KING CETSHWAYO DISTRICT MUNICIPALITY
TENDER DOCUMENT

TENDER REFERENCE: KCDM/RBIG/02/2022

MTHONJANENI SSA 2 PHASE 1B2: TENDER FOR CONSTRUCTION OF PIPELINES, 500KL RESERVOIR, AND PUMPING STATION

SITE/BRIEFING MEETING:	**Thursday, 29 September 2022 @ 10h00**
TENDER CLOSING:	**Thursday, 20 October 2022 @ 12h00**

The Tender Document (which includes the Form of Offer and Acceptance) completed in all respects, plus any additional supporting documentation required, must be addressed to the Municipal Manager and submitted in a sealed envelope with the legal name and address of the Tenderer, the Tender No. and tender title as well as the closing date indicated on the envelope. The sealed envelope must be inserted into the Tender Box situated in the foyer of King Cetshwayo House, Corner of Kruger Rand & Barbados Bay Road, CBD, Richards Bay before closing time. If the tender offer is too large to fit into the abovementioned Tender Box or the Box is full, please enquire at the reception counter as to where the SCM (Tender Office) is for alternative instructions. The onus remains with the Tenderer to ensure that the tender is placed in either the Tender Box or as alternatively instructed.

SERVICE PROVIDER'S DETAILS

Name of Service Provider:	
CSD Supplier Number	
Contact Person:	
E-mail Address:	
Telephone Number:	( )Code
Fax Number:	( )Code
Physical Address:	
Postal Address:	

NOTE:

The Service Provider shall be deemed to have satisfied himself/herself/themselves as to all the conditions and circumstances affecting this tender, including the physical aspects of working areas, and by the submission of a tender, will confirm acceptance of the conditions and circumstances applicable to any subsequent contract.

Enquiries relating to this tender must be directed as indicated below:

Tender Queries:	Technical Queries:
Contact Name: Mr. Zamo Mkhwanazi	**Contact Name:** Mr. Z Ndlovu
Telephone: 035-799 2715	**Telephone:** 035 – 799 2500

Contents

No	Heading		Page
The Tender			
Part T1: Tendering procedures			
T1.1	Tender Notice and Invitation to Tender **(WHITE)**		T.1
T1.2	Tender Data **(PINK)**		T.3
T1.3	Standard Conditions of Tender		T.7
Part T2: Returnable Documents **(YELLOW)**			
T2.1	List of Returnable Documents		T.16
T2.2	**Returnable Schedules Evaluation Documents**		
	Record of Addenda to Tender Documents	RS001	T.17
	Compulsory Enterprise Questionnaire	RS002	T.18
	Site Inspection Certificate	RS003	T.19
	Contractor Registration with Construction Industry	RS004	T.20
	Workmen's Compensation Letter of Good Standing	RS005	T.21
	Performance Security	RS006	T.22
	Municipal Account Statement	RS007	T.24
	Preferential Procurement	RS008	T.25
	Certificate of Authority for Signatory	RS009	T.30
	Schedule of Plant and Equipment	RS010	T.32
	Tenderer's Experience	RS011	T.33
	Key Personnel	RS012	T.35
	Proposed Amendments and Qualifications	RS013	T.37
	Declaration of Tenderer's Past Supply Chain Management Practices	RS014	T.38
	Declaration of Interest	RS015	T.40
	Certificate of Independent Tender Determination	RS016	T.42
	Day-works Schedule	RS017	T.44
	Preliminary Programme	RS018	T.45
	Declaration of competency on Health and Safety Requirements	RS019	T.46
	Quality Assurance and Environmental Management	RS020	T.47
	Declaration certificate for Local Production and Content for Designated Sectors (MBD 6.2)	RS021	T.49
	Annual Financial Statement	RS022	T.59
	Proposed Targeted Enterprises	RS023	T.60
	Tenderer's Participation in Job Creation Using Local Labour	RS024	T.62

The Contract			
Part C1: Agreement and Contract Data			
C1.1	Form of Offer and Acceptance	**(YELLOW)**	C2
C1.2	Contract Data	**(YELLOW)**	C8
Part C2: Pricing data		**(YELLOW)**	
C2.1	Technical Data Sheets		C25
C2.2	Pricing Instructions		C35
C2.3	Bills of Quantities		C38
Part C3: Scope of Work		**(BLUE)**	
	Description of the Works		C78
	Engineering		C79
	Procurement		C81
	Construction		C82
	Management		C84
	Annexure C3.A Variations to Standard Specifications		C91
	Annexure C3.B Particular Specifications		C133
Part C4: Site Information		**(GREEN)**	
C4	Site Information		C216
Part C5: Annexures		**(WHITE)**	
	Annexure C5.1: Drawings		
	Annexure C5.2: Health and Safety Specification		
	Annexure C5.3: Baseline Risk Assessment		
	Annexure C5.4: Signboard		
	Annexure C5.5: Proforma Permission To Occupy (PTO)		
	Annexure C5.6: PCI Policy		
	Annexure C5.7: Environmental Management Plan		
	Annexure C5.8: Geotechnical Report		

T1.1 Tender Notice and Invitation to Tender

KING CETSHWAYO DISTRICT MUNICIPALITY
TENDER REFERENCE: KCDM/RBIG/02/2022

MTHONJANENI SSA 2 PHASE 1B2: TENDER FOR CONSTRUCTION OF PIPELINES, 500KL RESERVOIR, AND PUMPING STATION

Interested parties must collect tender documents from the SCM Unit at King Cetshwayo House, Suite No. 8, Corner of Krugerrand & Barbados Bay Road, CBD, Richards Bay (035 799 2500), after a payment of R6621.15 (Incl. VAT) non-refundable, cash or EFT (FNB, King Cetshwayo District Municipality, Acc. 62943444109, Bank code 210554, Ref. Your company name and Tender ref. no.), tender deposit should be paid at the rates hall at of the King Cetshwayo District Municipality or alternatively download & print the bid document from www.kingtshwayo.gov.za or www.etenders.gov.za. The King Cetshwayo District Municipality will strive to achieve targeted procurement in accordance with Preferential Procurement Policy Framework Act Regulation 2017 in the manner that only tenderers with Level 1 BBBEE is targeted for this tender. The tenderer must also have a CIDB grading of 7CE or Higher. The tender that fails to meet the stipulated criteria will be regarded as non-responsive.

Any tender submitted by a person(s) who is in the service of the state or if that person(s) is not a natural person, of which any director, manager, principal shareholder, or stakeholder is a person in the service of the state or who is an advisor or consultant contracted with the Municipality shall not be considered in terms of regulation 44 of the Municipal Supply Chain Regulations. National Treasury has introduced the Central Supplier Data Base (CSD), where all suppliers are required to register. For more information, please contact Mr. M Mkhize on (035) 799 2715 or visit the CSD website at www.csd.gov.za. Only tenderers who are registered with CSD and King Cetshwayo District Municipality Supplier Data base will be considered for this tender.

A compulsory tender briefing meeting will be held on Thursday 29 September 2022 at 10h00 at the Mfanefile Community Hall (28°40'14.5"S 31°21'30.2"E). The sites will be visited after the meeting. LDV type transport is recommended to traverse the route.

Completed tenders in sealed envelopes bearing the tender number must be deposited in the Municipality's tender box in the foyer of King Cetshwayo House, Corner of Krugerrand & Barbados Bay Road, CBD, Richards Bay on or before 12h00 on Thursday, 20th October 2022. It must be noted that tender documents will not be opened in public, however the opening register will be published on KCDM's website. Tenders received after the due date and time will not be considered. Only locally produced goods or locally manufactured goods, meeting the stipulated minimum threshold for local production and content will be considered. The exchange rate to be used for the calculation of local content (local content and local production are used interchangeably) must be the exchange rate published by the SARB at 12h00 on the date, one week (7 calendar days) prior to the closing date of the bid

Tenderers are required to employ Targeted Enterprises on this contract., failure to do so may lead to the tenderer being completely disqualified. The Targeted Enterprises to be utilized should meet the requirements of Preferential Procurement Regulations 2017, and registered with CIDB with grading of 2 CE to 4 CE, EME or QSE which are at least 51% black owned. At least 30% of contract value must be subcontracted to the Targeted Enterprises. The objective is to bring about meaningful transformation in the Construction Industry through meaningful economic participation, transfer of technical, management and entrepreneurial skills and creation of sustainable Black Enterprises.

This tender will be evaluated on a 80/20 preferential points system. Please ensure to submit a certified copy of your companies' BBBEE level status verification certificate with the tender document.

Please note that this tender will be evaluated on compliance (returnable and completeness) and functionality. The following criteria in "Functional Evaluation Criteria", will be applicable for the functionality and compliance and maximum weight of each criterion is indicated in the table below and any tenderer who scores less than 70 percent, in respect of "functionality" will be regarded as submitting a non-responsive tender and will be disqualified. Note that only tenderers who administratively comply (returnable and completeness of document) shall move to functionality stage.

Prospective service providers are required to ensure full completion and correctness of information when responding to MBD 4 and all other required declarations in the document. The municipality reserves the right to validate the correctness of the declarations through various databases inclusive of the Central Supplier Database (CSD). Failure to fully complete and/or provision of incorrect information in the declaration will be regarded by the employer as a non-responsive tender.

Functional Evaluation Criteria:

#	Criteria Description		Weight
1	Service providers must comply with the following pre-requisites:		
	a.	Tenderer's experience in similar nature and value (No project will lead to disqualification)	25
	b.	Key Personnel: Site Agent / Contracts Manager (No experience or less than 1 year will lead to disqualification)	20
	c.	Key Personnel: Foreman (No experience or less than 1 year will lead to disqualification)	20
	d.	Construction Programme	15
	e.	Quality Assurance / Quality Management System (No quality assurance will lead to disqualification)	15
	f.	Geographic location of Tenderer	5
		TOTAL	100

It will be the tenderer's responsibility to check the document on receipt for completeness and to notify the employer of any discrepancies or omissions. It is the tenderer's responsibility to provide all the data and information requested in the form required, failure to do so may be regarded by the employer as a non-responsive tender. Submissions may only be done on documentation supplied by the Municipality.

All communication between the employer and the tenderer shall be in a form that can be read, copied, and recorded. All writing shall be in the English Language. The employer shall not take any responsibility for non-receipt of communications from a tenderer.

All tender enquiries which are non-technical must be directed to Zamo Mkhwanazi at Tel. 035-799 2715, Technical queries must be directed to Mr. Zenzele Ndlovu at Tel. 035 799 2529.

Tenderers who do not hear from the King Cetshwayo Municipality within 90 days of the closing date of the tender should consider their tender unsuccessful. Please note that no tender will be accepted by fax or e-mail.

Mr PP Sibiya
Municipal Manager
King Cetshwayo District Municipality
Private Bag X1025
RICHARDS BAY
3900

T1.2 Tender Data

The Conditions of Tender are the Standard Conditions of Tender as contained in Annex C of the CIDB Standard for Uniformity in Construction Procurement (2019) (See www.cidb.org.za) which are reproduced without amendment or alteration and are, for the convenience of Tenderers attached as an Annex to this Tender Data.

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

Variations and additions to the Standard Conditions of Tender are indicted at the end of the Tender Data.

Clause Number **Tender Data**

C.1 The Employer is the King Cetshwayo District Municipality.

C.1.2 The tender documents issued by the employer comprise:

a) Book 1 (This document)

b) Book 2 (The drawings)

C.1.4 The employer's agent, for the purposes of any communication between the employer and tenderer, is:

Queries Type	Tender Matters	Technical Matters
Name:	Mr Zamo Mkhwanazi	Mr. Zenzele Ndlovu
Postal Address:	Private Bag X1025 Richards Bay 3900	Private Bag X1025 Richards Bay 3900
Physical Address	King Cetshwayo House, Corner Kruger Rand & Barbados Bay Road, Richards Bay CBD	King Cetshwayo House, Corner Kruger Rand & Barbados Bay Road, Richards Bay CBD
Tel /Fax No.:	035 799 2715	035 799 2313
E-mail:	Mkhwanaziz@kingcetshwayo.gov.za	ndlovuze@kingcetshwayo.gov.za

C1.6.2 A competitive negotiation process will not be used.

C1.6.3 A two-envelope procedure will not be used.

C.2.1.1 Eligibility to Tender

Only those tenderers meeting the following criteria are eligible to tender.

a) Tenderers who have a BBBEE rating of Level 1;

b) Tenderers who are registered with the CIDB, in an equal or higher than 7 Civil Engineering works (7CE or higher) class of construction work and are registered with the CIDB as having a track record;

c) Tenderers who meet the minimum score for functionality;

d) Tenderers who are registered on the National Treasury Central Supplier Database and the KCDM supplier database;

e) Tenderers who's name and signature appear on the attendance register of the tender briefing meeting;

f) Tenderers who have not failed to perform on any previous contract and were issued a written notice to this effect;

g) Tenderers who when completing the Compulsory Enterprise Questionnaire can show that there are no conflicts of interest which may impact on the Tenderer's ability to perform the contract in the best interests of the Employer or potentially compromise the Tender process.

h) Only those tenderers who have in their employ management and supervisory staff satisfying the requirements of the scope of work for labour intensive competencies for supervisory and management staff are eligible to submit tenders.

C2.2.1 The employer will provide R0.00 compensation.

C.2.7 The arrangements for a clarification meeting are as stated in the Tender Notice and Invitation to Tender.

C.2.11 No correction fluid/ tape should be used on this tender document.

C.2.12.2 If a Tenderer wishes to submit an alternative Tender offer, the only criteria permitted for such alternative Tender offer is that it demonstrably satisfies the Employer's standards and requirements, the details of which may be obtained from the Employer's Agent.

Calculations, drawings and all other pertinent technical information and characteristics as well as modified or proposed Pricing Data must be submitted with the alternative Tender offer to enable the Employer to evaluate the efficacy of the alternative and its principal elements so as to take a view on the degree to which the alternative complies with the Employer's standards and requirements and to evaluate the acceptability of the pricing proposals. Calculations must be set out in a clear and logical sequence and must clearly reflect all design assumptions. Pricing Data must reflect all assumptions in the development of the pricing proposal.

Acceptance of an alternative Tender offer will mean acceptance in principle of the offer. It will be an obligation of the contract for the Tenderer, in the event that the alternative is accepted, to accept full responsibility and liability that the alternative offer complies in all respects to the Employer's standards and requirements.

The modified Pricing Data must include an amount equal to 5% of the amount Tendered for the alternative offer to cover the Employer's costs of confirming the acceptability of the detailed design before it is constructed.

C.2.13.3 Each Tender offer communicated on paper shall be submitted as an original only with zero copies.

C.2.13.4 All forms where a requirement for a signature is indicated are to be signed.

C.2.13.5 & 2.13.7 The employer's address and identification details to be shown on each Tender offer package are:

Identification details:	Reference No. KCDM/RBIG/02/2022
Title of Tender	MTHONJANENI SSA 2 PHASE 1B2: TENDER FOR CONSTRUCTION OF PIPELINES, 500KL RESERVOIR, AND PUMPING STATION
Closing Date	As per Tender Notice
Time	As per Tender Notice
Employers Address:	Private Bag X1025, Richards Bay, 3900

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

C2.15.1 The closing time is as stated in the Tender Notice and Invitation to Tender.

C2.15.1 The address for receipt of the tender document is:

The tender box in the foyer of the offices of the King Cetshwayo District Municipality, Corner of Krugerrand & Barbados Bay Road, CBD, Richards Bay

C.2.16 The Tender offer validity period is 90 days.

C.2.18 The tenderer shall, when requested by the Employer to do so, submit the names of all management and supervisory staff that will be employed to supervise the labour-intensive portion of the works together with satisfactory evidence that such staff members satisfy the eligibility requirements.

C.2.19 Should it be necessary in the course of an inspection, test or analysis for whatever reason that an official of the Employer or the Employers Agent should need to proceed to other centres for inspection, test or analysis purposes, such costs shall be for the account of the Tenderer.

C.2.23 The tenderer must submit to the Employer the details as requested in the various returnable schedules.

C.3.4 Tenders will be opened immediately after the closing time for Tenders at a venue to be announced at the tender box immediately after the closing time for Tenders.

C.3.11.1 The procedure for the evaluation of responsive Tenders is as per the Preferential Procurement Regulations, 2017.

With reference to the clauses in the regulation:

3.(a)(i) The 80/20 preference point system will apply.

5.(1) the tender will be evaluated on functionality.

5.(3)(a)&(b) The evaluation criteria for measuring functionality and the points for each criteria is given the Functionality Criteria Table.

5.(3)(c) the minimum qualifying score for functionality for a tender to be considered further is 70%

The information provided by the tenderer in the returnable documents will be used in the evaluation process.

Table 1 Functionality Criteria Table

NO.	CRITERIA	POINTS	RETURN-ABLE SCHEDULE	WEIGHT
1.	Tenderer's Experience: Successful completion of similar projects (in nature and value) in the last ten (10) years	˅ No Project (Disqualification) ˅ 1 project (5) ˅ 2 projects (10) ˅ 3 projects (15) ˅ 4 projects (20) ˅ 5 projects and above (25)	RS011	25
2.	Key Personnel: Site Agent/ Contracts Manager qualifications and experience.	Qualification required is 3yr Degree / N. Diploma in Civil Engineering, LIC NQF 5 and the following experience ˅ No qualification or less than 1-year experience (Disqualification) ˅ 1- 2 years of relevant experience in the position (7) ˅ More than 2-5 years' relevant experience in the position (14) ˅ more than 5 years' relevant experience in the position (20)	RS012	20
3.	Key Personnel: Foreman qualification and experience	Qualification required is LIC NQF 4, Matric/N3 and the following experience ˅ No experience or less than 1-year experience (Disqualification) ˅ 1-2 years' relevant experience in the position (4) ˅ More than 2 - 4 years of relevant experience in the position (8) ˅ More than 4 years - 6 years' relevant experience in the position (12) ˅ More than 6 years - 8 years' relevant experience in the position (16) ˅ More than 8 years' relevant experience in the position (20)	RS012	20
4.	Preliminary Construction Programme: Detail to which works items are planned.	˅ No programme (Disqualification) ˅ Poor (only major work items shown) (5) ˅ Adequate (all necessary work items shown) (10) ˅ Excellent (all necessary work items shown including links between tasks) (15)	RS018	15
5.	Quality Management System	˅ Nothing submitted (Disqualification) ˅ Poor Quality Management system (4) ˅ Detailed company quality management program attached (8) ˅ ISO 9001: 2015 certified (15)	RS020	15
6.	Geographic Location: Locality of the Tenderer	˅ Outside KZN (1) ˅ Inside KZN (3) ˅ Inside the King Cetshwayo District Municipality (5)	RS007	5

Variations and Additions to the Standard Conditions of Tender

1 Variation of Clause C.2.14

Replace Clause C2.14 with the following

"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, shall be regarded by the employer as non-responsive. This would include, but not be limited to, aspects such as letters not signed or certification not provided where certification is requested."

2 Add New Clause C.2.24

"C.2.24 Verification of Information

Accept and agree that the Employer may verify the validity and correctness of any data provided by the tenderer through direct contact with the source of such data. Which would include, but not be limited to banking institutions, SARS, the Central Supplier Database, CIPRO, references, key personnel, etc."

T1.3 Standard Conditions of Tender

The CIDB Standard for Uniformity 2019: Annex C Standard Conditions of Tender is reproduced here for convenience. The original can be accessed as published in Board Notice 423 of 2019 in Government Gazette 42622 of 8 August 2019.

Annex C Standard Conditions of Tender

C.1 General

C.1.1 Actions

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

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

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

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

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

C.1.2 Tender Documents

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

C.1.3 Interpretation

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

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

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

a) **conflict of interest** means any situation in which:
   i) someone in a position of trust has competing professional or personal interests which make it difficult to 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 engineering and construction works specified in the invitation;
b) funds are no longer available to cover the total envisaged expenditure; or
c) no acceptable tenders are received.
d) there is a material irregularity in the tender process.

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

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

C.1.6 Procurement procedures

C.1.6.1 General

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

C.1.6.2 Competitive negotiation procedure

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

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

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

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

C.1.6.2.4 The contract shall be awarded in accordance with the provisions of 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.2.10.2Show VAT payable by the employer separately as an addition to the tendered total of the prices.

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

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

C.2.11 Alterations to documents

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

C.2.12 Alternative tender offers

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

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

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

C.2.13 Submitting a tender offer

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

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

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

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

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

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

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

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

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

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

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

C.2.15 Closing time

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

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

C.2.16 Tender offer validity

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

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

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

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

C.2.17 Clarification of tender offer after submission

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

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

C.2.18 Provide other material

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

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

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

C.2.19 Inspections, tests and analysis

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

C.2.20 Submit securities, bonds and policies

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

C.2.21 Check final draft

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

C.2.22 Return of other tender documents

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

C.2.23 Certificates

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

C.3 The employer's undertakings

C.3.1 Respond to requests from the tenderer

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

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

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

C.3.2 Issue Addenda

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

C.3.3 Return late tender offers

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

C.3.4 Opening of tender submissions

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

C.3.4.2 Announce at the meeting held immediately after the opening of tender submissions, at a venue indicated in the tender data, the name of each tenderer whose tender offer is opened and, where applicable, the total of his prices, number of points claimed for 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	**Qualitative interpretation of goal**
Fair	The process of offer and acceptance is conducted impartially without bias, providing simultaneous and timely access to participating parties to the same information.
Equitable	Terms and conditions for performing the work do not unfairly prejudice the interests of the parties.
Transparent	The only grounds for not awarding a contract to a tenderer who satisfies all requirements are restrictions from doing business with the employer, lack of capability or capacity, legal impediments and conflicts of interest.
Competitive	The system provides for appropriate levels of competition to ensure cost effective and best value outcomes.
Cost effective	The processes, procedures and methods are standardized with sufficient flexibility to attain best value outcomes in respect of quality, timing and price, and least resources to effectively manage and control procurement processes.

The activities associated with evaluating tender offers are as follows:

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

C.3.11.1 General

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

C.3.12 Insurance provided by the employer

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

C.3.13 Acceptance of tender offer

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

a) is not under restrictions, or has principals who are under restrictions, preventing participating in the employer's procurement;
b) can, as necessary and in relation to the proposed contract, demonstrate that he or she possesses the professional and technical qualifications, professional and technical competence, financial resources, equipment and other physical facilities, managerial capability, reliability, experience and reputation, expertise and the personnel, to perform the contract;
c) has the legal capacity to enter into the contract;
d) is not; insolvent, in receivership, under Business Rescue as provided for in chapter 6 of the Companies Act 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.

