shall be 23" Colour LCD.
- The SCADA Servers cases will be 19" rack mount with forced air cooling and dust filters.
- The SCADA Servers will have at least one USB port on the front of the case.
- All the SCADA Servers and ancillary equipment will be mounted in an aluminium frame 19" rack fitted with a toughened smoked glass door.

(12) Network

The Ethernet switch will be a (Latest) Model of Enterasys V2H123-24

(13) Firewall

The security router will be (Latest) Model of Enterasys

- XSR-1805 Enterasys security router
- XSR-18XX-FW Firewall code upgrade for the XSR 1800 series.
- XSR-1805-KTM XSR rack mounting.
- XSR-64MB-EM 64mb Memory Upgrade for XSR 1805.

(14) KVM Switches

- The unit will cater for 4 computers.

- The unit will have USB inputs.
- 4 * Sets of USB (keyboard and mouse) and monitor cables will be provided to link the switch to the computers.

(15) Software

- Latest Microsoft Windows Server or Microsoft Windows Platform Operating System
- Latest Microsoft SQL Database Software Package
- Latest version of PLC Programming tool Unity

29.13 SQL DATABASE

- All Analog and Digitals must be mapped to the data base.
- The data must be represented on a web page format.
- Current Inflow/s and Outflow/s displayed.
- A Maximum of 4 values can be selected from a dropdown list.
- A Graph of the selected values must be drawn.
- The data must be downloadable in an Excel data sheet

29.14 SECURITY

29.14.1 General

The SCADA requires security to prevent unauthorised access to the system. Securing the system through usernames and passwords will prevent accidental reconfiguring by the process controllers and managers.

Four levels of security have been identified. Windows groups should be used or created as follows:

29.14.2 Operator User

The users must logon to be able to perform their functions as follows:

- When the system boots up the Adroit Agent Server shall start as (a Windows Service)
- The ADROIT CLASSIC/SMART UI user interface shall automatically start.
- After start up, the Overview Mimic or Graphical Form without data shall be displayed. This will force the process controller or manager to logon so a trace of all users can be kept.
- All Adroit menu items will be inaccessible
- All Operating System's operations shall be inaccessible. The Task Manager shall not be accessible from the keyboard. The Explorer shall not be accessible.
- Windows Operating System shall not be able to be shutdown.
- Operation of the USB and the CD ROM drive shall be disabled.

29.14.3 Process Controllers

The process controllers must logon to be able to perform their functions as follows:

- Move from mimic to mimic.
- Stop, start and reset all equipment.
- Change value settings.
- Acknowledge alarms.
- Reconfigure TREND periods.
- Print TRENDS

29.14.4 Managers:

In addition the process controllers the managers must be able to perform the following functions:

- View the EVENTS list.
- Reconfigure the EVENTS list.
- Print the EVENTS

29.15 **INSTALLATION**

a) General

The PLC and SCADA system components shall be installed to satisfy the configuration diagrams.

b) PLC's:

PLC's for process control shall be installed in control panels to be designed, supplied and installed next to each new LV switchboard called for the Project Specification. The PLC power supply, CPU unit, 10 cards and signal marshalling terminals shall be arranged in the control panel.

Remote 10 Modules shall be installed in wall mounted enclosures conforming to the standard specification. Inputs to the remote 10 modules shall be connected to auxiliary terminals on the terminal boxes of the medium voltage switchgear.

All signals shall be connected using the specified signal cable and shall be installed according to the standard specification for wiring, cable terminations and glanding.

29.16 **INSPECTION AND TESTING**

Each PLC and its software as well as the link to the SCADA system shall preferably be individually inspected and tested.

The Contractor shall provide a staggered inspection and test plan which clearly indicates when the SCADA system and hardware shall be ready for inspection and testing and on what date the inspection and/or test shall take place.

The test report produced by the Contractor shall clearly show test results of all motor, valve, actuator, measured values and closed loop controllers programmed in the PLC.

The Engineer shall review the full test report and may call for the random re-testing of specific motors, valves, actuators, measured values or closed loop controllers, during the witnessing of tests.

The successful Tenderer shall make provision to configure, test and prove the functionality of the fibre optic ring "Process Level" data communications which test shall be demonstrated to and witnessed by the client and the Engineer.

30 **TELEMETRY SYSTEM FOR RETICULATION PUMP STATIONS**

30.1 **Purpose**

To provide standards for equipment, functionality and installation of telemetry Remote Terminal Units (RTU's) to be installed at the wastewater pump station.

BACKGROUND

This specification describes the Remote Terminal Unit (RTU) to be installed on the Reticulation Telemetry for pump stations and reservoirs using Terrestrial Trunked Radio (Tetra) modem as a primary communication medium. Telemetry is a means of remote monitoring and control of reservoir levels, pump stops/starts, overflows and other important information from sewage outstations.

DATA gathered by the RTU is transported to a Central SCADA system running on the Adroit software suit. The RTU will be programmed to operate in the following manner:

- **1/0.** The RTU must cater for a minimum of 32 digital inputs and 5 differential 4 to 20 mA analogue inputs and 4 voltage free relay outputs. Each analogue input to be Isolated.
- **Event driven.** The RTU will be programmed to send alarm data on an event bases to the SCADA thus when an alarm is raised the RTU initiates the transmission.
- **Logging.** Values will be logged at a 1 minute interval and periodically downloaded through the SCADA with data catch-up facilities should communications be interrupted.
- **Power management.** The RTU will run a power management programme. This will have two time periods per day whereby the RTU will endeavour to hold off pumping to conserve electrical power during peak demand periods. The time and duration will be set for each pump station from the SCADA.
- **Communications.** The RTU must communicate to the central SCADA via a TETRA packet data modem (OBCU).

CENTRAL PROCESSOR UNIT (CPU)

The CPU will be a Spectrum Tele Flex system or similar approved. All new installations shall comply with this specification using a Teleflex 05 CPU and a Tetra Modem. The Tele Flex RTU will run a power management programme. This will have two time periods per day whereby the RTU will endeavour to hold off pumping to conserve electrical power during peak demand periods. The time and duration will be set for each pump station from the SCADA.

If a PLC to Telemetry RTU is required, the on-board Teleflex **Ethernet port** shall be used.

Display Unit (HMI)

- The display unit must indicate the status of each pump (Running/Tripped).
- The display unit must indicate each pump motor current (red phase only).
- The display unit must indicate each pump's running hours and number of starts since reset.
- The display unit must indicate all levels and flows.
- The display unit must indicate all alarm states

The minimum size for HMI's is 10.1" unless the council representative suggests a smaller display for minor processes with very little data to display.

Configuration

Transmission must be on an exception basis to the central with a periodic poll from the central. The central must poll at least every 4 hours to check communications to each outstation.

All digital inputs must have a configurable hold off time "de-bounced" for a period of **35 seconds** except the alarm trigger inputs.

All analogue inputs must have a configurable hold *off* time for a period of 60 seconds. All analogue inputs must have a dead band of 5% of full scale (20mA) unless otherwise stated. The RTU will log all analogues and register values with a date and time stamp every 5 minutes. The log values will be updated at the central station when RTU sends data to it.

30.3.3 RTU Program

Standard Operating Program

A switch on the Electrical Motor Control Panel will drive one of the RTU's digital inputs, (see 1/0 schedule, annexure A), to switch the RTU into Manual Mode, Ultrasonic Mode or Remote Mode (RTU control).

- Water Outstations- [Manual and Automatic Mode]
- Waste Outstations- [Manual Mode, Ultrasonic Mode or Remote Mode]

When in Manual Mode the RTU will monitor and report all status and parameters but not control any pumps. When in Remote mode the RTU will control the starting and stopping of pumps based on levels received from their analogue input or from another RTU.

Each duty pump will have a START set point and a STOP set point, see 1/0 schedule for number of pumps. All set points must be able to be modified, under password control, through the local display (HMI) and remotely from the SCADA.

The RTU must perform duty selection, where the next available pump to start has the lowest running hours or set, under password control, through the local display (HMI) and remotely from the SCADA. The RTU will sum each pump's Running Hours up to 99 999 hours with a 0.01 hour, resolution whereupon the counter will roll over.

The Running Hours must be able to be reset, under password control, through the local display (HMI) and remotely from the SCADA.

The Number of Starts must be able to be reset, under password control, through the local display (HMI) and remotely from the SCADA.

A number of sites will require pumps at one location to be operated based on measurables at a second location (separate RTU's), communicating via the Central Station (Adroit Server).

30.3.4 Intrusion Alarm System

The RTU must be programmed to perform the function of intruder alarm detection. The intrusion alarm will operate when the RTU is in either Local or Remote Mode. The alarm must be activated or deactivated by entering a code on the local display (HMI) or remotely from the SCADA under password control.

The RTU must have the capability of storing 10 alarm codes used for activating/deactivating the alarm. The alarm codes must be able to be programmed into the RTU (locally), under password control, through the local display (HMI) and also remotely from the SCADA. When the alarm is activated or deactivated the status must be reported to the central station along with the code entered.

When setting the alarm there must be a 30 second delay after entering the code before the alarm is activated, during which a buzzer will beep periodically. After the alarm is triggered there must be a 30 second delay, during which a buzzer will beep periodically, to allow the code to be entered before

raising an alarm. The alarm must be triggered from one of the RTU's digital inputs detecting an open circuit. See 1/0 listing. Once the alarm has been raised the RTU must report the status to the Central Station and drive one of its digital outputs closed for a period of 3 minutes, see 1/0 listing. Only after the alarm has been deactivated will it be able to raise a new alarm. Contractor shall supply and install magnetic locks, Passive Infrared Sensors (PIR).

30.4 RTU MOUNTING POSITION AND DISPLAY

The RTU must be firmly secured using bolts or other suitable fixings and the Engineer shall approve final position on site. Final position of the Display Unit to be approved by the Engineer (normally closer to the access door to enable ARM /DISARM of Outstation

30.4.1 Enclosure

Material: 3CR12 stainless steel powder coated unless otherwise stated, same colour as the Electrical DB.

All cable entry via IP 65 compression glands mounted on the bottom of the enclosure. All

equipment and terminals must be mounted on a backplane.

All terminals must be rail mount.

30.4.2 Power Supply

The RTU power supply unit (PSU) shall be of the "switch mode" type with 12 Volt output, capable of supplying 2 amperes continuous current.

The input voltage is nominally 230V AC, at 50Hz.

The RTU power supply unit (PSU) must maintain the standby battery at 13.8V while supplying a separate isolated supply to the RTU with load shedding

30.4.3 Wiring

Interface Instrumentation cable shall be constructed of multiple twisted pairs of insulated stranded copper wire, PVC insulated with an overall aluminium shield, extruded PVC inner jacket, served with steel wire armour with an extruded PVC outer jacket.

The nominal conductor resistance shall not exceed 3, 5 ohms per 100 m at 20°C.

The complete cable shall withstand a dielectric test conductor to conductor and conductor to shield of 1 000 V de for one minute.

The insulation resistance of each conductor shall be not less than 8 800 Meg ohms/km for 1 minute at 500 V and 20°C, measured with the remaining conductors in the cable connected to the armouring.

The minimum core size shall be 0.75 mm².

All instrumentation and signal cables (excluding optical fibre cables) shall be installed separate from power cables.

The control wiring shall be terminated in corrosion - proof terminals.

All internal wiring shall be number ferruled in accordance with the wiring diagrams supplied by the Contractor.

All control wiring shall be marked in accordance with the Contractor's wiring diagram with black lettering on white PVC ferrule type cable markers placed on the cable adjacent to each connection.

All inter-RTU wiring shall be accommodated in trunking. Separate terminals shall be provided at the base of the RTU to accommodate the incoming and outgoing control circuits and power circuit

30.5

CONTRACTOR MANAGEMENT

- All equipment must be approved by the engineer prior to installation.
- The control philosophies and any programming algorithms must be approved by the engineer prior to RTU or system programming.
- The tenderer must allow for a minimum of 4 iterations of the SCADA mimics
- All SCADA mimics must be approved by the engineer before deployment
- A simulated test from the RTU to the SCADA using the live communications must be performed to the satisfaction of the engineer prior to commissioning.
- RTU Alarm codes must be able to be programmed by user into the CPU remotely from TOC and locally.
- All RTU parameters must be able to be updated, by user, from the central station (TOC)

30.6

GENERAL

Contractor shall supply and install FLOATS Switches and Level Transducers as per 1/0 list.

Contractor shall supply and install Current Transformers to measure Pump Currents as per 1/0 list and any other required site specific Telemetry Interfacing equipment.

Additional 1/0 modules shall be added upon an outstation specific need (if more than 32 Digital Inputs are required).

31 INCORPORATION OF AN ALTERNATOR/GENERATOR INTO AN INSTALLATION

31.1 NORMAL ELECTRICITY SUPPLY 400V

31.2 EMERGENCY ELECTRICAL SUPPLY

In the event of a power outage the proposed new standby generator will be used to supply emergency power. The Contractor shall use the following as a guide to design and install control equipment that is of the latest technology in use.

- The Contractor shall supply, install and commission a new standby alternator and diesel Prime-mover, designed to be installed within an ISO container. The prime power generator shall have a continuous (Prime) rated output of 100kVA, 400V, 50Hz supply and shall be suitable for use where equipment generates harmonics (FVD's, PC's, UPS's etc.). The waveform of the generator shall be sine wave shaped and have no distortion that may cause undue damage to electronic equipment that they will be supplying when in operation.

Generator output voltages shall not drop by more than 10% under worst-case step loading.

- The proposed new standby generator shall start up automatically if a no volt situation is detected on the Municipal incoming supply.
- Suitable automatic changeover equipment shall be supplied and installed.
- When the Municipal/Eskom supply is re-established, the alternator circuit breaker shall open and the Municipal circuit breaker shall close.
- The alternator shall run for 5 minutes after the Municipal/Eskom supply has been re-established before switching off.

31.3 DIESEL PRIME-MOVER BATTERY CHARGER

The electrical supply for the alternator when in standby mode shall be from the main distribution board within the ISO container for the charging of the diesel Prime-mover batteries.

31.4 ALTERNATOR

The alternator shall have a continuous output or higher at 0,8 lagging power factor. The machine shall deliver a three-phase four-wire 50Hz supply at 400 Volts.

The alternator output voltage shall not drop by more than 15% under worst-case step loading.

The alternator/prime mover will be installed within a suitable ISO container mounted on a concrete base.

31.5 **OVER CURRENT AND SHORT CIRCUIT PROTECTION**

The generator shall have one suitably rated main circuit breaker (moulded case) for generator main output circuit protection. The main circuit breaker shall be mounted within 300mm (max) of the generator output terminals and shall supply the generator change over switch installed within the generator ISO Containers or canopy.

31.6 **CHANGE - OVER CIRCUIT BREAKER**

The Contractor shall design control circuits that will allow for automatic change over from mains to alternator supply when the main supply fails. The alternator and main incomer circuit breakers shall be mechanically as well as electrically interlocked.

31.7 **ALTERNATOR SHALL MEET THE FOLLOWING REQUIREMENTS**

1. Synchronous.
2. Operating at a speed of 1500 rpm.
3. The alternator shall be capable of delivering 115% of its continuously rated power output, on the site, for a minimum of 15 minutes at the rated voltage, without damaging the alternator or shortening the life span.
4. Seals shall be provided to prevent the lubricating grease from migrating along the shaft to the rotor windings. (Pre-sealed bearings will not be accepted).
5. Grease cups shall be provided for each bearing in readily accessible positions, even if this means remotely mounting the cups.
6. The shaft-mounted fan shall be fitted at the air intake end of the machine and preferably this shall be the non-drive end.
7. The exciter shall be of the brushless construction, inboard of the bearings, of three-phase full wave design with silicon rectifying diodes.
8. Insulation shall be non-hygroscopic, non-nutrient Class B on the exciter, Class F on the stator and Class H on the rotating pole pieces.
9. The alternator shaft shall be rolled steel. The rotating field pole shall be bolted to the shaft with all other rotating electrical components. This means that the shaft shall be free from electrical grounds on the shaft.
10. The alternator shall have the capability of permitting the measurement of the excitation voltage at rated speed. This voltage shall be obtainable under any load condition.
11. The rotating bridge assembly shall be mechanically constructed with glass cloth impregnated with an epoxy resin binder.
12. The alternator shall be 4-wire Y connected with all cable ends brought out to the terminal blocks in the alternator cable end box.
13. The feet shall have machined surfaces at the mounting rail positions for good axial parallelism and shall be designed to minimise noise and vibration transmitted to the bedplate.
14. The alternator shaft with its rotating equipment shall be dynamically balanced up to 25% over speed condition.

15. A heater shall be provided in the alternator, which shall be arranged to keep the machine warm, to prevent the ingress of moisture. The heater shall be energised whilst the machine is stationary and de-energised when the machine is operating.
16. Measures shall be taken to limit noise emission to an absolute minimum and to achieve this, use of a high efficiency-cooling fan may be necessary.
17. It should be noted that the electric load of the alternator will include harmonic load (i.e. up to 1MVA harmonic loading) which could be developed by the equipment being fed.
18. The components of the voltage regulator shall consist of semi-conductors, completely static and containing no electro mechanical relays or fuses. The regulator shall be of the solid-state electronic type. A circuit breaker for protection of the power circuit shall be provided with the voltage regulator.
19. Response time to changes in load shall be less than 10 milliseconds and shall maintain voltage regulation at 1% R.M.S., when:
 - Load varies between no load and full load
 - The power factor varies between 0,8 and unity
 - A speed change of up to 5% occurs
 - The regulator shall be capable of withstanding centrifugal forces from 20 to 500 Hertz.

31.8 **ALARM EQUIPMENT WITH INDICATION AND TRIP FACILITIES**

Any trip conditions shall be indicated on the alternator controller to allow easy visual identification of fault conditions and those alarms, which are annotated with the word TRIP shall incorporate facilities, which shall be arranged to stop the diesel engine driven alternator set.

The conditions shall include a minimum of the following:-

- High engine temperature. [TRIP]
- Low oil pressure. [TRIP]
- Low cooling water level.
- Low fuel level. [TRIP]
- Excess electrical load on alternator. [TRIP]
- Battery voltage low at starter motor cranking speed.
- Failure of supply to engine immersion element.
- Failure of supply to battery charger.
- Start system inhibited (excessive start attempts).
- Alternator output under voltage. [TRIP]
- Alternator output over voltage. [TRIP]
- Alternator output under frequency.
- Alternator output over frequency. [TRIP]

All trip conditions shall not be resettable unless the fault has been cleared.

31.9 **ADDITIONAL EQUIPMENT**

A cell phone modem shall be supplied with the alternator set to inform operation staff, as to trip conditions and alternator set warning conditions.

The cell phone modem shall be installed in the alternator control panel.

An omni-directional aerial shall be mounted on top of the MDB and shall be connected to the cell phone modem via a RF extender cord.

The Water and Sanitation Department shall provide a SIM card for the omni directional cell phone modem.

31.10 GSM MODEM SPECIFICATIONS:

- The modem should be of dual band type 900Mhz /1800Mhz.
- The modem should conform to the GSM standard with GPRS class 10 capabilities.
- The Maximum Radio Frequency output power will be 2 watts for GSM 900 and 1 watt for GSM 1800. The data connection should be via RS232. The modem should be configurable using the AT command set. The operating temperatures should be between -20°C and + 55°C.

The following shall be monitored and transmitted via the cell phone modem:-

- Low oil pressure
- Generator Trip
- UPS Trip
- Low fuel level.
- Main supply failure
- Illegal access to generator (alarm activating devices on all doors)

31.11 GSM MODEM SPECIFICATIONS:

The Contractor shall supply RICA'd sim cards for the modems. The Contractor shall ensure completely operational systems, able to transmit all the alarm conditions as listed above, to the relevant COCT operational staff.

31.12 PRIME-MOVER

- The prime-mover shall be a diesel engine specifically designed for the purpose of driving a prime power generator at governed speed of 1500 - 3000 revolutions per minute.
- The engine shall be freely available in the Republic of South Africa, including spares, servicing and workshop facilities.
- The engine of the standby alternator set as supplied and installed shall be suitably rated to meet the requirements of this specification.
- The exhaust gas temperature, measured in or on the manifold, shall not exceed the manufacturers stated limit, and in any case shall not exceed 500°C at 100% of the specified engine/alternator rating.
- Turbo-charged engines will only be accepted provided the engine is designed and manufactured as such. The turbo-charger shall be fitted with a heat shield if near any combustible material. Turbo-charged engines shall be suitably sized to meet the step load performance specified. Reaction time of the turbo-charger shall not exceed the time specified in BS 5514, for class AO governing.
- The Tenderer shall ensure that the manufacturer of the prime-mover shall provide the prime-mover intake and exhaust silencing, to ensure compliance with standards and specifications

pertaining to the prime-mover considered. Should 'add on' silencing equipment be necessary for sound attenuation, then the 'add on' shall be to the approval of the manufacturer of the prime-mover.

31.13 **ENGINE**

The engine shall be provided with the following:

- An enclosed flow, force feed lubrication system by a positive displacement type oil pump fed from engine oil sump. A low oil pressure protection alarm.
- Fuel and lubricating oil filters with replaceable elements and pressure by-pass.
- An air-inlet manifold filter of the dry element type.
- A fuel injection pump with a suitable governor, capable of controlling the engine speed in accordance with BS 5514 class AO.
- A continuously rated fuel solenoid required for engine cut out. The control arm shall have only one knuckle joint and should an external spring be required it shall be anchored to a purpose made bracket.
- A heavy-duty 26-volt charging alternator, regulator and batteries for engine starting. Battery shall be capable of at least 6 consecutive start attempts, each attempt at cranking calculate for duration of 5 seconds.
- Provision shall be made to adequately protect the engine against failure of the cooling system (i.e. high temperature protection and alarm).
- "EMERGENCY STOP" button shall be fitted within the alternator control panel, affording maximum safety to the operators of the standby alternator set.
- A rotary pump, with pipe, for the removal of the crankcase oil where oil is difficult to drain.
- An acceptable over speed sensing device.
- The engine shall be supported at the front by mounting brackets. An acceptable method of supporting the back of the engine in the event of alternator removal shall be supplied, such as loose mounting brackets.
- The flywheel shall have a moment of inertia, which shall allow the cyclic irregularity of the set to fall within the limits specified by BS 5514 as amended and meet the specified performance. The flywheel shall be both statically and dynamically balanced.
- The engine shall be fitted with the necessary devices to automatically protect the engine against low oil pressure, excessive temperature rise, etc. Further, suitable gauges shall be mounted on a suitable purpose made bracket, mounted within the prime-mover area, to afford visual inspection of the state of the standby generator set, operating parameters.

31.14 **EXHAUST AND SILENCING SYSTEM**

All piping for the exhaust system shall be of grade 304 stainless steel. The silencers and all pipe support brackets shall also be of stainless steel.

The exhaust system, including silencers, shall be acoustically insulated with a preformed

mineral wool inner layer sealed with asbestos free finishing plaster in order to satisfy the OHS requirements.

Exhaust outlets shall be fully protected against the ingress of rain.

The silencing system shall include a reactive silencer and an absorptive type silencer and all support brackets. A flexible connection of the bellows type shall be installed as close to the manifold(s) as possible to limit vibration transfer and to allow expansion under heating. The standard reactive (i.e. pulsation damper type) silencer shall be installed downstream of the flexible connection. The distance between the engine and the reactive silencer shall be designed to avoid resonance. An additional absorptive silencer, Burgess or equivalent, shall be installed downstream of the reactive silencer. The tail pipe shall have a length of at least 15 times the pipe diameter, measured downstream of the absorptive silencer.

Where the generator set is installed inside an enclosure or room, both silencers shall be installed inside the enclosure. The exhaust outlet shall be led outside the generator room to discharge at least 2, 5 metres above ground level.

31.15 **STARTING AND STOPPING**

The engines shall be easily started from cold, without the use of any special ignition devices, under summer as well as winter conditions, against full load. To ensure easy starting in cold weather the engines shall each be provided with a thermostatically controlled 230-250 volt AC. electric immersion heater fitted to the water jacket. The electric circuits for these heaters shall be taken from the respective battery charger control board and shall be de-energised once the alternator has reached a 'steady state' output.

Circuit-breaker protection (with earth-leakage) is required for each immersion heater circuit.

The starting control for the prime-mover shall make provision for three consecutive start attempts of 10 seconds duration, each with 10 seconds rest periods in between. After a 3 minute rest period provision shall be made for a further three start attempts also of 10 seconds duration. If the prime-mover fails to start after these six attempts, the control circuit shall inhibit further start attempts until the reason for the failure to start has been traced and rectified, whereupon it shall be possible to reset the inhibiting device. When the set fails to start a visual alarm shall indicate the fault.

31.16 **PRIME-MOVER BATTERIES**

The prime-mover batteries shall be deep charging lead acid type batteries. The Tenderer shall ensure that the batteries are rated for the application intended in this specification.

The batteries shall be mounted on free standing, corrosion resistant stand that shall be separate from the prime-mover, and allow for easy maintenance of all cells.

The battery stand shall incorporate a protective cover to prevent accidental contact with the battery terminals. The stand shall incorporate a cubicle to accommodate a hydrometer, which shall be provided with the unit.

31.17 **BATTERY CHARGER**

Automatic battery charging equipment of the constant current, voltage, monitoring type, shall be provided in a compartment, within the DB board. The battery charging equipment shall be isolated, with sheet steel barriers, from the remainder of the equipment in the control board.

When the battery voltage reaches a pre-determined high level, the charger shall be switched off, thus enabling the battery to discharge to a pre-determined lower point, whereupon the charger shall again

be switched on.

The battery charger circuit shall incorporate a "boost charge" with a lock out key switch, thus ensuring only authorised persons have access to the "boost" facility.

In the event of a mains failure, the supply to the battery charger shall be arranged to change over to the standby power output when the diesel engine driven alternator set is switched to its load, thus obviating the necessity for a separate charging device mounted on the engine.

31.18 **COOLING SYSTEMS**

The prime-mover shall be of the water cooled type and shall incorporate a built-on, heavy duty pattern, pressurised radiator, suitable for ambient temperatures up to 450 C. The cooling system shall be arranged to draw the air over the prime-mover and to force the cooling air through the radiator and into the duct which shall direct the air to the outside of the ISO container. Temperature sensing devices shall be provided which shall monitor temperatures in both the engine cooling and exhaust systems. The temperature monitors shall be provided with alarm and "shut down" features. The temperatures at which the alarms are set shall be adjustable within the range 85% to 98% of the value set for the temperature at which "shut down" occurs. The temperature at which "shut down" occurs shall be similarly adjustable but shall be set and sealed by the manufacturer. Should a high temperature be monitored, an alarm (both visual and audible) shall be provided. If the temperature continues to rise the alternator set shall automatically shut down when the "shut down" temperature setting is attained. Audible and visual alarms shall be indicated and enunciated when "shut down" occurs. The audible alarms, at all levels, shall be provided with accept facilities but the visual alarms shall remain displayed until the cause is removed. All alarms and settings shall be provided on the control board.

31.19 **LUBRICATION**

Each lubrication system shall comprise:-

- a self-lubricated, positive displacement gear driven oil pump with a pressure relief valve
- full flow engine mounted oil filter of the replaceable element type equipped with an automatic by-pass valve (direct engine mounted no exposed oil lines)
- full flow oil cooler with an automatic by-pass valve
- pressure lubricated main, connecting rod, gudgeon pin, camshaft and rocker arm bearings
- spray oil cooled piston under crowns
- positive crankcase ventilation.
- low engine oil level sensor

Protection shall be provided against low oil system pressure. This protective device shall shut down the engine and give a visual and audible indication on the control board. The detection system shall be manually reset before the engine may be re-started.

The Contractor shall provide details of the recommended lubricants specified by the manufacturer in the operation and maintenance manuals.

31.20 **FUEL SYSTEM**

The fuel system shall comprise:-

- One base tank consisting of a polyethylene inner fuel tank and a 304 stainless steel safety outer tank (with filler pipe protected with vandal proof locking covers exterior). The safety tank shall have a sight glass for visual inspections of the polyethylene tank and for leaks that may occur. The safety tank shall have a stop-cock for draining any such leakages.
- Anti-fuel theft device/s fitted to tank filler piping.
- Manual, self-lubricated, positive displacement, gear driven fuel transfer pump requiring no adjustment
- One primary and one secondary fuel filter of the replacement element type, and a water trap of the "Automatic" type or equivalent.
- An approved water trap/traps.
- An indicating fuel level gauge.
- A low fuel level alarm giving an audible and visual signal on the control board. A cancel device for the audible alarm is required.
- A drain cock/s shall be provided on the fuel tank/s to permit the tank/s to be drained and cleaned. The drain cock/s shall be fitted with a padlocking facility.
- A visual fuel level indication (non electric or electronic)
- Tank capacity for 12 hours uninterrupted operation, at the rated full load of the alternator.
- The fuel tank shall be designed, constructed and installed in accordance with SANS 10131: "The Storage and Handling of liquid Fuel, Part II - 1979 Large Consumer Installations".
- Exterior of tank to be painted with a suitable diesel resistant paint.
- The capacity of the fuel tank/s shall be stencilled on the outside of the tanks.
- The fuel tank/s shall be supplied with fuel filled to the tank/s full capacity.
- E-fuel tagging together with all electrical connections needed.
- Sufficient 304 stainless steel bunding tank with drain facility.