T2.1 List of Returnable Documents

The Tenderer must complete and /or sign the following Returnable Documents:

		Completed
1	**Returnable Schedules –Evaluation Documents**	
RS001	Record of Addenda to Tender Documents	
RS002	Compulsory Enterprise Questionnaire	
RS003	Site Inspection Certificate	
RS004	Contractor Registration with the Construction Industry Development Board	
RS005	A copy of a valid Letter of Good Standing from Workmen's Compensation	
RS006	Performance Security	
RS007	Municipal Account Statement	
RS008	Preferential Procurement (MBD 6.1)	
RS009	Authority for Signatory	
RS010	Schedule of Plant and Equipment	
RS011	Tenderer's Experience	
RS012	Key Personnel	
RS013	Proposed Amendments and Qualifications	
RS014	Declaration of Tenderers Past Supply Chain Management Practices (MBD8)	
RS015	Declaration of Interest (MBD4)	
RS016	Certificate of Independent Bid Determination (MBD9)	
RS017	Dayworks Schedule	
RS018	Preliminary Programme	
RS019	Declaration of Competency on Health and Safety	
RS020	Quality Assurance & Environmental Management	
RS021	Declaration Certificate for Local Production and Content for Designated Sectors (MBD6.2)	
RS022	Annual Financial Statement	
RS023	Targeted Enterprise	
RS024	Tenderer's Participation in Job Creation Using Local Labour	
2	**The Offer of the C1.1 Offer and Acceptance**	
3	**C1.2 Contract Data (Part 2)**	
4	**C2.2 Bill of Quantities**	

....
Signature Date

T2.2 Returnable Schedules to be completed by Tenderer

Record of Addenda to Tender Documents RS001

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

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

Attach additional pages if more space is required.

Compulsory Enterprise Questionnaire RS002

As Per Annex G of CIDB Standard for Uniformity 2019

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

Section 1: Name of enterprise:

Section 2: VAT registration number, if any:

Section 3: cidb registration number, if any:

Section 4: CSD number:

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

Name*	Identity number*	Personal income tax number*

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

Section 6: Particulars of companies and close corporations

Company registration number:

Close corporation number:

Tax reference number:

Section 7: MBD4 issued by National Treasury must be completed for each tender and be attached as a tender requirement.

Section 8: MBD6-1 and 6-2 issued by National Treasury must be completed for each tender and be attached as a tender requirement.

Section 9: MBD8 issued by National Treasury must be completed for each tender and be attached as a tender requirement.

Section 10: MBD9 issued by National Treasury must be completed for each tender and be attached as a tender requirement.

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

i) authorizes the employer to verify the tenderers tax clearance status from the South African Revenue Services that it is in order;
ii) confirms that the neither the name of the enterprise or the name of any partner, manager, director or other person, who wholly or partly exercises or may exercise, control over the enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004;
iii) confirms that no partner, member, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears, has within the last five years been convicted of fraud or corruption;
iv) confirms that I / we are not associated, linked or involved with any other tendering entities submitting tender offers and have no other relationship with any of the tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest; and
v) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of my belief both true and correct.

Signed		Date	
Name		Position	
Enterprise name			

Site Inspection Certificate RS003

Site Inspection Certificates are signed and handed out by the Engineer at the Tender Site Inspection.

ATTACH YOUR SIGNED ORIGINAL SITE INSPECTION CERTIFICATE TO THIS PAGE

Failure to do so may lead to your Tender being disqualified.

Contractor Registration with Construction Industry Development Board RS004

The CIDB registration details are as follows:

Name of entity registered with CIDB: _____

Registration CRS number: _____

Registration category and class: _____

Workmen's Compensation Letter of Good Standing RS005

PAGE TO WHICH A VALID NUMBERED CERTIFICATE OF THE WORKMEN'S COMPENSATION COMMISSIONER LETTER OF GOOD STANDING MUST BE ATTACHED.

Please provide a valid certificate number of the Workmen's Compensation if registered with the department of labour, or attach valid original (or valid certified copy) of the Workmen's Compensation commissioner letter of good standing from applicable agencies e.g, FEM, RAM etc, if not registered with the department of labour.

Workmen's Compensation registration number: _____

Workmen's Compensation certificate number: _____

OR

In the case where it is not possible for an applicant to obtain the above letter of good standing from the Workmen's Compensation Commissioner, an affidavit is to be submitted advising that the business has registered with the Workmen's Compensation Commissioner.

OR

In the case where a business does not employ any employees an affidavit together with a letter from the Workmen's Compensation Commissioner addressed to the business, confirming that registration is not required, must be submitted.

Failure to do so may lead to your tender being disqualified.

Performance Security RS006

The tenderer is to issue a performance guarantee equal in value to 10 (ten)% of the tendered amount excluding VAT, such performance guarantee must be one of the options indicated on the table below. For the purposes of GCC2015 Clause 6.2 the selection below will be Contract Data provided by the Contractor.

Type of Security	**Contractor's choice** (Indicate "Yes" or "No")
Cash deposit of **10%** of the Contract Sum Attach a letter from the bank confirming availability of funds equivalent to 10 (ten) % of the tendered amount exclusive of VAT.	
Fixed Performance Guarantee of **10%** of the Contract Sum Attach a letter of undertaking from a recognized financial institution, confirming the issuing of a performance guarantee equal to in value to 10 (ten) % of the tendered amount exclusive of VAT. The letter of undertaking will not oblige the financial institution to issue a performance guarantee, but merely serves as an indication of the tenderer's ability to obtain a performance guarantee The performance guarantee is to be issued by a Bank registered in terms of the Banking Act (94 of 1990).	
Retention of **10%** of the Works Attach to this document a letter from the director/s giving the Employer consent to deduct 10 (ten) % retention from each progress payment due to the contractor until a limit of 10 (ten) % is reached.	
Cash deposit of **5%** of the Contract Sum plus retention of **5%** of the value of the Works - Attach a letter from the bank confirming availability of funds equivalent to 5 (five) % of the tendered amount exclusive of VAT. - Attach a letter from the director/s giving the Employer consent to deduct 10 (ten) % retention from each progress payment due to the contractor until a limit of 5 (five) % is reached.	
Fixed Performance Guarantee of **5%** of the Contract Sum plus retention of **5%** of the value of the Works - Attach a letter of undertaking from a recognized financial institution, confirming the issuing of a performance guarantee equal to in value to 5 (five) % of the tendered amount exclusive of VAT. The letter of undertaking will not oblige the financial institution to issue a performance guarantee, but merely serves as an indication of the tenderer's ability to obtain a performance guarantee The performance guarantee is to be issued by a Bank registered in terms of the Banking Act (94 of 1990) - Attach a letter from the directors giving the Employer consent to deduct 10 (ten) % retention from each progress payment due to the contractor until a limit of 5 (five) % is reached.	

Failure to do so may lead to your Tender being disqualified.

RS006-2 – Bank Rating

TENDERER'S FINANCIAL STANDING AND STABILITY

a In terms of the Standard Conditions of Tender, the Tenderer shall provide information about its commercial position, which includes information necessary for the Employer to evaluate the Tenderer's financial standing.

b A third party credit bureau check will be used to determine the credit worthiness of the Tenderer.

c The financial standing of the Tenderer will be assessed by third party credit checks on the main contractor

d An analysis of the Tenderer financial standing will be conducted by third party for the purposes of establishing the Tenderers financial viability and ability to meet all of its contractual obligations for the duration of the contract, should the Tenderer be awarded the contract.

e Tenders that do not meet King Cetshwayo District Municipality's financial requirements as per third party assessment, will be disqualified from further assessment.

The financial standing of the Tenderer will be assessed by evaluating the bank rating codes in order to carry out the financial risk analysis on the Tenderer. This is done as to establish the Tenderers financial viability and ability to meet all of its contractual obligation for the duration of the contract should the tenderer be awarded the contract.

Attach bank Rating with bank code A-C

	BANK CODE	DESCRIPTION OF BANK CODE
1.	A	Undoubted for the amount of enquiry
2.	B	Good for the amount of enquiry
3.	C	Good for the amount quoted if strictly in the way of business
4.	D	Fair Trade risk for amount of enquiry
5.	E	Figures considered too high
6.	F	Financial position unknown
7.	G	Occasional dishonours
8.	H	Frequent dishonours

Failure to do so may lead to your Tender being disqualified.

Municipal Account Statement **RS007**

Confirmation of Good Standing with Regard to Municipal Accounts

PAGE TO WHICH ANY OF THE FOLLOWING MUST BE ATTACHED

IN THE CASE WHERE:

Please select the relevant option by ticking below

A. TENDERER AS LANDOWNER FOR PURPOSE OF CONDUCTING BUSINESS FROM PREMISES

A.1 In the case where the tenderer owns the property from which the tenderer's business operates from, an original or certified copy of the tenderer's business municipal account (not older than 3 months) indicating the status of payment of all municipal rates and taxes i.e. property rates, electricity, water, refuse & sewer from the Municipality in which jurisdiction the said property is situated, must be submitted.. ☐

OR

A.2 In the instance where the tender occupies Tribal land an original/certified affidavit from commissioner of oaths, confirming that the tenderer is residing in the area where no municipal accounts are billed. If the property rates, electricity, water, refuse is charged by the municipality, the original or certified copy of the statement not older than three (3) months in the name of the service provider or any of its directors must be attached. ☐

NB: Should there be separate tax invoices from the municipality for property rates and services (taxes), you are required to submit the most recent of each of these invoices.

OR

B. TENDERER IS THE TENANT FOR PURPOSE OF CONDUCTING ITS BUSINESS FROM PREMISES ☐

B.1 In the case where the tenderer does not own property and is a tenant for the purpose of its business establishment, the tenderer to provide an original or certified copy of a certificate from its landlord certifying that all the tenants payments in respect of all municipal rates and taxes i.e. property rates, electricity, water, refuse & sewer are paid up to date, or ☐

B.2 In the case where the tenderer as tenant is responsible for its own municipal accounts with the municipality then tenderer must attach the letter from the landlord certifying the above together with original or certified copies of all most recent relevant municipal invoices i.e. property rates, electricity, water refuse & sewer.. ☐

B.3 In the case where the tenderer operates in the property owned by relative and does not pay rent or rates, an affidavit from the relative confirming such must be attached. Also the up to date original or certified copy municipal rates statement of the relative must be attached or letter from the councillor in case of the Traditional Authority ☐

B.4 In case where the potential service provider is under incubation programme an original or certified copy of the letter from the incubator confirming that the service provider is using their facilities (property). The incubator is to provide their original or certified copy of rates account or letter from the landlord.

Failure to do so may lead to your tender being disqualified.

Preferential Procurement RS008

(MBD 6.1)

THIS FORM, BIDDERS MUST STUDY THE GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF B-BBEE, AS PRESCRIBED IN THE PREFERENTIAL PROCUREMENT REGULATIONS, 2017.

1. GENERAL CONDITIONS

1.1 The following preference point systems are applicable to all bids:

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

1.2 The 80/20 preference point system will apply, and the lowest acceptable tender will be used to determine the applicable preference point system on this tender.

1.3 Preference points for this bid shall be awarded for:

(a) Price; and

(b) B-BBEE Status Level of Contribution.

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

	POINTS	
	80/20 system	90/10 system
PRICE	80	90
B-BBEE STATUS LEVEL OF CONTRIBUTION	20	10
Total points for Price and B-BBEE must not exceed	100	100

1.5 Failure on the part of a bidder to submit a B-BBEE Verification Certificate from a Verification Agency accredited by the South African Accreditation System (SANAS), or a Registered Auditor approved by the Independent Regulatory Board of Auditors (IRBA) or a sworn affidavit confirming annual turnover and level of black ownership in case of an EME and QSE together with the bid, will be interpreted to mean that preference points for B-BBEE status level of contribution are not claimed.

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

2. DEFINITIONS

(a) "all applicable taxes" includes value-added tax, pay as you earn, income tax, unemployment insurance fund contributions and skills development levies;

(b) "B-BBEE" means broad-based black economic empowerment as defined in section 1 of the Broad-Based Black Economic Empowerment Act;

(c) "B-BBEE status level of contributor" means the B-BBEE status received by a measured entity based on its overall performance using the relevant scorecard contained in the Codes of Good Practice on Black Economic Empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act;

(d) "bid" means a written offer in a prescribed or stipulated form in response to an invitation by an organ of state for the provision of services, works or goods, through price quotations, advertised competitive bidding processes or proposals;

(e) "Broad-Based Black Economic Empowerment Act" means the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003) as amended by Act No 46 of 2013;

(f) "comparative price" means the price after the factors of a non-firm price and all unconditional discounts that can be utilized have been taken into consideration;

(g) "consortium or joint venture" 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;

(h) "contract" means the agreement that results from the acceptance of a bid by an organ of state;

(i) "EME" means an Exempted Micro Enterprise as defines by Codes of Good Practice issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);

(j) "Firm price" means the price that is only subject to adjustments in accordance with the actual increase or decrease resulting from the change, imposition, or abolition of customs or excise duty and any other duty, levy, or tax, which, in terms of the law or regulation, is binding on the contractor and demonstrably has an influence on the price of any supplies, or the rendering costs of any service, for the execution of the contract;

(k) "functionality" means the measurement according to predetermined norms, as set out in the bid documents, of a service or commodity that is designed to be practical and useful, working or operating, taking into account, among other factors, the quality, reliability, viability and durability of a service and the technical capacity and ability of a bidder;

(l) "non-firm prices" means all prices other than "firm" prices;

(m) "person" includes a juristic person;

(n) "QSE" means a Qualifying Small Enterprise as defines by Codes of Good Practice issued in terms of section 9 (1) of the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);

(o) "rand value" means the total estimated value of a contract in South African currency, calculated at the time of bid invitations, and includes all applicable taxes and excise duties;

(p) "sub-contract" means the primary contractor's assigning, leasing, making out work to, or employing, another person to support such primary contractor in the execution of part of a project in terms of the contract;

(q) "total revenue" bears the same meaning assigned to this expression in the Codes of Good Practice on Black Economic Empowerment, issued in terms of Section 9(1) of the Broad-Based Black Economic Empowerment Act and promulgated in the Government Gazette on 9 February 2007;

(r) "trust" means the arrangement through which the property of one person is made over or bequeathed to a trustee to administer such property for the benefit of another person; and

(s) "trustee" means any person, including the founder of a trust, to whom property is bequeathed in order for such property to be administered for the benefit of another person.

3. ADJUDICATION USING POINT SYSTEM

3.1 The bidder obtaining the highest number of total points will be awarded the contract.

3.2 Preference points shall be calculated after prices have been brought to a comparative basis taking into account all factors of non-firm prices and all unconditional discounts;.

3.3 Points scored must be rounded off to the nearest 2 decimal places.

3.4 In the event that two or more bids have scored equal total points, the successful bid must be the one scoring the highest number of preference points for B-BBEE.

3.5 However, when functionality is part of the evaluation process and two or more bids have scored equal points including equal preference points for B-BBEE, the successful bid must be the one scoring the highest score for functionality.

3.6 Should two or more bids be equal in all respects, the award shall be decided by the drawing of lots.

4. POINTS AWARDED FOR PRICE

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

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

80/20

$$P_S = 80\left(1 - \frac{P_t - P_{\square\square}}{P_{\square\square}}\right)$$

or

90/10

$$P_S = 90\left(1 - \frac{P_t - P_{\square\square}}{P_{\square\square\square\square}}\right)$$

Where

Ps = Points scored for comparative price of bid under consideration

Pt = Comparative price of bid under consideration

Pmin = Comparative price of lowest acceptable bid

5. POINTS AWARDED FOR B-BBEE STATUS LEVEL OF CONTRIBUTION

5.1 In terms of Regulation 5 (2) and 6 (2) of the Preferential Procurement Regulations, preference points must be awarded to a bidder for attaining the B-BBEE status level of contribution in accordance with the table below:

B-BBEE Status Level of Contributor	Number of points (80/20 system)	Number of points (90/10 system)

1	20	10
2	18	9

3	16	8
4	12	5
5	8	4
6	6	3
7	4	2
8	2	1
Non-compliant contributor	0	0

5.2 A bidder who qualifies as an EME in terms of the B-BBEE Act must submit a sworn affidavit confirming Annual Total Revenue and Level of Black Ownership.

A Bidder other than EME or QSE must submit 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.

5.3 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.

5.4 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 bid.

5.5 Tertiary Institutions and Public Entities will be required to submit their B-BBEE status level certificates in terms of the specialized scorecard contained in the B-BBEE Codes of Good Practice.

5.6 A person will not be awarded points for B-BBEE status level if it is indicated in the bid documents that such a bidder intends sub-contracting more than 25% of the value of the contract to any other enterprise that does not qualify for at least the points that such a bidder qualifies for, unless the intended sub-contractor is an EME that has the capability and ability to execute the sub-contract.

5.7 A person awarded a contract may not sub-contract more than 25% of the value of the contract to any other enterprise that does not have an equal or higher B-BBEE status level than the person concerned, unless the contract is sub-contracted to an EME that has the capability and ability to execute the sub-contract.

6. BID DECLARATION

6.1 Bidders who claim points in respect of B-BBEE Status Level of Contribution must complete the following:

7. B-BBEE STATUS LEVEL OF CONTRIBUTION CLAIMED IN TERMS OF PARAGRAPHS 1.4 AND 5.1

7.1 B-BBEE Status Level of Contribution: = (maximum of 10 or 20 points)

(Points claimed in respect of paragraph 7.1 must be in accordance with the table reflected in paragraph 5.1 and must be substantiated by means of a B-BBEE certificate issued by a Verification Agency accredited by SANAS or a Registered Auditor approved by IRBA or a sworn affidavit.

8. SUB-CONTRACTING

8.1 Will any portion of the contract be sub-contracted?

(Tick applicable box)

YES		NO	

If yes, indicate:

(i) What percentage of the contract will be subcontracted?..... %

(ii) The name of the sub-contractor.....

(iii) The B-BBEE status level of the sub-contractor .....

(iv) Whether the sub-contractor is an EME or QSE

(Tick applicable box)

YES		NO	

Tick applicable EME or QSE classification of the party named in (ii)

- ☐ an EME or QSE;
- ☐ an EME or QSE which is at least 51% owned by black people;
- ☐ an EME or QSE which is at least 51% owned by black people who are youth;

- ☐ an EME or QSE which is at least 51% owned by black people who are women
- ☐ an EME or QSE which is at least 51% owned by black people with disabilities;
- ☐ an EME or QSE which is 51% owned by black people living in rural or underdeveloped areas or townships;
- ☐ a cooperative which is at least 51% owned by black people;
- ☐ an EME or QSE which is at least 51% owned by black people who are military veterans;

9. DECLARATION WITH REGARD TO COMPANY/FIRM

9.1 Name of company/firm: .....

9.2 VAT registration number:.....

9.3 Company registration number:.....

9.4 TYPE OF COMPANY/ FIRM

- ☐ Partnership/Joint Venture / Consortium
- ☐ One person business/sole propriety
- ☐ Close corporation
- ☐ Company
- ☐ (Pty) Limited

[TICK APPLICABLE BOX]

9.5 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES

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

9.6 COMPANY CLASSIFICATION

- ☐ Manufacturer
- ☐ Supplier
- ☐ Professional service provider
- ☐ Other service providers, e.g. transporter, etc.

[*TICK APPLICABLE BOX*]

9.7 MUNICIPAL INFORMATION

Municipality where business is situated: .....

Registered Account Number: .....

Stand Number: .....

9.8 Total number of years the company/firm has been in business:.....

9.9 I/we, the undersigned, who is / are duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the B-BBE status level of contribution indicated in paragraph 7 of the foregoing certificate, qualifies the company/ firm for the preference(s) shown and I / we acknowledge that:

(i) The information furnished is true and correct;

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

(iii) In the event of a contract being awarded as a result of points claimed as shown in paragraph 7, the contractor may be required to furnish documentary proof to the satisfaction of the purchaser that the claims are correct;

(iv) If the B-BBEE status level of contribution has been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the purchaser may, in addition to any other remedy it may have:

a. disqualify the person from the bidding process;

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

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

d. restrict the bidder or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, 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

WITNESSES

……..
SIGNATURE(S) OF BIDDERS(S)

1. ……..……..……..

DATE: ……..……...

2. ……..……..…….. ADDRESS:

……

……

……

Please attach, to this page, an original or certified copy of the valid B-BBEE status level verification certificate, issued by either:

(a) A Verification Agency that was accredited by the South African National Accreditation System (SANAS).

(b) Sworn Affidavit from DTI website in case of EME or QSE.

FAILURE TO COMPLETE AND ATTACH THE CERTIFICATE MAY LEAD TO DISQUALIFICATION

Certificate of Authority for Signatory RS009

This Returnable Schedule is to be completed by companies and close corporations.
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 or may attach the original or certified board resolution stating the nominated member. **Failure to do so may lead to your Tender being disqualified.**

A Company	B Joint Venture	C Close Corporation

A. CERTIFICATE FOR COMPANY

I, ..., managing director of the board of directors of

....., hereby confirm that by resolution of the board

taken on ..... 20....., Mr/Ms ..... , has been duly authorized

to sign all documents in connection with this tender and any contract resulting from it on behalf of the company.

As witnesses:-

1. ....
Managing director

2. ....
Date

B. CERTIFICATE FOR JOINT VENTURE

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

Mr/Ms ..... , authorized signatory of the company

....., acting in the capacity of lead partner, to sign all documents in connection with the tender offer and any contract resulting from it on our behalf.

NAME OF FIRM	ADDRESS	AUTHORISING SIGNATURE, NAME & CAPACITY
Lead partner		

C. CERTIFICATE FOR CLOSE CORPORATION

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

.....hereby authorize Mr/Ms.....
to sign all documents in connection with the tender and any contract resulting from it on our behalf.

NAME	ADDRESS	SIGNATURE	DATE

NOTE: This certificate is to be completed and signed by all of the key members upon whom rests the direction of the affairs of the Close Corporation as a whole.

Schedule of Construction Equipment RS010

Tenderers to furnish with their tenders a complete list of the major items of construction equipment which they propose to use in the work. After his tender has been accepted, the Contractor must satisfy the Project Manager at all times that such plant and equipment, or its equivalent, is available for use.

TYPE OF construction Equipment	MAKE & DESCRIPTION / CAPACITY	NUMBER	
CATEGORY 1 – Heavy Equipment		Owned	Hired
EXCAVATOR			
COMPACTOR			
TLB			
TIPPER TRUCK			
CATEGORY 2 – Smalls		Owned	Hired
Walk behind roller 600			
Wacker type impact compactor			
18kg electrical breakers			
Pipeline Pressure Tester			

Failure to complete this form properly and correctly, may lead to the conclusion that the Tenderer does not have the necessary plant and equipment resources at its disposal, which will prejudice its tender.

Tenderer's Experience RS011

LIST OF SIMILAR PROJECTS SUCCESSFULLY COMPLETED OVER THE PAST 10 YEARS

1. Tenderers must take care to provide accurate information in this return. Incorrect contact details of references listed may have a negative impact on scoring.

2. Table RS011.1.1 is a statement of similar work successfully executed by the Tenderer. If the space provided is insufficient, add more projects on a separate sheet by photocopying this template.

3. The Tenderer must indicate the numerical list number out of a given total number of lists submitted on the right top corner of each list.

4. The Tenderer should also indicate duration of each project in weeks as this will be used to calculate the number of years of relevant experience.

5. Tenderers are to also attach completion certificates or reference letter from the client/clients agent for the completed projects.

Table RS011.1.1: List of similar Projects carried out over the past 10 years **Sheet … of …**

Employer:	Contact person (Employer's Agent)	Description of contract (name of project)	Project Value (incl. VAT)	Completion Date	Duration (weeks)
1. Employer's name:	Consultant's name:				
Contact:	Contact:				
Tel:	Tel:				
Cell:	Cell:				
Fax:	Fax:				
2. Employer's name:	Consultant's name:				
Contact:	Contact:				
Tel:	Tel:				
Cell:	Cell:				
Fax:	Fax:				
3. Employer's name:	Consultant's name:				
Contact:	Contact:				
Tel:	Tel:				
Cell:	Cell:				
Fax:	Fax:				
4. Employer's name:	Consultant's name:				
Contact:	Contact:				
Tel:	Tel:				
Cell:	Cell:				
Fax:	Fax:				
5. Employer's name:	Consultant's name:				
Contact:	Contact:				
Tel:	Tel:				
Cell:	Cell:				
Fax:	Fax:				
Total duration in number of weeks (for official use only)					

…… ……

Signature Date

Key Personnel RS012

RS012-1 – List of Key Personnel Assigned to the Contract

1) Provide relevant information as prescribed below for the following Key Persons proposed in the tender to fulfil the following positions:
2) Attach a proposed organogram to this page.
3) Should at the time of award alternate key personnel be appointed to this contract they are to have similar or better qualifications and experience.

Table RS012.1.1: List of personnel to be assigned to this project

Name	ID No.	Current Position	No. of Years Employed	Qualifications / Experience
CATEGORY 1 – CONTRACTS MANAGER / SITE AGENT (LIC NQF 5)				
CATEGORY 2 – FOREMAN (LIC NQF 4)				
CATEGORY 3 – HEALTH AND SAFETY STAFF (SAMTRAC NQF 5)				
CATEGORY 4 – ANY OTHER LIC NQF 5 SUPERVISORS				

....
Signature Date

RS012-2 – Curriculum Vitae of Key Personnel

Contractors shall employ in labour-intensive works only those supervisory and management staff that have completed the required Skills Programme in terms of Appendix C of the “Guidelines for the implementation of labour intensive infrastructure projects under the Expanded Public Works Programme (EPWP) Third Edition 2015”:

The following levels of qualification is particularly required:

- Foremen / Supervisors: N3/Metric and "Manage Labour-Intensive Construction Processes" at NQF level 4;
- Site Agent / Construction Manager: National Diploma or 3-year Degree in Civil Engineering and NQF level 5 "Manage Labour-Intensive Construction Processes".
- Health and Safety staff at NQF level 5 “Samtrac”

CURRICULUM VITAE OF KEY PERSONNEL
Curriculum Vitae of key personnel to be attached to this page for whom functionality points are sought:

- Contracts Manager
- / Site Agent
- Foreman

and

QUALIFICATIONS OF KEY PERSONNEL – LABOUR INTENSIVE ACTIVITIES
Relevant qualification certificates to be attached to this page for each person possessing the required qualifications in the supervision or management of LIC projects:

- Site Agent
- Foreman

Proposed Amendments and Qualifications RS013

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 C.3.3 of the Standard Conditions of Tender referenced in the Tender Data regarding the Employer's handling of material deviations and qualifications.
These amendments and qualifications, if accepted by the Employer, will be incorporated in the Acceptance Form as Deviations.

Page	Clause or item	Proposal

The undersigned, who warrants that he / she is duly authorized to do so on behalf of the Tenderer, confirms that the contents of this schedule are within his / her personal knowledge and are to the best of his / her belief both true and correct.

....
Signature Date

Declaration of Tenderer's Past Supply Chain Management Practices RS014

(MBD8)

1 This Municipal Tendering Document must form part of all Tenders invited.

2 It serves as a declaration to be used by municipalities and municipal entities in ensuring that when goods and services are being procured, all reasonable steps are taken to combat the abuse of the supply chain management system.

3 The 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 committed 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 (No 12 of 2004).

4 In order to give effect to the above, the following questionnaire must be completed and submitted with the Tender.

Item	Question	Yes	No
4.1	Is the Tenderer or any of its directors listed on the National Treasury's database as a company or person prohibited from doing business with the public sector? (Companies or persons who are listed on this database were informed in writing of this restriction by the National Treasury after the *audi alteram partem* rule was applied).		
4.1.1	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 (No 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) 3265445).		
4.2.1	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?		
4.3.1	If so, furnish particulars:		
4.4	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?		
4.4.1	If so, furnish particulars:		
4.5	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?		
4.5.1	If so, furnish particulars:		

CERTIFICATION

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

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

....
Signature Date

....
Position Name of Tenderer

Declaration of Interest RS015

MDB4

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

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

3.2 Identity Number:.....

3.3 Position occupied in the Company (director, trustee, shareholder[2]):.....

3.4 Company Registration Number:.....

3.5 Tax Reference Number:.....

3.6 VAT Registration Number:.....

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

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

3.8.1 If yes, furnish particulars .....

.....

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

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

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

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

3.9.1 If yes, furnish particulars .....

.....

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

3.10.1 If yes, furnish particulars .....

.....

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

3.11.1 If yes, furnish particulars .....

.....

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

3.12.1 If yes, furnish particulars .....

.....

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

3.13.1 If yes, furnish particulars .....

.....

3.14 Do you or any of the directors, trustees, managers, principle shareholders, or stakeholders of this company have any interest in any other related companies or business whether or not they are bidding for this contract?

YES / NO

3.14.1 If yes, furnish particulars.....

.....

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

Full Name	Identity Number	State Employee Number

.....
Signature

.....
Date

.....
Position

.....
Name of Tenderer

Certificate of Independent Tender Determination RS016

I, the undersigned, in submitting the accompanying tender:

KCDM/RBIG/02/2022 MTHONJANENI SSA 2 PHASE 1B2: TENDER FOR CONSTRUCTION OF PIPELINES, 500KL RESERVOIR, AND PUMPING STATION

(Tender number and description)

In response to the invitation for the tender made by:

King Cetshwayo District Municipality

(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 Tenderer)

1. I have read and I understand the contents of the certificate;
2. I understand that the accompanying tender will be disqualified if this certificate is found not to be true and complete in every respect;
3. I am authorized by the tenderer to sign this certificate, and to submit the accompanying tender, on behalf of the tenderer;
4. each person whose signature appears on the accompanying tender has been authorized by the tenderer to determine the terms of and to sign the tender. On behalf of the tenderer;
5. for the purposes of this certificate and the accompanying tender, I understand that the word “competitor” shall include any individual or organization, other than the tenderer, whether or not affiliated with the tenderer, who:
   (a) Has been requested to submit a tender in response to this tender invitation;
   (b) Could potentially submit a tender in response to this tender invitation, based on their qualifications, abilities or experience; and
   (c) Provides the same goods and services as the tenderer and/or is in the same line of business as the tenderer.
6. The tenderer has arrived at the accompanying tender independently from, and without consultation, communication, agreement or arrangement with any competitor. However communication between partners in a joint venture or consortium[1] will not be construed as collusive tendering.
7. In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement 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 tender;
   (e) The submission of a tender which does not meet the specifications and conditions of the tender; or
   (f) Tendering with the intention not to win the tender.

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 tender invitation relates.

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

10. 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.

11. I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to tenders and contracts, tenders 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.

[1] 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.

.....	.....
Signature	Date
.....	.....
Position	Name of Tenderer

Dayworks Schedule RS017

The schedule is not applicable to this tender.

Preliminary Programme RS018

The tenderer shall outline in the table below or attached his proposed programme for the completion of the Works to conform with the requirements set out in the conditions of contract.

The tenderer shall take note of the Scope of Works Clause 5.2.7 items a. and b. regarding the requirements for programmes.

The successful Tenderer shall use the programme submitted below or attached as the basis for the detailed programme required in terms of the conditions of contract.

ACTIVITY NO.	DESCRIPTION OF WORK	ENVISAGED DURATION	STARTING WEEK	FINISHING

[Note: The programme must be based on the completion time as specified in the Contract Data. No other completion time that may be indicated on this programme will be regarded as an alternative offer, unless it is indicated as such as per C2.12 of the Conditions of Tender]

Declaration of Competency on Health and Safety Requirements RS019

Tenderer to provide a declaration on his competencies in establishing and maintaining a Health and Safety plan as required in terms of the Construction Regulations of 2014.

In order to demonstrate these competencies, the Tenderer is to provide with his tender (and attached to this page as a separate document) brief statements as to a safety plan and how the safety management systems will work and what control procedures they plan on using to ensure safety on the construction site.

The following generic aspects should be covered in the safety plan:

- What administrative procedures the Contractor envisage using in the implementation and maintenance of the safety plan with reference to the construction site.
- How continuous assessment of the safety plan will be assessed and implemented with respect to construction site.
- What control systems the Contractor envisage to implement on site to support his safety program.
- How the Contractor will ensure that he adheres to the construction regulations in respect of competent persons for appointments.
- What external resources the Contractor envisage on using to ensure successful implementation and sustainability of the safety plan.
- What training to employees the Contractor envisages and how he would go about to execute it.
- How Covid 19 is going to be handled on site.
- The Contractor should indicate which competent (as described in the OHS Act) persons he currently has in his employ or he plans on employing and **attach** abbreviated Curriculum Vitaes of these persons.

DECLARATION BY TENDERER:

It is confirmed that an outline of the Health and Safety plan is attached hereto. We further declare that we have the competence and necessary resources to carry out work safely in compliance with the Construction Regulations 2014 and that an approved Health and Safety Plan will be submitted prior to commencing with this contract.

....
Signature Date

Quality Assurance and Environmental Management RS020

1. Quality assurance systems employed by the Tenderer in his office in order to ensure compliance with stated employer's requirements ISO 9001 Certification: Tenderers who are certified as being compliant to the International Organisation for Standardisation's ISO 9001 quality management standard, will score higher in the functionality. Proof of certification or application with evidence of previously started process must be attached in order to qualify for functionality points. The extent of the use of this system must be attached in order to qualify for higher scores.
2. Tenderers who are following a quality management standard as set out by CESA/SABTACO will be deemed to be adequate if they indicate the extent of the use of this system which must be attached in order to qualify for satisfactory score.
3. Proof of certification of the tendering entity and its sub-contractor(s) or JV partner(s) must be submitted with the tender.
4. Note: Where the entity Tendering is a joint venture, provided one of these parties is ISO 9001 certified, and it has been indicated on the work plan submitted that the party will take responsibility for quality management.
5. Does the Tenderer have a Quality Management system which is certified in terms of ISO 9001
6. If "yes", Tenderer to supply brief summary of structure of system YES NO

.....

.....

.....

.....

.....

7. If "no", does the Tenderer intend to apply for certification? YES NO

   By when? (Date) ..... ,or

8. If "no", does the Tenderer have its own systems YES NO

9. If "yes", please supply details of the system

.....

.....

.....

.....

.....

10. Does the Tenderer have an Environmental Management system which is certified in terms of ISO 14 000 YES NO
11. Tenderer to supply brief summary of structure of system:

.....

.....

.....

12. If "no", does the Tenderer intend to apply for certification? YES NO

By when? (Date) ..... ,or

13. If “no”, does the Tenderer have its own systems

YES	NO

14. If “yes”, please supply details of the system

.....

.....

.....

15. If the Tenderer does not intend to apply for certification it shall submit details of the quality / environmental management system presently in place.

16. The Tenderer shall insert here a copy of the company’s quality assurance plan, control procedures and the relevant documentation supporting its commitment to environmental management. In the event of these documents being too extensive to be included in the procurement document, an abbreviated version of the master document will be included, referring to the master document.

....
Signature Date

....
Position Name of Tenderer

Declaration Certificate for Local Production and Content for Designated Sectors RS021

(MBD6.2)

This Municipal Bidding Document (MBD) must form part of all tenders invited. It contains general information and serves as a declaration form for local content (local production and local content are used interchangeably).

Before completing this declaration, bidders must study the General Conditions, Definitions, Directives applicable in respect of Local Content as prescribed in the Preferential Procurement Regulations, 2017 and the South African Bureau of Standards (SABS) approved technical specification number SATS 1286:2011 (Edition 1) and the Guidance on the Calculation of Local Content together with the Local Content Declaration Templates [Annex C (Local Content Declaration: Summary Schedule), D (Imported Content Declaration: Supporting Schedule to Annex C) and E (Local Content Declaration: Supporting Schedule to Annex C)].

1. General Conditions

1.1. Preferential Procurement Regulations, 2017 (Regulation 9) makes provision for the promotion of local production and content.

1.2. Regulation 9.(1) prescribes that in the case of designated sectors, where in the award of tenders local production and content is of critical importance, such bids must be advertised with the specific bidding condition that only locally produced goods, services or works or locally manufactured goods, with a stipulated minimum threshold for local production and content will be considered.

1.3. Where necessary, for tenders referred to in paragraph 1.2 above, a two stage tendering process may be followed, where the first stage involves a minimum threshold for local production and content and the second stage price and B-BBEE.

1.4. A person awarded a contract in relation to a designated sector, may not sub-contract in such a manner that the local production and content of the overall value of the contract is reduced to below the stipulated minimum threshold.

1.5. The local content (LC) expressed as a percentage of the tender price must be calculated in accordance with the SABS approved technical specification number SATS 1286: 2011 as follows: $LC = [1- x / y] *100$

Where x is the imported content in Rand

y is the bid price in Rand excluding value added tax (VAT)

Prices referred to in the determination of x must be converted to Rand (ZAR) by using the exchange rate published by the South African Reserve Bank (SARB) at 12:00 on the date of advertisement of the bid as required in paragraph 4.1 below.

The SABS approved technical specification number SATS 1286:2011 is accessible on http://www.thedti.gov.za/industrial development/ip.jsp at no cost.

1.6. A tender may be disqualified if this Declaration Certificate and the Annex C (Local Content Declaration: Summary Schedule) are not submitted as part of the bid documentation;

2. Definitions

2.1. “Tender” includes written price quotations, advertised competitive bids or proposals;

2.2. “Tender price” price offered by the tenderer, excluding value added tax (VAT);

2.3. “Contract” means the agreement that results from the acceptance of a tender by an organ of state;

2.4. “Designated sector” means a sector, sub-sector or industry that has been designated by the Department of Trade and Industry in line with national development and industrial policies for local production, where only locally produced services, works or goods or locally manufactured goods meet the stipulated minimum threshold for local production and content;

2.5. “Duly sign” means a Declaration Certificate for Local Content that has been signed by the Chief Financial Officer or other legally responsible person nominated in writing by the Chief Executive, or senior member / person with management responsibility (close corporation, partnership or individual).

2.6. “Imported content” means that portion of the tender price represented by the cost of components, parts or materials which have been or are still to be imported (whether by the supplier or its subcontractors) and which costs are inclusive of the costs abroad (this includes labour and intellectual property costs), plus freight and other direct importation costs, such as landing costs, dock duties, import duty, sales duty or other similar tax or duty at the South African port of entry;

2.7. “Local content”means that portion of the tender price which is not included in the imported content, provided that local manufacture does take place;

2.8. “Stipulated minimum threshold” means that portion of local production and content as determined by the Department of Trade and Industry; and

2.9. "Sub-contract" means the primary contractor's assigning, leasing, making out work to, or employing another person to support such primary contractor in the execution of part of a project in terms of the contract.

3. The stipulated minimum threshold(s) for local production and content (refer to Annex A of SATS 1286:2011) for this tender is/are as follows:

Description of services, works or goods	
Valves and valve products	70%
Steel Conveyance pipes (lined and coated)	80%
Plastic Piping	100%
Electrical and Telecom Cable sector	90%
Steel value added products	100%
Cement	100%

4. Does any portion of the services, works or goods offered have any imported content?

(Tick applicable box)

YES		NO	

4.1 If yes, the rate(s) of exchange to be used in this tender to calculate the local content as prescribed in paragraph 1.5 of the general conditions must be the rate(s) published by the SARB for the specific currency at 12:00 on the date of advertisement of the tender.

The relevant rates of exchange information is accessible on www.reservebank.co.za

Indicate the rate(s) of exchange against the appropriate currency in the table below (refer to Annex A of SATS 1286:2011):

Currency	**Rates of exchange**
US Dollar	
Pound Sterling	
Euro	
Yen	
Other	

NB: Tenderers must submit proof of the SARB rate (s) of exchange used.

6. Where, after the award of a tender, challenges are experienced in meeting the stipulated minimum threshold for local content the dti must be informed accordingly in order for the dti to verify and in consultation with the Accounting Officer / Accounting Authority provide directives in this regard.

LOCAL CONTENT DECLARATION

(REFER TO ANNEX B OF SATS 1286:2011)

LOCAL CONTENT DECLARATION BY CHIEF FINANCIAL OFFICER OR OTHER LEGALLY RESPONSIBLE PERSON NOMINATED IN WRITING BY THE CHIEF EXECUTIVE OR SENIOR MEMBER/PERSON WITH MANAGEMENT RESPONSIBILITY (CLOSE CORPORATION, PARTNERSHIP OR INDIVIDUAL)

IN RESPECT OF TENDER NO. KCDM/RBIG/02/2022

ISSUED BY: King Cetshwayo District Municipality

NB

1 The obligation to complete, duly sign and submit this declaration cannot be transferred to an external authorized representative, auditor or any other third party acting on behalf of the tenderer.

2 Guidance on the Calculation of Local Content together with Local Content Declaration Templates (Annex C, D and E) is accessible on http://www.thedti.gov.za/industrialdevelopment/ip.jsp. Tenderers should first complete Declaration D. After completing Declaration D, bidders should complete Declaration E and then consolidate the information on Declaration C. Declaration C should be submitted with the bid documentation at the closing date and time of the bid in order to substantiate the declaration made in paragraph (c) below. Declarations D and E should be kept by the bidders for verification purposes for a period of at least 5 years. The successful bidder is required to continuously update Declarations C, D and E with the actual values for the duration of the contract.

I, the undersigned, ... (full names), do hereby declare, in my capacity as

..... of ..... (name of bidder entity), the following:

(a) The facts contained herein are within my own personal knowledge.

(b) I have satisfied myself that the goods/services/works to be delivered in terms of the above-specified tender comply with the minimum local content requirements as specified in the bid, and as measured in terms of SATS 1286:2011;

(c) The local content percentages (%) indicated below has been calculated using the formula given in clause 3 of SATS 1286:2011, the rates of exchange indicated in paragraph 4.1 above and the information contained in Declaration D and E which has been consolidated in Declaration C;

Bid price, excluding VAT (y)	R
Imported content (x), as calculated in terms of SATS 1286:2011	R
Stipulated minimum threshold for local content	
Local content %, as calculated in terms of SATS 1286:2011	

If the bid is for more than one product, the local content percentages for each product contained in Declaration C shall be used instead of the table above. The local content percentages for each product has been calculated using the formula given in clause 3 of SATS 1286:2011, the rates of exchange indicated in paragraph 4.1 above and the information contained in Declaration D and E.

(d) I accept that the Procurement Authority / Municipality /Municipal Entity has the right to request that the local content be verified in terms of the requirements of SATS 1286:2011.

(e) I understand that the awarding of the tender is dependent on the accuracy of the information furnished in this application. I also understand that the submission of incorrect data, or data that are not verifiable as described in SATS 1286:2011, may result in the Procurement Authority / Municipal / Municipal Entity imposing any or all of the remedies as provided for in Regulation 13 of the Preferential Procurement Regulations, 2017 promulgated under the Preferential Policy Framework Act (PPPFA), 2000 (Act No. 5 of 2000).

....
Signature Date

....
Witness 1 Date

....
Witness 2 Date

See Annexure C

Annexure C(a) **SATS 1286: 2011**

LOCAL CONTENT DECLARATION - SUMMARY SCHEDULE

(C1)	Tender No.	KCDM/RBIG/02/2022										
(C2)	Tender Description:	MTHONJANENI SSA 2 PHASE 1B2: TENDER FOR CONSTRUCTION OF PIPELINES, 500KL RESERVOIR, AND PUMPING STATION										
(C3)	Designated Product(s)	Valves and Valve Products, Steel Pipes, Plastic Pipes, Electrical cables, Steel value added products, Cement										
(C4)	Tender Authority	King Cetshwayo District Municipality										
(C6)	Tender Exchange Rate	USD		EURO		GBP		Other				
(C7)	Special Local Content %	40%									Note: VAT to be excluded from all calculations	

		Calculation of local content						Tender summary			
Tender Item No's	List of Items	Tender price - each	Exempted imported value	Tender value net of exempted imported content	Imported Value	Local Value (Per Item)	Local Content % (per item)	Tender Qty	Total tender value	Total exempted imported content	Total imported content
(C8)	*(C9)*	*(C10)*	*(C11)*	*(C12)*	*(C13)*	*(C14)*	*(C15)*	*(C16)*	*(C17)*	*(C18)*	*(C19)*
2.10.1	400mm ND X42 steel pipe										
2.10.2	400mm ND X42 steel pipe										
2.10.3	0 to 11.25 degree bends										
2.10.4	11.25 to 22.5 degree bends										
2.10.5	22.5 to 45 degree bends										
2.10.6	45 to 90 degree bends										
2.10.7	Airvalve tees										
2.10.8	Scour valve tees										
2.10.9	Dismantling coupling										
2.10.10	Cutting of pipe and welding flange										
2.10.12	PN16 Airvalve assembly										
2.10.13	PN 10 Airvalve assembly										

		Calculation of local content						Tender summary			
Tender Item No's	List of Items	Tender price - each	Exempted imported value	Tender value net of exempted imported content	Imported Value	Local Value (Per Item)	Local Content % (per item)	Tender Qty	Total tender value	Total exempted imported content	Total imported content
(C8)	*(C9)*	*(C10)*	*(C11)*	*(C12)*	*(C13)*	*(C14)*	*(C15)*	*(C16)*	*(C17)*	*(C18)*	*(C19)*
2.10.14	PN 16 isolating valve assembly										
2.10.15	PN 10 isolating valve assembly										
2.10.16	PN 16 scour valve assembly										
2.10.17	PN 10 scour valve assembly										
3.3.1	160mmdia HDPE pipe										
3.3.2	Airvalve tees										
3.3.3	Scour valve tees										
3.3.4	Dismantling coupling										
3.3.5	Cutting of pipe and providing flange										
3.3.6	Cutting of pipe and providing flange										
3.3.7	Supply and install valves										
3.3.8	Supply and install valves										
3.3.9	Supply and install valves										
4.3.1	Supply and erect fence										
4.3.1	Supply and erect double leaf gates										

		Calculation of local content						Tender summary			
Tender Item No's	List of Items	Tender price - each	Exempted imported value	Tender value net of exempted imported content	Imported Value	Local Value (Per Item)	Local Content % (per item)	Tender Qty	Total tender value	Total exempted imported content	Total imported content
(C8)	*(C9)*	*(C10)*	*(C11)*	*(C12)*	*(C13)*	*(C14)*	*(C15)*	*(C16)*	*(C17)*	*(C18)*	*(C19)*
4.8.1	Mild steel reinforcement bars										
4.8.2	High tensile reinforcement bars										
4.9.1.1	Blinding 75mm thick										
4.9.1.2	Blinding 75mm thick										
4.10.1	35W concrete to sumps & walls										
4.10.2	35W concrete to floor slab and wall footing										
4.10.3	35W concrete to outlet chamber floor slab										
4.10.4	35W concrete to walls										
4.10.5	35W concrete to roof and beams										
4.10.6	35W concrete to columns										
4.10.7	35W Concrete to column heads										
4.13.1	Stainless Steel covers										
4.13.2.1	Stainless Steel Grade 304 catladder (5100mm high)										
4.13.2.2	Galvanised mild steel catladder (5700 high)										
4.13.2.3	Galvanised mild steel catladder (4230 high)										

		Calculation of local content						Tender summary			
Tender Item No's	List of Items	Tender price - each	Exempted imported value	Tender value net of exempted imported content	Imported Value	Local Value (Per Item)	Local Content % (per item)	Tender Qty	Total tender value	Total exempted imported content	Total imported content
(C8)	*(C9)*	*(C10)*	*(C11)*	*(C12)*	*(C13)*	*(C14)*	*(C15)*	*(C16)*	*(C17)*	*(C18)*	*(C19)*
4.13.2.4	Ball and tube handrail										
4.15.1.1	Pipe Item I1										
4.15.1.2	Pipe Item I2										
4.15.1.3	Pipe Item I3										
4.15.1.4	Pipe Item I4										
4.15.1.5	Pipe Item I5										
4.16.1	Pipe Item S1										
4.16.2	Pipe Item S2										
4.16.3	Pipe Item D1										
4.16.4	Pipe Item D2										
4.17.1	Pipe item O1										
4.17.2	Pipe item O2										
4.17.3	Pipe item O3										
4.17.4	Pipe item O4										
4.17.5	Pipe item O5										
4.17.6	Pipe item O6										
4.17.7	Pipe item O7										
4.20.2	70mm2 bare copper earth										
4.20.4	70mm2 PVC earth conductor										
4.20.5	70mm2 PVC earth conductor										
4.20.6	70mm2 PVC earth conductor										
4.20.12	10mm diameter solid aluminum roof terminal conductor saddled to roof slab										

		Calculation of local content					
Tender Item No's	List of Items	Tender price - each	Exempted imported value	Tender value net of exempted imported content	Imported Value	Local Value (Per Item)	Local Content % (per item)
(C8)	*(C9)*	*(C10)*	*(C11)*	*(C12)*	*(C13)*	*(C14)*	*(C15)*
4.20.7	70mm2 PVC earth conductor						
4.20.14	70mm2 PVC earth conductor						
5.1.1.2	Supply of pipework						
5.1.1.3a	Gate valve						
5.1.1.3b	Air valve						
5.1.1.3c	Ball valve						
5.1.1.3d	Non-return valve						
5.1.1.3e	strainer						
5.1.1.4	Gate valve						

Tender summary			
Tender Qty	Total tender value	Total exempted imported content	Total imported content
(C16)	*(C17)*	*(C18)*	*(C19)*

Expand the section above over multiple pages if required.