31.21 **FUEL LEAK TEST**

The fuel tank shall be tested for leaks prior to any paintwork that is to be undertaken and leak tests shall be witnessed by the Engineer.

31.22 **FUEL TANK**

The fuel tank requirement is:-

- Tank capacity to be 500l.
- The fuel tank shall be designed, constructed and installed in accordance with SANS

10131:2014 "The Storage and Handling of liquid Fuel, Part II - 1979 Large Consumer Installations".

- Manufactured from 304 stainless steel plate.
- Exterior of tank to be painted with a suitable diesel resistant paint.
- Pad lockable arrangement for fuel cap (Tenderer to furnish details for approval).
- The capacity of the fuel tank/s shall be stencilled on the outside of the tanks.
- The fuel tank/s shall be supplied with fuel filled to the tank/s full capacity.

31.23 **SPARE PARTS**

The Contractor shall ensure that the supplier of the prime-mover considered for the alternator shall be able to supply any spare parts within 24 hours of placing an order for spare parts should the need arise at a later date after the defects notification period has expired. Refer data sheets delivery times.

31.24 **ALTERNATOR CONTROLS PANEL**

31.24.1 **Control Panel**

The Alternator Control Panel located within the container shall include the following:-

- A "Deep Sea" controller (or similar) for the alternator supervision and control.
- 3 x MDI ammeters, with selector switches.
- 1 x Voltmeter, 0-500 V with ?-position selector switch.
- 1x kW meter (Total Alternator kW).
- E-stop.
- Power and lighting distribution board with a suitable earth leakage unit.
- Battery charger.
- Cell phone modem.
- Spare cubicle.
- Immersion heater control equipment.

31.24.2 **Supply Power Change Over Switch**

The proposed control panel shall house a cubicle for the change over equipment that will be used to select between two sources of electrical power, namely power from an external source Municipal Electricity Department, or electrical power from the alternator. The change over switches shall operate automatically if selected.

31.24.3 **Generator Water Heater**

The Contractor shall manufacture a 10 litre water heater reservoir from 304L stainless steel. The water heater reservoir shall have a 3kW dry element installed into a suitable heater pocket within or under the water volume to be heated.

The water heater reservoir shall have all hose connecting attachments match the existing water cooling system hoses. The water inlet must be at the lowest point of the reservoir and the outlet at the highest point, ensuring proper heat transfer. The design must ensure that no air is captured inside the reservoir.

31.25 **ISO CONTAINER SPECIFICATION**

31.25.1 **General**

Each container to be supplied and installed shall be a one-trip unit, with minimal damage. The

Engineer shall approve the container prior to the Contractor placing any firm orders for the aforementioned. The Contractor shall rectify any defects on the ISO container at the Engineer's direction.

The Engineer shall witness progress of the painting and further painting will not be allowed until the required finishes are achieved.

All metal that has been drilled, ground with carborandum disks, welded or any other process that exposes steel to the atmosphere shall be painted with rust inhibitor/rust converting paints or epoxies.

31.25.2 Sound Attention

The prime-mover and alternator-combined noise level, when installed in a 6m ISO container shall not exceed 60 dba for residential areas and 65 dba and higher for industrial areas measured 7m from the container, at full load. The sound attenuation louvres shall be manufactured from 304 stainless steel and be painted with a suitable type of paint that will bond onto the 304 stainless steel.

The Contractor shall notify the Engineer, prior to painting, to inspect and approve the attenuation louvres.

The contractor shall produce proof from his steel supplier to indicate the grade of steel supplied. The Contractor shall keep records to prove that the correct steel for the louvres has been used for manufacturing the louvres.

Sound attenuating materials that need to be supported/attached within the container interior walls shall be secured behind perforated 1,6mm thick, 10mm diameter perforation, 3CR12 steel sheets. The perforated sheets shall be supported by a method that hides the support system. All joins of the 3CR12 sheets as well as all corners where sheets meet shall be finished off with aluminium 2mm thick aluminium flashing.

The Contractor shall submit detailed drawings with his Tender Offer.

31.25.3 Each Container is to conform to the following:

Doors shall be lockable with a suitable door catch arrangement including a padlock cover for anti-vandalism.

One dry powder fire extinguisher shall be mounted within the container at the entrance double door. The fire extinguisher shall be easily accessible from the entrance double doors.

31.25.4 Signage

The Contractor shall fix the following notices (signage) to the exterior container walls in four of the official languages, viz English, Afrikaans, Xhosa and Zulu:

- Warning of Auto start of Generator
- Fire extinguisher location (red and white).
- Fire extinguishers.
- Danger of electrical shock (yellow and black).
- Hearing protection (blue and white).
- In the event of electrical shock - first aid steps for resuscitation of electrical shock victim.
- First aid steps for burn victims.

Operating signs that are not safety related need only be in English.

32

POSITIONS

The Engineer shall approve final positions and arrangements of all equipment forming part of this contract.

33

REDUNDANT EQUIPMENT

All equipment made redundant during work on this Council's Plant contract shall be listed in writing and made available to the Engineer who shall provide final confirmation as to what equipment may be scrapped by the Contractor. This Council reserves the right to retain any equipment made redundant for use on this or other plants under its control.

34

FINISHING AND PAINTING OF MATERIALS AND EQUIPMENT

All equipment and materials supplied under this Contract, irrespective of whether it is for the electrical subcontract or not, shall comply with this Council's specifications.

The painting and finishing specifications are detailed in the General Mechanical Specification, and the onus is on the Electrical Contractor to familiarise with these specifications.

35

OPERATION AND MAINTENANCE MANUALS

35.1

SUBMISSION OF MANUAL

Three draft copies of the Manual shall be submitted to the Engineer prior to commissioning the Works. One copy will be returned to the Contractor with comments. The second copy will be used by the operational staff on Site.

Six copies of the final version of the Manual, as accepted by the Engineer, shall be provided prior to the start of the Defects Notification Period.

35.2

GENERAL REQUIREMENTS

The Manual shall comply with the following:

- (a) The Manual shall be for the complete Works and shall be of a standard acceptable to the Engineer. It shall be in English and shall be practically and neatly presented.
- (b) One Manual shall contain original documents and this set shall be marked "Original". The other 5 Manuals shall contain all the information in the original and shall be marked "Copy 2" to "Copy 6".
- (c) Binders shall have hard, plastic protected covers utilising four-ring, spring-clip holders. Binders shall not be overloaded. One spare, empty binder shall be provided for every three used. A title label shall be affixed to the spine of all binders. This shall indicate Contract number, title, Contractor's name, Site/Plant name, volume number and contents.
- (d) Sections and sub-sections shall be titled, uniquely numbered and provided with separator sheets.
- (e) Printed matter which is inserted in the Manual shall be arrowed (indelibly) to indicate the equipment installed.
- (f) Drawings shall be to a scale which makes details clear. Large drawings shall be held in plastic envelopes in the Manual. A4 and A3 drawings may be bound as normal pages. Drawings shall also be provided on electronic data storage in AutoCAD, or equivalent, format.

35.3

FORMAT AND CONTENTS

The Manual shall be in accordance with the following (the Contractor shall modify, elaborate and repeat this format as required):

Electronic Format

All information in the hard copy O&M manuals to be provided in soft copy on a USB flash discs (x6) with separate folders for each section including all material related to the particular section. Each section shall be saved as a separate PDF file, with a hyperlinked index sheet for sub-sections. This shall include drawings and maintenance schedules as separate files. In addition, the "Summary equipment and maintenance template" shall be saved in Excel format under Section 1. Contractor to ensure the latest Excel template is requested, used and completed.

All necessary software programs and passwords to be provided.

No.	HEADING	CONTENT
1	GENERAL	
1.1	Contents List	Contents list for complete manual
1.2	Description of the Works	The description of the Works shall include a description of; firstly, the process; secondly, the design parameters and; thirdly, a detailed description of the equipment installation supported by drawings and process flow diagrams.
1.3	Equipment List	Equipment list containing each item of mechanical, electrical, instrumentation and control equipment. The equipment list shall include the make, model, serial number, description, size, range, performance data, motor and drive details, supplier's name, address and phone numbers, all as applicable. The design duty, the position of each unit's installation and its purpose in the system shall be given. Additional information which shall be provided for instruments includes the normal operating reading, maximum or minimum permissible readings, set-points (activation, warning and trip), etc. A separate list of all spares provided in terms of this Contract shall also be provided.
1.4	Drawing List	Drawing list of all the Contractor's drawings and the Tender drawings.
1.5	Cable Schedule	Cable schedule for power, data, control and instrumentation cables. This shall include the cable construction, conductor material, insulation, protection, voltage rating, start and finish points, route length, duty, load, voltage drop, core area, no. of cores, no. of cores used and gland size. For cable voltages above 400 Volts, the schedule shall also include the purchase details, specification and date of manufacture.
1.6	Documents	As-built system, layout and GA drawings. Plant circuit, flow diagrams and/or P&IDs. Control panel layouts. I/O list, program listing, loop and logic diagrams for each PLC. Colour prints of SCADA mimic screens, control faceplates and sequences. System control diagram and logic sequence chart. Copy of certificate of electrical compliance.

2	OPERATION	
2.1	Control System	Description of control system; including all manual and automatic controls. This shall include controls, instruments, protection list, settings, indications, alarms, trips, etc.
2.2	Commissioning	Commissioning Instructions. Commissioning report.
2.3	Operating and Training Manual	Operating and training manual. This shall include normal start-up, adjustment, operating and shut-down procedures and any emergency operating procedures. All specific safety aspects as well as settings, adjustments, observation, etc. shall be provided.
3	MAINTENANCE SCHEDULES	
	Maintenance and Lubrication	Schedule of routine maintenance, by time period, for all mechanical, electrical, instrumentation and control equipment. This shall be all-inclusive but reference to manufacturer's standard manuals in other parts of the Manual is acceptable. The schedule shall incorporate a lubrication schedule of recommended lubricants, capacity, lubrication periods, etc.
4	MECHANICAL EQUIPMENT <i>(This section shall be repeated for each item of equipment)</i>	
4.1	Identifying Information	Identifying information for the item; copied from the Equipment List.
4.2	Nameplate	A photograph of the nameplate and a table containing the unit's name plate information.
4.3	Design and Operation	Details of operating principles, construction and operating instructions.
4.4	Maintenance Information	Technical and maintenance information including instructions for installation, assembly, disassembly, lubrication, adjustment, calibration, reconditioning, repair, etc.
4.5	Spares	A spares list giving the item number, part number, description, quantity and materials. A list of spares recommended to be held on Site.
4.6	Test Results	Factory and Site test results.
4.7	Corrosion Protection	Corrosion protection systems used, coating supplier's data sheets and coating repair procedures.
4.8	Documents	Performance curves. Large scale, dimensioned, cross sectional and arrangement drawings of the item for assembly and spares recognition purposes, cross-referenced to the spares list. Dimensioned drawings of fabricated equipment. Circuit layout of any auxiliary systems
5	ELECTRICAL EQUIPMENT <i>(This section shall be repeated for each item of equipment)</i>	

5.1 to 5.6	As for 4.1 to 4.6 for Mechanical Equipment (see above).	
5.7	Control Details	Control and electrical details, including logic sequence, circuit diagrams and software, as applicable.
5.8	Documents	Electrical reticulation drawings. Equipment overall dimensions. Wiring diagrams. Switchboard layout drawings and SLDs. Electrical panel construction drawings.
6	INSTRUMENTATION EQUIP. <i>(This section shall be repeated for each item of equipment)</i>	
6.1 to 6.6	As for 4.1 to 4.6 for Mechanical Equipment (see above).	
6.7	Documents	Circuit diagrams of instrumentation systems and of individual instruments. Installation arrangement.
7	CONTROL EQUIP.; ETC.	
7.1	Identifying Information	Identifying information for PLCs, transmitters, HMIs, computers, etc.; copied from the Equipment List.
7.2	I/O List	Cross-referenced listing of all I/Os used.
7.3	SCADA	Colour prints of SCADA mimic screens, control faceplates, sequences and trend screens. Schedule of alarm messages and TAG lists. File structures, lists and naming conventions.
7.4	Program	Flash disk containing all software. An annotated program listing.
7.5	Documents	Schedule of cable terminals. Copy of SCADA hardware diagnostic mimic.
8	DRAWINGS	
	Drawings	All drawings not filed elsewhere shall be filed in this section.

36 STARTING, SITE TESTING AND COMMISSIONING OF PLANT

36.1 GENERAL

The Contractor shall advise the Engineer when instructions may be given to the Building Contractor to execute any necessary screeding and finishings around the Works. Tenderers shall allow a reasonable period in their installation programme for this work to be done and no compensation for delay in the commencement of testing and commissioning shall accrue to the Contractor during such period.

36.2 PREPARATION

Installation work shall be complete and accepted by the Engineer prior to commissioning.

Before starting up any section of the Works, the Contractor shall make all necessary checks to ensure that the installation has been correctly carried out, that all ducts, pipework, tanks, etc., are clean, that all equipment is correctly aligned, lubricated and connected up, and is in all respects ready to start with safety. The Contractor shall provide initial fill requirements, such as lubricating oil.

36.3 STARTING UP AND TESTING

The Contractor shall arrange for the Engineer to be present at initial start-up and also for any electrical and control instrumentation sub-contractors to be present.

The Contractor shall start up and test each section of the Works. These tests shall be carried out to certify that the Works is operating in accordance with the requirements specified and must be witnessed by the Engineer. All necessary modifications and rectifications shall be carried out during this period.

Set points for equipment and process parameters which are required for the operation of control systems shall be confirmed and recorded.

36.4 **SCADA SYSTEM**

During commissioning of a new installation which incorporates SCADA as part of the control system, each control system alarm and interlock shall be tested and the resulting alarm messages shall be modified by the Contractor to be acceptable to the Engineer.

A schedule of alarm messages and their full explanations shall be inserted in the Manual.

36.5 **COMMISSIONING**

When all tests have been completed to the satisfaction of the Engineer, the Works shall be commissioned. Unless the Engineer states otherwise, the complete plant, including all control functions and control systems shall be commissioned as a unit and the process performance requirements shall be achieved during normal operation.

Once the Works has been commissioned to the satisfaction of the Engineer, the operational acceptance period shall start and shall consist of a continuous period of operation free from trouble. Unless otherwise stated, this period shall be four weeks. During the operational acceptance period, the Contractor shall carry out all necessary servicing and any adjustments required. The plant staff will assist the Contractor in operating the Works during this period. The Contractor shall train the operational staff in the starting, operating and stopping of the Works, and shall train the maintenance staff on the routine maintenance requirements.

36.6 **COMMISSIONING REPORT**

A comprehensive commissioning test report, including the SCADA system commissioning procedure and schedule of alarm messages, shall be submitted by the Contractor prior to issue of the Certificate of Completion and shall be inserted in the Manual.

The contractor shall provide the following performance reports: for commissioning and tests as said above, a report after month of commissioning, report after three, six and 12 months of commissioning.

36.7 **INSPECTION**

At the end of the Trial Operation Period, an inspection shall be done by the Contractor and the Engineer for the purpose of taking over the Works in terms of Clause 10 of the General Conditions of Contract.

36.8 **DEFECTS NOTIFICATION PERIOD**

Refer to Clause 11 of the General Conditions of Contract and the Detailed Mechanical Specification for requirements regarding maintenance during the 365 day Defects Notification Period.

Reactive and proactive maintenance performed shall be captured by the Contractor and confirmed by the Senior Engineer. This communication shall be done in the following format:

Date:

Plant name:

Location and GPS:

Equipment reference / what failed:

What is the damage:

Causes of the damage:

Repair time:

37 SPARES AND TOOLS

At completion of the work, before commissioning, the Contractor shall submit for approval by the Engineer, a full list of the spares that he intends providing.

Where specific spares are recommended by the supplier or manufacturer, these shall be included in full in the list for approval.

Generally, spares shall include the following:

- LV fuses: 1 spare for every 2 installed.
- Indicator lamps: 1 spare for every 10 installed.
- Lamp lenses: 3 spare for each colour installed
- Push buttons: 1 spare for every 3 or less of each colour and type installed.
- Lamps of luminaires: 1 spare for every 10 or less of each type installed.

Any special tools required to perform routine maintenance on any specific item of equipment shall be provided under this contract. Contractor or tenderer must provide list of recommended spares- refer datasheet of spares

38 EQUIPMENT APPROVAL

The Contractor shall submit detailed working drawings of all boxes, boards, panels, brackets, trays, etc. to the Engineer for approval prior to manufacture. The drawings shall be not less than A2 and shall clearly indicate the principal dimensions and at least two cross sections shall be provided. Door and cover plate details shall be given, together with details of hinges and catches. The work may not proceed until the drawings have been properly scrutinised and approved.

39 SCHEDULE OF EQUIPMENT

A complete list of fittings and other equipment intended for use on this Contract is to be submitted with the tender. This list shall contain manufacturers' names, catalogue numbers, etc. Where any item offered is not to specification, prior approval in writing shall be obtained from the Engineer before this can be offered.

Should any item supplied not comply with the specification, an alternative which meets the specification is to be approved by the Engineer and provided at no additional cost to the Contract.

40 EQUIPMENT TO BE SUPPLIED AND INSTALLED

The Engineer reserves the right to call for samples of the equipment offered, to inspect the workmanship as the work proceeds and to either accept or reject the equipment, or workmanship. The Engineer's approval of the design, materials and workmanship shall in no way reduce the Contractor's liability to provide a complete and proper working plant which is abreast with modern technology.

All such samples may be retained until completion of the Contract. All such samples shall have securely attached thereto labels designating the Contract by name and number (if any), the name of the Contractor and any further relevant information.

Unless where specified and agreed to IN WRITING, all equipment supplied by all

parties shall be new and unused.

41 EVERYTHING NECESSARY

The Contractor will be deemed to have visited the site and to have satisfied himself as to the nature of the work, to have acquainted himself with any limitations which may be imposed upon him and to have provided for any additional costs which he may consider necessary for the proper completion of the work. No claim will be recognised or considered after submission of price on the grounds of lack of knowledge of site conditions or limitations.

The installation shall include everything necessary whether specified in detail or not and shall be carried out in the best possible way to ensure a complete and first-class installation to the approval of the Engineer.

42 UNIFORMITY

All items of the same type of equipment shall where at all possible - be of the same make and type for each item throughout the installation, to ensure interchange ability and ease of maintenance.

43 RADIO, TELEVISION, COMPUTER AND COMPUTER SYSTEM INTERFERENCE

The Contractor shall allow for interference suppression components where required, to ensure that the electrical installation shall not cause interference to radio, television, staff location, computer and computer systems.

44 DELIVERY

The Contractor must co-ordinate the delivery dates for all items of equipment supplied by him to allow adequate time for installation, commissioning and testing prior to contract completion.

To this end, the Contractor must ensure that shop drawings are presented to the Engineer for approval timeously, and a programme of submission of such drawings must be approved by the Engineer as specified in the Conditions of Tender.

Documentary proof is to be supplied of the placing of all orders for equipment having a protracted delivery period. No substitution of specified items will be allowed due to the late placing of orders, and no delay claims in this regard will be entertained.

45 CONTRACTOR'S STAFF

The work shall be done by, or at all times be under the personal supervision of an installation electrician appointed in writing by the Contractor as the Responsible Person, in terms of the requirements of the Machinery and Occupational Safety Act. This person shall be available during working hours, and shall be experienced in projects of the specified.

The Engineer may, if he deems fit, require that the Contractor removes or causes to be removed an employee of his from the specified premises by virtue of that person's incapability, appearance or any such reason which in the opinion of the

Engineer, is valid.

46 VARIATIONS

For the purpose of determining the cost of individual variations the Tenderer shall quote scheduled rates which would be accepted as a basis for the evaluation of extras and omission.

47 INSPECTIONS, TESTS, MEETINGS AND COMMISSIONING

47.1 GENERAL

The fact that the plant and equipment has satisfactorily passed any test made at the Subcontractor's works shall in no way lessen the responsibility of the Subcontractor to obtain the same results after it has been delivered and erected permanently on site.

47.2 TESTS

The Contractor shall notify the Engineer at least 2 weeks in advance, should his presence be required for inspections or witnessing of tests.

47.3 INSPECTIONS

Works acceptance (function) tests shall be performed, which shall be witnessed by the Engineer and the Client or the Engineer's representative.

In the event that tests fail, the Contractor shall be required to perform such tests again. Should these tests require the Engineer to be present again, the Engineer's cost for time and travel shall be recovered from the Contractor at rates as set out by ECSA.

All test certificates required in terms of the current SANS regulations shall be furnished before the project can be completed. These shall also be bound into the operating and maintenance manuals.

47.4 MEETINGS

It is expected that the Contractor will be represented at every Project meeting during the contract. Meetings will be held in two formats, Site meetings and Technical meetings. The Site meetings will be held monthly, and it is expected that the Subcontractor be represented by a senior person in the Subcontractor's firm, who can act on behalf of the Subcontractor.

At the Technical meetings, held between the Site meetings, the Subcontractor's representative may be a site or contracting foreman who is technically competent, having only to receive instructions on behalf of the Subcontractor. The Subcontractor shall make provision in the pricing of his Preliminary and General costs for these meetings.

PARTICULAR SPECIFICATION: PE

PE

BUILDING WORK

PE BUILDING WORK

PE 1 SCOPE

This specification covers the requirements for materials and workmanship for the construction of the Pump station building top structure. Materials and construction techniques in the schedule of quantities not covered by this specification shall be in accordance with the appropriate clauses of the national Building Regulations. Fittings, finishes etc. are shown on the drawings.

PE 2 INTERPRETATIONS

PE 2.2 Scaffolding specifications

The following supporting specifications shall apply:

(a) SABS 0400

PE 3 MATERIALS

PE 3.1 Earth filling

Earth filling under top structure floor to be instructed by the engineer. The rate shall include supply, transport, placement and compaction as specification, complete.

Earth filling (G7) supplied by the contractor, compacted to 93% Mod AASHTO density.....Units: m³
Earth filling (G5) imported from commercial sources, compacted to 93% Mod AASHTO densityUnits: m³

PE 3.2 Polythene sheeting

Polythene sheeting shall comply with SABS 952, type C, 0,25mm thick. All joints shall be overlapped and sealed with pressure-sensitive tape.

PE 3.3 Prestressed concrete lintels

Prestressed concrete lintels shall be manufactured in an approved factory. Concrete used in the manufacture shall be Class 35/7 – 35MPa strength concrete reinforced with steel wire of not less than 4mm diameter and having a tensile strength of 1300 – 1380MN/m². The wires shall be stressed to at least 900MN/m². The number of wires shall be as follows:

<u>Width of opening (m)</u>	<u>Reinforcing per half brick soffit width</u>
< 1,8m	2 x 4mm HT wire
1,8 to 3m	3 x 4mm HT wire

PE 3.4 Cement

Cement shall be ordinary Portland Cement complying with SABS 471.

PE 3.5 Sand

Sand shall comply with SABS 1090, washed where necessary and screened through a 2,4mm mesh sieve.

PE 3.6 **Bricks**

Face bricks and the Stock bricks used on this contract shall comply with SABS 227.

PE 3.7 **Wire ties**

Wire ties shall be the single wire type for solid walls and either the “Butterfly” or Modified PWD type for hollow walls, of galvanized steel and shall comply with SABS 28. Ties shall be of sufficient length to allow not less than 75mm of each end to be built into brickwork or embedded in concrete. All ties shall be space one per m2.

PE 3.8 **Brickwork reinforcement**

Brickwork reinforcement shall be manufactured from hard drawn steel wire conforming to BS 785 and shall consist of two 2,8mm diameter main wires with 2,5mm diameter cross wires at 300mm centres welded at intersections.

Brickwork reinforcement shall be lapped not less than 300mm at end joints and for a length equal to the width of the widest reinforcement at intersections.

PE 3.9 **Mortar**

Mortar shall comply with the following table:

1	2	3	4
Mortar Class	Portland Cement (kg)	Lime (ℓ)	Sand (measured loose and damp) ℓ max
I	50	0 – 10	130
II	50	0 – 40	200
III	50	0 – 80	300

Mortar shall be Class II unless otherwise specified.

PE 3.10 **Damp-proofing**

Damp-proofing and waterproofing materials shall comply with the following specifications and requirements:

Material	SABS Specification	Type and/or Additional Requirements
Bituminous damp-proof courses to walls, sills, etc.	248	Type FV
Polyethylene sheet in damp-proof courses to walls, sills, etc.	952	Type B
Ditto, to floors and basements	952	Type C
Sealing compounds with two-component polysulphide base	110	Type 2 Gun Grade

PE 3.11 **Timber and fasteners**

Materials are to comply with the following specifications and requirements:

Material	SABS Specification	Grade or Class
Flush doors	545	-
Mild steel nails	820	-
Metal screws for wood	1171	-

PE 3.12 **Locks etc.**

Mortice locks, mortice latches, mortice deadlocks, rim locks, cylinder rim latches and deadlocks and mortice lock furniture shall comply with SABS 4.

Locks described as “en suite” shall be in sets as described, each set controlled by its own master key.

PE 3.15 **Keys**

Locks shall not have interchangeable keys. Each lock shall have two keys and shall be clearly marked with consecutive numbers and each key shall be punched with the corresponding number of the relative lock.

PE 3.16 **Bolts and nuts**

Bolts and nuts, other than fitted bolts and bolts and nuts for friction grip joints, shall comply with the requirements of SABS 135, 136 or 1143 as applicable. Nuts shall be of at least the strength grade appropriate to the grade of bolt or other threaded element with which they are used.

PE 3.17 **Door frames**

Wooden door frames shall be primed to comply with SABS 678. Frames shall be flush with the final floor finish. Frames shall be treated with one coat of exterior varnish before leaving the factory.

Double doors shall be provided with an adjustable striking plate for a mortice lock and be provided with two pairs two pairs of 100mm x 100mm stainless steel parliament hinges in satin finish stainless similar to the Consort CPH30 type or equivalent.

PE 3.18 **Paint etc.**

Paints, primers, undercoats, etc. shall comply with the following specifications and requirements:

Material	SABS Specification	Grade or Type
Priming coats on structural steel	312	Type II Grade I
Priming coats on steel	679	Type I
Priming coats on galvanized iron	723	-
Red oxide zinc chromate primer	909	-
Priming coats on wood for external work	678	Type I
Priming coats on wood for internal work	678	Type III
Undercoats for paints (except emulsion paint)	681	Type I
Distemper	322	-

Emulsion paint for internal work	633	Grade I
Emulsion paint for external work	634	Synthetic polymer base
Matt, eggshell or semi-gloss paint for internal work	515	-
Oil gloss paint for internal and external work	631	-
High gloss enamel paint for internal and external work	630	Grade I
Roof paint	683	Type B
Structural steel paint	684	Type B
Aluminium paint	682	Grade II
Varnish for interior use	887	Type I

Materials for paintwork shall be delivered to the site in unopened containers and applied in accordance with the manufacturer's instructions. If necessary, materials shall be strained before use. Materials shall be suitable for application to the surfaces concerned. Undercoats shall be as recommended by the manufacturer of the finishing coats. Thinners and other agents shall not be used without approval.

PE 3.19 Timber doors

Doors shall be solid timber doors made of hard wood such as Meranti.

Double doors shall have rebated meeting stiles.

Descriptions of all doors shall be deemed to include for hanging, fitting the locks, etc.

PE 3.20 Electrical materials

All the electrical fittings shall be surface mounted by the electrical contractor who will be installing the electrical control panel for the pumps and other ancillary electrical equipment.

Refer to Particular Specification PD of the tender document set for the requirements for the electrical installations.

PE 4 CONSTRUCTION

PE 4.1 Earthworks

PE 4.1.1 General

The Contractor shall notify the Engineer as soon as the excavations are ready to receive foundations and no building work may be started until the Engineer has approved the excavations.

Any excavation taken out below the levels shown or required to obtain a solid foundation shall be filled in by the Contractor, at his own expense, with 10 MPa concrete.

PE 4.1.2 Filling, etc.

Filling under floors shall be of hardcore complying with PE 3.1 free from clay, vegetable matter, large stones, etc. spread, levelled, watered and consolidated with the finer material on top.

PE 4.2 **Brickwork**

Unless otherwise described, all brickwork shall be built in stretcher bond. Whole bricks shall be used except where bats or closers are required to form bond.

Brickwork, unless otherwise described, shall be built in Class II mortar.

Exterior walls shall be built with face brick 270mm wide with a cavity that must remain free of mortar.