Tenderer to add more items should they wish to claim more local content. Attach any additional sheets to this page.

NOTE: Editable Excel versions of this annex is available on the DTI Website with guidance on how to complete the form.

(C20) Total Tender Value	
(C21) Total Exempt imported content	
(C22) Total Tender value net of exempt imported content	
(C23) Total imported content	
(C24) Total local content	
(C25) Average local content % of tender	

NOTE: Editable Excel versions of this annex is available on the DTI Website with guidance on how to complete the form.

This form does not have to be submitted with the tender.

SATS 1286:2011

Annex D

Imported Content Declaration - Supporting Schedule to Annex C

(D1)	Tender No.	
(D2)	Tender description:	
(D3)	Designated Products:	
(D4)	Tender Authority:	
(D5)	Tendering Entity name:	
(D6)	Tender Exchange Rate:	Rate

Note: VAT to be excluded from all calculations

EU R 9.00 GBP R 12.00

A. Exempted imported content

				Calculation of Imported content						Summary	
Tender Item no's	Description of imported content	Local supplier	Overseas Supplier	Foreign currency value as per Commercial Invoice	Tender Exchange Rate	Local value of imports	Freight costs to port of entry	All locally incurred landing costs & duties	Total landed cost excl VAT	Tender Qty	Exempted imported value
(D7)	(D8)	(D9)	(D10)	(D11)	(D12)	(D13)	(D14)	(D15)	(D16)	(D17)	(D18)

(D19) Total exempt imported value R 0

This total must correspond with Annex C - C.21

B. Imported directly by the Tenderer

				Calculation of Imported content						Summary	
Tender Item no's	Description of imported content	Unit of measure	Overseas Supplier	Foreign currency value as per Commercial Invoice	Tender Rate of Exchange	Local value of imports	Freight costs to port of entry	All locally incurred landing costs & duties	Total landed cost excl VAT	Tender Qty	Total imported value
(D20)	(D21)	(D22)	(D23)	(D24)	(D25)	(D26)	(D27)	(D28)	(D29)	(D30)	(D31)

(D32) Total imported value by tenderer R 0

C. Imported by a 3rd party and supplied to the Tenderer

				Calculation of Imported content						Summary	
Description of imported content	Unit of measure	Local supplier	Overseas Supplier	Foreign currency value as per Commercial Invoice	Tender Rate of Exchange	Local value of imports	Freight costs to port of entry	All locally incurred landing costs & duties	Total landed cost excl VAT	Quantity Imported	Total imported value
(D33)	(D34)	(D35)	(D36)	(D37)	(D38)	(D39)	(D40)	(D41)	(D42)	(D43)	(D44)

(D45) Total imported value by 3rd party R 0

D. Other foreign currency payments

			Calculation of foreign currency payments		Summary of payments
Type of payment	Local supplier making the payment	Overseas beneficiary	Foreign currency value paid	Tender Rate of Exchange	Local value of payments
(D46)	(D47)	(D48)	(D49)	(D50)	(D51)

(D52) Total of foreign currency payments declared by tenderer and/or 3rd party

Signature of tenderer from Annex B

(D53) Total of imported content & foreign currency payments - (D32), (D45) & (D52) above R 0

This total must correspond with Annex C - C.19

Date:

NOTE: Editable Excel versions of this annex is available on the DTI Website with guidance on how to complete the form.

This form does not have to be submitted with the tender.

SATS 1286.2011

Annex E

Local Content Declaration - Supporting Schedule to Annex C

(E1)	Tender No.	
(E2)	Tender description:	
(E3)	Designated products:	
(E4)	Tender Authority:	
(E5)	Tendering Entity name:	

Note: VAT to be excluded from all calculations

Local Products (Goods, Services and Works)	Description of items purchased	Local suppliers	Value
	(E6)	(E7)	(E8)
		(E9) Total local products (Goods, Services and Works)	R 0

(E10)	Manpower costs	(Tenderer's manpower cost)	R 0
(E11)	Factory overheads	(Rental, depreciation & amortisation, utility costs, consumables etc.)	R 0
(E12)	Administration overheads and mark-up	(Marketing, insurance, financing, interest etc.)	R 0
		(E13) Total local content	R 0

This total must correspond with Annex C - C24

Signature of tenderer from Annex B

Date: _____

Annual Financial Statement RS022

PAGE TO WHICH AN ANNUAL FINANCIAL STATEMENT MUST BE ATTACED (FOR A PERIOD OF 3YEARS)

The AFS must be in accordance to the nature of the business, whether they must be audited or not audited statement. (E.g. Pty companies: Need to be audited and Close Cooperation: do not need to be audited).

FAILURE TO DO SO MAY LEAD TO DISQUALIFICATION

Proposed Targeted Enterprises **RS023**

RS023.1 PROPOSED TARGETED ENTERPRISES

Tenders are required to employ Targeted Enterprises on this contract; failure to do so shall lead to tenderer being completely disqualified. The Targeted Enterprises to be utilized should meet the requirements of Preferential Procurement Regulations, 2017 and be registered with CIDB with minimum grading of 2 CE to 4 CE, EME or QSE that is at least 51% Black owned. At least 30% of contract value excluding Contingencies and CPA must be subcontracted to the Targeted Enterprises. The objective is to bring about meaningful transformation in the Construction Industry through the following:

- Meaningful economic participation
- Transfer of technical, management and entrepreneurial skills
- Creation of sustainable Black Enterprises

The Targeted Enterprise ratio will be calculated based on the tendered sum of the works less the VAT, Contingencies, and CPA.

After award of the contract King Cetshwayo District Municipality will make available the list of all contractors registered on CSD database comprising of contractors from King Cetshwayo District Municipality jurisdiction, to provide the required goods and services of the applicable designated groups. Each supplier shall be expected to be eligible or qualify to upgrade to the next CIDB grading at the completion of the identified scope of works.

....
Signature Date

RS023.2 ADEQUACY AND QUALITY OF MENTORSHIP AND SKILLS TRANSFER PROGRAMME

1. Tenderers are required to employ designated Subcontractors on this contract with the targeted enterprise(s). The designated sub-contractors to be utilized should be black owned business and registered with CIDB with minimum grading of 2CE to 4CE.
2. A contract Participation Goal of at least 30% for subcontracting to these designated subcontractors has to be achieved by the Tenderer. The objective is to bring about meaningful transformation in the construction industry through the following:
   - Meaningful economic participation
   - Transfer of technical, management and entrepreneurial skills
   - Creation of sustainable Black Enterprises
3. In pursuance of the above objectives, the Tenderer has to develop a mentoring and skills transfer programme which is a practical training programme for targeted black owned SMME construction companies preferably located in King Cetshwayo District Municipality.
4. The mentorship programme must clearly specify the role of the targeted enterprise(s) showing the areas of development in relation to the work packages assigned to the targeted enterprise(s)
5. The on-job training is to be organized and managed by the Developed Enterprise; in contracts awarded and managed by KCDM, but works are executed with the guidance and assistance of experienced Main Contractors at the tendering, mobilization, construction and completion phases.
6. Depending on the nature of contract, the training programme should among other things cover areas such as: understanding Technical Specifications; Standard Specifications; Interpretation of Technical Drawings; Tendering Procedures; Pricing and Unit Rates Build-up; Construction of Civil Works in the Water Industry: Reinforcement, Formwork and False-work; Clearing and Site Establishment; Site Organization and Administration; Surveying and Setting Out; Project Planning and Work Programming/ Scheduling; Contract Supervision and Administration; Environmental Issues; Financial Planning; Project Cost Control; Cash Flow Management; Measurement of Works and Pricing; Preparation of Payment Certificates; Preparation of Claims and Claims Management; Procurement of Equipment and Materials; Personnel Management; Accident and Safety Precaution; Communication. This is just a guide for the design of the mentorship programme.
7. The mentoring and skills transfer programme must indicate what evidence will be produced to show that training did take place. This could for instance be in the form of SAQA accredited modules by relevant CETAs.
8. The Main Contractor (Developed Enterprise) is strongly encouraged to choose relevant CETA accredited modules for training of targeted SMMEs in which case the CETA's NQF level certificates indicating the credits attained could be produced as evidence of the training of the targeted SMMEs. Examples could be NQF2, 3 or 5 in labour intensive construction (LIC) methods
9. The mentorship and skills transfer programme will be assessed based on the submitted methodology or plan. It must be robust, well thought out and should meet most elements of the description given above depending on the nature of work:
10. A capacity building evaluation/ assessment form is to be designed by the main contractor in agreement with the targeted enterprise(s). This must be included in the tender document. The evaluation/ assessment form has to be filled in by all the contractors every month and after completion of the project. The form is to be used for assessing progress made with the training as well as identifying additional training (or gaps) requiring more training.
11. **The mentorship and skills transfer programme (refer to item no. 5 above) as well as the capacity building evaluation form (refer to item no. 10 above) must be attached below.**

....
Signature Date

Tenderer's Participation in Job Creation Using Local Labour RS024

The Contractor shall be required to participate in job creation (employment of local labour) by executing various portions of the Works using local labour (unskilled or semi-skilled), recruited from the local community, who are South African Citizens or foreigners in possession of a work visa issued by the Department of Home Affairs (only one such foreigner may be employed on any project). Proof of citizenship or work visa may be audited during the contract period.

The creation of one job shall mean the temporary employment, for any period of time, of one such unskilled or semi-skilled labourer from the local community.

The Tenderer shall note the requirements for Job Creation Reporting for EPWP as set out in the Requirements of the Expanded Public Works Programme (EPWP) of the project specifications.

The number of jobs to be created using such local labour is inclusive of the local labour employed to execute various portions of the Works by both the main Contractor and any subcontractors, including the small development subcontractors.

The number of jobs to be created using such local labour shall include for a minimum percentage allocation to the following individual targeted groups:

55% Women;
55% Youth; and
2% Disabled.

The minimum required content of such local labour for this project shall be calculated as follows:

$$\text{Minimum required content of such local labour (\%)} = \frac{\text{(100 x amount spent on wages for such local labour (excluding VAT))}}{\text{total value of the project (excluding VAT))}}$$

The minimum required content of such local labour for this project is stated in the Conditions of Contract Clause 4.10.4.

For purposes of completing the table on the next page containing the Tenderer's declaration with respect to participation in job creation using local labour, the total value of the project shall be the amount of the Tender Offer.

TENDERER'S DECLARATION WITH RESPECT TO PARTICIPATION IN JOB CREATION USING LOCAL LABOUR:

The Tenderer shall complete the table below reflecting the anticipated local labour force to be employed on this contract, including such local labour employed by subcontractors.

I/We hereby tender to participate in job creation through the employment of local labour by creating the following number of jobs using unskilled or semi-skilled labourers, recruited from the local community, who are South African Citizens or foreigners in possession of a work visa issued by the Department of Home Affairs (only one such foreigner may be employed on any project), including for a minimum allocation of 55% Women, 55% Youth and 2% Disabled:

Local labour comprising unskilled or semi-skilled labourers recruited from the local community	Anticipated number of jobs to be created	Total number of person-days anticipated	Wage rate per person-day (excluding VAT) (Rand)	Total wage cost (excluding VAT) (Rand)
Contractor's local labour content			R180	
Subcontractors' local labour content				
Total anticipated wage cost of local labour content (excluding VAT)				R
Tender Offer (excluding VAT)				R

Hence anticipated local labour content expressed as a percentage of the Tender Offer (excluding VAT) Note: Should this percentage not equal or exceed the specified minimum percentage, the tender will be considered non-responsive in terms of subclause C.3.8 of the Conditions of Tender and such a tender shall be rejected.	%
Specified minimum local labour content	5%

A penalty shall be applied to any shortfall in the local labour content achieved, as set out in the Requirements of the Expanded Public Works Programme (EPWP) of the project specifications. The penalty shall not apply to shortfalls in the allocations to the individual target groups (i.e., Women/Youth/Disabled), only to shortfalls in the total local labour content achieved.

The undersigned, who warrants that he/she is duly authorized to do so on behalf of the Tenderer, confirms that he/she understands the conditions for such participation and confirms that the tender satisfies the conditions for participation in job creation through the employment of local labour.

Name: .....

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

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

Failure to complete, sign and date this form shall result in the tender being considered non-responsive in terms of subclause C.2.14 of the Conditions of Tender and such a tender shall be rejected.

PART C1: AGREEMENTS AND CONTRACT DATA

TABLE OF CONTENTS

	Page
C1.1 Form of Offer and Acceptance	C2
C1.2 Contract Data	C8
Part 1 Data Provided by the Employer	C8
1. Contract Data	C8
2. Variations to the Conditions of Contract	C10
Part 2 Data Provided by the Contractor	C17
C1.3 Contractual Documentation	C18

IMPORTANT NOTE ON C1.1:

ALL Tenderers MUST complete and sign Form A: OFFER (the first page hereafter).

Form B: ACCEPTANCE will be signed by the Employer and then only in the case of the successful Tenderer.

Form C: SCHEDULE OF DEVIATIONS must be signed by the Employer as well as the successful Tenderer after award of the contract.

Form D: CONFIRMATION OF RECEIPT must be signed by the successful Tenderer on receipt of a fully completed original copy of the Agreement including the Schedule of Deviations, if any.

A tender in which Form A: OFFER has not been completed and signed by the Tenderer, will not be valid and will be disqualified in the discretion of the Employer.

C1.1 FORM OF OFFER AND ACCEPTANCE

FORM A: OFFER

The Employer, identified in the Acceptance signature block, has solicited offers to enter into a contract for the procurement of TENDER NO. KCDM/RBIG/02/2022 MTHONJANENI SSA 2 PHASE 1B2: TENDER FOR CONSTRUCTION OF PIPELINES, 500KL RESERVOIR, AND PUMPING STATION.

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

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

THE OFFERED TOTAL OF THE PRICES INCLUSIVE OF VAT IS:

(in words) .....
.....Rands

(in figures) R .....

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

For the Tenderer:

Signature: .....

Name(s).....

Capacity .....

Name of Tenderer (organization).....

Address: .....

.....

Postal Address:.....

.....

Telephone number: .....

As Witness:

Signature of Witness .....

Name.....

Date.....

For official use		
INITIALS OF KCDM OFFICIALS AT THE TENDER OPENING SESSION		
1.	2.	3.

FORM B: ACCEPTANCE

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

The terms of the contract are contained in:

C.1 Agreement, and Contract Data, (which include this Agreement)

C.2 Pricing Data, including the Bill of Quantities

C.3 Scope of Work

C.4 Site Information

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

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

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

Notwithstanding anything contained herein and unless agreed mutually elsewhere in writing between the Employer and the Tenderer, this agreement comes into effect on the earliest of: (a) Two weeks following the date on which the Tenderer acknowledges the receipt of a formal letter awarding the contract; (b) the date when the Tenderer receives one fully completed original copy of this document, including the schedule of deviations (if any). Unless the Tenderer (now contractor) within five working days of the date of receipt of either the letter from the Employer alluded to in (a) or the document alluded to in (b) above 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, effective from the date of signature below by the Employer.

Signature: (of person authorized to sign the acceptance) .....

Name: (of signatory in capitals) .....

Capacity: (of Signatory).....

Name of Employer: King Cetshwayo District Municipality

Address: Corner of Kruger Rand & Barbados Bay Road, CBD, Richards Bay

Postal Address: Private Bag X1025, Richards Bay, 3900

Telephone number: 035 799 2500

AS WITNESS

Signature: .....

Name: (in capitals) .....

Date: .....

FORM C: SCHEDULE OF DEVIATIONS

1. The extent of deviations from the tender documents issued by King Cetshwayo District Municipality prior to the tender closing date is limited to those permitted in terms of the Tender Data and the Conditions of Tender.
2. A Tenderer's covering letter will not necessarily 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:.....

By the duly authorized representatives signing this Schedule of Deviations, King Cetshwayo District Municipality and the Tenderer agree to and accept the foregoing Schedule of Deviations as the only deviations from and amendments to the documents listed in the Tender Data and addenda thereto as listed in the Tender Schedules, as well as any confirmation, clarification or change to the terms of the offer agreed by the Tenderer and King Cetshwayo District Municipality 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(s).....

Capacity .....

Name of Tenderer (organization).....

As Witness:

Signature of Witness.....

Name.....

Date:.....

FOR KING CETSHWAYO DISTRICT MUNICIPALITY

Signature: .....

Name(s).....

Capacity .....

As Witness:

Signature of Witness .....

Name.....

Date:.....

FORM D: CONFIRMATION OF RECEIPT

The Tenderer, (now Contractor), identified in the Offer part of this Agreement hereby confirms receipt from the Employer, identified in the Acceptance part of this Agreement, of a) one fully completed original copy of this Agreement.

FOR THE CONTRACTOR:

Signature: .....

Name(s).....

Capacity .....

As Witness:

Signature of Witness .....

Name.....

Date:.....

C1.2: CONTRACT DATA

The Conditions of Contract are the General Conditions of Contract for Construction Works, Third Edition, 2015 published by the South African Institution of Civil Engineering, Private Bag X200, Halfway House, 1685, is applicable to the Contract and is obtainable from www.saice.org.za

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

PART 1: DATA PROVIDED BY THE EMPLOYER

1 ESSENTIAL DATA

Reference	GCC Clause	Data
The Defects Liability Period is	1.1.1.13	12 months
The time for achieving Practical Completion is:	1.1.1.14	12 months (maximum)
The name of the Employer is	1.1.1.15	King Cetshwayo District Municipality
The name of the Employer's Agent is	1.1.1.16	MPAMOT Africa (Pty) Ltd
The Pricing Strategy is	1.1.1.26	Re-measurement contract
The address of the Employer is	1.2.1.2	Physical Address: King Cetshwayo House, Cnr Krugerrand & Barbados Bay Streets, CBD, Richards Bay, 3900 Postal Address: Private Bag X1025, Richards Bay, 3900 Tel No: 035 - 799 2500
The address of the Employer's Agent is	1.2.1.2	Physical Address: 2nd Floor, Liberty Building, 21 Aurora Drive Umhlanga Durban, 4301 Postal Address: P. O. Box 37002, Overport, 4067 Tel No: 021 820 5927 E-mail: Dirks@mpamot.com
Employer's Agent to obtain specific approval from the Employer for	3.2.3	Clause 6.3.1, issuing of a Variation Order with financial implications.
The documentation required before commencement with Works execution are:	5.3.1	Health and Safety Plan (Refer to Clause 4.3) Initial programme (Refer to Clause 5.6) Cash flow aligned to programme CPG targets Insurance (Refer to Clause 8.6) Performance guarantee DOL Work Permit (if the contractor is to arrange it)
The time to submit the documentation required before commencement with Works execution is	5.3.2	14 Days
The non-working days are:	5.8.1	Saturdays and Sundays
The special non-working days are:	5.8.1	Public holidays and the year-end break which commences on the first working day after 15 December and ends on the first Tuesday after 5 January of the next year.
The penalty for failing to complete the Works is:	5.13.1	R5000.00/day

Reference	GCC Clause	Data
The requirements for achieving Practical Completion are:	5.14.1	For pipework, successful hydraulic testing and disinfection, backfill to the natural ground level, and all manholes to have cover slabs and lids.
The latent defect period is	5.16.3	10 years
The type of security required	6.2.1	The security to be provided by the Contractor shall be one of the following: a) Guarantee from Financial Service Provider registered with Financial Sector Conduct Authority (FSCA). b) Guarantee from the Bank registered in terms of the Banks Acts (94 of 1990). c) Guarantee as cash deposit of the full amount required to the Municipality. d) Guarantee as additional retention on payment due to the contractor. e) Combination of guarantee from Financial Institution and/or cash deposit and additional retention monies.
The value of the certificates issued shall be adjusted in accordance with the Contract Price Adjustment Schedule with the following values:	6.8.2	a=0,20 b=0,15 c=0,55 d=0,10 x=0.10 The base month for CPA is: 1Month prior to the closing of the tender
The percentage advance on materials not yet built into the Permanent Works is	6.10.1.5	80% provided a cession in favour of the Employer is provided from both the supplier and the Contractor.
The percentage retention is	6.10.3	As determined by the security selected.
The limit of retention money is	6.10.3	As determined by the security selected.
The defects liability period is	6.10.5	12 months
The value of plant and materials supplied by the Employer to be included in the insurance sum is	8.6.1.1.2	Nil
The amount to cover professional fees for repairing damage and loss to be included in the insurance sum is	8.6.1.1.3	R 250,000.00
Liability insurance	8.6.1.3	The limit of indemnity for liability insurance is R20 000 000.00 for any single claim – the number of claims to be unlimited during the construction and defects liability periods.
Amicable Settlement	10.4	Dispute resolution by ad-hoc adjudication, failure of which will require to further the dispute through adjudication and thereafter to arbitration.
The number of Adjudication Board Members to be appointed is:	10.5.3	One

2 VARIATIONS AND ADDITIONS TO THE CONDITIONS OF CONTRACT

The additional clauses to the General Conditions of Contract are:

2.1 PREAMBLE

The variations and additions to the Conditions of Contract contains clauses hereinafter defined and forms an integral part of the Conditions of Contract. In the case of any discrepancy or conflict with any part of the General Conditions of Contract, these variations and additions to the Conditions of Contract shall take precedence and shall govern.