Inner walls will be 230mm solid walls of engineering strength (28Mpa) NFX bricks. The small walls as part of the cable channel will also be built of stock bricks as single 110mm walls. Inner walls shall be plastered to a smooth finish on both sides.

PE 4.3 **Damp-proofing**

Damp-proofing materials shall be applied in accordance with SABS 021.

PE 4.4 **Damp-proof course on walls**

All joints in damp-proof course on walls shall be lapped a minimum of 150mm except at junctions and corners where the lap shall equal the full thickness of the wall.

Descriptions of sheet damp-proofing and waterproofing shall be deemed to include for all laps, cutting and dressing.

Descriptions for turn-ups and turn-downs shall be deemed to include for angles, ends, etc.

PE 4.5 **Fixing of ironmongery**

Unless otherwise described, ironmongery is to be fixed to wood.

Items described as "plugged" shall be deemed to include for screwing to fibre, plastic or metal plugs.

Screws, bolts, etc. for fixing of ironmongery shall be of matching metal and finish, except for aluminium ironmongery or ironmongery fixed to aluminium in which cases stainless steel screws may be used.

PE 4.6 **Plastering**

Surfaces shall be clean and free of oil and thoroughly wetted directly before any plastering or other in situ finishes are commenced. Concrete surfaces shall be slushed with a mixture of one part cement and one part coarse sand or otherwise treated to form a proper key. Preparatory coats shall be thoroughly scored and roughened to form a proper key. Plaster shall be at least 10mm thick and not more than 20mm.

All final coats of paving and plastering shall be executed in one operation without any blemishes. No touching up of finished work will be permitted.

PE 4.7 **Granolithic screed**

Granolithic shall be composed of one part cement, one part fine sand, two parts coarse sand and one part of granite or other approved stone aggregate that will pass through a 5mm mesh sieve, finished with a steel trowel to a smooth polished surface and cured for at least seven days after laying.

Coloured granolithic shall be carried out in one operation and shall be tinted to the required colour with approved colouring pigment mixed into the finishing coat. Under no circumstances is the pigment to be sprinkled on and trowelled in after granolithic is laid.

Granolithic shall be divided into panels not exceeding 6m² with V-joints and deep trowel cuts.

PE 4.8 **Painting**

PE 4.8.1 **Preparatory work for plastered surfaces, etc.**

Plastered surfaces shall be thoroughly washed down and brushed in order to remove any traces of efflorescence and allowed to dry completely before any paint finish is applied. Before any paint is applied, holes, cracks and irregularities in plaster and other surfaces shall be filled with a suitable filler and finished smooth. Unfinished concrete surfaces shall have all projections rubbed off and shall be thoroughly cleaned with a spirits-of-salts to 4 parts water).

PE 4.8.2 **Preparatory work for metal surfaces**

Metal surfaces shall be sanded, where necessary, washed with a suitable cleaning agent and left smooth.

Protective coatings applied by manufacturers to galvanized metal surfaces shall be removed with a suitable agent and the surfaces washed down.

Rust, grease and defective factory primers on metal surfaces to be painted, as well as pitch on cast iron pipes, shall be removed.

PE4.8.3 **Preparatory work for wood surfaces**

Knots in woodwork shall be treated with knotting and cracks, splits and holes caused by nails filled with a suitable filler. Wood surfaces shall be sanded smooth.

PE 4.8.4 **Application of paint**

Primers to wood surfaces shall be applied by brush. Primers to other surfaces may be applied by roller with the approval of the Engineer. Undercoats and finishing coats may be applied by brush or roller.

Paint shall not be sprayed on except in the case of cellulose and other special paints where spray painting is the accepted method of application.

Before subsequent coats of paint are applied, the previous coat shall be properly dry and shall be sanded down where necessary.

PE 4.9 **Electrical work**

All the electrical fittings for lighting, power sockets, etc., will be done by the electrical contractor who designs and installs the pump control panel. See Particular Specification PD for details.

PE 4.9.1 **Switches and socket outlets**

All switches and switched socket outlets shall be of approved manufacture and comply with the specifications in Particular Specification in volume 4 and 5.

PE 4.9.2 **Luminaires**

All luminaires shall be complete with lamps, ballasts, chokes, control gear and all other accessories required. All luminaires shall be equipped with an earth terminal and shall be properly earthed.

Internal wiring of luminaires shall consist of heat-resisting PVC insulated stranded copper conductors of not less than 0,5mm².

Luminaires shall be designed to prevent excessive temperatures and components and materials shall be selected so that they are not adversely affected by the operating temperature.

The voltage rating and lamp wattage shall be clearly and indelibly marked on control gear. Ballasts shall be power factor corrected to at least 0,9 lagging and shall have a minimum circuit efficiency of 0,85. See Particular Specification PD for details.

PE4.9.3 Fixing of luminaires

Luminaires shall be wall mounted and be secured by at least two screws into the outlet box, using sherardized steel screws.

Fluorescent luminaires other than single or double tube luminaries of 1,2m long or less shall be supported in at least two positions, each of which shall be not exceeding 450mm from the ends of the luminaires.

Fixing in the concrete roof slabs shall not be allowed.

PE 4.10 Installation

The entire electrical installation shall be executed in accordance with SABS 0142 "The wiring of premises".

PE 5 **MEASUREMENT AND PAYMENT**

PE 5.1 General

The descriptions of the items on the drawings and in the specifications shall include all materials and labour required to install the item complete and according to specifications.

PE 5.1.1 Walls

The unit of measure for building wall is m² and the rate per unit shall include the full cost of the item for procurement of all required materials, transport to site, off loading of the materials, placement/construction and finishing off to the required standard.

PE 5.1.2 Reinforce Concrete Beams

The unit of measure is "Sum" for the complete item. The rate shall include the full cost of all the materials, including concrete, reinforcing steel and formwork, as well as the scaffolding/support for the curing period and all the labour costs, the contractors profit, overheads etc.

PE 5.1.3 Concrete Roof Slab (constructed in situ)

The unit of measure for constructing the reinforced concrete roof in situ is per m² and rate per unit shall include the full cost of all the materials, including concrete, reinforcing steel and formwork, as well as the scaffolding/support for the curing period and all the labour costs, the contractors profit, overheads etc.

PE 5.1.4 Roof Alternative Concrete - Roof Slab Construction (using prefabricated panels)

The unit of measure for constructing the reinforced concrete roof in situ is per m². The rate shall include the full cost of procurement of all the material, transport to site, off loading of the material, placement/construction and finishing off to the required standard.

PE 5.1.5 Painting of walls

The unit of measure for painting the walls is m² and the rate per unit shall include the full cost of the materials and labour to prepare the wall surface, apply the specified products and the required number of coatings as per the specification.

PE 5.1.6 Painting of Doors and Frames

The unit of measure for painting the doors and frames is per item (number) and the rate shall include the full cost of the materials and labour to prepare the surfaces, apply the specified products and the required number of coatings including priming as per the specification.

C3.5.1 MANAGEMENT OF THE WORKS**C3.5.1.1 Applicable SANS standards**

As specified under Clause C3.4

C3.5.1.2 Particular / generic specifications

As specified under Clause C3.4

C3.5.1.3 Planning and Programming

The time for completion will be 6 months, which includes all statutory public holidays for the Civil Engineering Industry falling within the authorised contract period, as well as the end-of-the-year builder's holiday.

The Contractors programme shall, in terms of the provisions of Clause 12 of the GCC clearly show the anticipated quantities of work to be performed each month, together with the manner in which the listed plant is to be used, as well as the anticipated earnings for the various sections of work.

The programme is to clearly show the critical path and this path is to be able to be identified through all the various programme activities.

If, during the progress of the work, the quantities of work performed per month fall below those shown 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, within one week after being notified by the Engineer, submit a revised programme.

If the programme is to be revised by reason of the Contractor falling behind his programme, he 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. Any proposal to increase the tempo of work must be accompanied by positive steps to increase production by providing more labour and-plant on site, or by using the available labour and plant in a more efficient manner.

Failure on the part of the Contractor to submit the programme or to work according to the programme or revised programme shall be sufficient reason for the Employer to take steps as provided for in Clause 9.2 of the Conditions of Contract.

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.

Also refer Clause 5.6 of the Conditions of Contract.

C3.5.1.4 Sequence of the works

The contractor is to plan and schedule his work in such a way that there is no interruption of services to the town.

The preliminary programme is to indicate the above.

C3.5.1.5 Software application for programming

The Contractor's programme shall be in Microsoft Project or in a similar format approved by the Engineer.

C3.5.1.6 Methods and Procedures

The Works shall be executed in terms of the various and applicable specifications, the general health and safety specifications and subsequent health and safety plan, the Conditions of Contract as well as the various clauses within the Scope of Work.

C3.5.1.7 Quality plans and control

Control Testing of Earthworks and Road Layers

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 tests, 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 re-tests required, due to failure of the initial tests, will be charged to the Contractor at the rates ruling at the time.

Acceptance control testing required by the Engineer will be carried out by an approved independent laboratory.

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.

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, materials 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 cost of supervision and process control, including testing carried out by the Contractor, will be deemed to be included in the rates bid for the related items of work.

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.

C3.5.1.8 Environment

The Contractor shall, for the duration of the contract, take appropriate measures to control the dust and soil movement which may arise due to his operations.

C3.5.1.9 Construction in Restricted Areas

Working space in certain areas may be restricted. The construction method used in these restricted areas largely depends on the Contractor's Plant and methods of construction. However, the Contractor must note that measurement and payment will be according to the specified cross-sections and dimensions irrespective of the method used, and that the rates and prices submitted will be deemed to include full compensation for difficulties

encountered while working in restricted areas. No extra payment nor any claim for payment due to these difficulties will be considered.

C3.5.1.10 Other Contractors on Site

No other contracts are envisaged to be in operation during the planned upgrading project.

C3.5.1.11 Accommodation of traffic on public roads occupied by the Contractor

The Contractor shall carry out, erect and maintain such temporary works and provide all temporary road signs, pipes, deviations, warning boards, barricades, signs, lighting and demarcations and the like, as are necessary to maintain and safeguard the normal flow of public and private vehicular and pedestrian traffic.

Work shall be undertaken in accordance with the S.A. Road Traffic Signs Manual and Road Signs Note No. 13, Roadwork (CSRA-CUTA Road Traffic Signs Sub-Committee).

C3.5.1.12 Recording of weather

Refer C3.4.11.

C3.5.1.13 Format of communications

All contractual communication shall be in writing.

The Contractor shall, for the full duration of the Contract Period, supply and maintain the following documentation:

- (a) Site Communication and Request Book.
- (b) Safety File containing all relevant safety data.
- (c) Daily register of all labour, plant and equipment.
- (d) Quality Control file containing all quality control/assurance forms and records.
- (e) Daily Register of labour and plant status.
- (f) One full set of Contract Drawings and documents.
- (g) Latest revision of the Construction Programme.

The above-mentioned shall be kept on Site and shall be accessible to the Employer's Agent at all times.

C3.5.1.14 Key personnel

Key personnel shall be on site at all times to control and supervise construction activities.

C3.5.1.15 Management meetings

The Contractor shall have regular site management meeting to coordinate and manage the Works.

Monthly Contract meeting shall be held on site. This meeting shall be chaired by the Employer's Agent.

C3.5.1.16 Forms for contract administration

The Employer, the Contractor and the Employer's Agent shall operate and maintain their own individual contract administration systems.

C3.5.1.17 Electronic payments

The Contractor must ensure that all interim payment certificates are accompanied by a Tax Invoice, with the Contractor's and the Employer's VAT Registration numbers printed thereon, to ensure timeous payment of the certificate. Contractors must allow 30 days from date of invoice for the payment to be effected.

Contractors wishing to be paid electronically must ensure that their correct banking details are also printed on their Tax Invoice.

C3.5.1.18 Spoil Material

No indiscriminate spoiling of material will be allowed. All surplus or unsuitable material shall be removed by the Contractor, transported to, and disposed of at the Municipal tip site or site designated and approved by the Engineer. The Contractor's tendered rate prices to also include for all overhaul costs and tip site charges.

The designated spoil sites for this contract shall be the Humansdorp Tip Site/s.

The Contractor should take note that no hazardous waste or hazardous materials - ie abandoned AC pipelines and materials, will be accepted at the Municipal tip site and these materials will have to be delivered to a facility which accepts hazardous waste.

Therefore, all abandoned and recovered asbestos cement pipelines, materials and the like shall be delivered to such a facility and the Contractor will be required to submit proof to the Engineer that these materials have been delivered and accepted by Waste-Tech or any other registered hazardous waste disposal facility.

The Contractor shall, for the duration of the contract, take appropriate measures to control the dust and soil movement, which may arise due to his operations.

C3.5.1.19 Length of Trenches

Because of the nature of the works, trenching and laying of pipes shall be so programmed that no length of trench remains open for more than 3 working days, unless otherwise permitted in writing by the Engineer. Further, the total length of open trenches shall not exceed 100 m at any one time unless a relaxation of this requirement is granted in writing by the Engineer.

C3.5.1.20 Daily records

A complete set of daily records indicating labour and plant on site, weather, work performed and any safety incidents, is to be kept on site and must be available for perusal by the Employer's Agent at all times.

C3.5.1.21 Bonds and guarantees

As specified elsewhere.

C3.5.1.22 Payment certificates

As specified elsewhere.

C3.5.1.23 Permits

Not applicable.

C3.5.1.24 Proof of compliance with the law

As specified elsewhere.

C3.5.1.25 Insurance provided by the employer

As specified elsewhere.

C3.5.1.22 “As built information”

As the work progresses, the Contractor shall keep full records of all amendments to and deviations from the drawings as issued to the Contractor at the start of the contract. The true positions, invert levels and ground levels of all services shall be surveyed after construction and indicated on the drawings, for which purpose the Contractor shall receive a separate complete set of drawings at no cost, from the Employer's Agent. The Contractor must provide as-built survey information in digital format. In addition, the Contractor shall provide a copy of all quality control test results signed off by the Employer's Agent as part of the as-built information submission.

The Completion Certificate shall only be issued after the Employer's Agent has received a properly completed set of "As Built" drawings and signed off test results from the Contractor. This set of information shall be approved and signed by the Contractor's Contracts Manager. No additional payment will be entertained as a result of this requirement.

C3.5.1.23 Testing

Process control

The Contractor shall arrange for all tests required for process control to be done by an accredited laboratory acceptable to and approved by the Employer's Agent.

The Contractor may establish his own laboratory on site 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 Employer's Agent. The costs for these tests shall be deemed to be included in the relevant rates and no additional payment will be made for testing as required.

Acceptance control

The process control test results submitted by the Contractor for approval of materials and workmanship may be used by the Employer's Agent for acceptance control. However, before accepting any work, the Employer's Agent 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.

C3.5.1.24 Management of EE's/QSE's

The monthly fee shall include full compensation for all guidance, mentoring, training, supervision, setting out and monitoring activities that may be deemed necessary to ensure the Works carried out by EE's/QSE's are in accordance with the technical and OHS specifications and within the agreed timeframes.

C3.5.1.25 Provisional Sum for the Variation in Rates

Works packages will be negotiated with the EEs/QSEs and any variance in the Contractor's agreed rates and the EEs/QSEs rates, both positive and negative will be set off under a provisional item included in the Preliminary and General section of the Bill of Quantities.

C3.5.2 HEALTH AND SAFETY

The Contractor shall comply with the Employers health and safety specifications as specified in Particular Specification PB.

C3.5.2.1 Health and safety requirements and procedures of the employer

- (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 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.
 - (vi) The Contractor shall furthermore, in compliance with Constructional Regulations 2014 (Notice No 10113, dated 7 February 2013) to the Act 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 coherent site specific 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 for approval, to the Employer or his agent, within 14 days of the Commencement Date and shall be implemented and maintained from the commencement of the Works. 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.
 - (vii) 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 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.
 - (viii) The proposed type of work, materials to be used and potential hazards likely to be encountered on this Contract are detailed in the C3.4: Construction, the Bill of Quantities, the Drawings, and

in the Employers' health and safety specification (regulation 5(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.

C3.5.2.2 Protection of the public

The Contractor shall at all times ensure that his operations do not endanger any member of the public.

As the site is public area the Contractor shall take special precautions to prevent public access to any danger areas on the Works, e.g. by temporary barricades and/or fencing.

C3.5.2.3 Barricades and lighting

The full extent of all areas in which plant and personnel are operating shall be at all times be clearly demarked and barricaded to prevent access by members of the public.

C3.5.2.4 Traffic control on roads

As specified elsewhere.

C3.5.2.5 Measures against disease and epidemics

As specified elsewhere.

C3.5.2.6 Aids awareness

Not applicable.

THE CONTRACT

PART 4 (OF 4): SITE INFORMATION

- C4.1 Scope**
- C4.2 Subsoil Investigation**
- C4.3 Site Mapping & Hydrological Data**
- C4.4 Interpretation of Geotechnical Investigation**
- C4.5 Existing Services**
- C4.6 Existing Buildings & Structures**
- C4.7 Atmospheric & Environmental Criteria**
- C4.8 Finishing off of the Site**

C4.1	SCOPE
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For the purposes of the Contract it will be deemed that, prior to submitting their Tender, the Contractor has acquainted himself fully with the specifications, information and data provided within the various and applicable SANS/SABS specifications, the EMP, the health and safety specifications, subsequent health and safety plan, the Conditions of Contract as well as the various clauses within the Scope of Work.

The Contractor shall have no claim against the Employer in respect of geotechnical or subsurface conditions encountered during the course of the Contract.

The documentation included in this section describes the site as at the time of tender to enable the tenderer to price his tender and to decide upon his method of working and programming.

Only actual information about physical conditions on the site and its surroundings have been included in this section and interpretation is a matter for the tenderers.

C4.2	SUBSOIL INVESTIGATIONS, BOREHOLE RECORDS AND TEST RESULTS
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A Geotechnical investigation will be conducted in specific positions in order to determine the sub-soil conditions. This information and results will be made available at the time of construction.

Tenderers who wish to dig trial holes as part of their own pre tender soil investigations shall do so at their own cost and they must first notify the Engineer to obtain information to ensure that existing underground services are not damaged when trial holes are made.

C4.3	REPORTS OBTAINED BY THE EMPLOYER CONCERNING THE PHYSICAL CONDITIONS WITHIN THE SITE OR ITS SURROUNDINGS INCLUDING MAPPING, HYDRO-GRAPHIC DATA, AND HYDROLOGICAL INFORMATION
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Nil

C4.4	REFERENCES TO PUBLICLY AVAILABLE INFORMATION ABOUT THE SITE AND ITS SURROUNDINGS SUCH AS PUBLISHED PAPERS AND INTERPRETATIONS OF THE GEOTECHNICAL INVESTIGATION
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Nil

C4.5	INFORMATION ABOUT PIPED AND OTHER SERVICES BELOW THE SURFACE OF THE SITE FOR CONTRACTS INVOLVING GROUND WORKS, AND ABOUT HOOK-UP AND BOUNDARY DETAILS FOR CONTRACTS WITH PLANT INTERFACES, IN ADDITION TO ANYTHING ABOUT THE PHYSICAL SITE WHICH IMPACTS UPON THE CONTRACT
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The Contractor is responsible for locating all existing services and should contact the relevant officials at the Kouga Local Municipality in order to determine the exact location and operation of the services. The Contractor is responsible for the protection of all affected existing services for the duration of construction.

The Contractor's attention is further directed to the various specifications and conditions under the SANS 1200 A Standardized Specification as amended under the Scope of Work as well as to the applicable Clauses within the Conditions of Contract.

C4.6	INFORMATION ABOUT ADJACENT BUILDINGS AND STRUCTURES, AND ABOUT EXISTING BUILDINGS AND STRUCTURES ON THE SITE (RESTRICTIONS FOR HEAVY LOADS ETC.)
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Nil

C4.7	ATMOSPHERIC AND ENVIRONMENTAL CRITERIA
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The Contractor shall comply with National Environmental Management Act (Act 107 of 1998, as amended) as well as Particular Specification PB: Environmental Management Plan Implementation Specifications

The Contractor's attention is further directed to the various specifications and conditions under the SANS 1200 A Standardized Specification as amended under the Scope of Work as well as to the applicable Clauses within the Conditions of Contract.

C4.8	FINISHING-OFF OF THE SITE
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The site shall be finished-off in accordance with the specifications and to the satisfaction of the Employer's Agent.

APPENDIX A

LIST OF TENDER DRAWINGS

List of Tender Drawings:

DRAWING No.	DESCRIPTION
GENERAL:	
2299-T-001	LOCALITY PLAN
2299-T-002	EXISTING SERVICES LAYOUT
2299-T-003	PROJECT NAMEBOARD
PLAN LAYOUTS:	
2299-T-100	PROPOSED SEWER INFRASTRUCTURE UPGRADES
2299-T-101	SEWER RISING MAIN KEY PLAN
SEWER RISING MAIN COMPOSITE PLAN AND LONG SECTIONS:	
2299-T-200	GEELHOUT TO KWANOMZAMO WWTW SEWER RISING MAIN (SHEET 1 OF 3)
2299-T-201	GEELHOUT TO KWANOMZAMO WWTW SEWER RISING MAIN (SHEET 2 OF 3)
2299-T-202	GEELHOUT TO KWANOMZAMO WWTW SEWER RISING MAIN (SHEET 3 OF 3)
SEWER RISING MAIN DETAILS:	
2299-T-300	AIR VALVE CHAMBER DETAILS
2299-T-301	ISOLATION VALVE CHAMBER DETAILS
2299-T-302	STILLING CHAMBER AND TRENCH DETAILS
2299-T-303	AIR VALVE & NON RETURN VALVE CHAMBER DETAILS
PUMP STATION DETAILS:	
2299-T-400	PUMP STATION, SUMP AND STRUCTURE LAYOUT DETAIL
2299-T-401	PUMP STATION AND SUMP FOUNDATION REINFORCING DETAILS
2299-T-402	PUMP STATION AND SUMP REINFORCING DETAILS
2299-T-403	PUMP STATION ELEVATION DETAILS
2299-T-404	INLET SCREENING CHAMBER DETAILS
2299-T-405	PUMP STATION EARTHWORKS, FENCE AND GATE DETAILS
2299-T-406	ELECTRICAL - KWANOMZAMO PUMP STATION - POWER LAYOUT
2299-T-407	ELECTRICAL - KWANOMZAMO PUMP STATION - LIGHTING LAYOUT
2299-T-408	ELECTRICAL - KWANOMZAMO PUMP STATION - SLEEVES & DATA LAYOUT



FOR TENDER		AS BUILT - NOTES		AMENDMENTS				SCALE	SCALE ON REDUCED DRAWING	DESIGN		CH	ENGINEERING ADVICE AND SERVICES associated with ULWAZI 73 Heugh Road, Walmer P.O. Box 13867 Humewood Port Elizabeth 6013 tel/fax: (041) 581 2421		APPROVED		APPROVED		PROJECT		CONTRACT NO. 220/2024	
				NO.		DATE	DESCRIPTION			APPROVED	DRAWN				EAR	ENGINEER			CLIENT	IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION AND RISING MAIN TO BUNGALOWS		
															PJ					DWG DESCRIPTION		
															NOV 2024					LOCALITY PLAN - SUPPLY FROM PROPOSED GEELHOUT PUMP STATION TO EXISTING KWANOMZAMO WWTW		
																				ISSUE		



FOR TENDER		AMENDMENTS			SCALE 1 : 2000	SCALE ON REDUCED DRAWING 0 10 20 30 100 m	DESIGN	CH	ENGINEERING ADVICE AND SERVICES associated with ULWAZI 73 Heugh Road, Walmer P.O. Box 13867 Humewood Port Elizabeth 6013 tel/fax: (041) 581 2421		APPROVED	APPROVED		PROJECT	CONTRACT NO.
		NO.	DATE	DESCRIPTION			DRAWN	EAR			ENGINEER	CLIENT		IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION AND RISING MAIN TO BUNGALOWS	220/2024
							APPROVED	PJ			DATE	DATE		DWG DESCRIPTION	DWG NO.
							DATE	NOV 2024						EXISTING SERVICES	2299-T-002
															ISSUE

2805

2605

75

25

25

75

100

200

50

350

150

50

100

50

500

50

150

75

50

75

100

150

100

25

2000

750

500

150

100

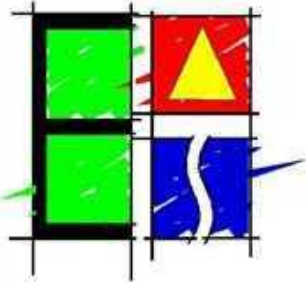
25

IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION AND RISING MAIN TO BUNGALOWS

For/uKwenzela: KOUGA MUNICIPALITY

CONSULTING ENGINEERS/UNXIBELELWANO KWEZOBUNJINELI

Font : Technical, logo to be supplied



ENGINEERING ADVICE & SERVICES

CONTRACTORS / IQELA LABAKHI

NAME OF FIRM

Oxford blue border

Oxford blue on White background

R 25

R 75

Gloss white on Smoke grey background

White

Leave margin clear before name

COLOUR SPECIFICATION

1. GLOSS WHITE

2. SMOKE GREY - 692 of BS 381 (c) of 1964

3. OXFORD BLUE - 105 of BS 381 (c) of 1964

FOR TENDER

AMENDMENTS			
NO.	DATE	DESCRIPTION	APPROVED

SCALE

SCALE ON REDUCED DRAWING



N/A

DESIGN	CH
DRAWN	EAR
APPROVED	PJ
DATE	NOV 2024

ENGINEERING ADVICE AND SERVICES associated with ULWAZI

73 Heugh Road, Walmer

P.O. Box 13867

Humewood

Port Elizabeth

6013

tel/fax: (041) 581 2421



APPROVED	APPROVED
ENGINEER	CLIENT
DATE	DATE



KOUGA

Local Municipality

Water & Sewerage Services

PROJECT	CONTRACT NO.
IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION AND RISING MAIN TO BUNGALOWS	220/2024
DWG DESCRIPTION	DWG. NO.
PROJECT NAMEBOARD	2299- T-003

LEGEND

CADASTRAL

2.5m CONTOURS

PROPOSED 250mm Ø SEWER RISING MAIN

DRAINAGE PATHS

KWANOMZAMO EAST + KWANOMZAMO WEST + SHUKUSHUKUMA + UPPER GOLF COURSE KWANOMZAMO 400 (POLAR PARK 553) + DIEP RIVIER

LOWER GOLF COURSE 153(POLAR PARK 553) + GEELHOUT EAST +GEELHOUT WEST + BUNGALOWS + POLAR PARK 257

1 IN 100 YEAR FLOODLINE

SEWER ZONES UNITS	
LOCATION	TOTAL UNITS
POLAR PARK 257	257
BUNGALOWS	103
LOWER GOLF COURSE 153 (POLAR PARK 533 SOUTH)	153
GEELHOUT WEST	625
GEELHOUT EAST	625



AS BUILT - NOTES

FOR TENDER

AMENDMENTS			
NO.	DATE	DESCRIPTION	APPROVED

SCALE

SCALE ON REDUCED DRAWING

DESIGN

CH

DRAWN

EAR

APPROVED

PJ

DATE

NOV 2024

ENGINEERING ADVICE AND SERVICES associated with ULWAZI

73 Heugh Road, Walmer

P.O. Box 13867

Humewood

Port Elizabeth

6013

tel/fax: (041) 581 2421

APPROVED

ENGINEER

DATE

APPROVED

CLIENT

DATE

KOUGA

local municipality

Good Governance Through Service Excellence

PROJECT

IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION AND RISING MAIN TO BUNGALOWS

DWG DESCRIPTION

PROPOSED KWANOMZAMO SEWER INFRASTRUCTURE UPGRADES & WATERSHEDS

CONTRACT NO.

220/2024

DWG. NO.

2299-T-100

ISSUE

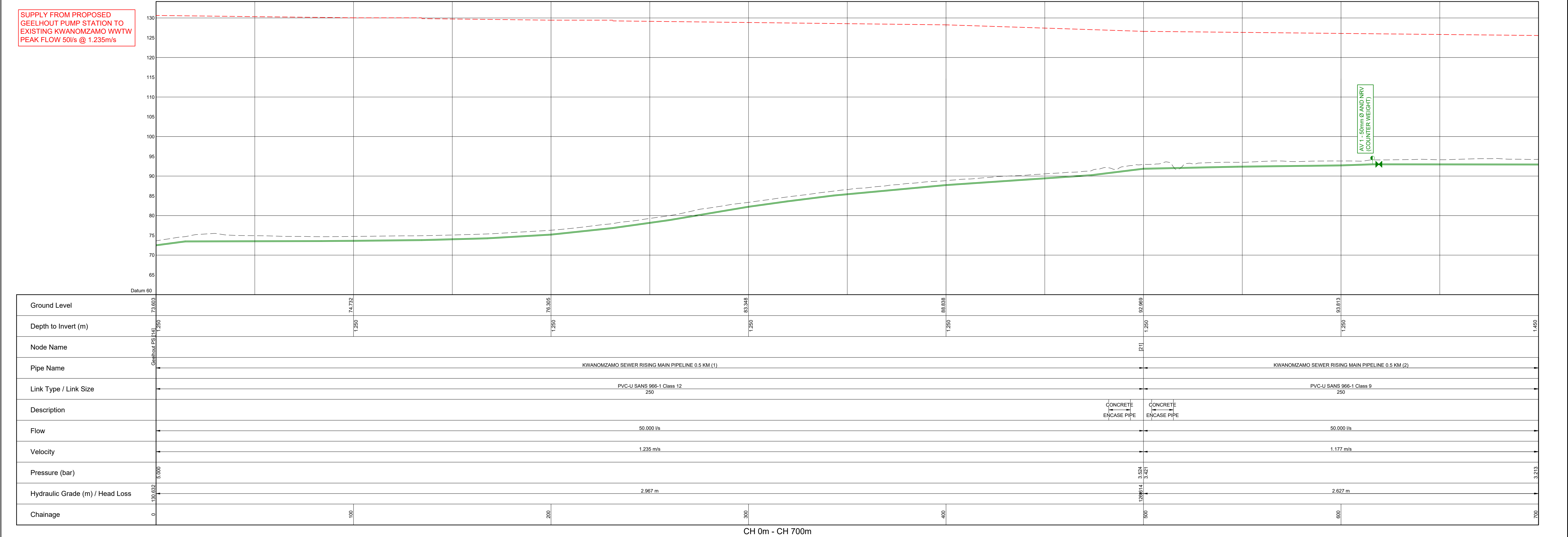
LEGEND

CADASTRAL

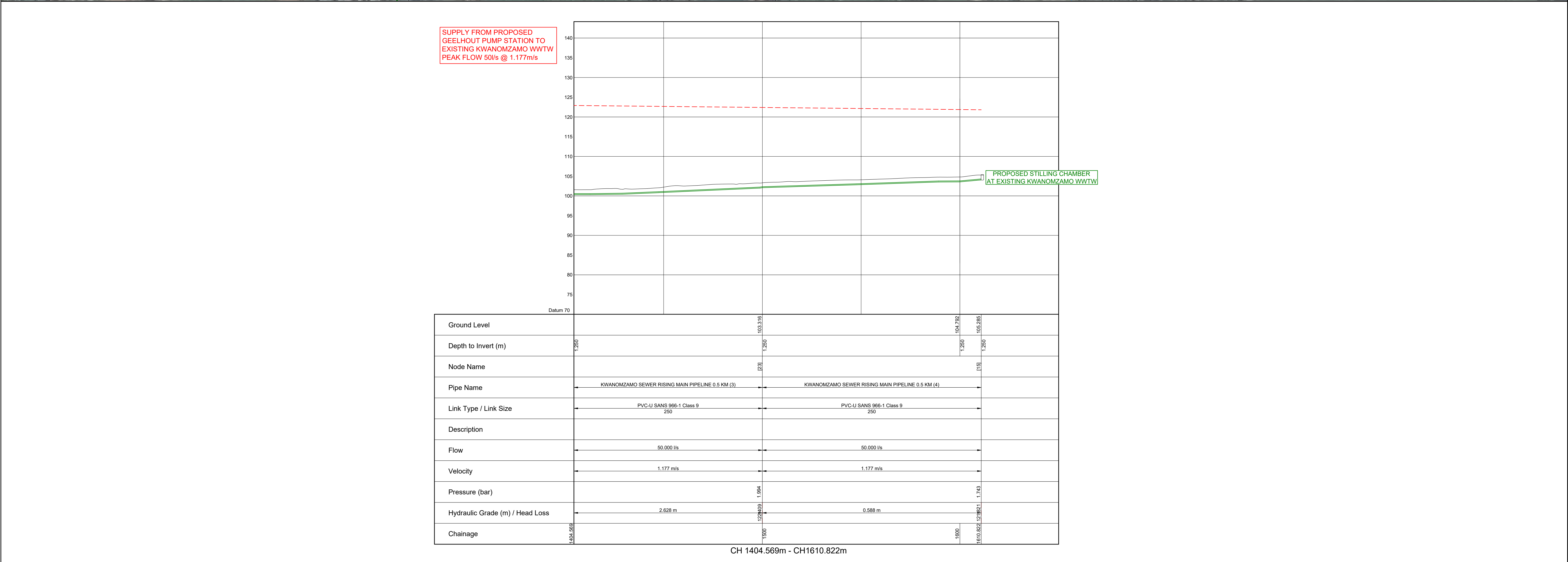
PROPOSED 250mm Ø SEWER RISING MAIN



FOR TENDER		AMENDMENTS			SCALE 1:2500	SCALE ON REDUCED DRAWING 0 12.5 25 50 125 m	DESIGN	CH	ENGINEERING ADVICE AND SERVICES associated with ULWAZI 73 Heugh Road, Walmer P.O. Box 13867 Humewood Port Elizabeth 6013 tel/fax: (041) 581 2421		APPROVED	APPROVED		PROJECT	IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION AND RISING MAIN TO BUNGALOWS	CONTRACT NO. 220/2024
		NO.	DATE	DESCRIPTION			DRAWN	EAR			ENGINEER	CLIENT		DWG DESCRIPTION		
							APPROVED	PJ						SUPPLY FROM PROPOSED GEELHOUT PUMP STATION TO EXISTING KWANOMZAMO WWTW - KEY PLAN		
							DATE	NOV 2024								







FOR TENDER

AS BUILT - NOTES

AMENDMENTS

NO.	DATE	DESCRIPTION	APPROVED

SCALE

SCALE ON REDUCED DRAWING

DESIGN

CH

ENGINEERING ADVICE AND SERVICES associated with ULWAZI

APPROVED

APPROVED

PROJECT

CONTRACT NO.

73 Heugh Road, Walmer P.O. Box 13867 Humewood Port Elizabeth 6013 tel/fax: (041) 581 2421

IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION AND RISING MAIN TO BUNGALOWS

DWG DESCRIPTION

DWG NO.

ISSUE

NOV 2024

2299-T-202

220/2024

GENERAL NOTES APPLICABLE TO ALL MANHOLES,
CHAMBERS AND STEEL PIPEWORK:

- ALL DIMENSIONS IN MILLIMETERS.
- ALL LEVELS IN M.S.L.
- 15mm SPX 120 (OR SIMILAR APPROVED) CLOSED CELL FOAM TO BE WRAPPED AROUND THE PERIMETER OF ALL PIPEWORK PASSING THROUGH BRICKWORK OR CONCRETE.
- ALL FLANGES FOR PIPES AND FITTINGS SHALL COMPLY WITH THE REQUIREMENTS OF SABS 1123/NP1600/3.
- ALL FLANGES SHALL BE T16 AND TO BE SUPPLIED COMPLETE WITH SUITABLE FULL-FACE GASKETS.
- ALL BOLTS, NUTS AND WASHERS SHALL BE STAINLESS STEEL GRADE 316L.
- ALL VALVES TO HAVE VALVE MARKERS AND BE ANTI-CLOCKWISE CLOSING CLASS 16, WITH HANDWHEEL IF IN CHAMBER, OTHERWISE WITH CAP TOP.
- ALL LEVELS AND DIMENSIONS SHALL BE CHECKED AND AGREED WITH THE ENGINEER BEFORE ANY WORK MAY COMMENCE.
- ALL STEEL PIPES AND SPECIALS TO BE MILD STEEL GALVANISED 720 SIGMA COATED.
- ALL EXCAVATIONS SHALL BE INSPECTED BY THE ENGINEER BEFORE THE PLACEMENT OF ANY CONCRETE.
- ALL FLANGED JOINTS (EXCLUDING GLANDS) TOGETHER WITH THEIR BOLTS ARE TO BE PROTECTED FROM CORROSION BY MEANS OF AN APPROVED PROTECTIVE PASTE AND SHALL THEN BE WRAPPED WITH 3 LAYERS OF APPROVED IMPREGNATED TAPE OF NOT LESS THAN 50mm WIDTH OR OTHER MEANS OF INHIBITING CORROSION WHICH SHALL BE APPROVED BY THE ENGINEER.
- ALL PVCu PIPES SHALL COMPLY WITH THE REQUIREMENTS OF SANS 966-1.
- REFER TO THE SCOPE OF WORK FOR CORROSION PROTECTION OF STEEL PIPES, SPECIALS AND FITTINGS AS WELL AS CI PIPES, SPECIALS, FITTINGS AND VALVES.

FOR BRICK CHAMBERS:

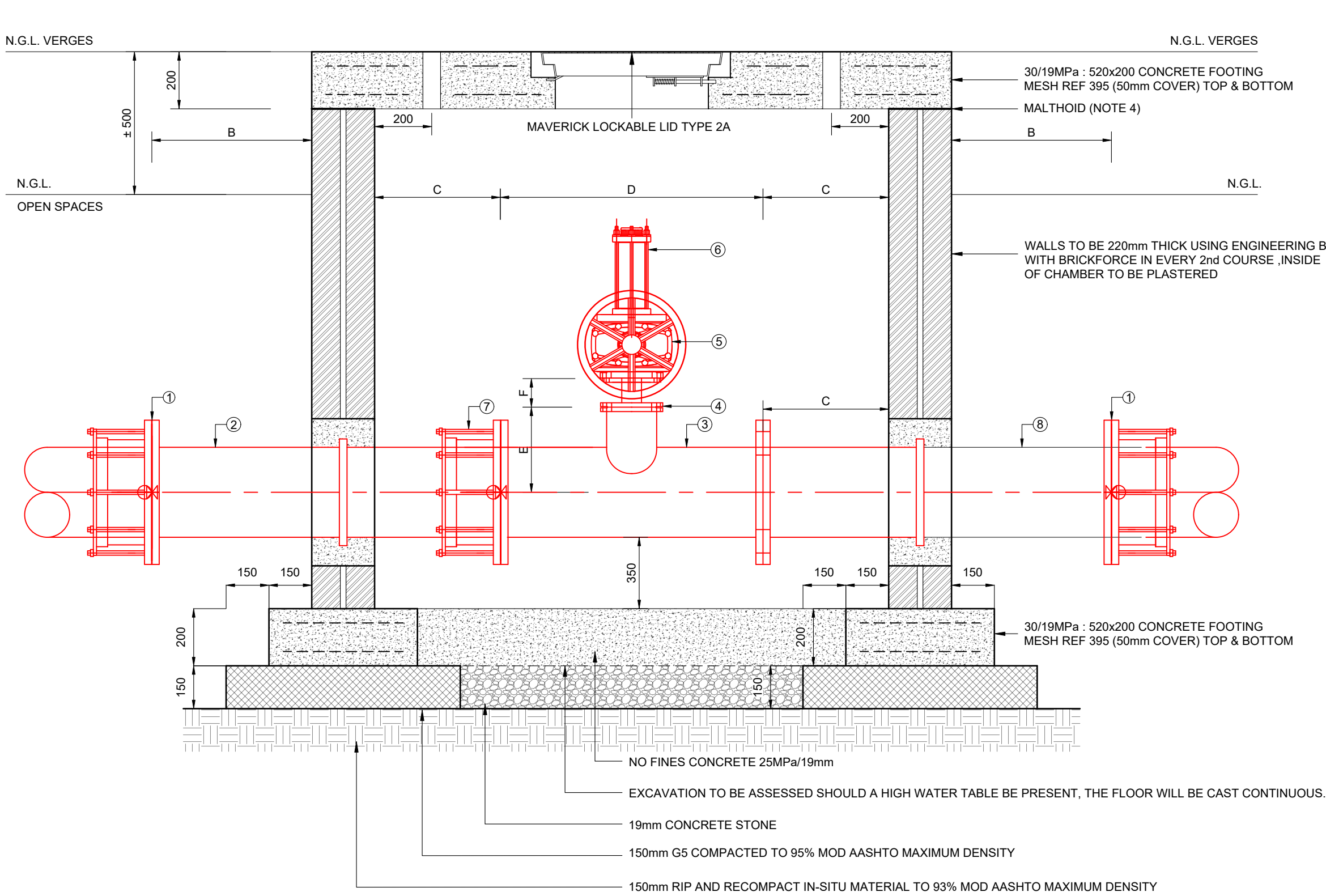
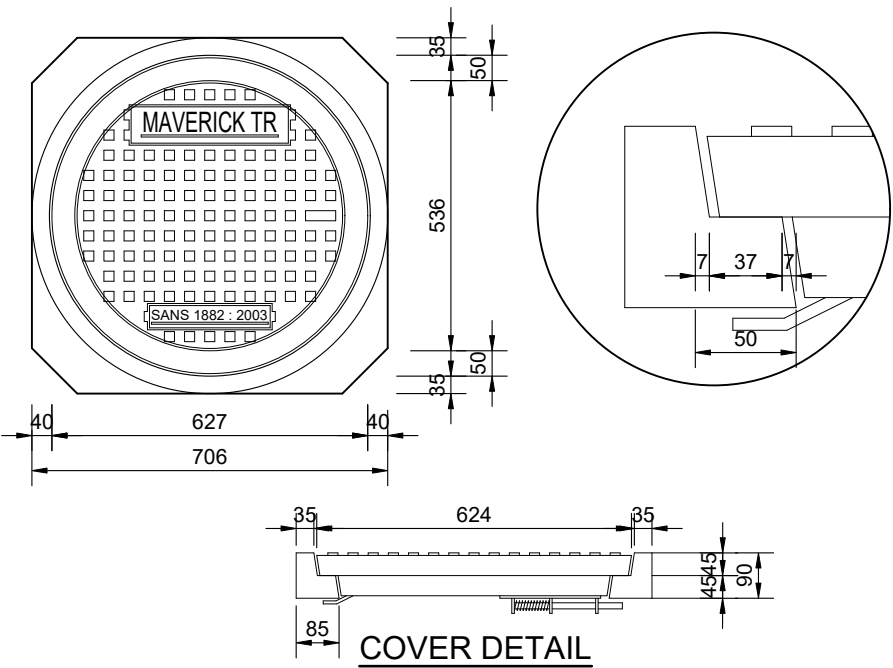
- CONCRETE SHALL BE 30 MPa.
- ALL VISIBLE CONCRETE CORNERS AND EDGES SHALL BE CHAMFERED (25 x 25mm).
- ALL BRICKS SHALL BE LAID IN STRETCHER BOND AND SHALL BE NFX ENGINEERING BRICK (28MPa) UNITS COMPLYING WITH THE REQUIREMENTS OF SABS 227. BRICKFORCE EVERY SECOND LAYER. TWO LAYERS OF MALTHOID SHALL BE PROVIDED BETWEEN ROOF SLAB AND BRICKWORK TO ACCOMMODATE MOVEMENT.
- 50mm COVER TO BE APPLIED TO ALL STEEL REINFORCING.
- CALCAMITE STEP - IRONS TO BE INSTALLED BELOW MANHOLE COVER AT 300mm VERTICAL CENTRES, STARTING AT 300mm ABOVE THE FLOOR LEVEL AND STAGGERED AT 300mm CENTRES HORIZONTALLY.
- CALCAMITE STEP IRON (ONLY REQUIRED IF CHAMBER DEPTH >2m)

ITEM LIST:

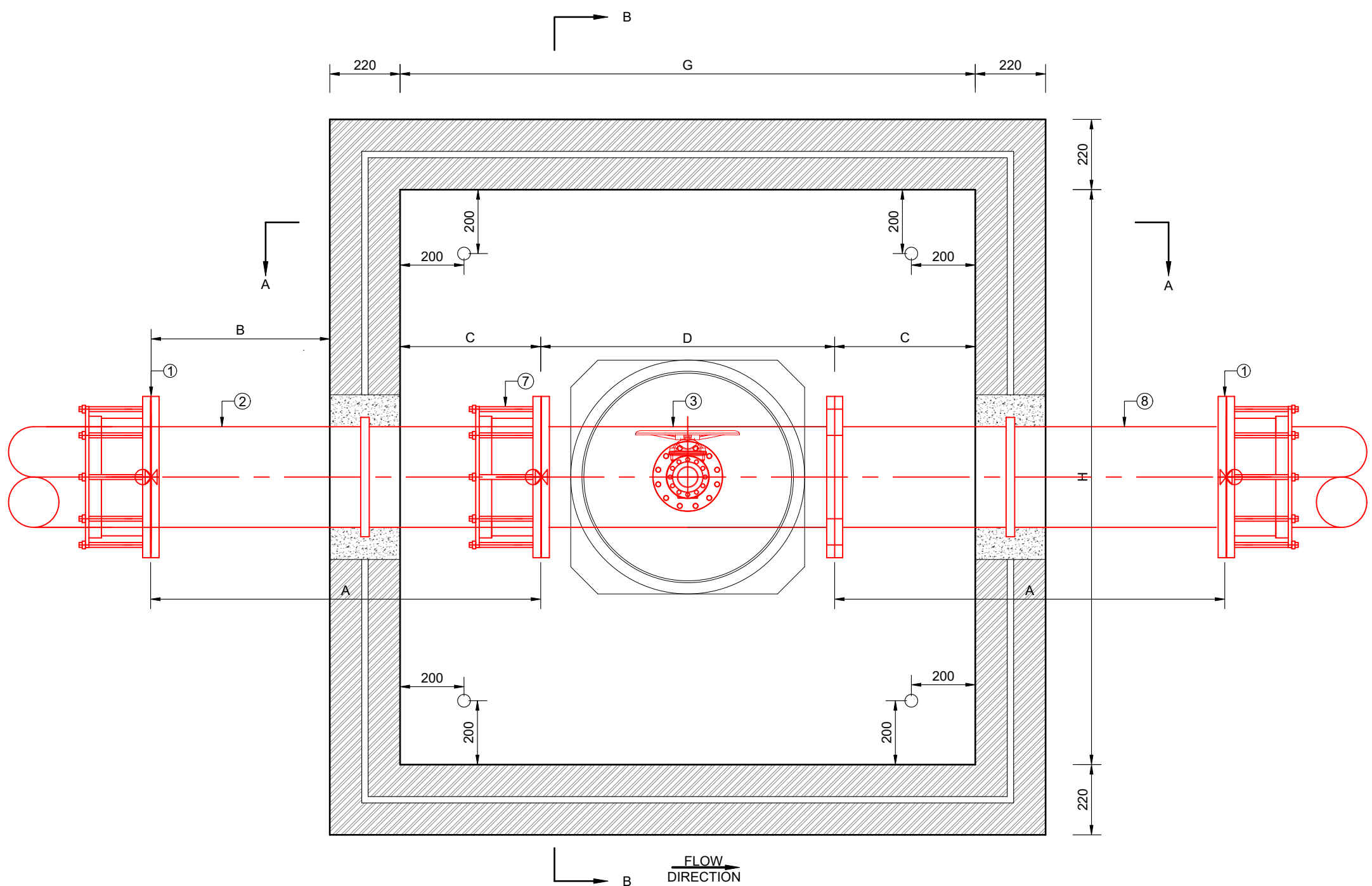
- *uPVC PIPE Ø7mm LONG BARREL VJ FLANGE ADAPTER.
- *FITTING Ø7mm MILD STEEL GALVANIZED 720 SIGMA COATED SPOOL PIECE FLANGED ON BOTH SIDES, WITH TOTAL LENGTH = 820mm CENTRALLY PLACED.
- *FITTING Ø7mm AS PER TABLE 1 mm x *ACCUMULATION CHAMBER Ø7mm MILD STEEL GALVANIZED 720 SIGMA COATED REDUCING TEE, FLANGE TO FLANGE LENGTH = AS PER DIMENSION D.
- *ACCUMULATION CHAMBER Ø7mm BLANK FLANGE LENGTH = AS PER DIMENSION F mm IN TABLE 1 *AIR VALVE Ø7mm MILD STEEL GALVANIZED 720 SIGMA COATED SPOOL PIECE.
- *AIR VALVE Ø7mm GATE VALVE LHC, FLANGED WITH HAND WHEEL.
- *AIR VALVE Ø7mm VENTO-MAT-RGX AIR VALVE PN 16 OR SIMILAR APPROVED.
- *FITTING Ø7mm LONG BARREL VJ FLANGE ADAPTER.
- *FITTING Ø7mm MILD STEEL GALVANIZED 720 SIGMA COATED SPOOL PIECE FLANGED ON BOTH SIDES, WITH TOTAL LENGTH = 820mm AND PUDDLE FLANGED CENTRALLY PLACED.

NOTES:

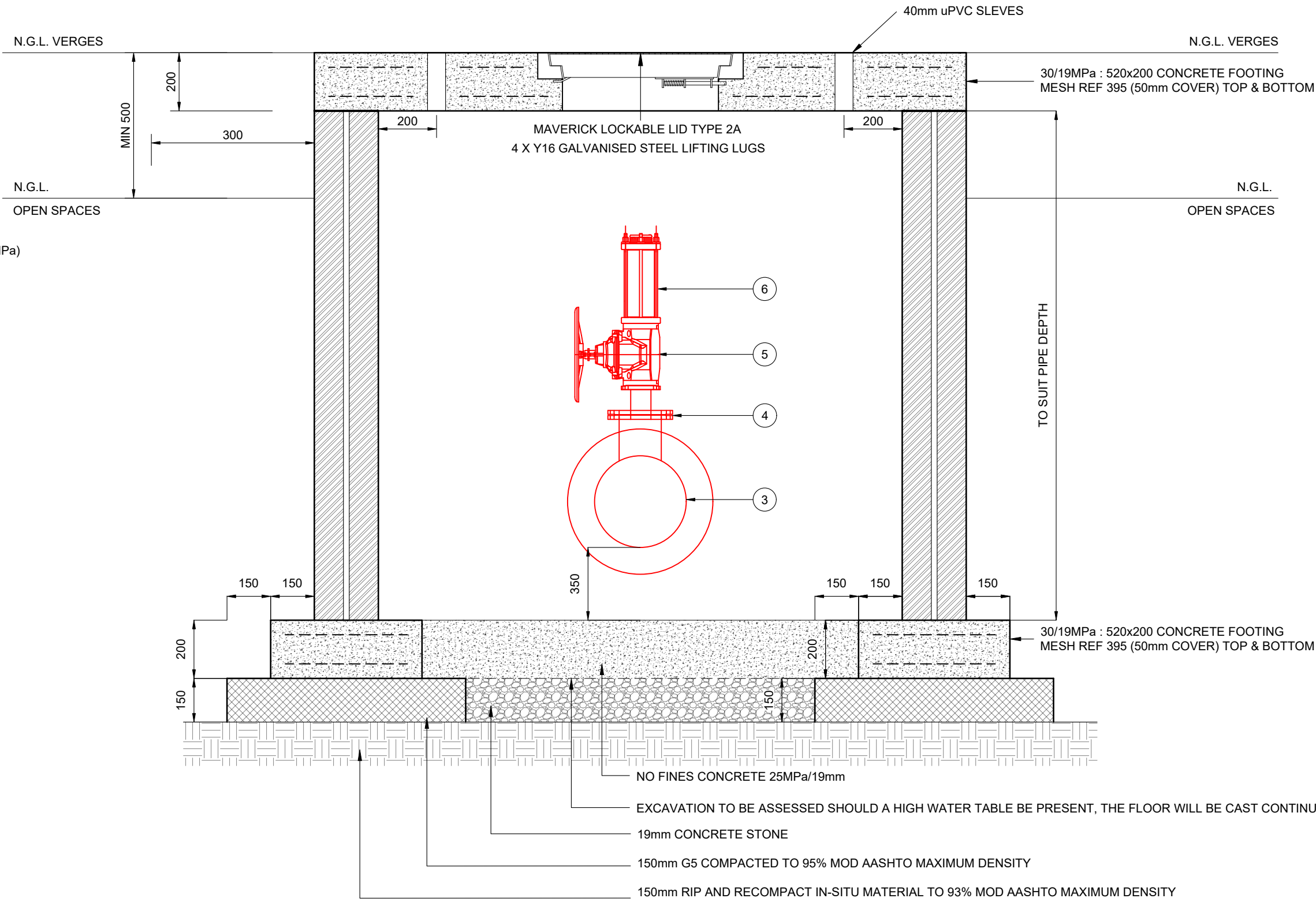
- EXACT POSITION OF CHAMBER TO BE DETERMINED ON SITE WITH ENGINEER AND KOUGA MUNICIPALITY REPRESENTATIVE.
- ALL EXISTING SERVICES TO BE EXPOSED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF CONSTRUCTION.



SECTION A-A



PLAN VIEW



SECTION B-B

TABLE 1 : AIR VALVE CHAMBER DIMENSIONS

u-PVC PIPE Ø (mm)	AIR VALVE SIZE (mm Ø)	PRESSURE CLASS	FITTING Ø (mm)	REDUCED FITTING Ø (mm)	A - mm	B - mm	C - mm	D - mm	E - mm	F - mm	G - mm	H - mm	DESCRIPTION
250	50	PN16	250	150	820	300	300	650	300	150	1250	1500	TYPE 1

*AS BUILT - NOTES

FOR TENDER

AMENDMENTS

NO.	DATE	DESCRIPTION	APPROVED

SCALE



1 : 15

SCALE ON REDUCED DRAWING



DESIGN

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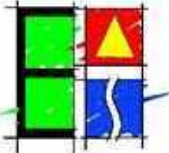
APPROVED

PJ

DATE

NOV 2024

ENGINEERING ADVICE
AND SERVICES
associated with ULWAZI
73 Heugh Road, Walmer
P.O. Box 13867
Humewood
Port Elizabeth
6013
tel/fax: (041) 581 2421



APPROVED

ENGINEER

DATE

APPROVED

CLIENT

DATE



PROJECT

IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION
AND RISING MAIN TO BUNGALOWS

DWG DESCRIPTION

AIR VALVE CHAMBER DETAILS

CONTRACT NO.

220/2024

DWG NO.

2299-T-300

ISSUE

GENERAL NOTES APPLICABLE TO ALL MANHOLES,
CHAMBERS AND STEEL PIPEWORK:

- ALL DIMENSIONS IN MILLIMETERS.
- ALL LEVELS IN M.S.L.
- 15mm SPX 120 (OR SIMILAR APPROVED) CLOSED CELL FOAM TO BE WRAPPED AROUND THE PERIMETER OF ALL PIPEWORK PASSING THROUGH BRICKWORK OR CONCRETE.
- ALL FLANGES FOR PIPES AND FITTINGS SHALL COMPLY WITH THE REQUIREMENTS OF SABS 1123NP1600/3.
- ALL FLANGES SHALL BE T16 AND TO BE SUPPLIED COMPLETE WITH SUITABLE FULL-FACE GASKETS.
- ALL BOLTS, NUTS AND WASHERS SHALL BE STAINLESS STEEL GRADE 316L.
- ALL VALVES TO HAVE VALVE MARKERS AND BE ANTI-CLOCKWISE CLOSING CLASS 16, WITH HANDWHEEL IF IN CHAMBER, OTHERWISE WITH CAP TOP.
- ALL LEVELS AND DIMENSIONS SHALL BE CHECKED AND AGREED WITH THE ENGINEER BEFORE ANY WORK MAY COMMENCE.
- ALL STEEL PIPES AND SPECIALS TO BE MILD STEEL GALVANISED 720 SIGMA COATED.
- ALL EXCAVATIONS SHALL BE INSPECTED BY THE ENGINEER BEFORE THE PLACEMENT OF ANY CONCRETE.
- ALL FLANGED JOINTS (EXCLUDING GLANDS) TOGETHER WITH THEIR BOLTS ARE TO BE PROTECTED FROM CORROSION BY MEANS OF AN APPROVED PROTECTIVE PASTE AND SHALL THEN BE WRAPPED WITH 3 LAYERS OF APPROVED IMPREGNATED TAPE OF NOT LESS THAN 50mm WIDTH OR OTHER MEANS OF INHIBITING CORROSION WHICH SHALL BE APPROVED BY THE ENGINEER.
- ALL PVCu PIPES SHALL COMPLY WITH THE REQUIREMENTS OF SANS 966-1.
- REFER TO THE SCOPE OF WORK FOR CORROSION PROTECTION OF STEEL PIPES, SPECIALS AND FITTINGS AS WELL AS CI PIPES, SPECIALS, FITTINGS AND VALVES.