2.2 EMPLOYER'S AGENT

Add to Clause 1.1.1.16

"In the Contract and Scope of Works references to "the Engineer" shall imply the Employer's Agent"

2.3 E-MAIL CORRESPONDENCE

Add new Clause 1.2.1.3

"1.2.1.3 Correspondence via e-mail is deemed to be a legitimate and binding form of written contract communication and the Contractor shall ensure that he has adequate facilities on Site to cater for this form of communication.

Site Instructions sent via e-mail and confirmed as received by the Contractor would be deemed to be a legal and legitimate form of correspondence for this contract."

2.4 COMPLIANCE WITH APPLICABLE LAWS

Add new Clause 4.3.1.1

"4.3.1.1 The following acts or regulations have applicable specifications which form part of the Scope of Works. Compliance with these specifications is required. Failure to comply will trigger the remedies/ penalties stated in the Scope of Works.

Construction Regulations 2014 – OHS Specification

Environmental Management Act- EMPr

Basic Conditions of Employment Act 1997 – EPWP Specification

Preferential Procurement Regulations 2017 – Targeted Sub-Contracting Specification plus

The Contractor shall also ensure that any Sub Contractor employed by him shall also comply with the Acts and the Regulations."

2.5 OCCUPATIONAL HEALTH AND SAFETY ACT

Add new Clause 4.3.3

"4.3.3 The Contractor shall comply with all the requirements of the Occupational Health and Safety Act (Act No. 85 of 2014) and the Regulations framed there under.

The Contractor shall also ensure that any Sub Contractor employed by him shall also comply with the Act and the Regulations.

The contractor shall submit an approved Health and Safety plan prior to commencement with this contract"

2.6 TARGETED SUBCONTRACTING

Add New Clause 4.4.8

"4.4.8 Targeted Contract Participation

It is a requirement that a minimum of 30% of the Contract be subcontracted to targeted enterprises in accordance with the Targeted Subcontracting specifications in the Scope of Works. Failure to comply will trigger the remedies/ penalties stated in the Scope of Works."

2.7 CONTRACTORS EMPLOYEES

Add new Clause 4.10.3

"4.10.3 The Contractor shall at all times exercise strict control over his employees to prevent, as far as possible, any unruly or unlawful behaviour by or amongst the labourers, local community members or leadership thereof and other employed by him.

The Contractor shall not engage or otherwise employ on the Works any person who, at the time of signing the contract, was employed by the Employer upon the Works, unless the Contractor obtains the written consent of the Employer or Employer's Representative in respect of the employment of such person".

2.8 LOCAL LABOUR

Add new Clause 4.10.4

"4.10.4 The contractor shall make maximum use of local labour for the construction of the Works. The target for use of local labour is 5% of the Contract Value. Failure to comply will trigger the remedies/ penalties stated in the Scope of Works."

2.9 CONTRACTORS SUPERINTENDENCE

Add to Clause 4.12.1

"Should the key personnel indicated during the tender stage not be available to superintend the Works, the Contractor shall replace such key personnel with persons having similar or better qualifications and experience."

2.10 LABOUR-INTENSIVE COMPONENT OF THE WORKS

Add New Clause 4.13

"4.13 Labour Intensive Works

It is a requirement that certain portions of the Works, identified by the Employer, be constructed in a labour intensive manner.

The Contractor shall construct such works in accordance with the Labour Intensive Construction specifications contained in the Scope of Works.

Payment for items which are designated to be constructed labour-intensively in the scope of works will not be made unless they are constructed using labour-intensive methods. Any unauthorised use of plant to carry out work, which was to be done labour-intensively will not be condoned, and any works so constructed will not be certified for payment.

Any non-payment for such works shall not relieve the Contractor in any way from his obligations either in contract or in delict."

2.11 DELAY THROUGH OPPORTUNITIES AFFORDED TO OTHER PERSONS

Add New Clause 5.4.4

"5.4.4 Whenever the Contractor considers that he is suffering a delay in the smooth running of his work as the result of the execution of any work on the Site by other persons he shall report to the Employer's Agent/Employer in writing within twenty-four (24) hours of the occurrence thereof the circumstances and extent of such delay. The Employer's Agent/Employer shall take such steps to resolve the problem as he considers necessary. Failure on the part of the Contractor to report to the

Employer's Agent/Employer such delay at the time of its occurrence shall invalidate any claim to any extension of time in terms of Clause 10.1.1".

2.12 EXTENSION OF TIME DUE TO INCLEMENT WEATHER

Add the following to sub-Clause 5.12.2.2

"(b) Abnormal climatic conditions.

No extensions of the time for completion shall be granted on the grounds of normal rainfall conditions, but extension of time in terms of Clause 5.12 of the General Conditions of contract on the grounds of abnormal rainfall or wet conditions shall be calculated separately for each calendar month or part thereof, according to the following formula. It shall be calculated as follows for the time for completion, including any extension thereof:

$$V = (Nw - N\text{[illegible]}) + \frac{R\text{[illegible]} - Rn}{X}$$

V = Extension of time for calendar days of the calendar month concerned. If the value of V is negative and the absolute value thereof is greater than Nn, V is taken as negative Nn.

Nw = Actual number of days during calendar month on which a rainfall of Y mm or more is recorded.

Nn = Average number of days in the calendar month concerned on which a rainfall of Y mm or more is recorded in terms of existing rainfall data

Rw = Actual rainfall for the calendar month concerned in mm

Rn = Average rainfall for the calendar month in mm deduced from existing rainfall data.

For the purposes of the contract Nn, Rn, X and Y shall have the values as stipulated below.

The total extension of time is the algebraic sum of the monthly totals for the period concerned, extension of time for parts of a month shall be calculated by using pro rata values of Nn and Rn. If the algebraic sum of the monthly totals is negative, no reduction of the time for completion as a result of rainfall shall be applicable.

This formula does not take any delays as a result of flood damage, which may cause further or simultaneous delays, into consideration and flood damage shall be treated separately for purposes of extension of time for completion.

The factor (Nw – Nn) is considered as a fair allowance for deviation from the normal for the number of days on which the rainfall exceeds Y mm. The factor (Rw – Rn)/X is considered as a fair allowance for deviation from the normal for the number of days on which the rainfall does not exceed Y mm, but on which wet conditions will hamper or disrupt work.

The Contractor shall keep daily rainfall records and submit it to the Employer's Representative at every site meeting. No additional payment shall be made for the supply and installation of the rain gauge or for the keeping of the rainfall records and all costs must be included in the scheduled items:

Information of the records of the nearest rainfall station are given below for the Contractor's information: * WB42 climate statistics from the South African Weather Services.

Rainfall Station Name : Eshowe – Mun

Rainfall Station Number : 0303833

Average annual rainfall : 802.4 mm (1998-2020)

Average number of days per year with rainfall exceeding:

Y = 10mm

X = 20mm

MONTH	Nn (No)	Rn (mm)	MONTH	Nn (No)	Rn (mm)
January	3.7	131.1	July August	0.5	19.9
February	2.6	106.1	September	0.4	17
March	2.1	69.5	October	1.9	67.6
April	1.2	39	November	3.1	103.7
May	0.8	25.6	December	3.8	121.4
June	0.5	11.1		2.6	90.4

"

2.13 EXTENSION OF TIME DUE TO DISRUPTION OF LABOUR

Add the following to Sub Clause 5.12.2.4

"Labour disruptions on a regional or national level due to political unrest, organised mass action or related incidents will be considered to be beyond the Contractor's control.

Any strike within the confines of the Contractor's company and/or this project only, will be deemed to be within the Contractor's control".

2.14 SELECTION OF PERFORMANCE GUARANTEE

Add to Clause 6.2.1

"The selection made in the returnable schedules will be deemed as Contract Data provided by the Contractor"

2.15 CESSION FOR CASH ADVANCEMENTS

Add new Clause 6.12

"6.12 Payment Cessions

6.12.1 Cession of payments due to the Contractor by the Employer to third parties will only be considered by the Employer on the following conditions:

i) on application by the Contractor to Employer;
ii) on forms and in formats acceptable to the Employer;
iii) for payment of material, plant and/or nominated sub-contractors only;
iv) that payment is due to the Contractor.

6.12.2 The Employer is not obliged to agree to requests for cessions of payments.

6.12.3 Payment for materials will only be effected on delivery and fixing of material in the required position.

6.12.4 Payment for plant will only be effected once the vesting of the plant is suitably dealt with in terms of clause 6.9.

6.12.5 Payments to sub-contractors will only be effected on the works involved being certified for payment by the Employer's Agent, and to a maximum value of the value of the works involved as listed in the Schedule of Quantities.

6.12.6 No cessions for cash advancements will be entertained by the Employer for whatever reason."

2.16 DEFECTS LIABILITY PERIOD

Add the following to Sub Clause 7.9

"7.9.2 Emergency repairs during defects liability period

7.9.2.1 Classification

Any defect resulting in an interruption in the supply of services will be deemed an emergency repair, and the timing of the works is then of an urgent nature. Such classification will be at the discretion of the Employer's Agent and communicated as such to the Contractor.

7.9.2.2 Availability of Contractor for emergency repairs

During the defects liability period, the Contractor will ensure that a member of his staff will at all times of day or night be contactable through a cell phone in the event of having to effect an emergency repair.

The Contractor shall as a minimum comply with the following requirements:

i) A minimum of 1 artisans and 1 skilled labourer shall be available to attend to an emergency repair at all times during normal hours and after hours.
i) suitable tools, plant, transport, test equipment, spares and repair kits shall be available at all times to do the necessary emergency repairs.
ii) Above labour and resources shall be available on all weekdays including Saturdays, Sundays and public holidays and the names, addresses and contact information shall be made available to the Employer and Employer's Agent for this purpose.

7.9.2.3 Procedure for commencement and execution of works

Upon notification of a defect by the Employer, the Employer's Agent or his representative will instruct the Contractor to attend to said emergency repair, which instruction will be verbal, and thereafter confirmed in writing.

The Contractor must within 3 hours from such notification arrive on site so as to define the extent of the repair required and must immediately make arrangements to have such a repair rectified, which repair must be effected within 8 hours thereafter.

7.9.2.4 Communication in the event of emergency repairs

The Contractor will immediately upon arrival inform the Employer's Agent of the extent of the problem and also of the anticipated timeframe required to effect the repairs thereto.

Immediately upon completion of the repairs, the Contractor has to provide a verbal notification to the Employer's Agent to the fact that the works have been completed and confirm same within 12 hours in writing.

7.9.2.5 Failure to effect emergency repairs

Failing to effect the emergency repair within the stipulated 12 hour time frame shall result in a penalty of R6 125 per event, followed by a further penalty of R1 225 per additional hour of interruption of water supply or late completion of the emergency repairs.

In the event that the Contractor should fail to attend to the emergency repairs as described above within the response times noted, the Employer shall be entitled to carry out such work by his own workman or by other persons without further notification to the Contractor and to recover the cost thereof from the Contractor. This would not relieve the Contractor of his obligations in terms of the penalty prescribed above."

2.17 NATURAL VEGETATION

Add new Clause 8.1.6

"8.1.6 The Contractor shall confine his operation to as small an area of the site as may be practical for the purpose of executing the works.

Only those trees and shrubs directly affected by the works and such others as the Employer's Agent/Employer may direct in writing shall be cut down and stumped. The natural vegetation, grassing and other plants shall not be disturbed other than in areas where it is essential for the execution of the work or where directed by the Employer's Agent".

2.18 CONTRACTOR'S RESPONSIBILITY FOR SETTING OUT

Add new Clause 8.2.3

"8.2.3 The Contractor shall take special precautions to protect all permanent survey beacons, bench-marks, stand boundary pens and trigonometrical beacons regardless whether such pegs or beacons were placed before or during the execution of the contract. If any such beacons or pegs which would not otherwise have been affected by construction of the works, have been disturbed by the Contractor or his employees, the Contractor shall have them replaced by a registered land surveyor at his own cost."

2.19 INSURANCES

2.20 WORKS COMMENCEMENT WITH WORK PERMIT REQUIREMENT

The following amendments to clauses 1.1 and 5.3 shall apply only in those circumstances where the Employer is required to apply for a construction work permit in terms of Construction Regulation 3(1):

1.1 Definitions

Delete the entirety of Clause 1.1.1.5 and replace it with the following:

"1.1.1.5 "Commencement Date" means the date 42 calendar days after the date that the Agreement, made in terms of the Form of Offer and Acceptance, comes into effect."

5.3 Commencement of the Works

Delete the entirety of Clauses 5.3.1, 5.3.2 and 5.3.3 and replace them with the following:

"5.3.1 Commencement of the Works

5.3.1 Upon the Employer's Agent's instruction, the Contractor shall, save as may be otherwise provided in the Contract, or be legally or physically impossible, commence carrying out the Works. Such instruction shall be provided not later than 14 days after the Commencement Date. Such instruction shall be subject to:

5.3.1.1 The timely submission by the Contractor, and approval by the Employer's Agent, of documentation required before commencing to carry out the Works and before the Employer applying for a permit to do construction work, as set out in the Contract Data,

5.3.1.2 Application by the Employer for a permit to do construction work in terms of Regulations 3(1) and (2) of the Construction Regulations 2014, and

5.3.1.3 Receipt by the Employer of the permit to do construction work.

5.3.2 Unacceptable documentation

5.3.1 If the documentation referred to in Clause 5.3.1 is not submitted within the number of days stipulated in the Contract Data from the date that the Agreement, made in terms of the Form of Offer and Acceptance, comes into effect, or if such documentation is found to be unacceptable, the Employer may terminate the Contract in terms of Clause 9.2.

5.3.3 Time to instruct commencement of the Works

5.3.3 Where the Contractor delays the submission by the Employer of the application for a permit to do construction work and such permit is not received within 14 days following the Commencement Date such that the Employer's Agent's instruction to commence carrying out the Works cannot be given, without prejudice to the Employer's rights to terminate the contract under Clause 5.3.2, the Employer's Agent shall delay issuing the instruction to commence carrying out the Works until such time as the permit to do construction work has been received. The Contractor shall have no entitlement under Clause 5.12 to an extension of time for Practical Completion.

Where the permit to do construction work is not received within the 14 day period following the Commencement Date for reasons not attributable to the Contractor, the Employer's Agent shall delay

the instruction to commence the Works and the Contractor shall be entitled to make a claim in accordance with Clause 10.1."

2.21 TIME FOR SUBMISION OF CLAIMS

Amend sub-clause 10.1.1.1

Replace 28 days with 14 days

PART 2 : DATA TO BE PROVIDED BY CONTRACTOR

REF. CLAUSE No	DATA BY CONTRACTOR
1.1.1.9	Name of Contractor:
1.2.1.2	Address of Contractor:
	Physical: ..... Postal: .....
	. ...
	. ...
	. ...
	e-mail: …… Telephone No: …..... Fax No:….....
1.1.1.14	Time for achieving Practical Completion of the whole of the Works is: *(Contractor to insert time for achieving practical completion if shorter than the period in the contact data provided by the Employer)* _____ Months (Max as per Contract Data provided by Employer is 12 months)

C1.3 : CONTRACTUAL DOCUMENTATION

C1.3.1 CONSTRUCTION GUARANTEE PROFORMA

NOTE *italic text are informative for completion of the form and should be omitted in the final version.*

King Cetshwayo District Municipality

King Cetshwayo House

Corner Kruger Rand and Barbados Bay Road

Richards Bay

DD MONTH YEAR

PERFORMANCE GUARANTEE

Contract Number / Tender Number:

WHEREAS, King Cetshwayo District Municipality (hereinafter referred to as "the Employer")

entered into a contract with ..... *(Contractor name)*

(hereinafter referred to as "the Contractor") on the *dd*th day of *month* 2021 in respect of CONTRACT NO. KCDM/RBIG/02/2022 MTHONJANENI SSA 2 PHASE 1B2: TENDER FOR CONSTRUCTION OF PIPELINES, 500KL RESERVOIR, AND PUMPING STATION.

AND WHEREAS, it is provided by such Contract that the Contractor shall provide the Employer with security by way of a guarantee for the due and faithful fulfilment of such Contract by the Contractor;

AND WHEREAS, ...*(guarantor name and reg no)*

(hereinafter referred to as "the Guarantor") of .....*(guarantor address)*

.....*(guarantor address)*

.....*(guarantor address)*

, have at the request of the Contractor, agreed to give such guarantee, subject to the terms and conditions contained herein.

NOW THEREFORE:

1. The Employer shall, without reference and/or notice to the Guarantor, have complete liberty of action to act in any manner authorized and/or contemplated by the terms of the said Contract, and/or to agree to any modifications, variations, alterations, directions or extensions of the completion date of the works under the said Contract, and that its rights under this Guarantee shall in no way be prejudiced nor the Guarantor's liability hereunder be affected by reason of any steps which the Employer may take under such Contract, or of any modification, variation, alterations of the completion date which the Employer may make, give, concede or agree to under the said Contract.
2. The Guarantor undertakes to pay the Employer in accordance with clause 6 below, any amounts up to but not exceeding the maximum aggregate of ..... *(Guarantee amount as numbers and in words)*, upon receipt by the Guarantor of the Employer's first written complying demand. A Complying Demand must:
    2.1. be in writing;
    2.2. contain a statement (whether included in the demand or a separately signed document) stating that the Contractor has failed to meet its obligations under the Contract;
    2.3. state the amount claimed; and
    2.4. purport to be signed by the Employer's duly authorised signatory(ies).

3. This Guarantee shall be limited to the payment of a sum of money only.
4. The Employer shall be entitled, without reference to the Guarantor, to release any guarantee held by it, and to give time to or compound or make any other arrangement with the Contractor.
5. This Guarantee shall remain in full force and effect until the completion date of the Contract.
6. Payment of the Guaranteed Amount, or any part thereof, will only be made following presentation by the Employer at the Guarantor's address referred to above of a Complying Demand and this original Guarantee for:
   6.1. endorsement in the case of part payment; or
   6.2. surrender in the case of final payment of the Guaranteed Amount.
7. The Guarantor will pay on demand under this Guarantee without regard to any claim or dispute of any nature which any party may allege and without verifying:
   7.1. the validity or authenticity of the Complying Demand; or
   7.2. the Contractor's alleged non-compliance; or
   7.3. the correctness of the amount(s) demanded.
8. The Guarantor reserves the right to withdraw from this Guarantee by depositing the Guaranteed Amount with the Employer, whereupon the Guarantor's liability hereunder shall cease.
9. The Employer hereby chooses its address for the serving og all notices for all purposes arising here from as King Cetshwayo House, Corner Kruger Rand and Barbados Bay Road, CBD, Richards Bay, Kwa-Zulu Natal.
10. This Guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No.758 and shall be governed by the laws of the Republic of South Africa. The courts of the Republic of South Africa shall have sole jurisdiction.

Signed at ..... *(place name)*

on *dd month year*

For..... *(Guarantor name)*

..... *(authorised signature)* .....*(authorised signature)*

..... *(name)* .....*(name)*

..... *(position)* ..... *(position)*

As Witness

..... *(signature)* .....*(signature)*

..... *(name)* .....*(name)*

C1.3.2 AGREEMENT OF INDEMNITY IN TERMS OF OCCUPATIONAL HEALTH AND SAFETY ACT 2014

THE KING CETSHWAYO DISTRICT MUNICIPALITY

duly represented herein by …… in his capacity as

…… (hereinafter referred to as "EMPLOYER")

and

…….. duly represented herein by

…….. in his capacity as

…… (hereinafter referred to as the "MANDATORY")

The EMPLOYER and the MANDATORY hereby agree, in terms of the provisions of Section 37(2) of the Occupational Health and Safety Act 2014 (Act 85 of 2014, hereinafter referred to as “the Act”), that as far as the work described in 1 hereafter, the following arrangements and procedures shall apply between them to ensure compliance by the MANDATORY with the provisions of the Act, namely:

1. DESCRIPTION OF WORK:
……..……..……..

89 of the Compensation for Occupational Injuries and Diseases Act 2014 (Act No 130 of 2014) before any work in terms of this agreement is commenced.

3.6. The MANDATORY undertakes to appoint a designated responsible person in terms of the Act, and to furnish the EMPLOYER with a copy of such appointment before any work in terms of this agreement is undertaken

THUS DONE AND SIGNED AT RICHARDS BAY ON THIS …….. DAY OF …… 20……

AS WITNESSES:

1. .....…….….. ……..……..
(For and on behalf of the EMPLOYER)

2. .....…….…..

THUS DONE AND SIGNED AT RICHARDS BAY ON THIS …… DAY OF …… 20…..

AS WITNESSES:

1. .....…….....

2. .....……..... …… (For and on behalf of the MANDATORY)

C1.3.3 TRANSFER OF RIGHTS AND INDEMNITY FOR MATERIALS

TRANSFER OF RIGHTS FOR MATERIAL ON SITE

Claim for materials on site, Payment Certificate No: …….. Date: ……

Contract No: …… for (*contract title*)
……

……
……

I, the undersigned (*name of signatory*) ……..…….. in my capacity as

…… of (*name of Contractor*)
…….. duly authorised hereto on behalf of the Contractor hereby transfer, cede and assign all the Contractor's rights, title and interest in and to the materials and goods, for which evidence of bona fide ownership is attached hereto,

unto and in favour of (*name of Employer*)
……..
Insofar as the Contractor retains actual control of the materials and goods, the right of ownership thereof passes to the Employer by *constitutum possessorium*.

I herewith indemnify the Employer against any claim to and in respect of said materials by reason of the Contractor's sequestration or liquidation or of any effect in the Contractor's title to the materials and agree that no payment for materials on site will be made by the Employer until such time as I have submitted documentary proof of bona fide ownership of the said materials and goods.

The transfer shall become effective upon conclusion of the Contractor receiving payment from the Employer or from any other person on behalf of the Employer for the materials and goods as Materials on Site, payment of retention money thereon excluded.

I further confirm that I am fully responsible for all materials and goods listed under this Transfer of Rights and that they have been insured adequately against all risks and will remain insured until they are built into or used in the permanent works and taken over by the Employer.

This certificate of Transfer of Rights applies only to the materials and goods as listed in the following table:

DESCRIPTION OF ITEM	UNIT	QTY	RATE	AMOUNT	SUPPLIER
TOTAL VALUE OF MATERIALS AND GOODS					

Signed by …….. Date
……
for and on behalf of the Contractor,

Witnesses by ……..…….. Date ……..……...

[Note: This form, together with the documentary proof of ownership or proof of payment by the Contractor to the supplier, shall accompany the Contractor's claim for payment for materials on site in terms of Clause 6.10.1.5 of the General Conditions of Contract.]