FOR BRICK CHAMBERS:

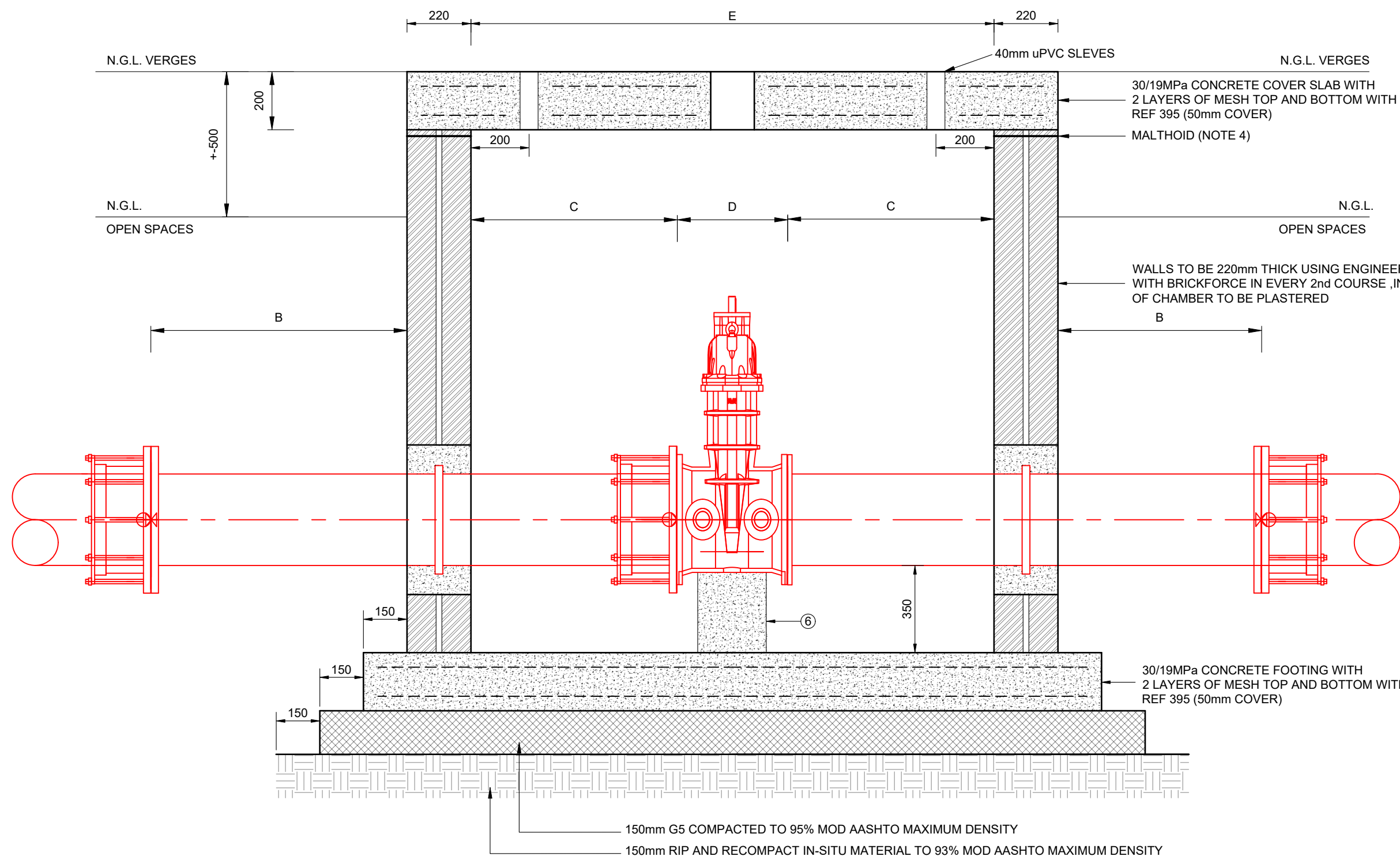
- CONCRETE SHALL BE 30 MPa.
- ALL VISIBLE CONCRETE CORNERS AND EDGES SHALL BE CHAMFERED (25 x 25mm).
- ALL BRICKS SHALL BE LAID IN STRETCHER BOND AND SHALL BE NFX BURNT CLAY MASONARY UNITS COMPLYING WITH THE REQUIREMENTS OF SABS 227. BRICKFORCE EVERY SECOND LAYER.
- TWO LAYERS OF MALTHOID SHALL BE PROVIDED BETWEEN ROOF SLAB AND BRICKWORK TO ACCOMMODATE MOVEMENT.
- 50mm COVER TO BE APPLIED TO ALL STEEL REINFORCING.
- CALCAMITE STEP - IRONS TO BE INSTALLED BELOW MANHOLE COVER AT 300mm VERTICAL CENTRES, STARTING AT 300mm ABOVE THE FLOOR LEVEL AND STAGGERED AT 300mm CENTRES HORIZONTALLY.
- CALCAMITE STEP IRON (ONLY REQUIRED IF CHAMBER DEPTH >2m).

ITEM LIST:

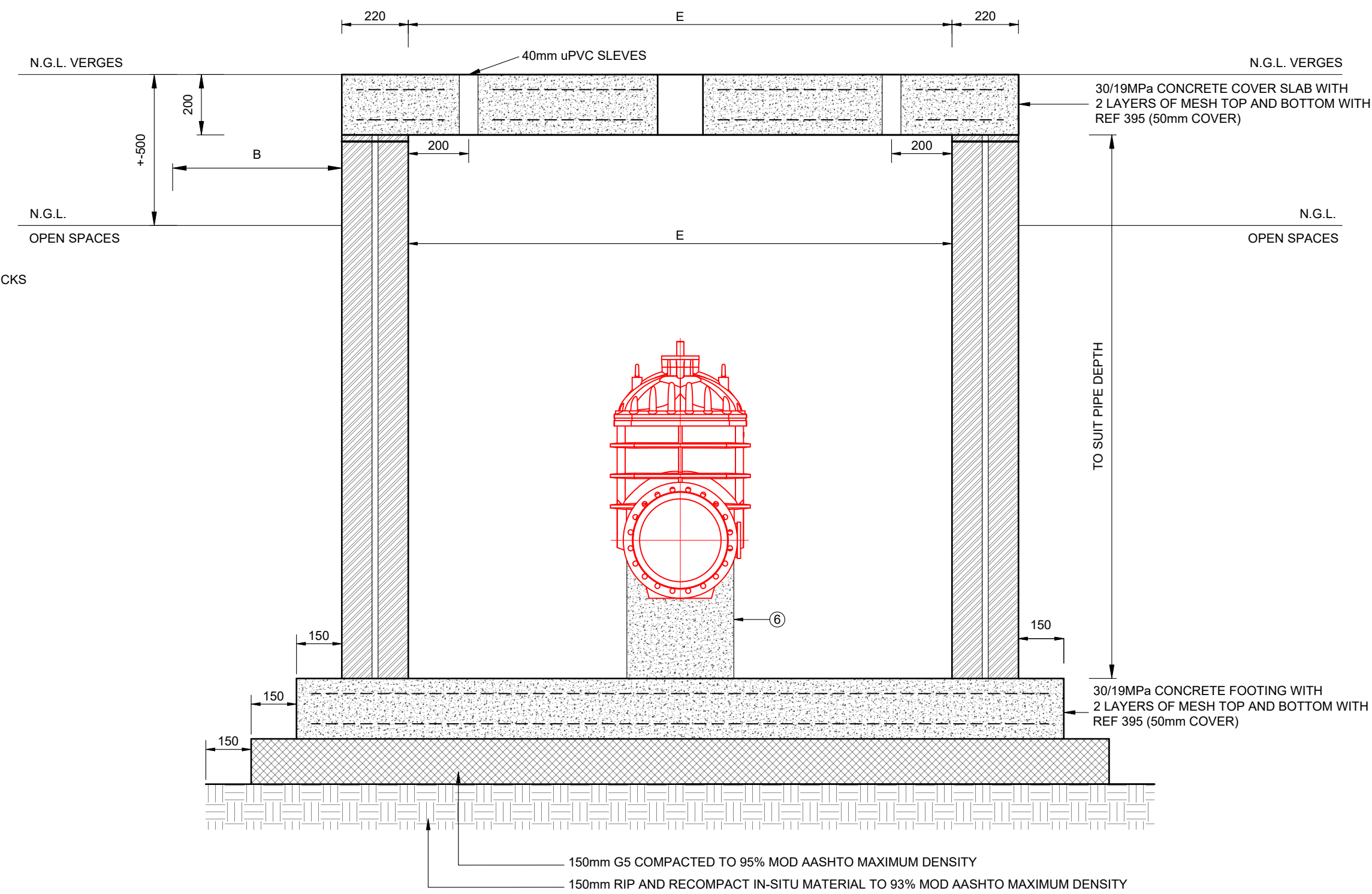
- *uPVC PIPE Ø7mm AS PER TABLE 1 LONG BARREL VJ FLANGE ADAPTER.
- *FITTING Ø7mm MILD STEEL GALVANISED 720 SIGMA COATED SPOOL PIECE FLANGED ON ONE SIDE, WITH TOTAL LENGTH = 820mm AND PUDDLE FLANGE CENTRALLY PLACED.
- *FITTING Ø7mm AS PER TABLE 1 VJ FLANGE ADAPTER.
- *VALVE SIZE Ø7mm AS PER TABLE 1 WEDGE GATE VALVE FLANGED, LHC CAP TOP.
- *FITTING Ø7mm MILD STEEL GALVANISED 720 SIGMA COATED SPOOL PIECE FLANGED ON BOTH SIDES, WITH TOTAL LENGTH = 820mm AND PUDDLE FLANGE CENTRALLY PLACED.
- CONCRETE PEDESTAL.

NOTES:

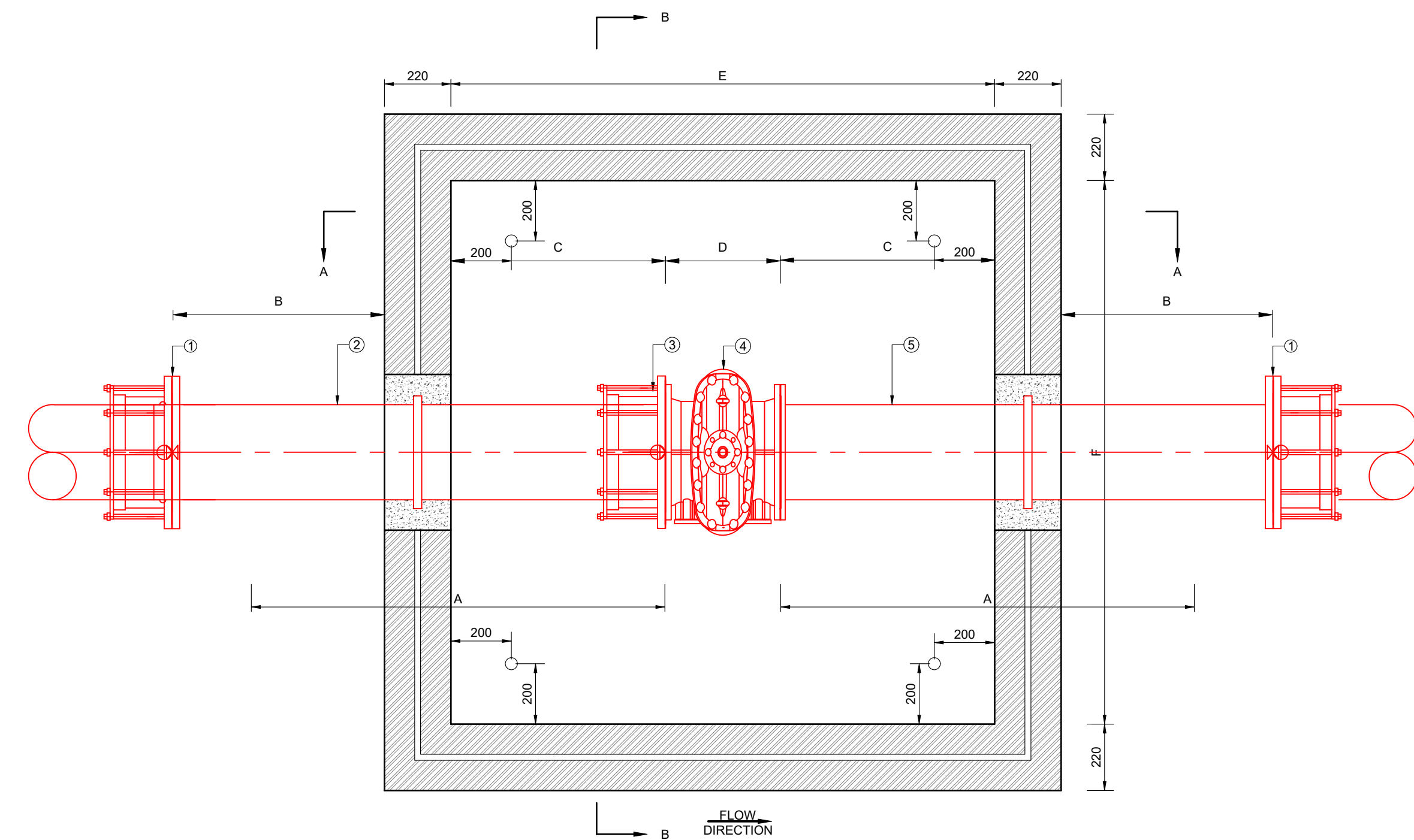
- EXACT POSITION OF CHAMBER TO BE DETERMINED ON SITE WITH ENGINEER AND KOUGA MUNICIPALITY REPRESENTATIVE.
- ALL EXISTING SERVICES TO BE EXPOSED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF CONSTRUCTION.



SECTION A-A



SECTION B-B



PLAN VIEW

TABLE 1 : ISOLATION VALVE CHAMBER DIMENSIONS

u-PVC PIPE Ø (mm)	VALVE SIZE (mm Ø)	PRESSURE CLASS	FITTING Ø (mm)	A - mm	B - mm	C - mm	D - mm	E - mm	F - mm	DESCRIPTION
250	250	PN16	250	820	300	300	356	956	1500	TYPE 1

*AS BUILT - NOTES

FOR TENDER

AMENDMENTS

NO.	DATE	DESCRIPTION	APPROVED

SCALE



1 : 15

SCALE ON REDUCED DRAWING



DESIGN

CH

DRAWN

APPROVED

DATE

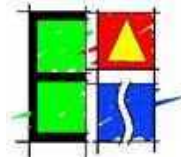
CH

EAR

PJ

NOV 2024

ENGINEERING ADVICE
AND SERVICES
associated with ULWAZI
73 Heugh Road, Walmer
P.O. Box 15867
Humewood
Port Elizabeth
6013
tel/fax: (041) 581 2421



APPROVED

ENGINEER

DATE

APPROVED

CLIENT

DATE



PROJECT

IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION
AND RISING MAIN TO BUNGALOWS

DWG DESCRIPTION

ISOLATION VALVE CHAMBER DETAILS

CONTRACT NO.

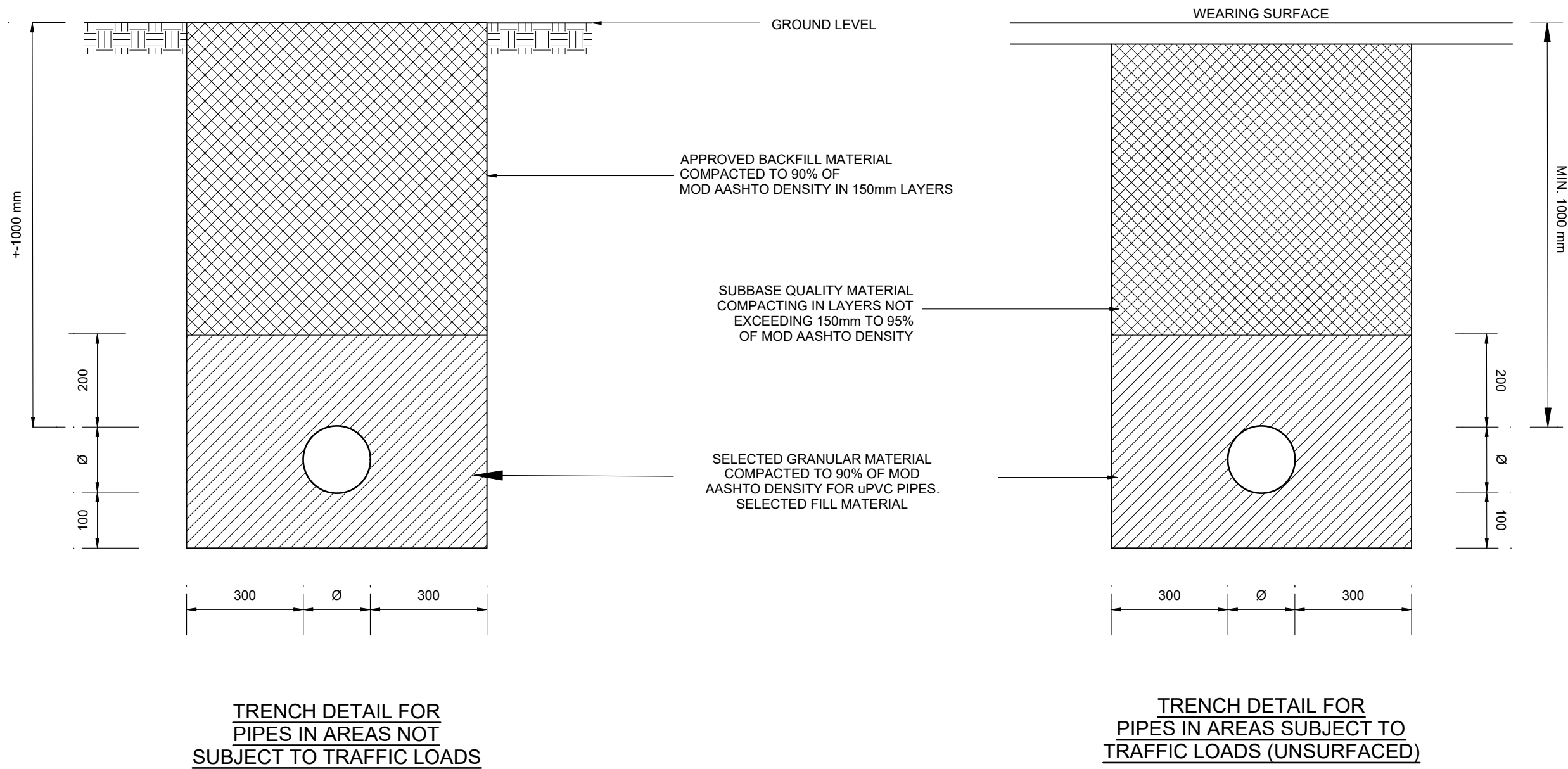
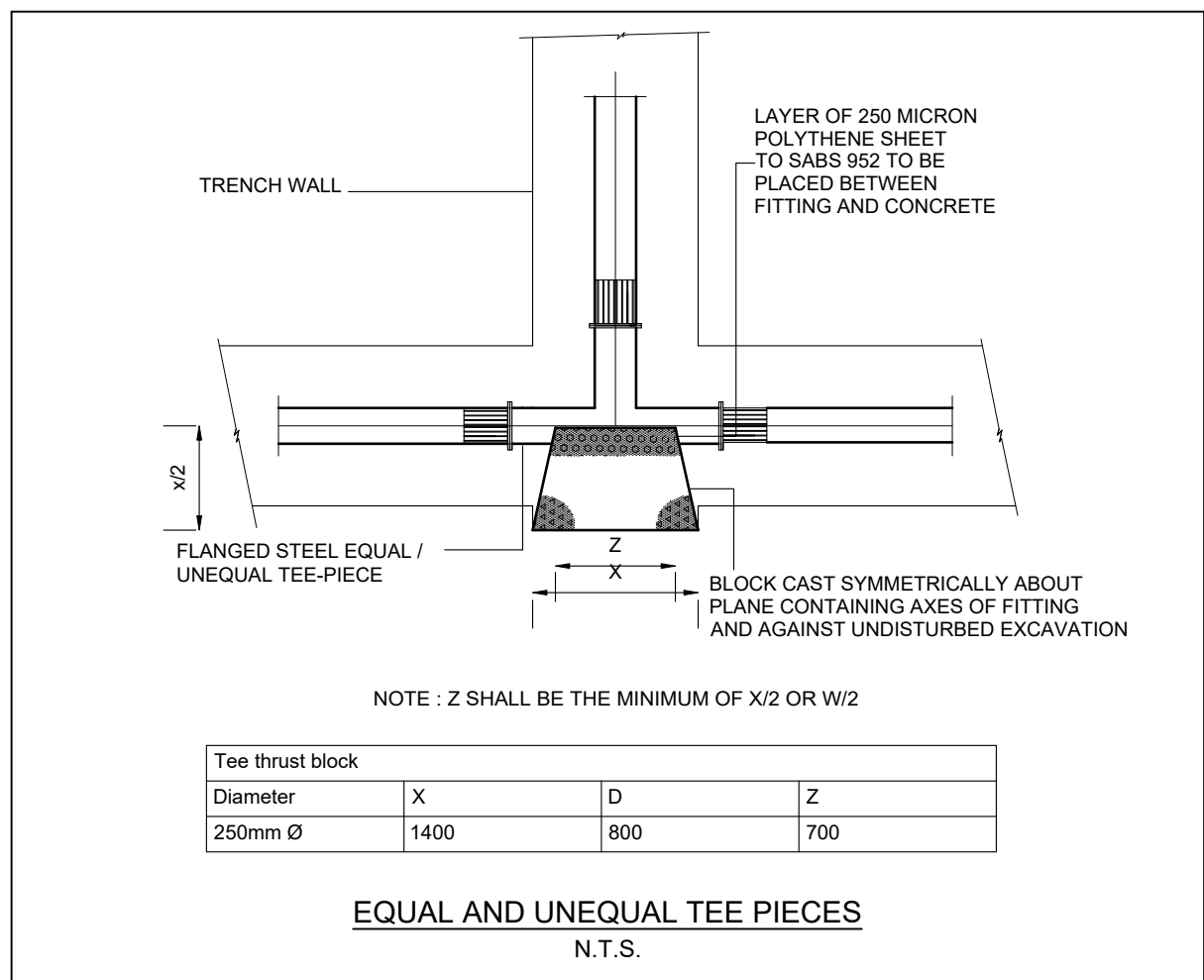
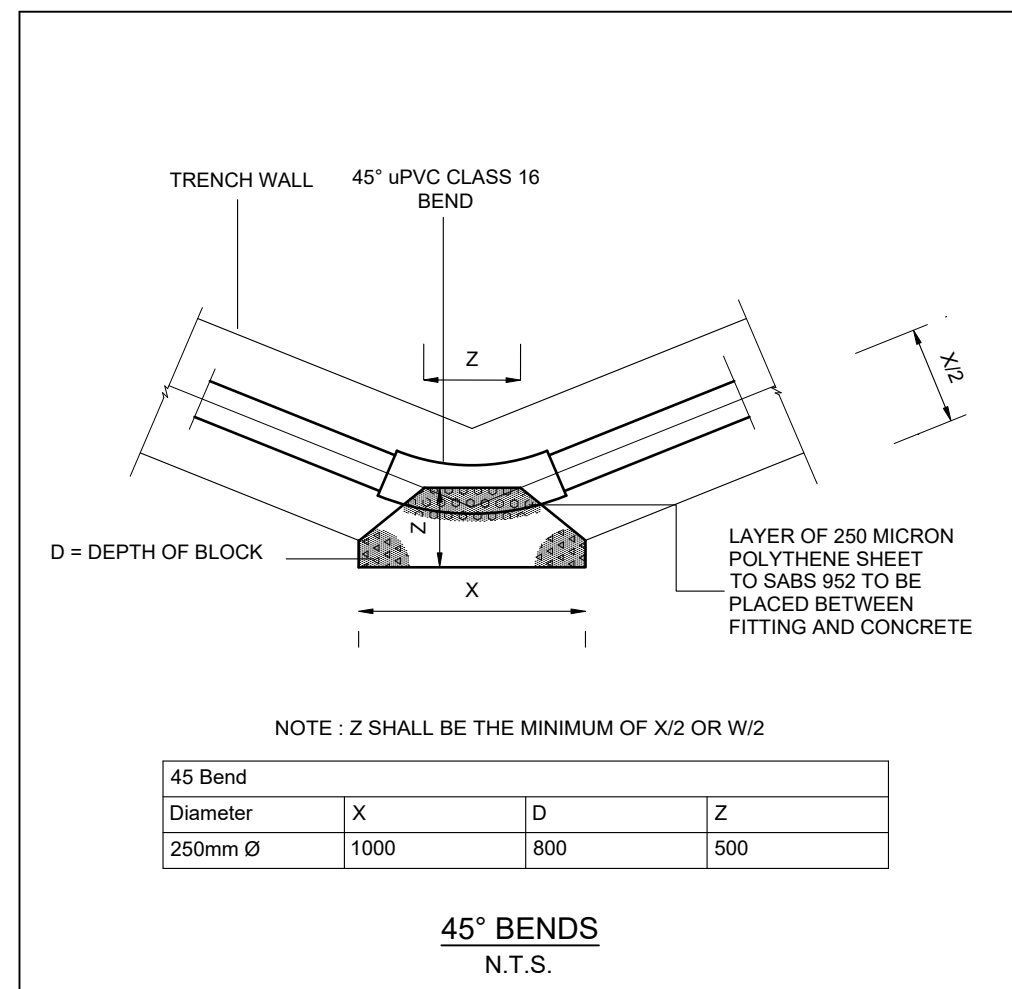
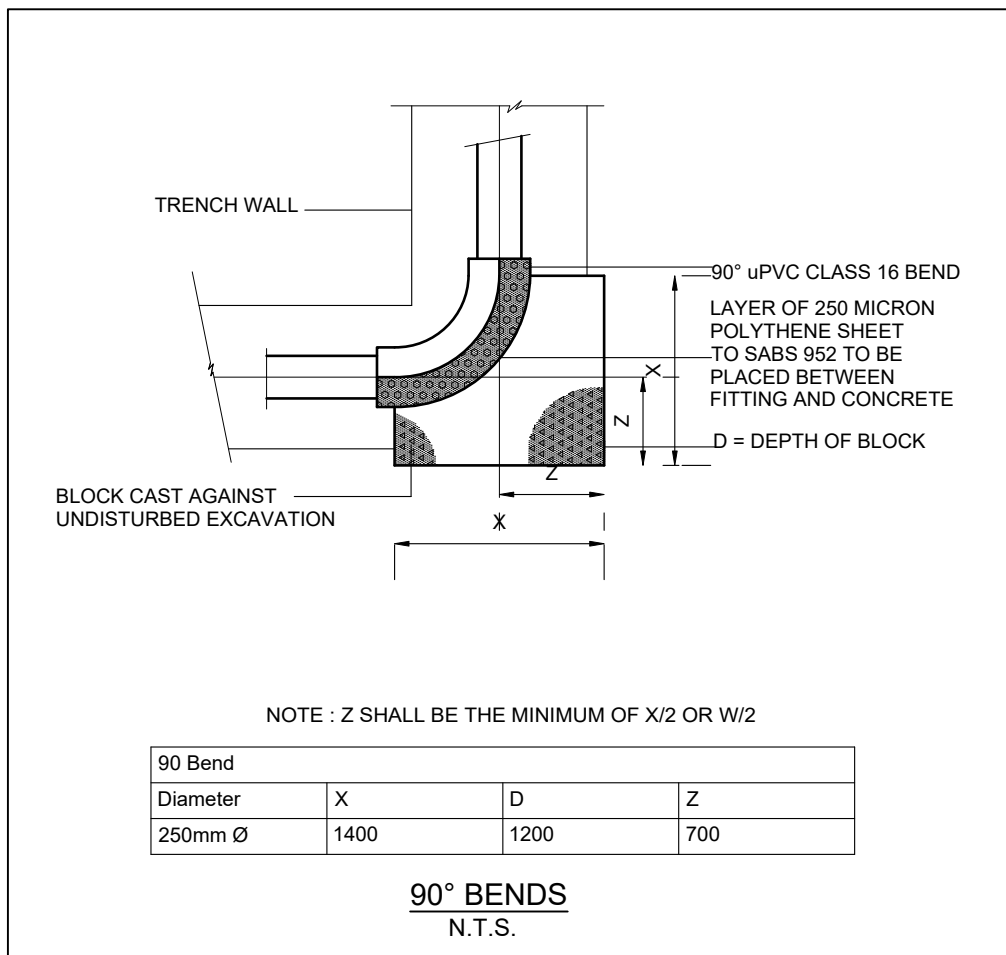
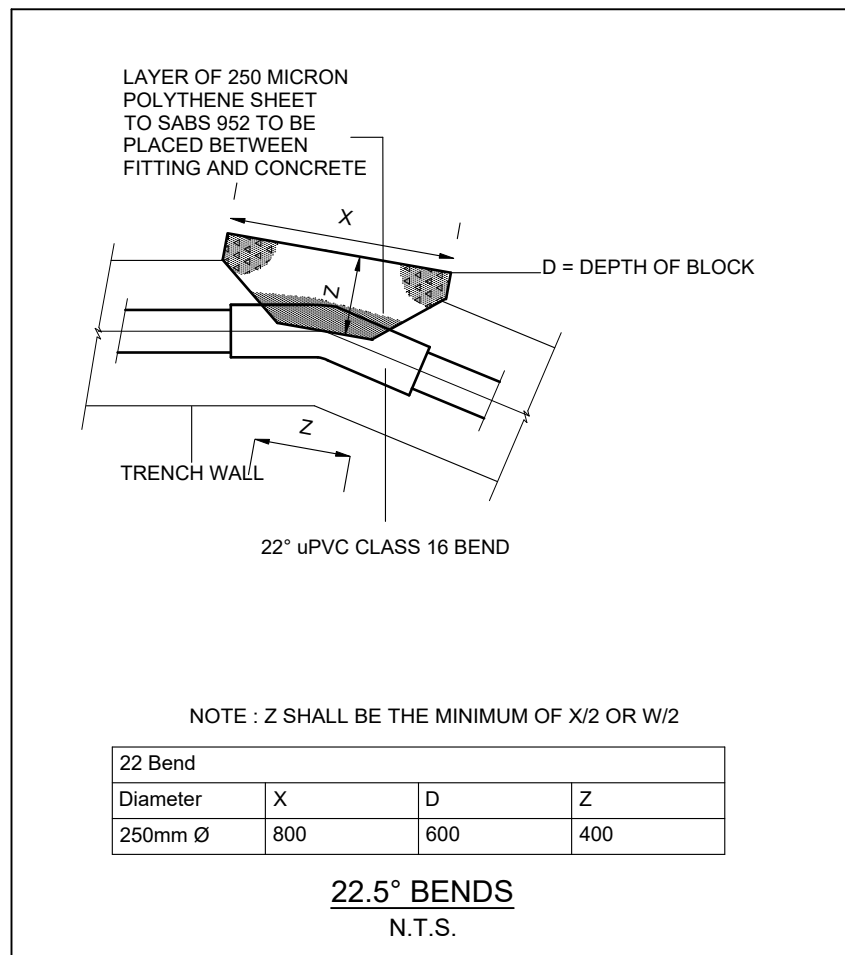
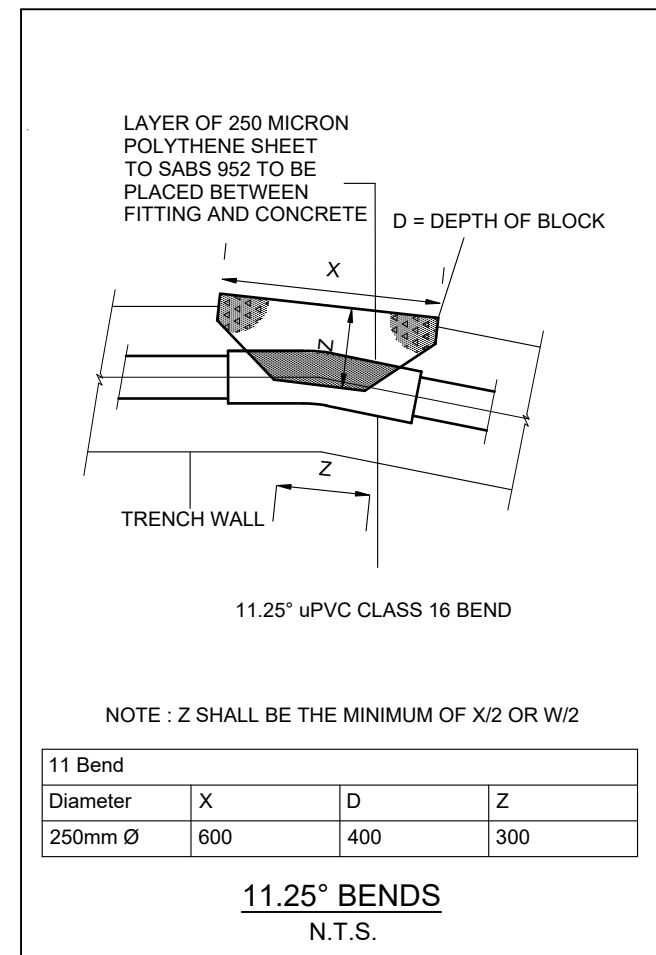
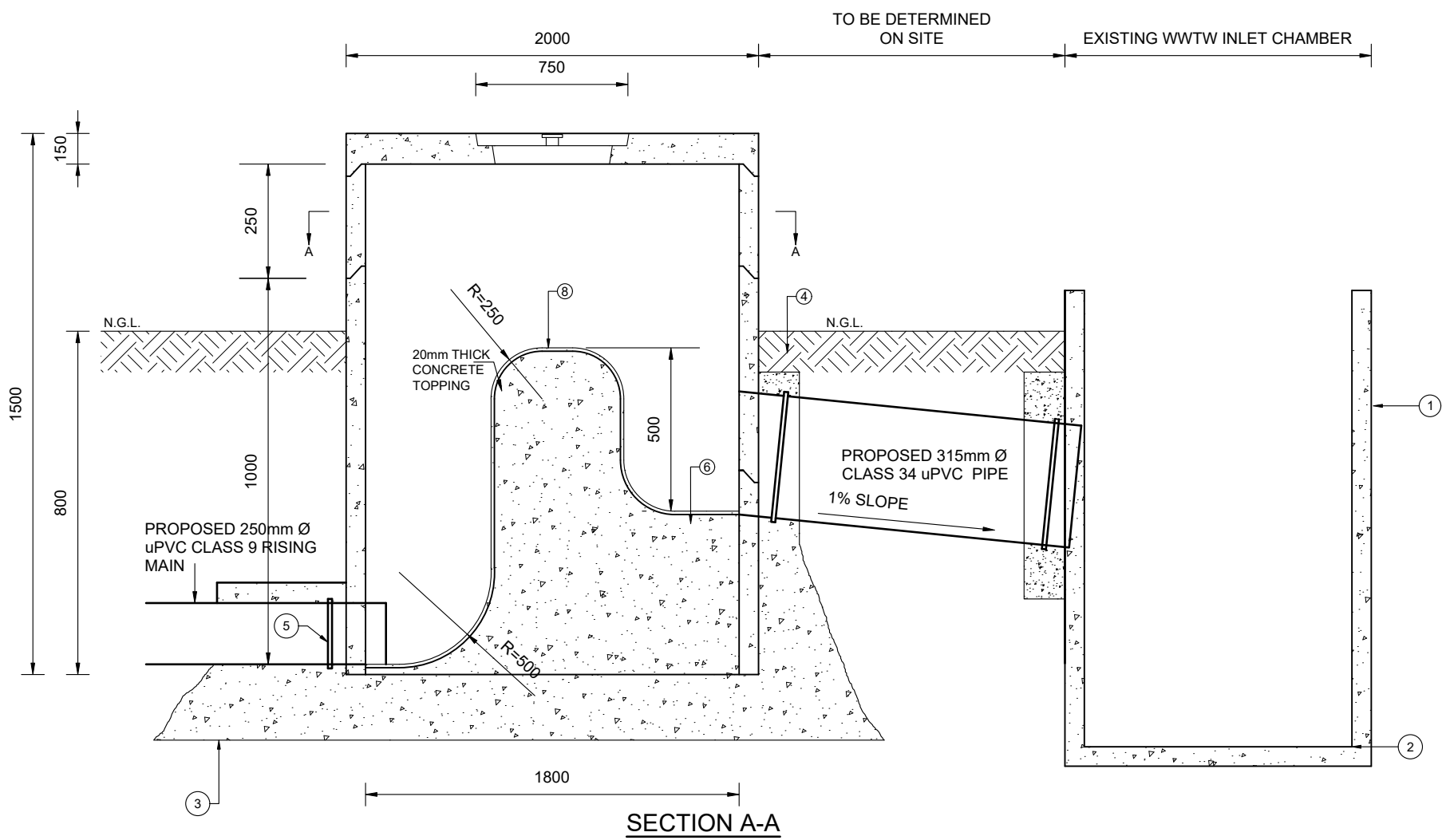
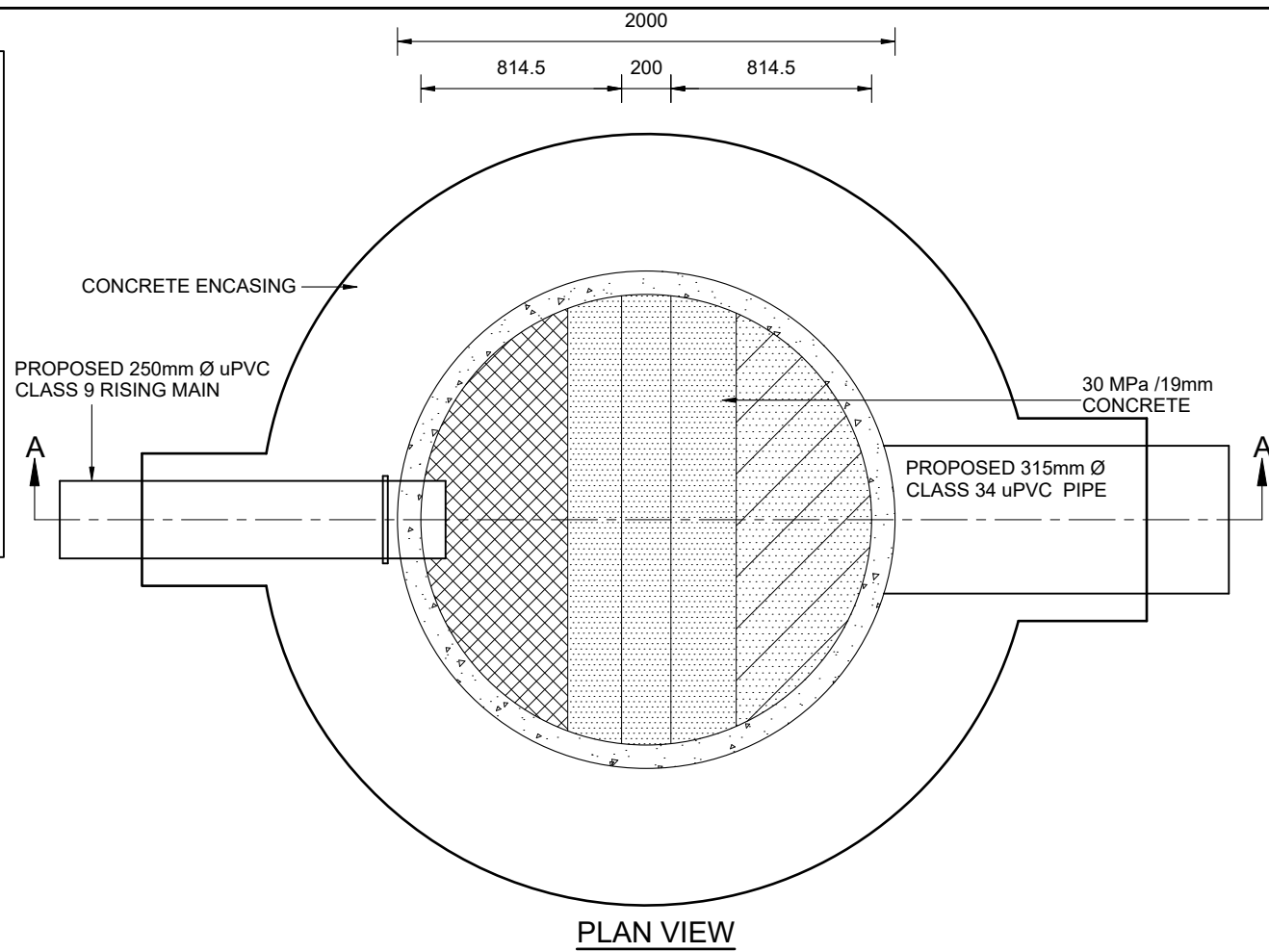
220/2024

DWG NO.

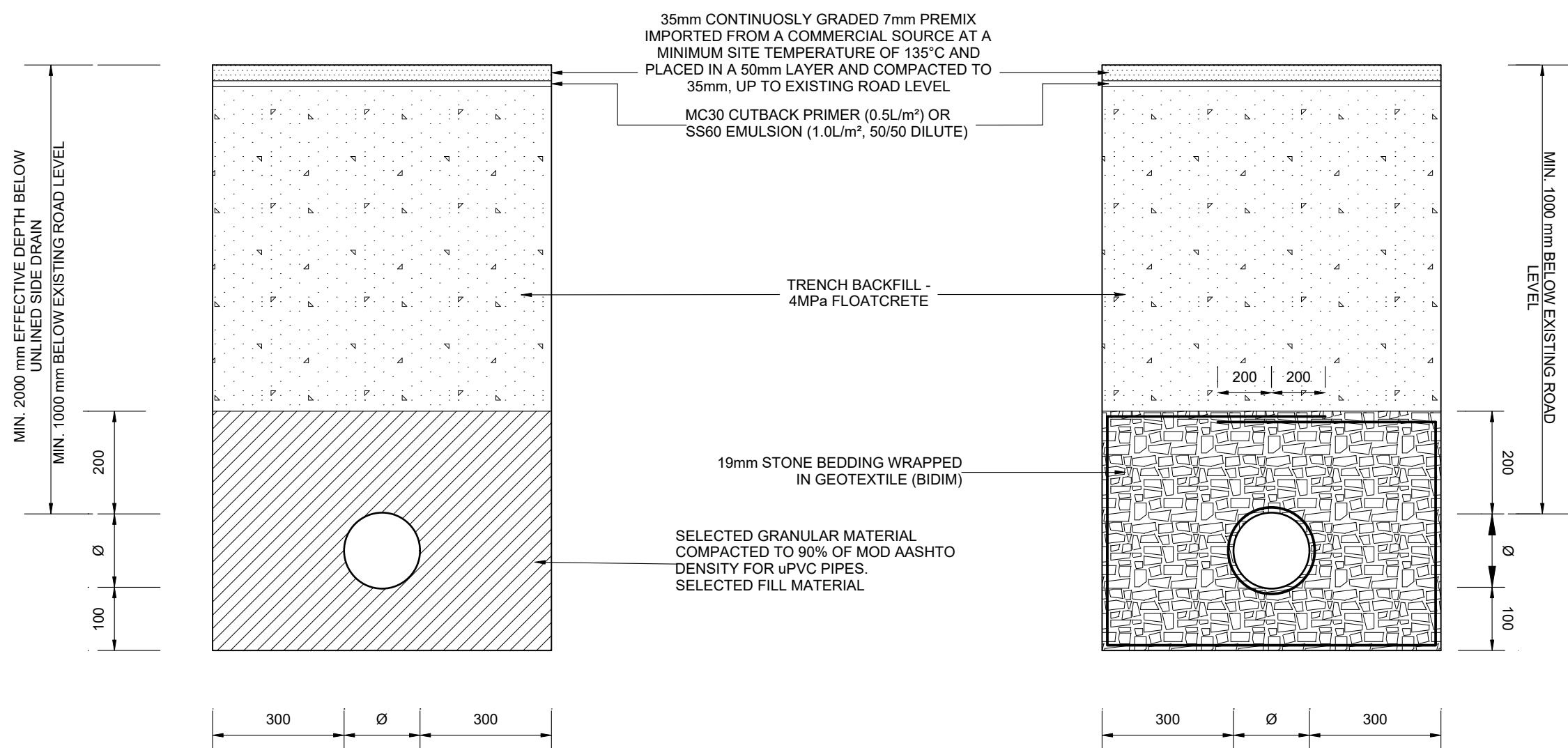
2299-T-301

ISSUE

- NOTES:
1. *EXISTING KWANOMZAMO WWTW INLET CHAMBER.
 2. *BENCHING TO BE MODIFIED TO SUIT NEW INCOMING PIPE.
 3. *FINAL FORM OF OVERFLOW TO BE SHAPED USING 30MPa CONCRETE.
 4. *30 MPa CONCRETE TO BE POURED IN A SINGLE POUR (ENCASING PUDDLE FLANGES).
 5. *PUDDLE FLANGE
 6. JOINTS SEALED WITH APPROVED BITUMASTIC FILLER BETWEEN JOINTS AND DENSOTAPE (OR SIMILAR) APPLIED TO PRIMED OUTSIDE SURFACE TO 75mm.
 7. ALL FLANGED JOINTS (EXCLUDING GLANDS) TOGETHER WITH THEIR BOLTS ARE TO BE PROTECTED FROM CORROSION BY MEANS OF AN APPROVED PROTECTIVE PASTE AND SHALL THEN BE WRAPPED WITH 3 LAYERS OF APPROVED IMPREGNATED TAPE OF NOT LESS THAN 50mm WIDTH OR OTHER MEANS OF INHIBITING CORROSION WHICH SHALL BE APPROVED BY THE ENGINEER.
 8. CONCRETE TOPPING FOR THE 20mm THICK LAYER TO THE BENCHING SHALL CONSIST OF 1:2:3 PARTS OF CEMENT, SAND, 7mm CONCRETE STONE, BY MASS



TRENCH DETAIL FOR PIPES IN AREAS SUBJECT TO TRAFFIC LOADS (UNSURFACED)



TYPICAL TRENCH DETAIL FOR PIPES IN AREAS SUBJECT TO TRAFFIC LOADS (SURFACED) - INCLUDING DISTRICT AND MUNICIPAL ROADS

TYPICAL TRENCH DETAIL FOR PIPES IN AREAS SUBJECT TO TRAFFIC LOADS WITH HIGH WATER TABLE (SURFACED) - INCLUDING DISTRICT AND MUNICIPAL ROADS

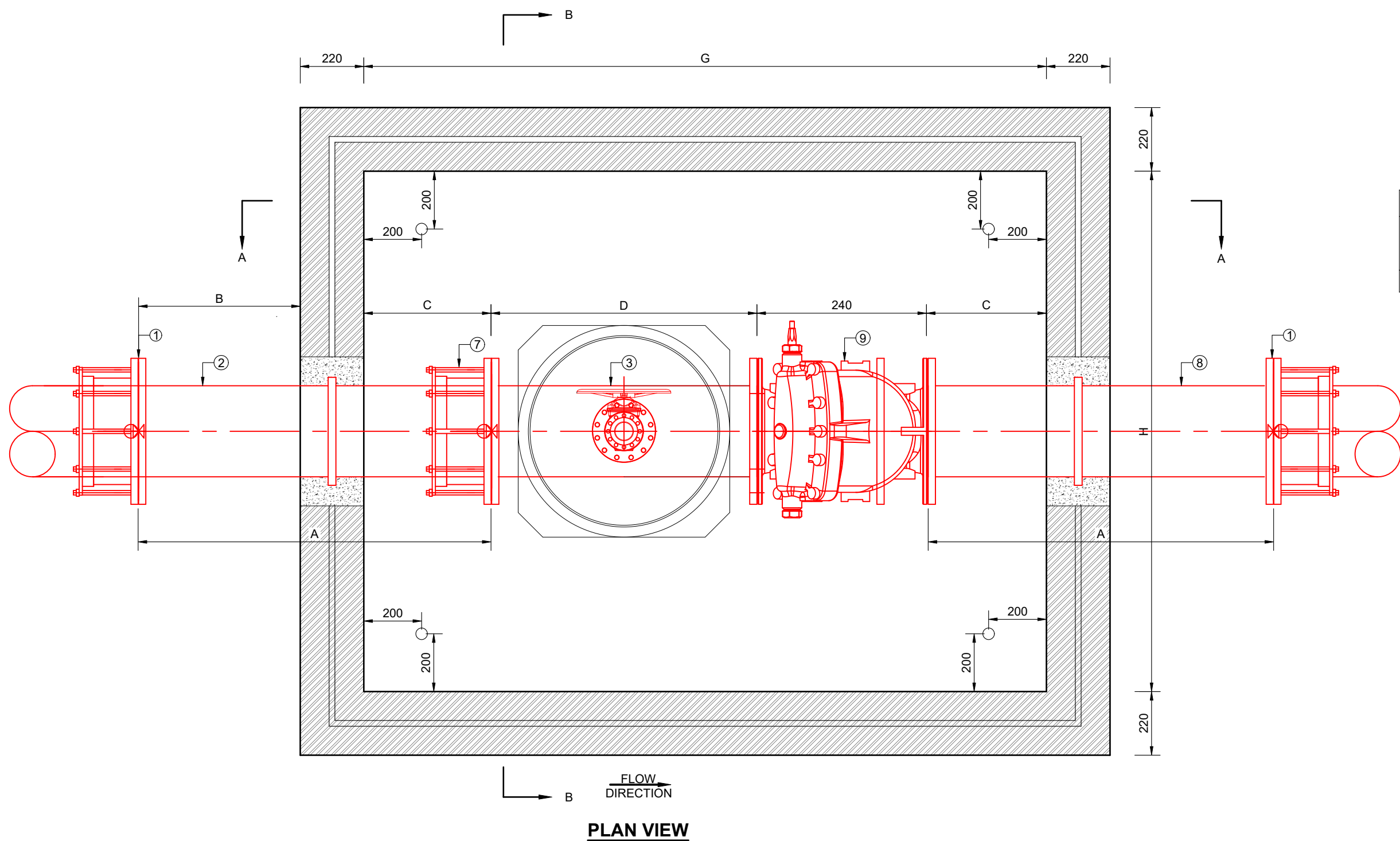
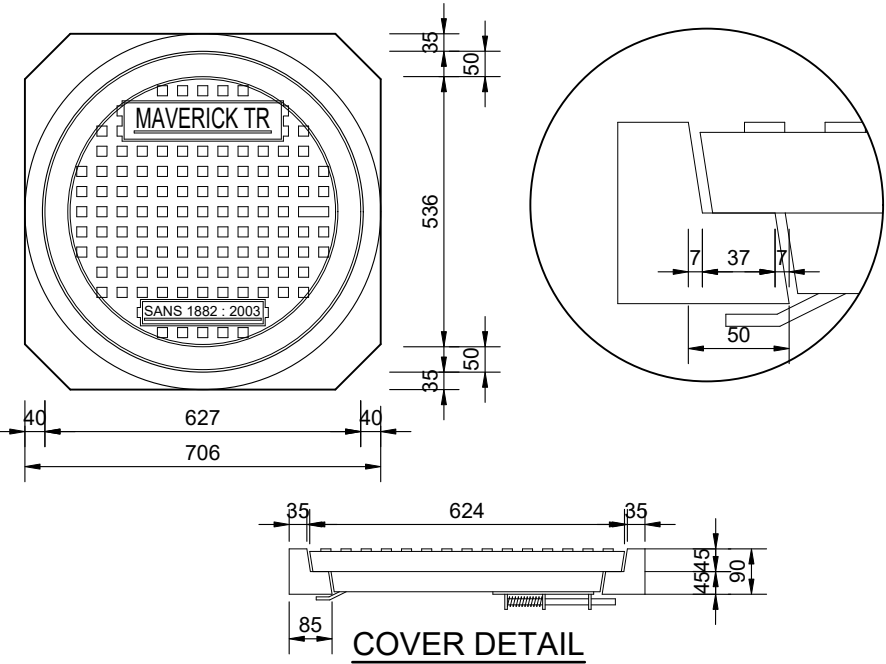
FOR TENDER	AMENDMENTS				SCALE	SCALE ON REDUCED DRAWING	DESIGN	CH	ENGINEERING ADVICE AND SERVICES associated with ULWAZI 73 Heugh Road, Walmer P.O. Box 13867 Humewood Port Elizabeth 6013 tel/fax: (041) 581 2421		APPROVED	APPROVED		PROJECT	CONTRACT NO.
	NO.	DATE	DESCRIPTION	APPROVED			DRAWN	EAR			ENGINEER	CLIENT		IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION AND RISING MAIN TO BUNGALOWS	220/2024
							APPROVED	PJ			DATE	DATE		DWG DESCRIPTION	DWG NO.
														STILLING CHAMBER , THRUSTBLOCK ANDTRENCH DETAILS	2299-T-302
														ISSUE	

- ALL DIMENSIONS IN MILLIMETERS.
- ALL LEVELS IN M.S.L.
- 15mm SPK 120 (OR SIMILAR APPROVED) CLOSED CELL FOAM TO BE WRAPPED AROUND THE PERIMETER OF ALL PIPEWORK PASSING THROUGH BRICKWORK OR CONCRETE.
- ALL FLANGED JOINTS OR OTHER JOINTS AND FITTINGS SHALL COMPLY WITH THE REQUIREMENTS OF SABS 1232NP/1600/3.
- ALL FLANGED SHALL BE T16 AND TO BE SUPPLIED COMPLETE WITH CLOSURE FLANGES AND BOLTS.
- ALL BOLTS, NUTS AND WASHERS SHALL BE STAINLESS STEEL GRADE 316L.
- ALL VALVES TO HAVE VALVE MARKERS AND BE ANTI-CLOCKWISE TURNING CLASS 16, WITH NO NEEDLIF IF IN CHAMBER, OTHERWISE WITH CAP TOP.
- ALL LEVELS AND DIMENSIONS SHALL BE CHECKED AND AGREED WITH THE ENGINEER BEFORE ANY WORK BEING COMMENCED.
- ALL STEEL PIPES AND SPECIALS TO BE MILD STEEL GALVANISED 720 SIGMA COATED.
- ALL ELEVATIONS SHALL BE INSPECTED BY THE ENGINEER BEFORE THE PLACEMENT OF ANY CONCRETE.
- ALL FLANGED JOINTS (EXCLUDING GLANDS) TOGETHER WITH THEIR BOLTS ARE TO BE PROTECTED FROM CORROSION BY MEANS OF AN APPROVED CORROSION PROTECTANT BY THE ENGINEER. SHALL BE WRAPPED WITH 3 LAYERS OF APPROVED IMPREGNATED TAPE OF NOT LESS THAN 50mm width OR OTHER MEANS OF INHIBITING CORROSION WHICH SHALL BE APPROVED BY THE ENGINEER.
- ALL PVCU PIPES SHALL COMPLY WITH THE REQUIREMENTS OF SABS 966-1.
- REFER TO THE SCOPE OF WORK FOR CORROSION PROTECTION OF STEEL PIPES, SPECIALS AND FITTINGS AS WELL AS CI PIPES, SPECIALS, FITTINGS AND VALVES.

- FOR BRICK CHAMBERS:
CONCRETE SHALL BE 30 MPa.
ALL VISIBLE CONCRETE CORNERS AND EDGES SHALL BE CHAMFERED (25 x 25mm).
ALL BRICKS SHALL BE LAID IN STRETCHER BOND AND SHALL BE NF3 ENGINEERING BRICK (28MPa) UNITS COMPLYING WITH THE REQUIREMENTS OF SABS 227. BRICKFORCE EVERY SECOND LAYER. TWO LAYERS OF MALTHOID SHALL BE PROVIDED BETWEEN ROOF SLAB AND BRICKWORK TO ACCOMMODATE MOVEMENT.
60mm COVER TO ALL STEEL REINFORCING.
CALCULATE STEP - IRONS TO BE INSTALLED BELOW MANHOLE COVER AT 300mm VERTICAL CENTRES, STARTING AT 300mm ABOVE THE FLOOR LEVEL AND STAGGERED AT 300mm CENTRES HORIZONTALLY.
CALCULATE STEP IRON (ONLY REQUIRED IF CHAMBER DEPTH >2m)

1. "UPVC PIPE Ø90 mm LONG BARREL VJ FLANGE ADAPTOR.
2. "AIR VALVE Ø90 mm MILD STEEL GALV. ZINCO COATED SPOOL, PIECE FLANGED ON BOTH SIDES, WITH TOTAL LENGTH = 820mm CENTRALLY PLACED.
3. "FITTING Ø90 mm AS PER TABLE 1 mm x "ACCUMULATION CHAMBER Ø90 mm MILD STEEL GALVANIZED 720 SIGMA COATED REDUCING TE. FLANGE TO FLANGE LENGTH = AS PER DIMENSION F mm
4. "ACCUMULATION CHAMBER Ø90 mm BLANK FLANGE LENGTH = AS PER DIMENSION F mm IN TABLE 1 "AIR VALVE Ø90 mm MILD STEEL GALVANIZED 720 SIGMA COATED SPOOL, PIECE
5. "AIR VALVE Ø90 mm GATE VALVE LHC. FLANGE WITH HAND WHEEL
6. "AIR VALVE Ø90 mm VENTO-MAT-RGX. AIR VALVE PN 16 OR SIMILAR APPROVED.
7. "FITTING Ø90 mm LONG BARREL VJ FLANGE ADAPTOR.
8. "FITTING Ø90 mm MILD STEEL GALV. ZINCO 720 SIGMA COATED SPOOL, PIECE FLANGED ON BOTH SIDES, WITH TOTAL LENGTH = 820mm AND PUDDLE FLANGED CENTRALLY PLACED.
9. 250mm Ø NØN RETURN VALVE (COUNTER WEIGHT)

1. EXACT POSITION OF CHAMBER TO BE DETERMINED ON SITE WITH ENGINEER AND KOUGA MUNICIPALITY REPRESENTATIVE.
2. ALL EXISTING SERVICES TO BE EXPOSED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF CONSTRUCTION.