INDEMNITY FOR MATERIALS ON SITE

We the.....(Bank or Insurance Company)

do hereby bind ourselves as surety in solidum and co-principal debtors to recompense the employer in the event of his not acquiring ownership of materials for whatever reason, or in the event of his lawfully being required to make payment of any sum of money to any third party in order to obtain or retain ownership of full and free possession of the said materials, in circumstances where the employer has paid the Contractor for the said materials on site in terms of Clause 6.10.1.5 of the General Conditions of Contract, and for all losses, damages and expenses that may be suffered or incurred by the Employer as a result of such payment for the said materials, renouncing all benefits from the legal exceptions ordinis se excursionis et divisions “No value received” and all other exceptions which might or could be pleaded against the validity of this guarantee, with the meaning and effect of which exceptions we declare ourselves to be fully acquainted; provided that the liability of the undersigned under this guarantee is limited to and shall not exceed

R.....
(.....
….)

and will lapse after issue of the Certificate of Completion of the Contract, unless the surety is advised in writing by the Employer before issue of the said Certificate of his intention to institute claims and the particulars thereof, in which event this guarantee shall remain in force until all such claims are paid or settled.

This undertaking is not negotiable nor transferable and must be returned to us upon payment of the above-mentioned amount. Bank/Insurance Company:.....
Address: .....

.....
Date:.....

PART C2: PRICING DATA

TABLE OF CONTENTS

	Page
C2.1 Technical Data Sheets	C25
C2.2 Pricing Instructions	C35
C2.3 Bill of Quantities	C38

C2.1: TECHNICAL DATA SHEETS

Technical Data Sheet 1:	PUMPING EQUIPMENT CENTRIFUGAL PUMPSET	C26
Technical Data Sheet 2:	PUMP STATION 2B MCC & RESERVOIR 4 CONTROL PANEL.	C27
Technical Data Sheet 3:	PUMP CABLES, CABLE ACCESSORIES AND AUX ITEMS.	C31
Technical Data Sheet 4:	PUMP INSTRUMENTATION AND FIELD EQUIPMENT	C33
Technical Data Sheet 5:	PUMP ELECTRICAL CONTRACTOR / MCC MANUFACTURER	C34

C2.2.1 MECHANICAL TECHNICAL DATA SCHEDULE

To be completed by the Tenderer and submitted as part of his tender. In the event of the tender being accepted this schedule of material offered shall be strictly adhered to.

TECHNICAL DATA SHEET 1: PUMPING EQUIPMENT CENTRIFUGAL PUMPSET

Pump sets	**Pump Station 2B**
Manufacturer of Pump	
Place of Manufacture	
Pump Model No	
Speed of rotation (rpm)	
Suction diameter (mm)	
Delivery diameter (mm)	
Type of bearings	
Materials of wear rings	
Type of impeller	
Material of casing	
Material of shaft	
Method of lubrication	
Method of gland sealing	
Manufacturer of motor	
Speed of rotation	
Rated power at site (kW)	
Overall mass of pump, motor and baseplate (kg)	
Type of coupling	
Material of bedplate	
Operation at duty point	
Delivery (l/s)	
Head (m)	
Efficiency (%)	
Absorbed power (kW)	
Type of piping offered	
Name of manufacturer	
Make and class of gate valves	
Make and class of reflux valves	
Pressure gauges	

C2.2.2 ELECTRICAL TECHNICAL DATA SCHEDULE

To be completed by the Tenderer and submitted as part of his tender. In the event of the tender being accepted this schedule of material offered shall be strictly adhered to.

TECHNICAL DATA SHEET 2: PUMP STATION 2B MCC & RESERVOIR 4 CONTROL PANEL.

Item	Description	Make	Part number	Supplier
2.1	15 inch, Core I7 processor, 16GB Ram, 1TB Hard Drive Laptop			
2.2	Microsoft Windows 11			
2.3	Microsoft One Time Purchase Office 2021 Home & Business.			
2.4	PLC programming software.			
2.5	Pump Station 2B PLC CPU.			
2.6	Reservoir 4 Ethernet IP Adaptor			
2.7	PLC 24V DC digital input module			
2.8	PLC 230V AC digital input module			
2.9	PLC potential free digital output module			
2.10	PLC analog input module			
2.11	PLC panel extraction fan			
2.12	PLC Surge Arrester Analog Field			

Item	Description	Make	Part number	Supplier
2.13	PLC Surge Arrester Analog Marshalling			
2.14	PLC Surge Arrester Digital Field			
2.15	PLC Surge Arrester Digital Marshalling			
2.16	PLC Surge Arrester Power Marshalling			
2.17	PLC Power Supply			
2.18	PLC marshalling terminals			
2.19	PLC terminal fuses			
2.20	230V / 24VDC power supply			
2.21	230V / 48VDC power supply			
2.22	Ethernet TCP/IP managed switch			
2.23	Fibre Optic Splice Box			
2.24	Fibre optic multi mode patch leads.			
2.25	12 inch HMI			
2.26	HMI Software			
2.27	Power meter			

Item	Description	Make	Part number	Supplier
2.28	Maximum demand ammeter			
2.29	Voltmeter			
2.30	Voltmeter selector switch			
2.31	Main incoming supply surge arrestors			
2.32	Relays			
2.33	Selector switch			
2.34	Push buttons			
2.35	LED indication lamp			
2.36	Hour meter			
2.37	Motor Contactors			
2.38	Motor overloads			
2.39	Power terminals			
2.40	30mA earth leakage unit			
2.41	Main Three Phase Circuit Breaker.			
2.42	Motor three phase circuit breakers			

Item	Description	Make	Part number	Supplier
2.43	Single phase circuit breakers			
2.44	Power factor controller			
2.45	Power factor step contactors			
2.46	Power factor capacitors			
2.47	VSD’s			
2.48	VSD extraction fan			
2.49	HMI			
2.50	HMI Software			
2.51	100mm flygt float switch			

TECHNICAL DATA SHEET 3: PUMP CABLES, CABLE ACCESSORIES AND AUX ITEMS.

Item	Description	Make	Part number	Supplier
3.1	PVC/SWA/PVC 1000V cables			
3.2	Exe corrosion guard cable glands for the above PVC/SWA/PVC cable			
3.3	PVC/SWA/PVC 4 core multi mode fiber optic cable			
3.4	Splicing of fibre optic cable			
3.5	CAT 5 Network cable			
3.6	M872 SW armoured individually & overall screened pairs electronic instrument cable.			
3.7	Exe corrosion guard cable glands for M872 cable			
3.8	Exe cable junction boxes			
3.9	Cable numbers			
3.10	PVC warning tape.			
3.11	Cable route markers.			
3.12	3CR12 OL55 cable ladder			
3.13	3CR12 cable tray			
3.14	Galvanised conduit			

Item	Description	Make	Part number	Supplier
3.15	1.5m IP65 49W LED Polycarbonate diffuser luminaire.			
3.16	1.5m IP65 emergency 49W LED Polycarbonate diffuser luminaire.			
3.17	17W LED bulkhead.			
3.18	Photo cell			
3.19	Photo cell contactor			
3.20	Industrial surface mounted 16A switch.			
3.21	Industrial surface mounted 16A switched socket outlet.			

TECHNICAL DATA SHEET 4: PUMP INSTRUMENTATION AND FIELD EQUIPMENT

Item	Description	Make	Part number	Supplier
4.1	Ultrasonic level detector transmitter			
4.2	Ultrasonic level detector sensor			
4.3	304 stainless steel support brackets for the sensors			
4.4	Magnetic flow meter sensor.			
4.5	Indicating transmitter for magnetic flow meters.			
4.6	FEB's for instrument transmitters.			
4.7	Pressure transmitter			
4.8	Pressure switch			
4.9	Flow switch			
4.10	Surface mounted IP65 emergency stop button.			
4.11	3CR12 support stands for the above item			

TECHNICAL DATA SHEET 5: ELECTRICAL CONTRACTOR / MCC MANUFACTURER

Item	ELECTRICAL CONTRACTOR	MCC / CONTROL PANEL MANUFACTURER
5.1		

C2.2: PRICING INSTRUCTIONS

1. GENERAL

1.1 Payment Clauses

Measurement and payment shall be in accordance with the relevant provisions of Clause 8 of each of the SANS 1200 Standardised Specifications for Civil Employer's Agenting Construction referred to in the Scope of Work. The Preliminary and General items shall be measured in accordance with the provisions of SANS 1200-A, General.

Payment descriptions for additional items are listed at the end of this section.

1.2 Units

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

%	=	percent
h	=	hour
ha	=	hectare
kg	=	kilogram
kl	=	kilolitre
km	=	kilometre
km-pass	=	kilometre-pass
kPa	=	kilopascal
kW	=	kilowatt
l	=	litre
m	=	metre
mm	=	millimetre
m²	=	square metre
m²-pass	=	square metre-pass
m³	=	cubic metre
m³-km	=	cubic metre-kilometre
MN	=	meganewton
MN.m	=	meganewton-metre
MPa	=	megapascal
No.	=	number
Prov sum	=	Provisional sum
PC sum	=	Prime Cost sum
R/only	=	Rate only
sum	=	lump sum
t	=	ton (1000 kg)
W/day	=	Work day
u/mth	=	unit per month

1.3 Nett Measurement

Unless otherwise stated, items are measured net in accordance with the drawings, and no allowance is made for waste.

Cable quantities given in the Schedule of Quantities and Cable Schedules have been measured against scaled drawings. It is the contractor's responsibility to measure the exact cable lengths before purchasing / installing cables. All cables will be subject to re-measure by the engineer once installed. Furthermore, before any material is purchased for electrical and mechanical works the contractor must obtain the written permission of the engineer.

1.4 Pricing to be Inclusive

The prices and rates in these Bills of Quantities are fully inclusive prices for the work described under the items. Such prices and rates cover all costs and expenses that may be required in and for the

execution of the work described in accordance with the provisions of the Scope of Work, and shall cover the cost of all general risks, liabilities, and obligations set forth or implied in the Contract Data, as well as overhead charges and profit. These prices will be used as a basis for assessment of payment for additional work that may have to be carried out.

Where the Scope of Work requires detailed drawings and designs or other information to be provided, all costs associated therewith are deemed to have been provided for and included in the unit rates and sum amount Tendered such items.

1.5 Pricing on Latest Laws and Standards

It will be assumed that prices included in these Bills of Quantities are based on Acts, Ordinances, Regulations, Bylaws, International Standards and National Standards that were published 28 days before the closing date for Tenders. (Refer to www.stanz.org.za or www.iso.org for information on standards)

1.6 Pricing Zero or Group Pricing

An item against which no price is entered will be considered to be covered by the other prices or rates in the Bills of Quantities. A single lump sum will apply should several items be grouped together for pricing purposes.

1.7 Quantities are Re-measurable

The quantities set out in these Bills of Quantities are approximate and do not necessarily represent the actual amount of work to be done. The quantities of work accepted and certified for payment will be used for determining payments due and not the quantities given in the Bills of Quantities.

1.8 No Applicable Pay Items

Where no pay item appears in the Bills of Quantities in respect of work required, the terms of the Contract will be applied to determine compensation.

1.9 Descriptions not Full

Descriptions in the Bills of Quantities are abbreviated and comply generally with those in the SANS 1200 Standardised Specifications. The short descriptions of the items of payment given in these Bills of Quantities are only for the purposes of identifying the items. More details regarding the extent of the work entailed under each item appear in the Scope of Work.

1.10 Pricing Dayworks

Dayworks items priced in the Dayworks Schedule in the Bill of Quantities are to include:

- For plant and equipment, the rate shall be regarded as a wet rate including any ground engaging tools and consumables;
- For labour the rate shall include all supervision above foreman level, all hand tools as would be expected to be on site for the execution of the Scope of Work;
- All overheads and profit.

The % provided by the contractor in terms of GCC2015 clause 6.5.1.2.3 is only applicable to dayworks not priced in the dayworks schedule.

1.11 Labour

The Labour unit rates in the electrical schedule shall include the cost of the working time of foremen and travelling time of the workmen and foremen to and from the Site.

2. ITEMS SCHEDULED FOR CONSTRUCTION USING LABOUR-INTENSIVE METHODS

Those parts of the Works to be constructed using labour-intensive methods are marked in the Schedule of Quantities with the letters LI, either in a separate column or as a prefix or suffix against every item so designated. The Works or parts of the Works so designated are to be constructed using labour-intensive methods only, unless otherwise specified in the Scope of Work.

The items marked with the letters LI include:

(a) Items in the COLTO or SANS Standard Specifications that would normally be carried out using labour-intensive construction methods.

(b) Items in the COLTO or SANS Standard Specifications that would normally be carried out using plant but which have been modified specifically so as to require the use of labour-intensive construction methods instead of plant for some or all of the work components of the item.

(c) New items that have been written for this contract specifically requiring the use of labour-intensive construction methods rather than plant for some or all of the work components of the item.

The items marked with the letters LI are not necessarily an exhaustive list of all the activities which could be carried out using labour-intensive methods. Where a minimum percentage for local labour content is specified, additional activities may need to be identified to be carried out using labour-intensive methods rather than plant in order to meet such target.

Those parts of the contract to be constructed using labour-intensive methods have been marked in the bill of quantities with the letters LI in a separate column filled in against every item so designated. The works, or parts of the works so designated are to be constructed using labour-intensive methods only. The use of plant to provide such works, other than plant specifically provided for in the scope of works, is a breach to the contract. The items marked with the letters “LI” are not necessarily an exhaustive list of all the activities, which must be done by hand, and this clause does not over-ride any of the requirements in the generic labour intensive specification in the Scope of Works.

The Contractor's payment invoices shall be accompanied by labour information for the corresponding period in a format specified by the Employer. If the contractor chooses to delay submitting payment invoices, labour returns shall still be submitted as per frequency and timeframes stipulated by the Employer. The contractor's invoices shall not be paid until all pending labour information has been submitted.

The following information shall be maintained on site and submitted in electronic/hard copy formats:

- Certified ID copies of all locally employed labour
- Signed Contracts between the employer and the EPWP Participants
- Attendance Registers for the EPWP Participants
- Proof of Payment of EPWP Employees
- Monthly Reporting Template as per EPWP requirements

C2.3: BILLS OF QUANTITIES

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
	SABS 1200 A	**SECTION 1: PRELIMINARY AND GENERAL**				
1.1	8.3	FIXED-CHARGE ITEMS				
1.1.1	8.3.1	Contractual Requirements.	Sum	1		
	8.3.2	Establish facilities on site				
	8.3.2.1	Facilities for the Engineer				
1.1.2		a) Furnished offices (see PSAB 3.2)	Sum	1		
1.1.3		c) Nameboard. (see PSAB 3.1)	Sum	1		
1.1.4		d) Survey Equipment (see PSAB 5.6)	Sum	1		
	8.3.2.2	Facilities required by the contractor:				
1.1.5		a) Offices and storage sheds.	Sum	1		
1.1.6		b) Workshops.	Sum	1		
1.1.7		e) Ablution and latrine facilities.	Sum	1		
1.1.8		f) Tools and equipment	Sum	1		
1.1.9		g) Water supplies, electric power and communications.	Sum	1		
1.1.10		h) Dealing with water. (Subclause 5.5)	Sum	1		
1.1.11		i) Access (Subclause 5.8)	Sum	1		
1.1.12	8.3.3	Other fixed-charge obligations.	Sum	1		
1.1.13	8.3.4	Remove Engineer's and Contractor's Site establishment on completion.	Sum	1		
Total Carried Forward						

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
1.2	8.4	TIME-RELATED ITEMS				
1.2.1	8.4.1	Contractual Requirements.	Sum	1		
	8.4.2	Operate and maintain facilities on the Site for the duration of construction				
	8.4.2.1	Facilities for the Engineer				
1.2.2		a) Furnished office (see PSAB 3.2)	Sum	1		
1.2.3		c) Nameboard. (see PSAB 3.1)	Sum	1		
1.2.4		d) Survey Assistants and material (see PSAB 5.6)	Sum	1		
	8.4.2.2	Facilities for the Contractor for the duration of construction				
1.2.5		a) Offices and storage sheds.	Sum	1		
1.2.6		b) Workshops.	Sum	1		
1.2.7		e) Ablution and latrine facilities.	Sum	1		
1.2.8		f) Tools and equipment.	Sum	1		
1.2.9		g) Water supplies, electric power and communications.	Sum	1		
1.2.10		h) Dealing with water.	Sum	1		
1.2.11		i) Access	Sum	1		
1.2.12		j) Plant (designated plant)	Sum	1		
1.2.13	8.4.3	Supervision	Sum	1		
1.2.14	8.4.4	Company and head office overhead costs.	Sum	1		
1.2.15	8.4.5	Other time-related obligations.	Sum	1		
Total Carried Forward						

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
1.3	8.5	SUMS STATED PROVISIONALY BY THE ENGINEER:				
1.3.1	8.5 (a)	Acceptance tests required by the Engineer	Prov Sum			100,000.00
1.3.2		Dayworks not covered in the dayworks section	Prov Sum			75,000.00
1.3.3		Allowance for setting up training venue facility at community hall and transporting of learners	Prov Sum			75,000.00
1.3.4		Allowance for CPG subcontractor P&G	Prov Sum			600,000.00
1.3.5		Cathodic protection design	Prov Sum			150,000.00
1.3.6		Cathodic protection installation	Prov Sum			500,000.00
1.3.7	8.5 (b)	Overheads, charges and profit on above	%	1,500,000		
1.4	8.7	DAYWORKS				
1.4.1		Excavator (20 ton)	hrs	50		
1.4.2		TLB	hrs	30		
1.4.3		Tipper truck (10m3)	hrs	30		
1.4.4		Crane truck (6 ton)	hrs	30		
1.4.5		Water cart/truck (12 000 litres)	hrs	30		
1.4.6		LDV (1 ton or equivalent)	hrs	30		
1.4.7		Pedestrian roller	day	10		
1.4.8		Trench compactor	day	10		
1.4.9		Compressor with 2 breakers and 2 operators	day	10		
1.4.10		Water pump (4 inch)	day	10		
1.4.11		Field Surveyor	hrs	10		
1.4.12		Foreman	hrs	10		
1.4.13		Skilled Labourer	hrs	20		
1.4.14		Semi-skilled Labourer	hrs	30		
1.4.15		Unskilled Labour	hrs	50		
Total Carried Forward						

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
1.5	8.8	TEMPORARY WORKS				
1.5.1	PSA8.8.1	Access to works	Sum	1		
1.5.2	PSA8.8.2	Dealing with traffic	Sum	1		
1.5.3	8.8.4 (c)	Excavation by hand to expose existing services	m^3	100		
1.6	PSA 8.9	DEALING WITH PROPERTY OWNERS				
1.6.1		(a) Obtaining permission to occupy	Sum	1		
1.6.2		(e) Detail digital survey	Sum	1		
1.7	PSA 8.11	COMMUNITY LIAISON OFFICER				
1.7.1		Provision of CLO	Prov Sum			240,000.00
1.7.2		Overheads cost and mark up	%	240,000		
Total Carried Forward						

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
1.8		Electrical works preliminary and general items The supply, installation, testing, commissioning and a 52 week defects liability period in accordance with this bill of material, Local Supply Authority's by-laws & regulations, National Building Regulations, detailed electrical specification, SANS 10142-1: 2003 (Code of Practice), Occupational Health and Safety Act, General Conditions of Contract and drawings listed in the detailed specification.				
1.8.1		Fixed Charge Items				
1.8.1.1		Site establishment Allow for site establishment, and for storage of plant, materials and equipment including protection thereof.	Sum	1		
1.8.1.2		Site disestablishment Allow for the demolishing and removal of the site camp upon completion of the contract.	Sum	1		
1.8.1.3		Commissioning and testing Supply all test equipment and labour for testing and commissioning of the final installation.	Sum	1		
1.8.1.4		Guarantee Allow for a guarantee period of 12 months against defect in equipment, material and workmanship, but wear and tear and normal maintenance excluded.	Sum	1		
Total Carried Forward						

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
1.8.1.5		Additional fixed charge items Any additional item(s) that the tenderer may wish to detail and price.				
1.8.1.6		AS BUILT DRAWINGS The marking - up of "As Built" drawings during the contract to ensure that accurate "As Built" drawings are submitted to the Engineer at the end of the contract.	Sum	1		
1.8.1.7		OPERATING & MAINTENANCE MANUALS Compilation of an O & M manual	Sum	1		
1.8.1.8		Value related items Tenderer to detail				
1.8.1.9		Time related items Tenderer to detail				
Total Carried Forward						

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
1.9		Mechanical works preliminary and general items The supply, installation, testing, commissioning and a 52 week defects liability period in accordance with this bill of material, Local Supply Authority's by-laws & regulations, National Building Regulations, detailed electrical specification, SANS 10142-1: 2003 (Code of Practice), Occupational Health and Safety Act, General Conditions of Contract and drawings listed in the detailed specification.				
1.9.1		Fixed Charge Items				
1.9.1.1		Site establishment Allow for site establishment, and for storage of plant, materials and equipment including protection thereof.	Sum	1		
1.9.1.2		Site disestablishment Allow for the demolishing and removal of the site camp upon completion of the contract.	Sum	1		
1.9.1.3		Commissioning and testing Supply all test equipment and labour for testing and commissioning of the final installation.	Sum	1		
1.9.1.4		Guarantee Allow for a guarantee period of 12 months against defect in equipment, material and workmanship, but wear and tear and normal maintenance excluded.	Sum	1		
Total Carried Forward						

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
1.9.1.5		Additional fixed charge items Any additional item(s) that the tenderer may wish to detail and price. a) b) c)				
1.9.1.6		AS BUILT DRAWINGS The marking - up of "As Built" drawings during the contract to ensure that accurate "As Built" drawings are submitted to the Engineer at the end of the contract. .	Sum	1		
1.9.1.7		OPERATING & MAINTENANCE MANUALS Compilation of an O & M manual	Sum	1		
1.9.1.8		Value related items Tenderer to detail a) b) c)				
1.9.1.9		Time related items Tenderer to detail a) b) c)				
Total Carried Forward to Summary						

SECTION 2: BULK MAINS - 400mm

ITEM NO	PAYMENT	LI	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
2			**SECTION 2: BULK MAINS - 400mm**				
2.1	SABS 1200 C		SITE CLEARANCE				
2.1.1	8.2.5		Take down existing fencing regardless of type	m	1,000		
2.1.2			Reinstate removed fences with type to match previous	m	1,000		
2.1.3			Extra over 2.1.2 for purchase of new fencing material				
2.1.4			a) 1,5m high 5 strand galvanised wire fence, with fence posts at 8m spacing and droppers at a maximum of 2m spacings	m	150		
2.1.5			b) 1,8m high ""Bonnox"" fencing	m	150		
2.1.6			c) Creosote timber poles for fencing, 100mm diameter and 2,4 m long	No.	50		
2.1.7			Take down existing VIP toilets, dispose of material and make good	No	2		
2.1.8			Relocate and rebuild VIP toilets as per existing	No	2		
2.1.9	8.2.9		Transport materials and debris to unspecified sites and dump (Provisional)	t.km	200		
2.2	SABS 1200DB		**EARTHWORKS FOR PIPE TRENCHES**				
			EXCAVATION				
2.2.1	8.3.1 (a)		Clear vegetation and trees of girth up to 1m to a maximum of 10 m wide	m	2,850		
Total Carried Forward							