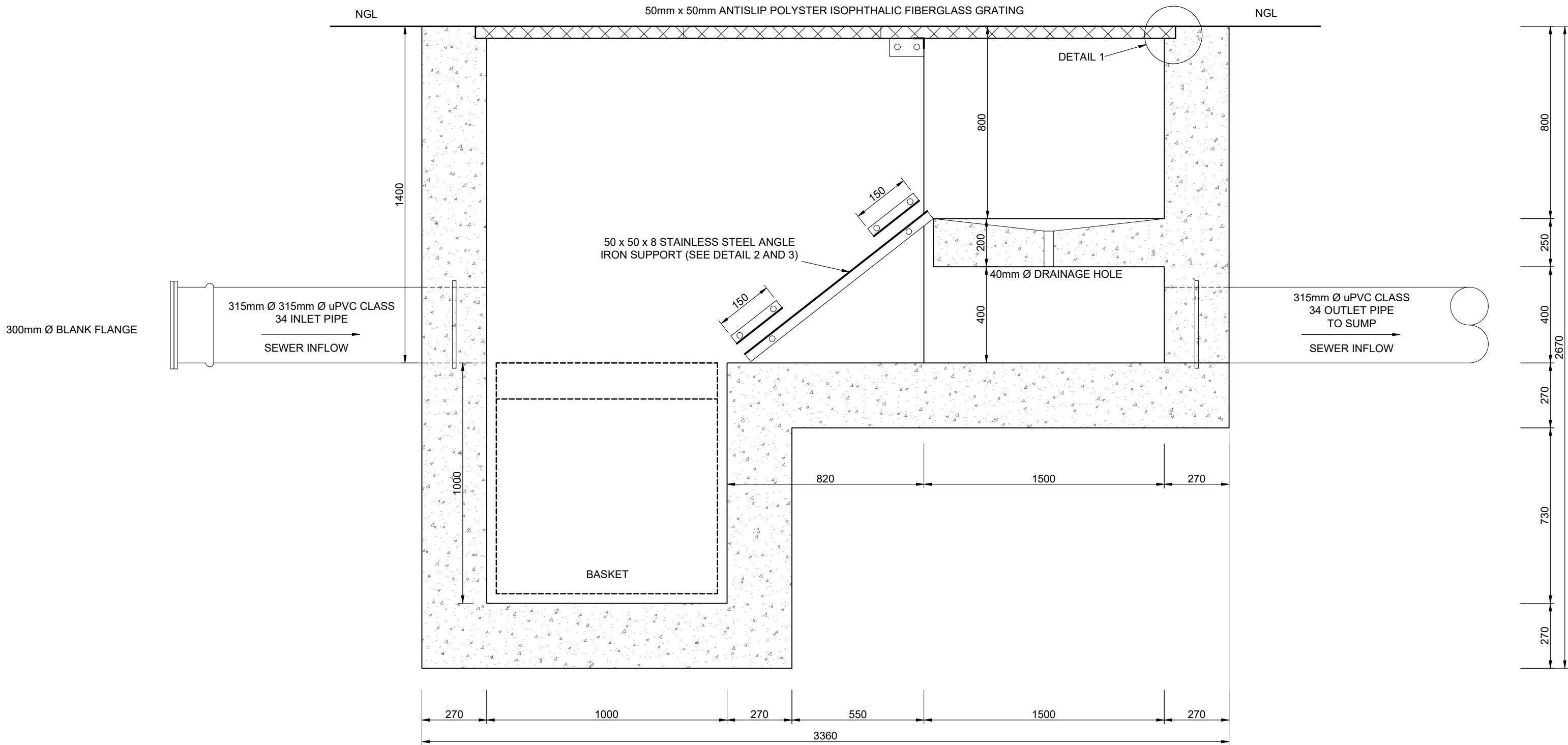
u-PCV PIPE Ø (mm)	AIR VALVE SIZE (mm Ø)	PRESSURE CLASS	FITTING Ø (mm)	REDUCED FITTING Ø (mm)	A - mm	B - mm	C - mm	D - mm	E - mm	F - mm	G - mm	H - mm	DESCRIPTION
250	50	PN16	250	150	820	300	300	650	300	150	1490	1500	TYPE 1

u-PCV PIPE Ø (mm)	AIR VALVE SIZE (mm Ø)	PRESSURE CLASS	FITTING Ø (mm)	REDUCED FITTING Ø (mm)	A - mm	B - mm	C - mm	D - mm	E - mm	F - mm	G - mm	H - mm	DESCRIPTION
250	50	PN16	250	150	820	300	300	650	300	150	1490	1500	TYPE 1

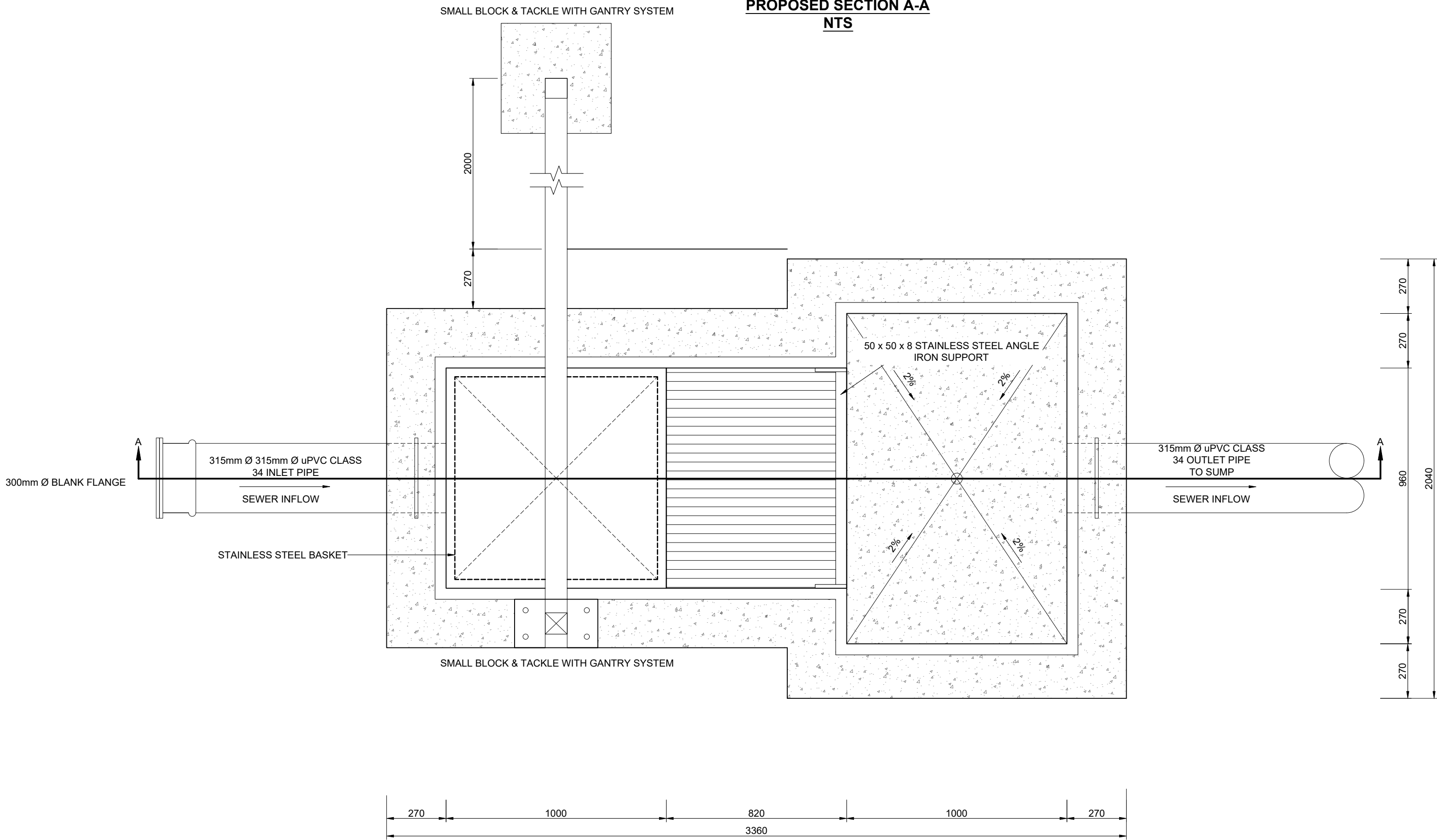
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NOTE:
1 DIMENSIONS OF PROPOSED WORK TO SUIT CONDITIONS ON SITE.
2 ALL FLANGED JOINTS (EXCLUDING GLANDS) TOGETHER WITH THEIR BOLTS ARE TO BE PROTECTED FROM CORROSION BY MEANS OF AN APPROVED PROTECTIVE PASTE AND SHALL THEN BE WRAPPED WITH 3 LAYERS OF APPROVED IMPREGNATED TAPE OF NOT LESS THAN 50mm WIDTH OR OTHER MEANS OF INHIBITING CORROSION WHICH SHALL BE APPROVED BY THE ENGINEER.



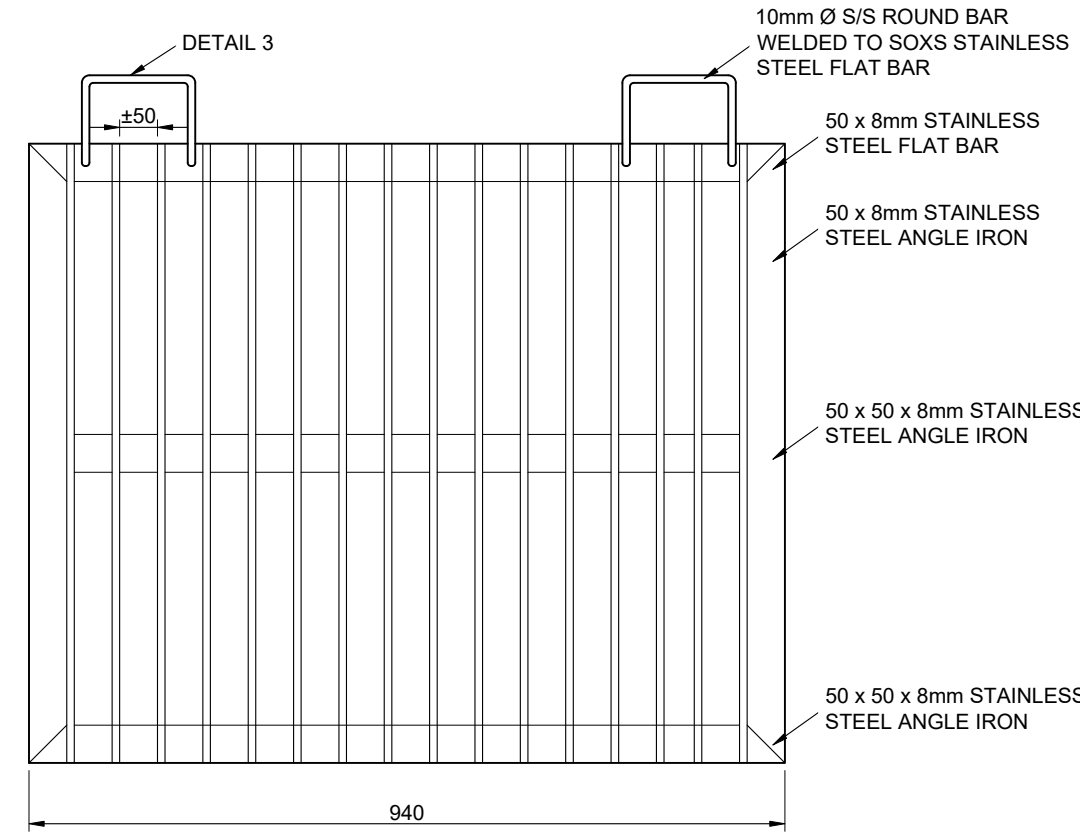
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NTS



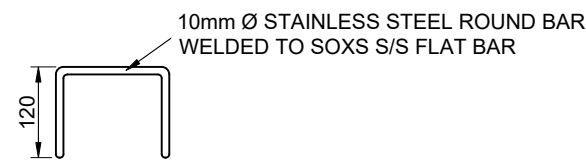
PROPOSED PLAN LAYOUT
NTS



DETAIL 1
NTS



DETAIL 2
NTS



DETAIL 3
NTS

FOR TENDER

AS BUILT - NOTES

AMENDMENTS			
NO.	DATE	DESCRIPTION	APPROVED

SCALE



AS SHOWN

SCALE ON REDUCED DRAWING



DESIGN

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APPROVED

DATE

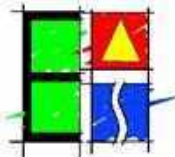
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NOV 2024

ENGINEERING ADVICE
AND SERVICES
associated with ULWAZI
73 Heugh Road, Walmer
P.O. Box 13867
Humewood
Port Elizabeth
6013
tel/fax: (041) 581 2421



APPROVED

ENGINEER

DATE

APPROVED

CLIENT

DATE



PROJECT

IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION
AND RISING MAIN TO BUNGALOWS

DWG DESCRIPTION

INLET SCREENING CHAMBER DETAILS

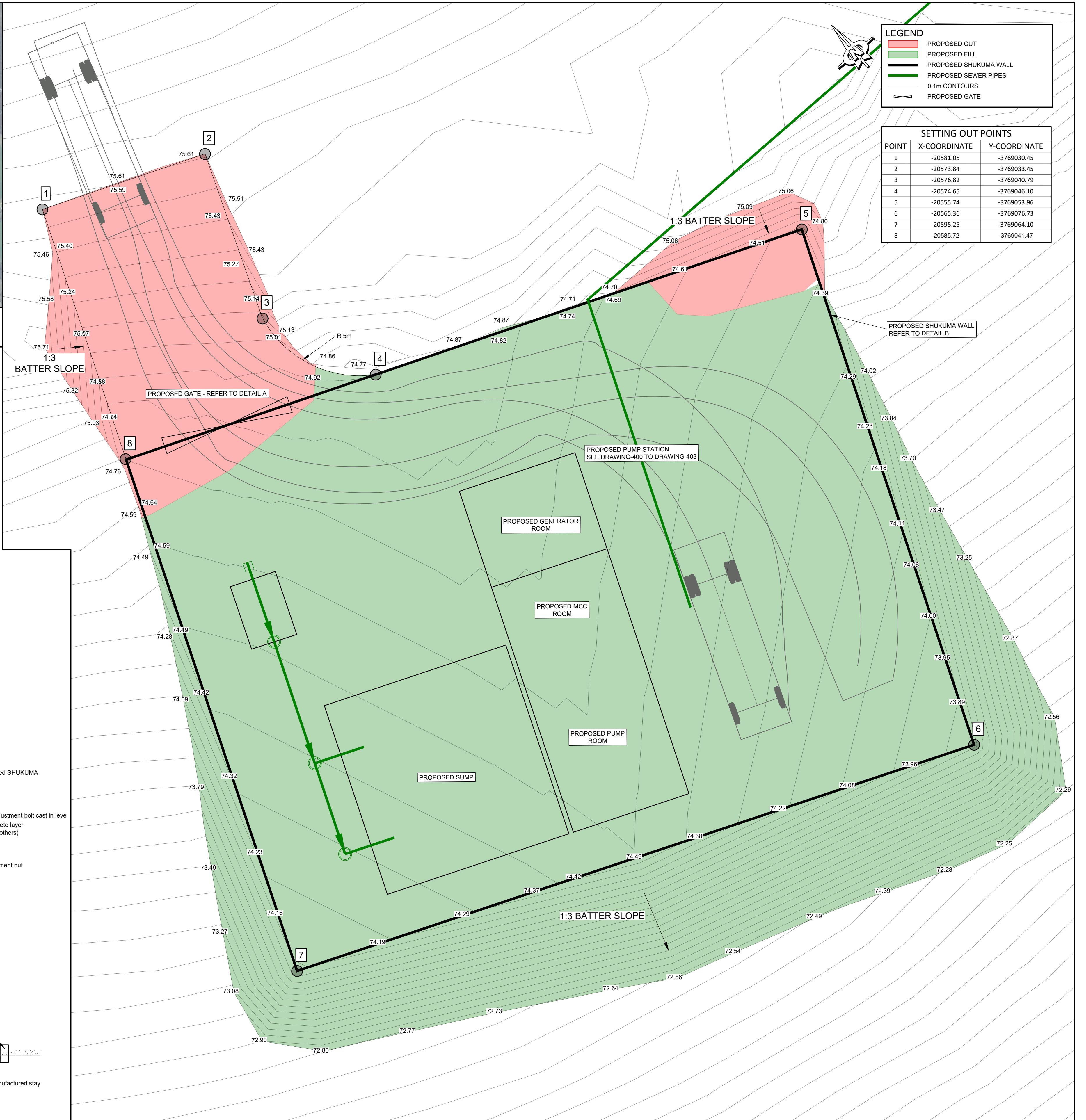
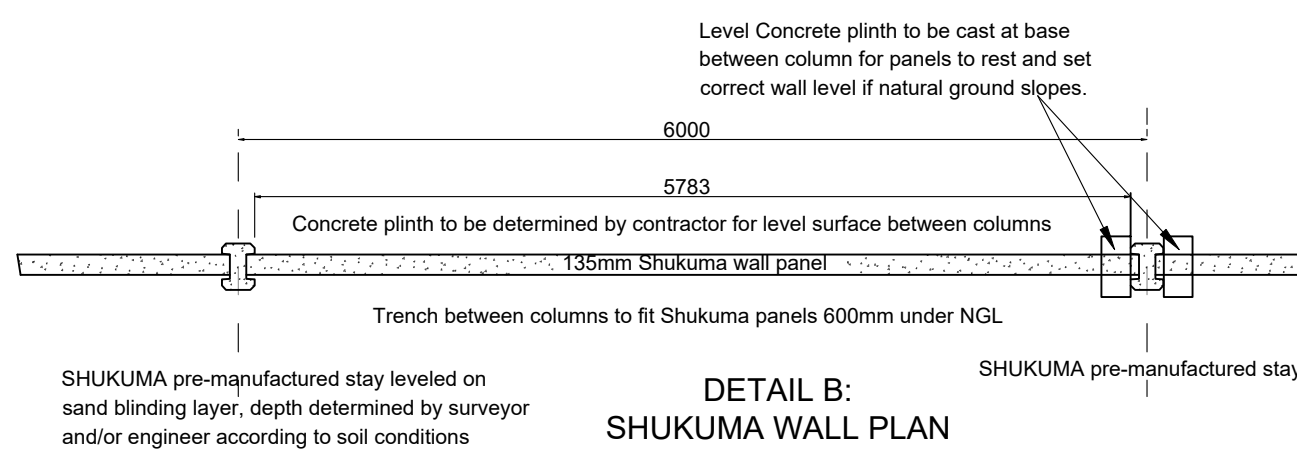
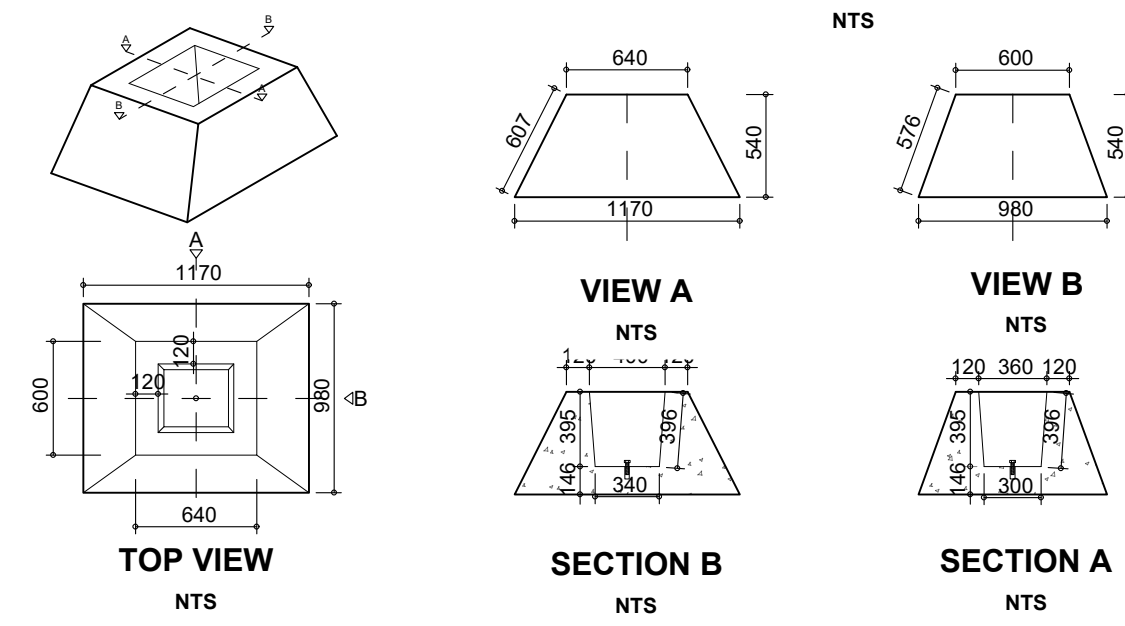
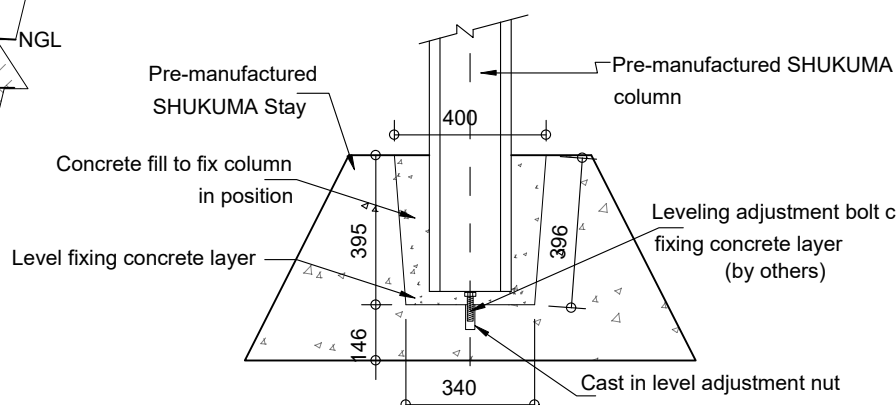
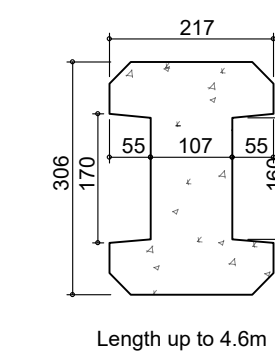
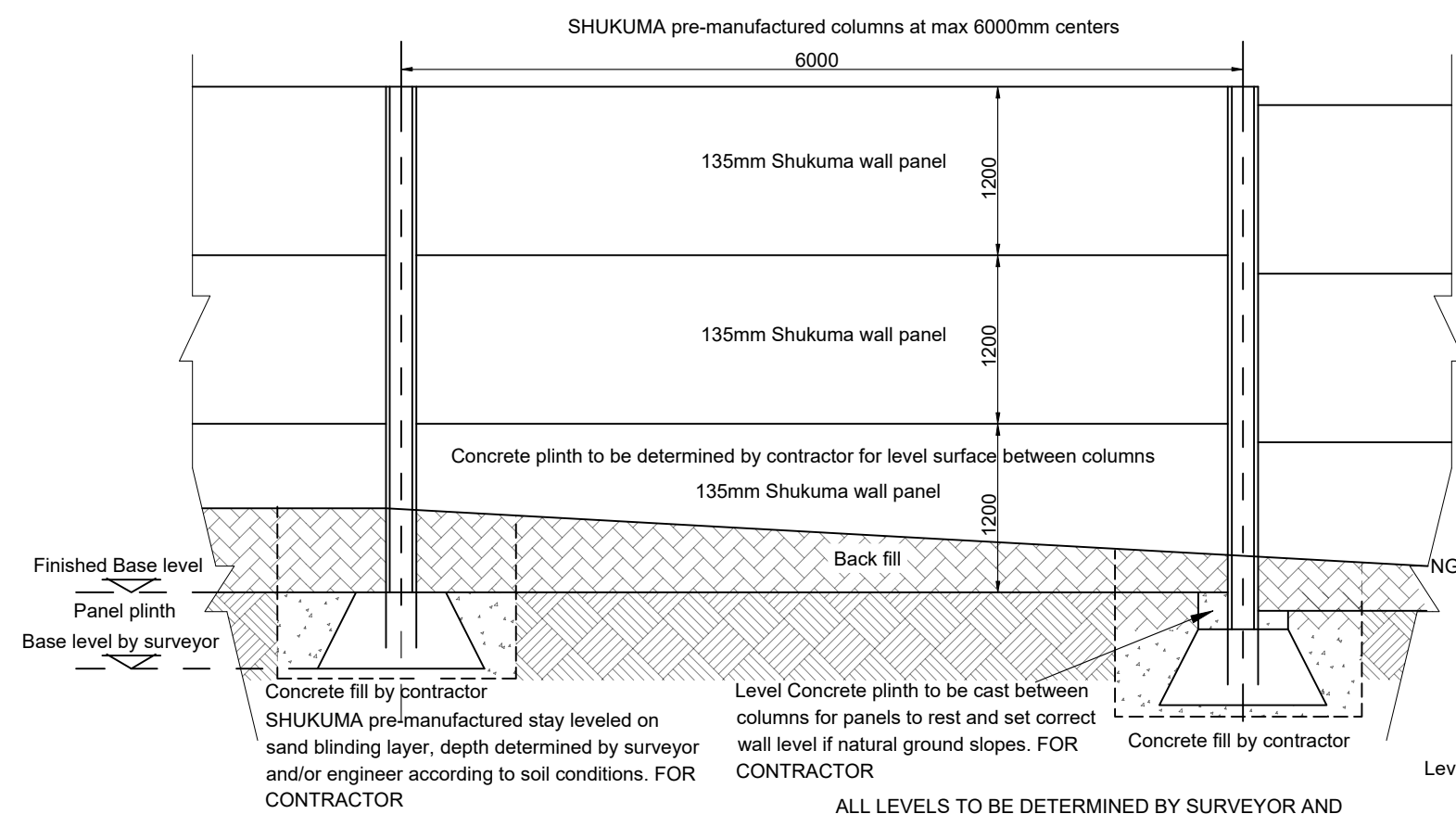
CONTRACT NO.

220/2024

DWG NO.

2299-T-404

ISSUE



LEGEND

- PROPOSED CUT
- PROPOSED FILL
- PROPOSED SHUKUMA WALL
- PROPOSED SEWER PIPES
- 0.1m CONTOURS
- PROPOSED GATE

SETTING OUT POINTS		
POINT	X-COORDINATE	Y-COORDINATE
1	-20581.05	-3769030.45
2	-20573.84	-3769033.45
3	-20576.82	-3769040.79
4	-20574.65	-3769046.10
5	-20555.74	-3769053.96
6	-20565.36	-3769076.73
7	-20595.25	-3769064.10
8	-20585.72	-3769041.47

FOR TENDER

AMENDMENTS			
NO.	DATE	DESCRIPTION	APPROVED



1 : 100



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APPROVED

DATE _____

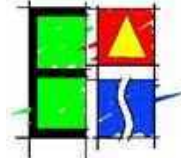
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NOV 2024

**ENGINEERING ADVICE
AND SERVICES**
associated with ULWAZI
73 Heugh Road, Walmer
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6013
tel/fax: (041) 581 2421



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DATE _____

APPROVED

1000

DATE _____



PROJECT

AND RISING MAIN TO BUNGALOWS

DWG DESCRIPTION	
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DWG DESCRIPTION

PUMP STATION EARTHWORKS, FENCE AND GATE DETAILS

CONTRACT NO.