SECTION 2: BULK MAINS - 400mm

ITEM NO	PAYMENT		DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
Brought Forward							
2.2.2	PSDB 8.3.2		Excavate in all materials for pipe trenches, backfill, compact and dispose of surplus material for the 400 diameter pipe				
2.2.2.1			Exceeding 1.0m but not exceeding 1.5m	m	450		
2.2.2.2			Exceeding 1.5m but not exceeding 2.0m	m	550		
2.2.2.3			Exceeding 2.0m but not exceeding 2.5m	m	1,350		
2.2.2.4			Exceeding 2.5m but not exceeding 3.0m	m	350		
2.2.2.5			Exceeding 3.0m but not exceeding 3.5m	m	130		
			b) Extra-over Items 2.2.2.(1-5)				
2.2.2.6			Intermediate excavation	m^3	500		
2.3	8.3.3		EXCAVATION ANCILLARIES				
2.3.1	8.3.3.1		Make up deficiency in backfill material a) From other necessary excavations within the site (provisional)	m^3	200		
2.3.2	8.3.3.3		Compaction in road reserve	m^3	100		
2.4	SANS 1200 DK		GABIONS AND PITCHING				
2.4.1	8.2.2		Gabion baskets. Construction of gabion basket as directed by engineer. Mesh Type 80; 2,7mm dia wire	m^3	300		
	8.2.4		Geotextile (Or Geomembrane) (a) Below foundation:				
2.4.2			(1) Geotextile 210g/m^2	m^2	300		
			(b) Behind wall:				
2.4.3			(1) Geotextile 210g/m^2	m^2	200		
Total Carried Forward							

SECTION 2: BULK MAINS - 400mm

ITEM NO	PAYMENT		DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
Brought Forward							
2.5	8.3.5		EXISTING SERVICES THAT INTERSECT OR ADJOIN A PIPE TRENCH				
			a) Service that intersect a trench				
2.5.1			1) Overhead power line	No	12		
2.5.2			2) Water pipes with dia <300mm	No	10		
			b) Service that adjoin a trench				
2.5.3			1) Overhead power line	m	1,230		
2.5.4			2) Water pipes with dia <300mm	m	75		
2.6	8.3.6		FINISHINGS Reinstate road surfaces complete with all courses for road crossings				
2.6.1			a) Gravel provincial roadways crossing pipeline route (Provisional)	m^2	50		
2.7			ACCOMMODATION OF TRAFFIC				
2.7.1	8.3.12		Traffic signs for deviations as required by Traffic Authority (see drawing no Z20536-MPA-Z-DR-00-1B-2018 for layout) for all road crossings	Sum	4		
2.8	SABS 1200 LB 8.2.2 8.2.2.3		BEDDING (PIPES) SUPPLY ONLY OF BEDDING BY IMPORTATION From commercial sources				
2.8.1			a) Selected granular material	m^3	1,350		
2.8.2			b) Selected fill material	m^3	570		
2.8.3			c) 19mm Crushed stone	m^3	20		
2.9			ROAD CROSSINGS				
			Supply and install concrete sleeve pipe at road crossings: -				
2.9.1	SANS 1200 LE 8.2.1		a) 1050mm diameter concrete sleeve pipe, CLASS 100 D	m	40		
2.9.2			Brick-up pipe ends	No	8		
2.9.3			1:10 cement sand pipe bedding to centreline of 400 dia pipe	m	40		
Total Carried Forward							

SECTION 2: BULK MAINS - 400mm

ITEM NO	PAYMENT		DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
Brought Forward							
2.10	SABS 1200 L		MEDIUM PRESSURE PIPELINES (Refer to Clause PSL 3.1 for general information regarding the pipe instalation)				
	8.2.1		Supply and install steel grade X42 pipes complete with cement mortar lining and 3LPE coating (both to project specification). Pipes to be supplied with one end belled as per detail. Rate to include supplying, laying, joining, disinfecting and testing of pipes. (Refer to project specification for details of steel pipes and fittings).				
2.10.1			400mm ND x 6mm wall thickness	m	2,810		
2.10.2			400mm ND x 6mm wall thickness at road crossings	m	40		
	8.2.2		Extra-over for the supplying, laying and bedding of specials				
2.10.3			0 to 11.25 degree	No	31		
2.10.4			over 11.25 to 22.5 degree	No	16		
2.10.5			over 22.5 to 45 degree	No	7		
2.10.6			over 45 to 90 degree	No	4		
2.10.7			Airvalve tees	No	10		
2.10.8			Scour tees	No	10		
2.10.9			Rigid dismantling coupling PN16	No	9		
	8.2.4		Cutting of pipe and welding flange to plain end				
2.10.10			PN16	No	19		
2.10.11			PN10	No	7		
	8.2.5		AIR VALVE FITTINGS (Dwg. No. Z20536-MPA-C-DR-04-1B-2012) Supply and install all valves, fittings, specials. Rate to include all necessary gaskets, bolts etc for airvalve installation				
2.10.12			PN16	No	5		
2.10.13			PN10	No	3		
	8.2.5		ISOLATING VALVE FITTINGS (Dwg. No. Z20536-MPA-C-DR-04-1B-2013) Supply and install all valves, fittings, specials. Rate to include all necessary gaskets, bolts etc. for isolating valve installation				
2.10.14			PN16	No	6		
2.10.15			PN10	No	2		
Total Carried Forward							

SECTION 2: BULK MAINS - 400mm

ITEM NO	PAYMENT		DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
Brought Forward							
	8.2.5		SCOUR VALVE FITTINGS (Dwg. No. Z20536-MPA-C-DR-04-1B-2014) Supply and install all valves, fittings, specials. Rate to include all necessary gaskets, bolts etc. for scour valve installation				
2.10.16			PN16	No	5		
2.10.17			PN10	No	2		
2.11	8.2.13		VALVE CHAMBERS Construct valve chambers in accordance with project drawings Air Valve				
2.11.1			Chambers	No	8		
2.11.2			Isolating valve chambers	No	8		
2.11.3			Scour valve chambers	No	7		
2.12	SABS 1200 D		EARTHWORKS				
	PSDB 8.5		Construct berms and cross embankments				
2.12.1		LI	b) 300mm high	m^3	30		
2.12.2		LI	c) 375mm high	m^3	30		
2.12.3	PSD 8.3.12 (f)		Hydro seeding by indigenous grass seeds. Rate to include watering of seedlings until sufficiently established.	m^2	28,500		
2.13			SUNDRIES				
2.13.1		LI	Type A Pipeline Markers as per drawing Z20536-MPA-Z-DR-00-1B-	No	30		
		LI	Type B Pipeline Markers as per drawing Z20536-MPA-Z-DR-00-1B-2003	No	30		
Total Carried Forward to Summary							

SECTION 3: BULK MAINS - 160mm

ITEM NO	PAYMENT	LI	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
3			**SECTION 2: BULK MAINS - 160mm** Note to bidders: Due to the sensitive terrain, steep slopes, and to create employment oppertunities, the 160mm pipeline should exclusively be constructed by labour intensive methods and no plant will be allowed to move along the pipe route without permission of the Engineer				
3.1	SABS 1200DB		**EARTHWORKS FOR PIPE TRENCHES** EXCAVATION				
3.1.1	8.3.1 (a)	LI	Clear vegetation to a maximum of 4m wide	m	315		
3.1.2	PSDB 8.3.2		Excavate in all materials for pipe trenches, backfill, compact and dispose of surplus material for the 400 diameter pipe				
3.1.2.1		LI	Exceeding 1.0m but not exceeding 1.5m	m	285		
3.1.2.2		LI	Exceeding 1.5m but not exceeding 2.0m	m	30		
			b) Extra-over Items 2.2.2.(1-5)				
3.1.2.3		LI	Intermediate excavation	m^3	50		
3.1.2.4		LI	Hard rock excavation	m^3	100		
3.2	8.3.5		EXISTING SERVICES THAT INTERSECT OR ADJOIN A PIPE TRENCH **a) Service that intersect a trench**				
3.2.1			1) Overhead power line	No	4		
3.3	SABS 1200 L		MEDIUM PRESSURE PIPELINES (Refer to Clause PSL 3.1 for general information regarding the pipe instalation)				
	8.2.1		Supply and install HDPE PE100 pipe class PN16.				
3.3.1		LI	160mm dia	m	320		
	8.2.2		Extra-over for the supplying, laying and bedding of specials				
3.3.2		LI	Airvalve tees	No	1		
3.3.3		LI	Scour tees	No	1		
3.3.4		LI	Rigid dismantling coupling	No	1		
	8.2.4		Cutting of pipe and providing flanged end with backing ring				
3.3.5		LI	PN16	No	1		
3.3.6		LI	PN10	No	1		
Total Carried Forward							

SECTION 3: BULK MAINS - 160mm

ITEM NO	PAYMENT		DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
Brought Forward							
	8.2.5		AIR VALVE ASSEMBLY FITTINGS (Dwg. No. Z20536-MPA-C-DR-06-1B-2012) Supply and install all valves, fittings, specials. Rate to include all necessary gaskets, bolts etc for airvalve installation				
3.3.7			PN16	No	1		
3.3.8			PN10	No	1		
	8.2.5		SCOUR VALVE ASSEMBLY FITTINGS (Dwg. No. Z20536-MPA-C-DR-06-1B-2014) Supply and install all valves, fittings, specials. Rate to include all necessary gaskets, bolts etc. for scour valve installation				
3.3.9			PN16	No	1		
3.4	8.2.13		VALVE CHAMBERS Construct valve chambers in accordance with project drawings Air Valve				
3.4.1			Chambers	No	1		
3.4.2			Scour valve chambers	No	1		
3.5	SABS 1200 D PSDB 8.5		EARTHWORKS Construct berms and cross embankments				
3.5.1		LI	b) 300mm high	m^3	10		
3.5.2		LI	c) 375mm high	m^3	10		
		LI	d) 450mm high	m^3	50		
3.5.3		LI	Seeding by indigenous grass seeds. Rate to include light scarrifying to cover up the seeds.	m^2	1,250		
3.6			SUNDRIES				
3.6.1			Type A Pipeline Markers as per drawing Z20536-MPA-Z-DR-00-1B-2003	No	320		
Total Carried Forward to Summary							

SECTION 4 : 0.5Ml RESERVOIR 4

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
4		**SECTION 4 : 0.5Ml RESERVOIR 4** 0.5Ml RESERVOIR (REFER DRAWING NO: Z20536-MPA-C-DR-03-1B-2001)				
4.1	SANS 1200 D	**EARTHWORKS**				
4.1.1	8.3.1.1	Clear and grub reservoir site, stockpile areas and temporary storage area	m²	550		
4.1.2	8.3.1.2	Remove topsoil under reservoir to nominal depth of 150mm, stockpile and maintain.	m²	300		
4.1.3	8.3.2 (a)	Excavate in all material for reservoir to 200mm below the underside of blinding, and use as fill, or stockpile for use in backfill around structure. (Excavations are measured neat to the footprint of the foundations, and backfill or fill will not be paid seperately)	m³	1,300		
4.1.4		Excavate in all material for reservoir to 200mm below the underside of blinding, and spoil.	m³	900		
4.1.5	8.3.3(a)	Restricted excavation below bulk excavation level:				
4.1.5.1		(a) Sumps and outlet chamber	m³	12		
4.1.5.2		(b) Outlet, Scour, Under drain pipe	m³	14		
4.1.6	8.3.2(b)	Extra over items 4.1.3. to 4.1.5 for excavation in intermediate excavation (Provisional).	m³	700		
4.1.7	8.3.2(c)	Extra over items 4.1.3. to 4.1.5 for excavation in hard rock excavation (Provisional).	m³	300		
4.1.8	8.3.10	Top soiling to surfaces 150 mm thick around the reservoir site from stockpile	m²	250		
4.1.9	PSD 8.3.12 (e)	Fertiliser (2:3:2)	ton	0.04		
4.1.10	PSD 8.3.12 (f)	Hydroseeding	m²	250		
Total Carried Forward						

SECTION 4 : 0.5Ml RESERVOIR 4

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
4.3		FENCING				
4.3.1		Supply and erect fence as per detail on Drawing No. Z20536-MPA-Z-DR-00-1B-2002	m	120		
4.3.2		Supply and erect double leaf gates as detail on Drawing No. Z20536-MPA-Z-DR-00-1B-2002	No	1		
	SANS 1200 G	**SCHEDULED FORMWORK ITEMS**				
4.4	8.2.2	SMOOTH FORMW ORK TO:				
4.4.1		(a) Battered external face of reservoir.	m²	233.4		
4.4.2		(b) Vert.internal face of a reservoir wall.	m²	208.1		
4.4.3		(c) Vertical internal and external face of outlet chamber walls	m²	55.3		
4.4.4		(d) Vertical internal face of sump.	m²	2.8		
4.4.5		(e) Soffit of reservoir roof slab and propping 5.15m high	m²	106.1		
4.4.6		(f) Soffit of outlet/scour chamber roof slab and propping 5.15-6.15m high.	m²	3		
4.4.7		(g) Vertical to column sides.	m²	5.7		
4.4.8		(h) Soffit to battered column head	m²	1.3		
4.4.9		(i) Sloping to overflow weir as detailed on drawing No Z20536-MPA-S-DR-03-1B-2001	m	1.8		
Total Carried Forward						

SECTION 4 : 0.5Ml RESERVOIR 4

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
4.5	8.2.5	VERTICAL IN NARROW WIDTHS				
4.5.1		(a) 50mm to outlet sump.	m	5.5		
4.5.3		(b) 300 to edge of beam	m	43.6		
4.6	8.2.6	BOX OUT FOR THE FOLLOWING:				
4.6.1		(a) 250x250 in 200 slab for stormwater fullbore	No	1		
4.6.2		(b) 350x350 in 250 wall for 250mm outlet pipe	No	3		
4.6.3		(c) 250x250 in 250 wall for 150mm scour pipe	No	2		
4.6.4		(d) 200 x 200 in 250 wall for 75mm drain pipe	No	1		
4.6.5		(e) 200x200 in 250 wall for 150mm inlet pipe	No	1		
4.6.6		(f) 400x400 in 250 wall for 315mm scour pipe	No	1		
4.6.7		(g) 300Ø hole in 200 slab for telemetry	No	1		
4.6.8		(h) 150 x 150 in 200 slab for ultrasonic	No	2		
4.7		BUILD IN THE FOLLOWING PIPEWORK THROUGH BOX OUT				
4.7.1		(a) 75mm drain pipe from no fines sump	No	1		
4.7.2		(b) 150mm Steel scour pipe	No	2		
4.7.3		(c) 250mm Steel outlet pipe	No	3		
4.7.4		(d) 150mm Steel Inlet pipe	No	1		
4.7.5		(e) 315mm uPVC scour pipe	No	1		
Total Carried Forward						

SECTION 4 : 0.5Ml RESERVOIR 4

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
4.8	SANS 1200 G	**SCHEDULED REINFORCEMENT ITEMS**				
4.8.1	8.3.1	Mild steel reinforcement bars to structure.	t	1.0		
4.8.2	8.3.1	High tensile reinforcement bars to structure.	t	48		
4.9	SANS 1200 G	**SCHEDULE CONCRETE ITEMS**				
		15Mpa CONCRETE				
4.9.1.1	8.4.2	(a) In 75mm thick blinding layer under outlet chamber	m²	3.5		
4.9.1.2	8.4.2	(b) In 75mm thick blinding layer under wall foundation	m²	146.5		
4.10	8.4.3	STRENGTH CONCRETE GRADE 35W TO RESERVOIR				
4.10.1		(a) Sump/outlet bases and walls below floor slab level	m³	1.5		
4.10.2		(b) Floor slab and wall footing	m³	102.5		
4.10.3		(c) Outlet chamber floor slab	m³	0.7		
4.10.4		(d) Wall and outlet chamber walls	m³	110		
4.10.5		(e) Roof slab and beam	m³	30		
4.10.6		(f) Column	m³	0.5		
4.10.7		(g) Column head	m³	0.5		
4.11	8.5	JOINTS				
		All joints as detailed on drawing No. Z20536-MPA-S-DR-03-1B-2001				
4.11.1		(a) Type F2 in wall footing joint	m	25		
4.11.2		(b) Type C1 in wall	m	20.6		
4.11.3		(c) Type C1 Horizontal construction joint in wall between first and second lift.	m	43.6		
4.11.4		(d) Type W1 in footing to wall	m	43.6		
4.11.6		(e) Roof /Wall joint Type F5	m	43.6		
Total Carried Forward						

SECTION 4 : 0.5Ml RESERVOIR 4

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
4.12	8.4.4	FINISHES TO CONCRETE				
	8.4.4 (a)	Wood float finish to:				
4.12.1		(a) Reservoir roof slab and outlet chamber roof slab.	m²	120		
4.12.2		(b) Reservoir external wall footing	m²	20		
4.12.3	8.4.4 (b)	Steel trowel finish to:				
4.12.4		(a) Reservoir floor slab and internal wall footings	m²	102		
4.12.5		(b) Outlet/Scour chamber floor screeds.	m²	2.5		
4.13		BUILD INTO RESERVOIR				
4.13.1		Supply all materials for and build in standard hinged stainless steel cover and frame 900 x 600mm. Refer to Standard Drawings No. Z20536-MPA-Z-DR-00-1B-2008, -2009, -2010	No	3		
4.13.2		Supply and fix access ladders and handrailing as detailed on Drawing No Z20536-MPA-S-DR-03-1B-2001. Ladders to be manufactured in accordance with the South African Steel Construction handbook details				
4.13.2.1		(a) Reservoir - Stainless Steel Grade 304; 5 100mm high overall for climbing into reservoir	No	2		
4.13.2.2		(b) Galvanised mild steel outlet/Scour chamber 5 700mm high overall for access to scour and isolating valve	No	1		
4.13.2.3		(c) Galvanised mild steel to climb onto reservoir roof 4230mm high	No	1		
4.13.2.4		(d) Standard ball and tube galvanised mild steel handrail at reservoir access hatches	No	3		
4.13.2		Supply and build in stormwater fullbore outlet for 110 diameter downpipe in outlet chamber roof complete as detailed on drawing No Z20536-MPA-S-DR-03-1B-2001. Rate to include downpipe and brackets.	No	1		
4.13.3		Supply and place in 100mm thick layer, 25mm washed crushed stone on roof	m²	102.0		
Total Carried Forward						

SECTION 4 : 0.5Ml RESERVOIR 4

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
4.13.4		Clean out and sterilize reservoir, fill and test to leaks.	Sum	1		
4.13.5		Filling of the reservoir by tanker from Reservoir 2B (1,4km away) if the supply main is not complete. Rate to include temporary loading and offloading piping.	Sum	1		
4.14		**PIPE WORK**				
	SANS 1200 DB	**EARTHWORKS (PIPE TRENCHES)**				
	8.3.2(a)	Excavate in all material for the following trenches, backfill, compact and dispose of surplus material:				
4.14.1		UP TO 300mm DIAMETER FOR STEEL OUTLET AND INLET PIPES:				
		Over, up to and including:				
4.14.1.1		(a) 0 - 1.0m	m	5		
4.14.1.2		(b) 1.0 - 2.0m	m	5		
4.14.1.3		(c) 2.0 - 3.0m	m	5		
4.14.1.4		(d) 3.0 - 4.0m	m	20		
4.14.2		UP TO 315 DIAMETER uPVC CLASS 34 SCOUR PIPE:				
		Over, up to and including:				
4.14.2.1		(a) 0.0-1.0m	m	5		
4.14.2.2		(b) 1.0 - 2.0m	m	15		
4.14.2.3		(c) 2.0 - 3.0m	m	5		
4.14.2.4		(d) 3.0 - 4.0m	m	20		
Total Carried Forward						

SECTION 4 : 0.5Ml RESERVOIR 4

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
4.4.3		Extra over for items 4.14.1-2 above for hard rock/boulder excavation (provisional)	m³	50		
4.14.4	8.3.2(c)	Excavate and dispose of unsuitable material from trench bottom (provisional)	m³	5		
4.14.4.1		(a) From other necessary excavations on site (Provisional)	m³	5		
4.15	SANS 1200L	**MEDIUM PRESSURE PIPELINES** Note: Item numbers correspond with those that appear on drawing number Z20536-MPA-C-DR-03-1B-2001 Each joint set shall include all nuts, bolts, washers and insertions. All pipework and fittings to be in accordance with the project specification. **Rates must include the cost of wrapping/protection of joints** Supply, lay, bed, joint, test, and disinfect the following: 0.5Ml RESERVOIR OUTLET, INLET AND SCOUR PIPEW ORK (REFER TO DRAWING No. Z20536-MPA-C-DR-03-1B-2001&Z20536-MPA-C-DR-03-1B-2002)				
4.15.1	8.2.5	INLET ITEMS				
4.15.1.1		Item No. I1, 150Ø Steel Pipe. Flanged one end, with puddle flange.Galvanized.	No	1		
4.15.1.2		Item No. I2, 150Ø 90° Medium radius bend. Flanged both ends. Galvanized+ tape wrap	No	2		
4.15.1.3		Item No. I3, 150Ø Steel pipe. Flanged both ends. Galvanized+ tape wrap	No	1		
4.15.1.4		Item No. I4, 150Ø Flanged rigid dismantling joint. Galvanized+ tape wrap	No	1		
4.15.1.5		Item No. I5, 150Ø Flanged stub end and backing flange. Galvanized+ tape wrap	No	1		
Total Carried Forward						

SECTION 4 : 0.5Ml RESERVOIR 4

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
4.16	8.2.5	SCOUR AND DRAINAGE ITEMS				
4.16.1		Item No. S1, 150Ø Stainless steel grade 304 pipe. Flanged one end. Other end plain, with puddle flange. Epoxy coating + lining (400µm minimum DFT)+tape wrap	No	1		
4.16.2		Item No. S2, 150Ø Flanged gate valve PN10. FBE 250µm minimum DFT	No	1		
4.16.3		Item No. D1,75Ø uPVC pipe. Cl 10	No	1		
4.16.4		Item No. D2,315Ø uPVC Pipe Cl34	m	50		
4.17	8.2.5	OUTLET ITEMS				
4.17.1		Item No. O1, 250Ø Stainless Steel pipe. Flanged one end. Other end plain, with puddle flanges. Epoxy coating + lining (400µm minimum DFT) + tape wrapped	No	1		
4.17.2		Item No. O2, 250Ø Flanged butterfly valve PN10	No	1		
4.17.3		Item No. O3, 250Ø VJ Flange adaptor. FBE 250µm minimum DFT	No	1		
4.17.4		Item No. O4, 250Ø Steel pipe. Flanged one end, other end plain to suit flange adaptor. Galvanized + tape wrap	No	1		
4.17.5		Item No. O5, 250Ø Flange insulating kit with **'Dehn LX100'** surge protection device or approved equivalent	No	1		
4.17.6		Item No. O6, 250Ø Steel pipe. 6000mm long. Flanged both ends. Galvanized + tape wrap	No	1		
4.17.7		Item No. O7, 250Ø Blank flange. Galvanized + tape wrap	No	1		
4.18		HEADWALL WALLS				
4.18.1		Supply all materials and construct headwalls complete inclusive of excavations, formwork, plant and labour as detailed on Drawing Z20536-MPA-Z-DR-00-1B-2007	No	1		
4.19	SANS 1200 LB	**BEDDING (PIPES)** Supply bedding by importation from commercial sources (provisional)				
4.19.1	8.2.2.1(a)	(a) Selected granular material	m^3	25		
Total Carried Forward						