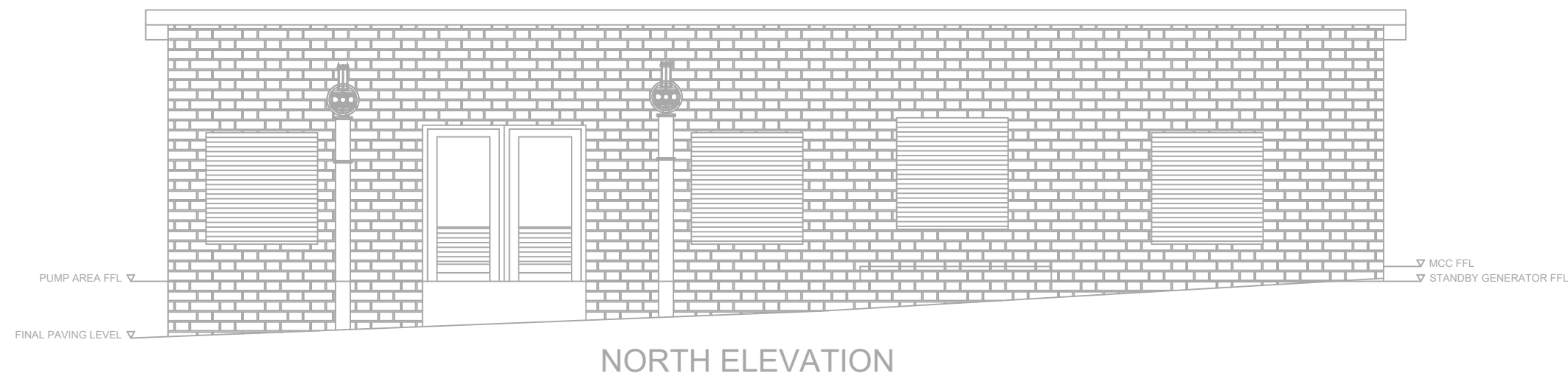
220/2024

PMO NO

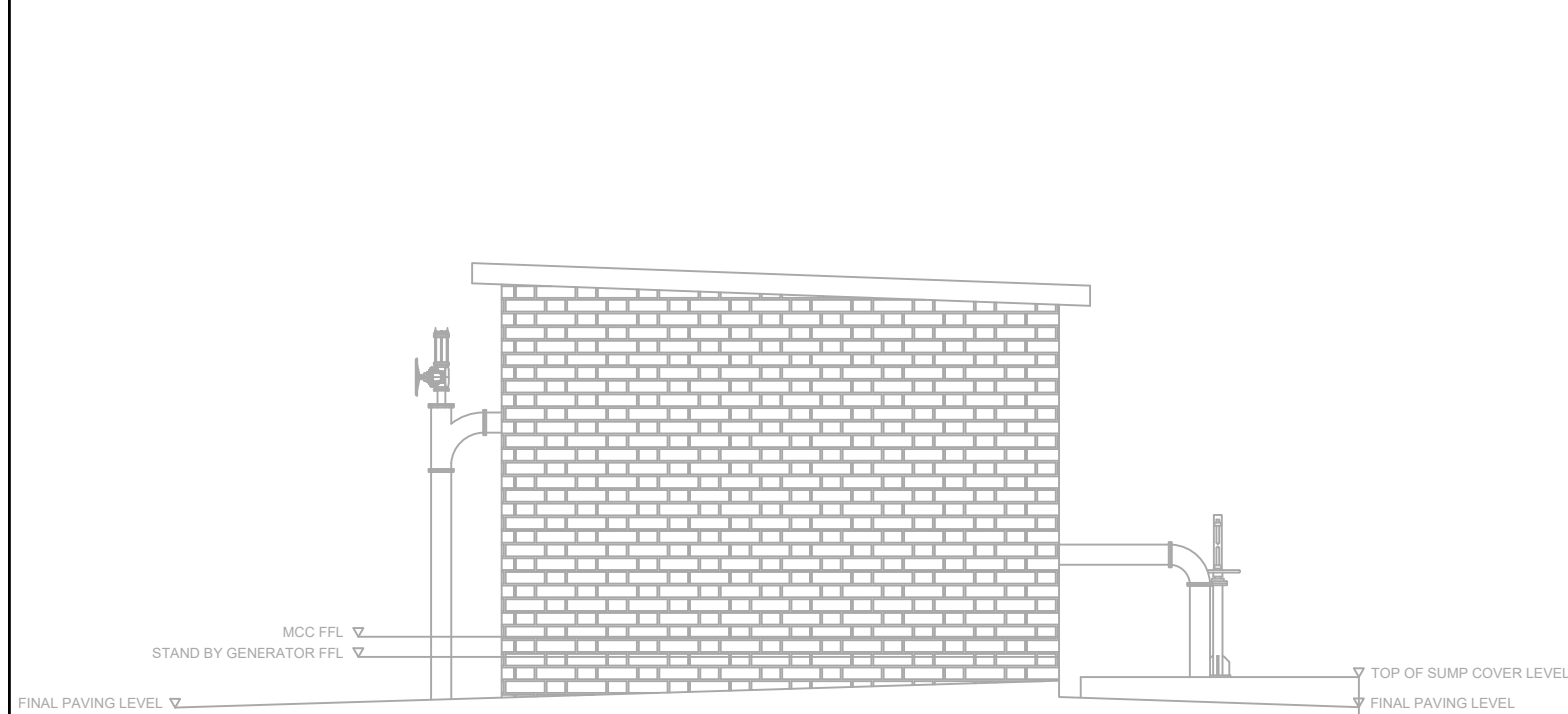
DWG.NO.

2299-T-405

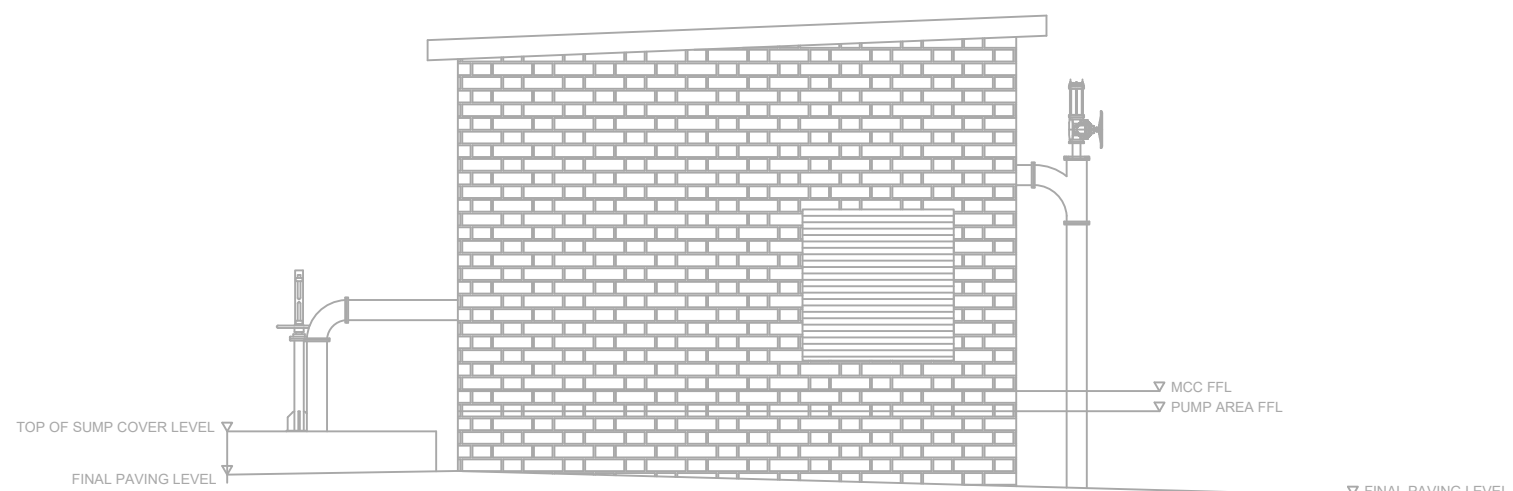
TYPE	POWER LEGEND SPECIFICATIONS	MOUNTING TYPE / HEIGHT
	DISTRIBUTION BOARD	SURFACE
	MOTOR CONTROL CENTER AND POWER DISTRIBUTION BOARD	SURFACE
	CAT ELECTRICAL BOARD	SURFACE
	ATS ELECTRICAL BOARD	-
	POWER CIRCUIT CABLING	-
	SINGLE PHASE ISOLATOR	-
	HA ESSENTIAL DOUBLE SOCKET OUTLET	WALL MOUNTED
	100mm Ø SERVICE CABLE SLEEVE	-
	150mm Ø SERVICE CABLE SLEEVE	-
	FIBRE SERVICE PROVIDER MANHOLE	-
	ELECTRICAL CABLE TRAY	-
	E-STOP PUSH BUTTON DEVICE	-



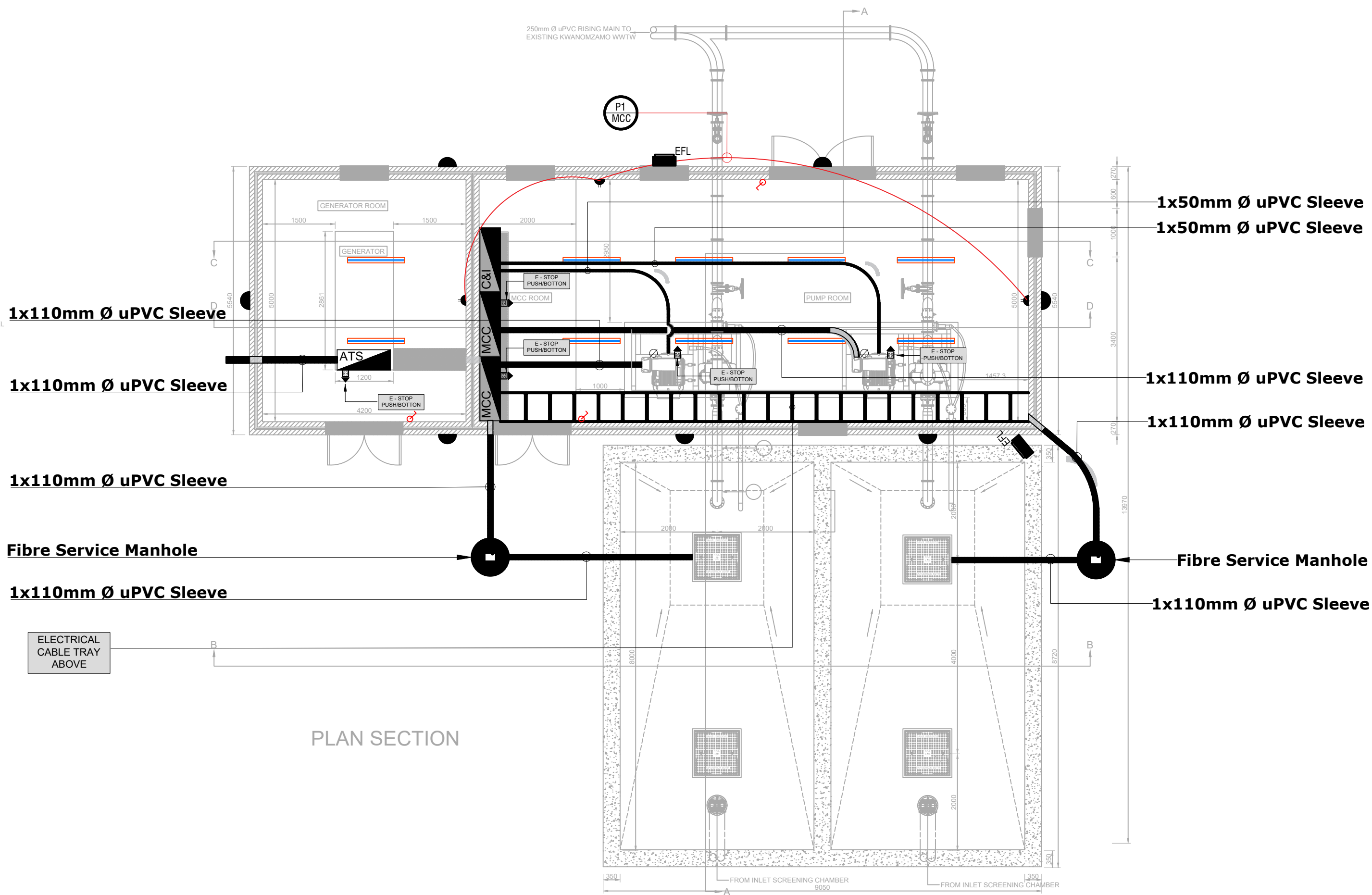
NORTH ELEVATION



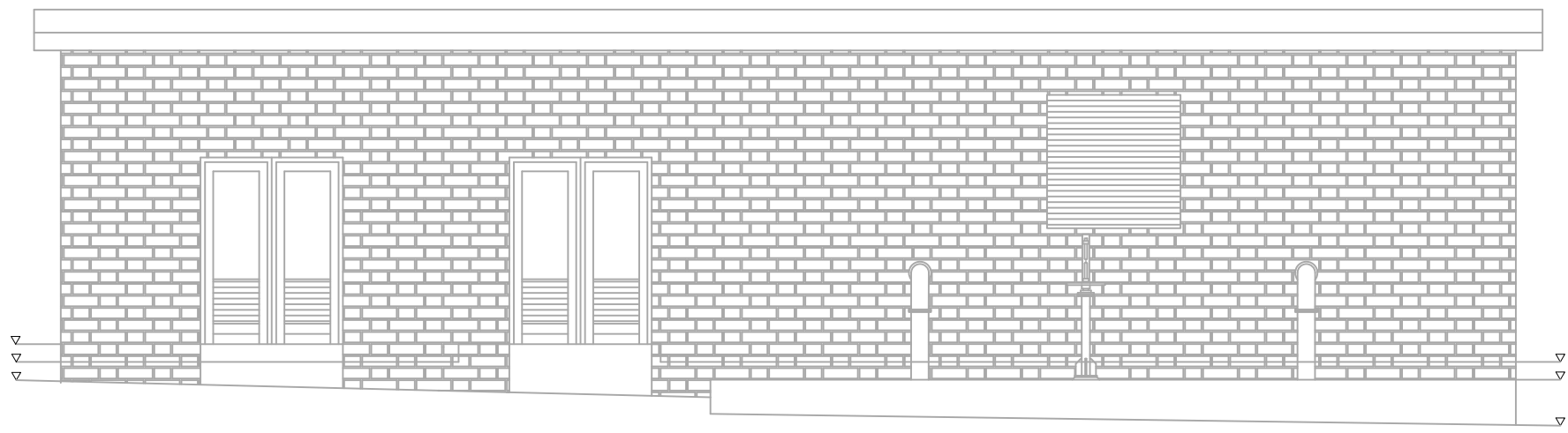
WEST ELEVATION



EAST ELEVATION



PLAN SECTION



SOUTH ELEVATION

FOR TENDER	AMENDMENTS				SCALE	SCALE ON REDUCED DRAWING	DESIGN	CH	ENGINEERING ADVICE AND SERVICES associated with ULWAZI 73 Heugh Road, Walmer P.O. Box 13867 Humewood Port Elizabeth 6013 tel/fax: (041) 581 2421		APPROVED	APPROVED		PROJECT	IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION AND RISING MAIN TO BUNGALOWS	CONTRACT NO. 220/2024
	NO.	DATE	DESCRIPTION	APPROVED			DRAWN	EAR			ENGINEER	CLIENT		DWG DESCRIPTION		
							APPROVED	PJ			DATE	DATE		ELECTRICAL - KWANOMZAMO PUMP STATION - POWER LAYOUT		
							DATE	NOV 2024								

LEGEND

TYPE	LIGHTING LEGEND SPECIFICATIONS	MOUNTING TYPE HEIGHT
●	BULKHEAD LIGHTING	1200mm AFFL
○	BULKHEAD LIGHTING (ELEVATION)	1200mm AFFL
■	FLOODLIGHT	1200mm AFFL
□	FLOODLIGHT (ELEVATION)	1200mm AFFL
—	LINEAR LIGHTS - 40W LED 1800X VAPOR PROOF FITTING PRE RATED	1200mm AFFL
—	LIGHTING CIRCUIT	1200mm AFFL
1	1 LEVER 1 WAY 16A LIGHT SWITCH	1200mm AFFL
2	2 LEVER 2 WAY 16A LIGHT SWITCH	1200mm AFFL

NORTH ELEVATION

WEST ELEVATION

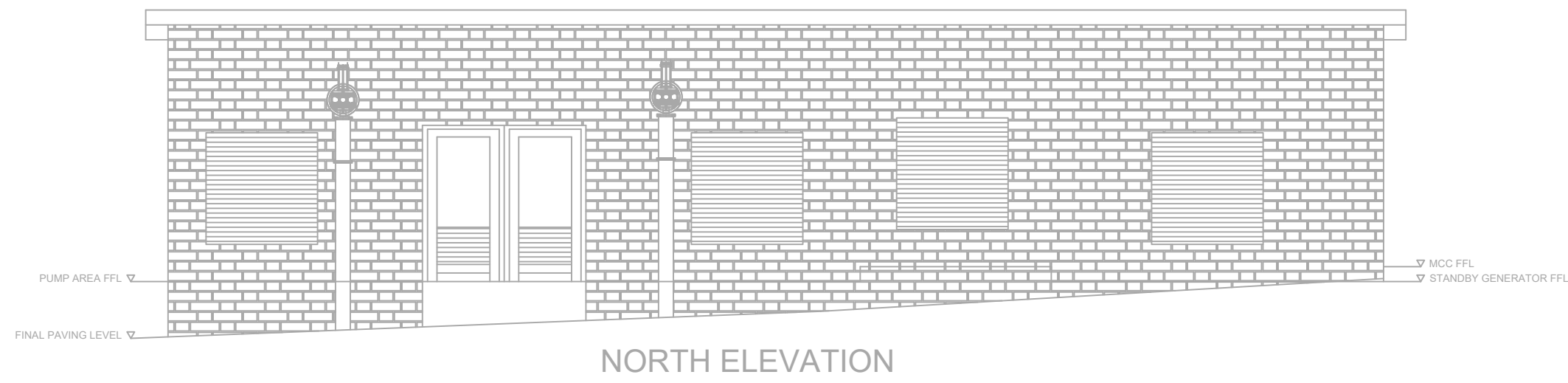
EAST ELEVATION

PLAN SECTION

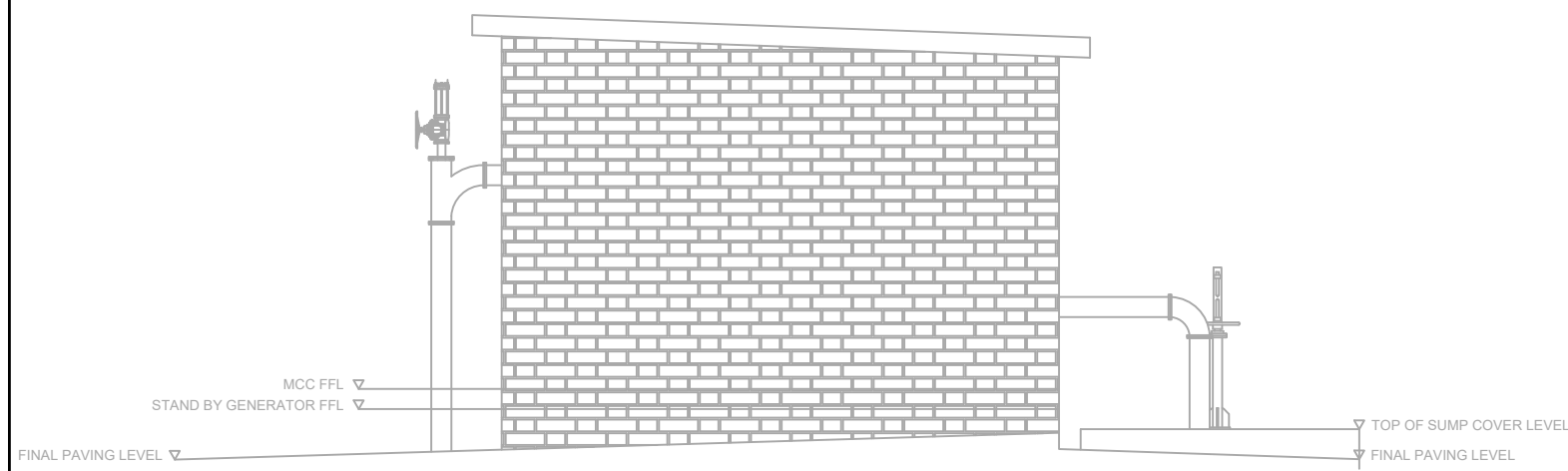
SOUTH ELEVATION

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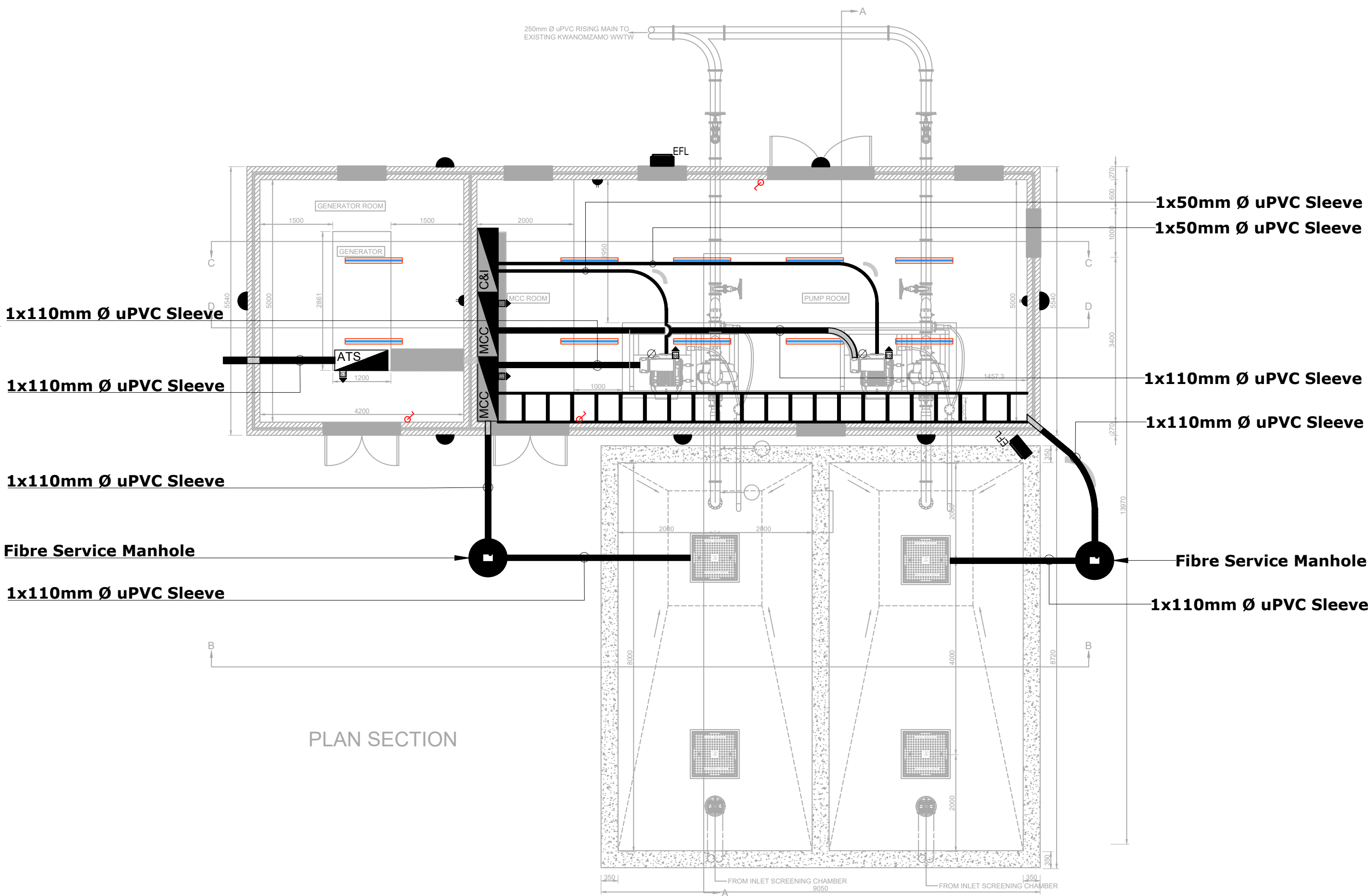
TYPE	SLEEVING & DATA LEGEND SPECIFICATIONS	MOUNTING TYPE HEIGHT
	11mm SERVICE CABLE SLEEVE	-
	50mm SERVICE CABLE SLEEVE	-
	FIBRE SERVICE PROVIDER MANHOLE	-
	CABLE TRAY	-



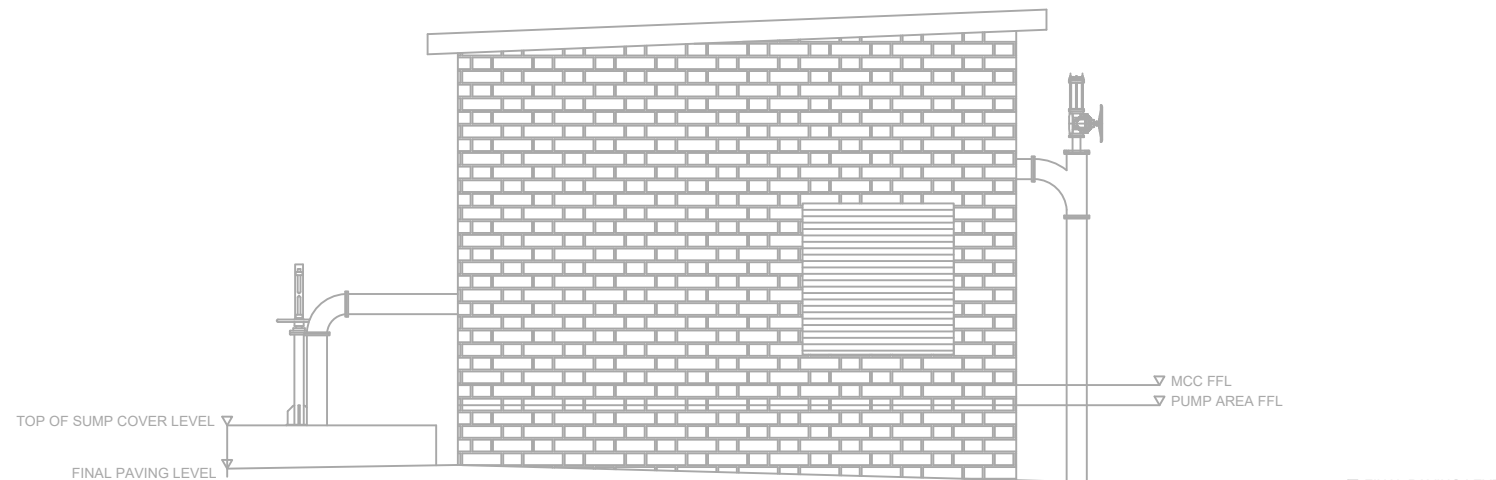
NORTH ELEVATION



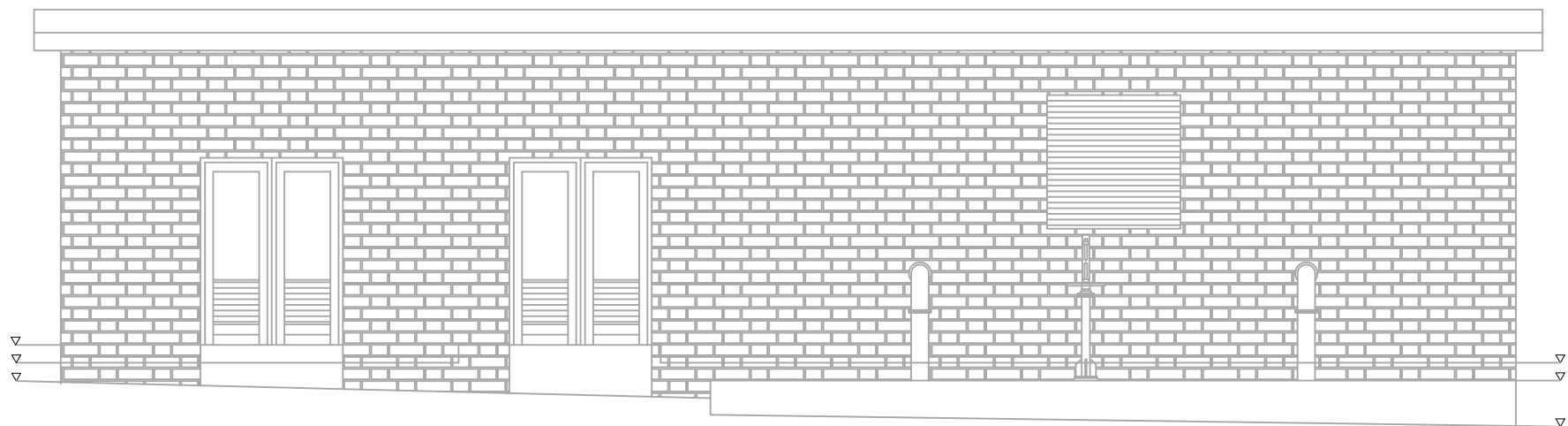
WEST ELEVATION



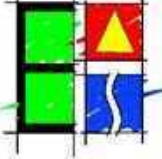
PLAN SECTION



EAST ELEVATION



SOUTH ELEVATION

FOR TENDER	AMENDMENTS				SCALE	SCALE ON REDUCED DRAWING	DESIGN	CH	ENGINEERING ADVICE AND SERVICES associated with ULWAZI 73 Heugh Road, Walmer P.O. Box 13867 Humewood Port Elizabeth 6013 tel/fax: (041) 581 2421		APPROVED	APPROVED		PROJECT	CONTRACT NO.
	NO.	DATE	DESCRIPTION	APPROVED			DRAWN	EAR			ENGINEER	CLIENT		IMPLEMENTATION OF KWANOMZAMO NEW SEWER PUMP STATION AND RISING MAIN TO BUNGALOWS	220/2024
							APPROVED	PJ			DATE	DATE		DWG DESCRIPTION	DWG NO.
							DATE	NOV 2024						ELECTRICAL - KWANOMZAMO PUMP STATION - SLEEVES & DATA LAYOUT	2299-T-408
														ISSUE	