SECTION 4 : 0.5Ml RESERVOIR 4

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
4.19.2	8.2.2.1(b)	(b) Selected fill material	m^3	25		
4.2	SANS 1200 D	**LIGHTNING PROTECTION AND EARTHING INSTALLATION** Rates to include for any P&G items, overheads, supply and install including testing and commisioning etc complete. Work to be carried out by approved Earthing Specialist				
4.20.1		Carryout the earth resistivity survey and provide report to Engineer	Sum	1		
4.20.2		70mm² bare copper ground trench earth ring main	m	60		
4.20.3		Trenching and backfilling for above trench earth 500mm deep	m	55		
4.20.4		70mm² PVC earth conductor from trench earth to concrete columns or walls bonding to brass bushes and rebar	m	12		
4.20.5		70mm² PVC earth conductor from trench earth to rebar in floor slabs	m	2		
4.20.6		70mm² PVC earth conductor from roof terminal conductor to reinforcing steel in roof slabs	m	8		
4.20.7		70mm² PVC earth conductor from roof terminal earth conductor bonded to steel catladder and handrailing	m	5		
4.20.8		2m copper clad electrodes driven into natural ground include bond to earth ring using 70mm² PVC conductor	No	4		
4.20.9		Brass bushes clamped or welded to reinforcing steel flush with concrete surface	No	12		
4.20.10		Exothermical welds 70/70	No	6		
4.20.11		70mm² terminations	No	18		
4.20.12		10mm diameter solid aluminum roof terminal conductor saddled to roof slab or roof upstand beam (around perimeter of roof structure)	m	55		
Total Carried Forward						

SECTION 4 : 0.5Ml RESERVOIR 4

	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
4.20.13		PVC conduit for 70mm² conductor	m	5		
4.20.14		70mm² PVC earth conductor from brass bush cast in column to reinforcing steel in roof slab	m	1		
4.20.15		Standard earth bar 300 x 80 x 6mm	No	1		Rate Only
4.20.16		Break 100 x 100 x 50 deep opening in existing concrete column or wall or roof slab to locate and expose reinforcing steel and welding of earth bush to steel or clamping of earth wire to steel and patching of concrete and making good	No	1		Rate Only
4.20.17		Provide 100 x 100 x 100 polystyrene foam as boxing in concrete for access to reinforcing steel for bonding or welding of earth bush	No	1		Rate Only
4.20.18		Test for continuity from roof conductor to columns and to earthing ring	Sum			
4.20.19		Test the entire earthing system with Engineer and issue of the test certificate	Sum			
Total Carried Forward						

SECTION 5: PUMP STATION 2B

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
5		SECTION 6: PUMP STATION 2B				
5.1		MECHANICAL PUMP INSTALATION				
5.1.1		SUPPLY OF EQUIPMENT				
5.1.1.1		Supply of horizontal high pressure centrifugal pumpset in ring section design, including pump, electrical motor, base plate, coupling and coupling guard	No	2		
5.1.1.2		Supply of pipework including all pipe supports and anchors. Refer drg Z20536-MPA-C-DR-02-1B-2005	Sum	1		
5.1.1.3		Supply of valves and strainers on delivery side (16 bar rated)				
		a) Wedge gate valves - 150mm	No	3		
		b) Double acting air release valve - 25mm	No	1		
		c) ball valve - 25mm (isolating of air valve)	No	1		
		d) Swing check non-return valves - 150mm	No	2		
		e) Strainer - 80mm	No	1		
		Supply of valves on suction side (10 bar rated)				
5.1.1.4		a) Wedge gate valves - 200mm	No	2		
5.1.1.5		Supply of (suction and delivery) Ø 100 mm stainless steel pressure gauges	No	4		
5.1.1.6		Supply of all mechanical accessories including bolts, nuts, washers and packings	Sum	1		
5.1.2		INSTALLATION OF EQUIPMENT				
5.1.2.1		Installation of all plant and material supplied under the sub-items of item 5.1.1 including all off-loading, storing until erection, handling, assembly of pump sets, adjusting, painting, operation, factory testing, site testing and handing over in complete working order and upholding for a period of twelve (12) months, including all electrical gear	Sum	1		
Total Carried Forward						

SECTION 5: PUMP STATION 2B

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
5.1.2.2 5.1.2.3		Adjusting the level of existing 200 dia suction pipe connection by cutting of the 90 degree bend, cutting the vertical pipe to correct level, and welding flanges to the vertical pipe and 90 degree bend to create flanged joint, plus repair of epoxy coating and lining Allow for any additional equipment and / or services to fully complete the installation to an acceptable standard and to operate as intended Specify:	Sum	1		
Total Carried Forward To Summary						

SECTION 6 : ELECTRICAL

ITEM	DESCRIPTION	UNIT	EST QTY	PRICES			
				RATES LABOUR	RATES MATERIAL	TOTAL LABOUR	TOTAL MATERIAL
	The supply, installation, testing, commissioning and a 52 week defects liability period in accordance with this bill of material, Local Supply Authority's by-laws & regulations, National Building Regulations, detailed electrical specification, SANS 10142-1: 2003 (Code of Practice), Occupational Health and Safety Act, General Conditions of Contract and drawings listed in the detailed specification.						
	Schedule No 6.1 PUMP STATION 2B & RESERVOIR 2 B.						
6.1.1	Manufacture, supply, off loading and installation of Pump Station 2B 3CR12 MCC including PLC, extraction fans, marshalling tier, power supplies, ethernet switch, fibre optice splice tray, fibre optic fly leads, HMI, HMI software and commissioning as detailed in the specifications and drawings.	No	1				
6.1.2	PLC Programming Software						
a	PLC Licensed Programming Software	No	1				
6.1.3	LAPTOP						
a	15 inch, Core I7 Processor, 16GB Ram, 1TB Hard Drive Laptop including Windows 11 & one time purchase Office 2021 home & business.	No	1				
6.1.4	LV CABLE PVC/SWA/PVC copper conductor cables strapped to cable ladders or laid in trenches. (trenches, sleeves and cable terminations measured elsewhere)						
a	35mm^2 x 4 core (main supply to PS 2B MCC)	m	60				
b	16mm^2 x bare copper earth conductor.	m	60				
c	6mm^2 x 4 core (15kW motor cable)	m	20				
d	1.5mm^2 x 3 core (emergency stop cable)	m	20				
e	1.5mm^2 x 3 core (FT003 mag flow meter)	m	10 f				
	1.5mm^2 x 3 core (FT004 mag flow meter)	m	20 g				
	1.5mm^2 x 3 core (LT005 ultrasonic level detector)	m	40				
6.1.5	LV CABLE TERMINATION PVC/SWA/PVC Exe corrosion guard cable glands (IP68) complete including conductor & earth termination, lugs, tapes, drilling etc						
a	35mm^2 x 4 core (main supply to PS 2B MCC)	No	2				
b	16mm^2 x bare copper earth conductor.	No	2				
c	6mm^2 x 4 core (15kW motor cable)	No	4				
d	1.5mm^2 x 3 core (emergency stop cable)	No	4				
e	1.5mm^2 x 3 core (FT003 mag flow meter)	No	2 f				
	1.5mm^2 x 3 core (FT004 mag flow meter)	No	2 g				
	1.5mm^2 x 3 core (LT005 ultrasonic level detector)	No	2				
6.1.6	INSTRUMENTATION CABLES ~~Dekoron or similar approved SW~~ armoured electronic instrument cable strapped to cable ladder & laid in cable trench (type M872 individually & overall screened pairs) (cable ladder, trenching and cable terminations measured elsewhere)						
a	1mm^2 x 1 pair (PT002, PS003, PS004, FS003 & FS004)	m	50				
b	1mm^2 x 2 pair (FT003, FT004 & LT005)	m	70				
	Totals Carried Forward						

SECTION 6 : Electrical

ITEM	DESCRIPTION	UNIT	EST QTY	PRICES			
				UNIT LABOUR	RATES MATERIAL	TOTAL LABOUR	TOTAL MATERIAL
	Totals Brought Forward						
6.1.7	INSTRUMENT CABLE TERMINATION PVC/SWA/PVC Exe corrosion guard cable glands (IP68) complete including conductor & earth termination, lugs, heatshrink, drilling etc						
a	1mm^2 x 1 pair	No	10				
b	1mm^2 x 2 pair	No	6				
6.1.8	CABLE EXCAVATION						
a	Pickable material	m^3	40				
b	Backfilling of cable trenches.	m^3	40				
6.1.9	CABLE ROUTE MARKERS The supply and installation of concrete cable route markers	No	12				
6.1.10.	JUNCTION BOXES PVC/SWA/PVC Exe 4 way ezee / fit junction box (IP68) complete including terminals, lugs, tapes, drilling etc (glands measured elsewhere).						
a	1mm^2 x 2 pair	No	8				
6.1.11	FIBRE OPTIC CABLE						
a	PVC/SWA/PVC 4 core fibre optic multimode cable. (Multimode 10/100Mbits, 1300nm, 50/125µm) Trenching and backfilling by others.	m	350				
6.1.12	PVC WARNING TAPE						
a	PVC warning tape to be laid above fibre optic cable.	m	350				
6.1.13.	FIBRE OPTIC SPLICING						
a	Fibre optic splicing inside splice tray.	No	4				
6.1.14	CABLE LADDER AND TRAY OL55 duplex coating (exterior polyester) 3CR12 cable ladder including all accessories mounted to concrete slabs / walls.						
a	100mm cable ladder	m	10				
b	100mm 90^o bends	No	4				
c	200mm cable ladder	m	10				
d	200mm 90^o bends	No	4				
e	100mm duplex coating (exteria polyester) 3CR 12 cable tray.	m	10				
6.1.15	FLOAT SWITCHES						
a	100mm flygt float switch including 20m cable.	No	1				
	Totals Carried Forward						

SECTION 6 : Electrical

ITEM	DESCRIPTION	UNIT	EST QTY	PRICES			
				UNIT LABOUR	RATES MATERIAL	TOTAL LABOUR	TOTAL MATERIAL
	Totals Brought Forward						
6.1.16	LOCAL EMERGENCY STOP STATIONS						
a	Surface mounted IP65 emergency stop push buttons.	No	2				
b	3CR12 support stands for the above item.	No	2				
6.1.17	MAGNETIC FLOW METER						
a	150mm mag flow meter (FT003 from PS 2B to Reservoir 4).	No	1				
b	Indicating transmitter (FT003 from PS 2B to Reservoir 4)	No	1				
c	FEB for the transmitter including terminals, surge arrestors, circuit breaker & stainless steel pedestal (FT003 from PS 2B to Res 4).	No	1				
6.1.18	ULTRASONIC LEVEL DETECTOR (LT005)						
a	FDU92 level sensor including 20m of cable.	No	1				
b	304 stainless steel support bracket for the sensor head. (0 - 5metres)	No	1				
c	FMU90 ultrasonic level transmitter.	No	1				
d	Programming of the ultrasonic level transmitter.	No	1				
e	FEB for the transmitter including terminals, surge arrestors, circuit breaker & stainless steel pedestal.	No	1				
6.1.19	PRESSURE TRANSMITTER						
a	Pressure transmitter PT002 screwed into a 150mm steel pipe. (0 - 10bar)	No	1				
6.1.20	PRESSURE SWITCHES.						
a	Pressure switches PS003 & PS004 screwed into a 150mm steel pipe (0 - 10bar)	No	2				
6.1.21	FLOW SWITCHES						
a	Flow switches FS003 & FS004 screwed into a 150mm steel pipe.	No	2				
6.1.22	PEPPER SPRAY SECURITY SYSTEM						
	Pepper spary security system for the inside of Pump Station 2B (8 x 4.5 x 2.8m) including door magnet, visual and audio activation / arming / disarming indication, remote transmitter, potential free contacts for arming and service & battery backup.	sum	1				
	Totals Carried Forward						

SECTION 6 : ELECTRICAL

ITEM	DESCRIPTION	UNIT	EST QTY	PRICES			
				UNIT LABOUR	RATES MATERIAL	TOTAL LABOUR	TOTAL MATERIAL
	Totals Brought Forward						
	Schedule No 6.2 PUMP STATION 2B LIGHTING AND SMALL POWER						
6.2.10.	GALVANISED CONDUIT						
a	Surface mounted 20mm galvanised conduit including couplings, galvanised saddles and all accessories.	m	60				
b	Surface mounted round galvanised 20mm conduit boxes including galvanised cover plate.	No	10				
6.2.11	PHOTO CELL						
a	Royce Thompson photo cell including conduit box.	No	1				
6.2.12	WIRING PVC insulated copper conductors drawn into galvanised conduit.						
a	1.5mm^2	m	100				
b	2.5mm^2	m	60				
6.2.13	EARTH WIRING BCEW drawn into galvanised conduit.						
a	2.5mm^2	m	60				
6.2.14	LUMINAIRES To be mounted to concrete soffit.						
a	1.5m IP65 49W LED Polycarbonate diffuser luminaires. Beka Vapourline VLNLED49N1 or similar approved.	No	4				
b	1.5m IP65 emergency 49W LED Polycarbonate diffuser luminaires. Beka Vapourline VLNLED49N1/E1 or similar approved.	No	2				
c	17W LED Bulkhead. Beka series 30 SILNW17W or similar approved.	No	4				
6.2.15	LIGHT SWITCHES Industrial surface mounted 16A single lever one way switch.	No	1				
6.2.16	SOCKET OUTLETS Industrial surface mounted 16A single switched socket outlets.	No	3				
	Totals Carried Forward						

SECTION 6 : ELECTRICAL

ITEM	DESCRIPTION	UNIT	EST QTY	PRICES			
				UNIT LABOUR	RATES MATERIAL	TOTAL LABOUR	TOTAL MATERIAL
	Totals Brought Forward						
	Schedule No 6.3 RESERVOIR 4						
6.3.1	Manufacture, supply, off loading and installation of Reservoir 4 3CR12 IP 65 Control Panel including Ethernet Adaptor and cards, power supplies, ethernet switch, fibre optice splice tray, fibre optic fly leads and commissioning as detailed in the specifications and drawings.	No	1				
6.3.2	LV CABLE PVC/SWA/PVC copper conductor cables strapped to cable ladders or laid in trenches. (trenches, sleeves and cable terminations measured elsewhere)						
a	10mm^2 x 2 core (main supply to Control Panel)	m	60				
b	6mm^2 x bare copper earth conductor.	m	60				
c	1.5mm^2 x 3 core (FT005 mag flow meter)	m	20				
d	1.5mm^2 x 3 core (LT006 ultrasonic level detector)	m	15				
6.3.3	LV CABLE TERMINATION PVC/SWA/PVC Exe corrosion guard cable glands (IP68) complete including conductor & earth termination, lugs, tapes, drilling etc						
a	10mm^2 x 2 core (main supply to Control Panel)	No	2				
b	6mm^2 x bare copper earth conductor.	No	2				
c	1.5mm^2 x 3 core (FT005 mag flow meter)	No	2				
d	1.5mm^2 x 3 core (LT006 ultrasonic level detector)	No	2				
6.3.4	INSTRUMENTATION CABLES Dekoron or similar approved SW armoured electronic instrument cable strapped to cable ladder & laid in cable trench (type M872 individually & overall screened pairs) (cable ladder, trenching and cable terminations measured elsewhere)						
a	1mm^2 x 2 pair (FT005 & LT006)	m	35				
6.3.5	INSTRUMENT CABLE TERMINATION PVC/SWA/PVC Exe corrosion guard cable glands (IP68) complete including conductor & earth termination, lugs, heatshrink, drilling etc						
a	1mm^2 x 2 pair	No	4				
6.3.6	CABLE EXCAVATION						
a	Pickable material	m^3	20				
b	Backfilling of cable trenches.	m^3	20				
6.3.7	CABLE ROUTE MARKERS The supply and installation of concrete cable route markers	No	4				
6.3.8	JUNCTION BOXES PVC/SWA/PVC Exe 4 way ezee / fit junction box (IP68) complete including terminals, lugs, tapes, drilling etc (glands measured elsewhere).						
a	1mm^2 x 2 pair	No	2				
6.3.9	FIBRE OPTIC SPLICING						
a	Fibre optic splicing inside splice tray.	No	4				
	Totals Carried Forward						

SECTION 6 : ELECTRICAL

ITEM	DESCRIPTION	UNIT	EST QTY	PRICES			
				UNIT LABOUR	RATES MATERIAL	TOTAL LABOUR	TOTAL MATERIAL
	Totals Brought Forward						
6.3.10.	CABLE LADDER AND TRAY						
	OL55 duplex coating (exterior polyester) 3CR12 cable ladder including all accessories mounted to concrete slabs / walls.						
a	100mm cable ladder	m	10				
b	100mm 90° bends	No	4				
e	100mm duplex coating (exteria polyester) 3CR 12 cable tray.	m	10				
6.3.11	MAGNETIC FLOW METER						
a	150mm mag flow meter (FT005)	No	1				
b	Indicating transmitter (FT005)	No	1				
c	FEB for the transmitter including terminals, surge arrestors, circuit breaker & stainless steel pedestal (FT005).	No	1				
6.3.12	ULTRASONIC LEVEL DETECTOR (LT006)						
a	FDU92 level sensor including 20m of cable.	No	1				
b	304 stainless steel support bracket for the sensor head. (0 - 5metres)	No	1				
c	FMU90 ultrasonic level transmitter.	No	1				
d	Programming of the ultrasonic level transmitter.	No	1				
e	FEB for the transmitter including terminals, surge arrestors, circuit breaker & stainless steel pedestal.	No	1				
	Schedule 6.4 Provisional sums (These sums will be under the sole control of the Engineer and may be deducted in part or full).						
6.4.1	PLC programming and HMI configuration						R 300,000.00
6.4.2	Earthing of various civil structures						R 50,000.00
	Total Labour + Total Material Carried Forward to Summary						

SECTION 7 : COMPLIANCE & TRAINING

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
7		SECTION 7 : COMPLIANCE & TRAINING				
7.1		OCCUPATIONAL HEALTH AND SAFETY OBLIGATIONS				
7.1.1	PD.2.1	Contractor's initial obligation in respect of the Occupational Health and Safety Act and Construction Regulations	Sum	1		
7.1.2	PD.2.2	Contractor's time related obligations in respect of the Occupational Health and Safety Act and Construction Regulations	Sum	1		
	PD 2.3	Penalty for late submission of the Health and Safety File				
7.1.3		(a) Initial once off penalty	No	0	-5,000.00	
7.1.4		(b) Time related penalty (Non stated transgression fines will be as stated in the health and Safety Specification)	Week	0	-10,000.00	
7.2		ENVIRONMENTAL MANAGEMENT PLAN OBLIGATIONS				
7.2.1	PE.2.2	Contractor's initial obligation in respect of compliance with the Environmental Management Plan	Sum	1		
7.2.2	PE.2.3	Contractor's time related obligations in respect of the Environmental Management Plan and Environmental Regulations (Transgression fines will be as stated in the EMP)	Sum	1		
Total Carried Forward						

SECTION 7 : COMPLIANCE & TRAINING

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
7.3		REQUIREMENTS OF THE EXPANDED PUBLIC WORKS PROGRAMME (EPWP)				
	PA3.1	Payments associated with the EPWP programme:				
7.3.1		a) Provision of the following:				
7.3.2		i) Prescribe tool	Prov Sum			50,000.00
7.3.3		ii) EPWP PPE branded apparel	Prov Sum			40,000.00
7.3.4		h) Provision, erection and removal of EPWP signboard	Prov Sum			20,000.00
7.3.6		i) Handling costs and profit in respect of items listed above	%	110,000		
	PA 3.2	Payments associated with Training of the local workers programme:				
7.3.6		a) Provision of training by an accredited training provider including training material in the form of manuals, stationery etc	Prov Sum			50,000.00
7.3.7		b) General Skills Training in reading and interpreting construction drawings and specifications. Batching and mixing concrete by volume. Concrete handling, placing and surface finish.	Prov Sum			50,000.00
7.3.8		c) Handling costs and profit in respect of the items listed above	%	100,000		
	PA3.3	Compliance with Expanded Public Works Programme (EPWP)				
7.3.9		(a) Contractor's obligation in respect of compliance with the Expanded Public Works Program (EPWP)	Sum	1		
7.3.10		(b) Contractor's time related obligations in respect of compliance with the Expanded Public Works Program (EPWP)	Sum	1		
Total Carried Forward						

SECTION 7 : COMPLIANCE & TRAINING

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
7.4		DEVELOPMENT MENTORSHIP AND SKILLS PROGRAM				
	PB 10.1	Procurement of Targeted Enterprise subcontractors				
7.4.1		a) Contractor's charge for the management and execution of the Targeted Sub-contractors procurement process	Sum	1		
	PB.10.2	Construction Works for Targeted Sub-contractors				
7.4.2		a) Contractor's charge for the management of the Targeted Subcontractors. This may not be more than 10% of the value allocated to targeted sub contractors	Sum	1		
	PB.10.3	TRANSGRESSION FINES (a) Non-compliance with the Development				
7.4.3		Mentorship and Skills Program	Sum	0	-250000	0.00
	PB.10.4	Training and Mentoring of learners employed by Targeted Sub-contractors				
		a) Generic Skills				
		i) Training Costs				
7.4.4		ii) Handling Cost and profit in respect of subitem D6.4.1 (a) (i)	PC Sum			50,000.00
7.4.6			%	50,000		
		b) Entrepreneurial skills				
		i) Training Costs				
7.4.6		ii) Handling Cost and profit in respect of subitem D6.4.2 (b) (i)	PC Sum			50,000.00
7.4.7			%	50,000		
		(c) Engineering skills				
		i) Training costs				
7.4.8		ii) Handling Cost and profit in respect of subitem D6.4.3 c (i)	PC Sum			50,000.00
7.4.9			%	50,000		
		d) Transportation and accommodation costs for selected learners only, while receiving off-site training				
		i) Transportation and accommodation costs				
7.4.10		ii) Handling cost and profit in respect of subitems D6.4.4 (d) (i)	Prov Sum			50,000.00
7.4.11			%	50,000		
Total Carried Forward						

SECTION 7 : COMPLIANCE & TRAINING

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
7.6		HIV/AIDS REQUIREMENTS				
7.6.1	PC.3	Allowance for a workshop by an external service provider	Prov Sum			50,000.00
7.6.2		Handling cost and profit in respect of the above	%	50,000		
7.6.3	PC. 4.13	Displaying of plastic laminated posters and distribution of information booklets	Sum	1		
7.6.4	PC.5	Providing workers with access to condoms	Sum	1		
7.6.6		Contractor's initial obligations in addition to the above in respect of compliance with the HIV/AIDS Specification	Sum	1		
7.6.6		Contractor's time related obligations in addition to the above in respect of compliance with the HIV/AIDS Specification	Sum	1		
Total Carried Forward to Summary						

Summary of Sections

Section	Amount (R)
SECTION 1: PRELIMINARY AND GENERAL	
SECTION 2 : BULK MAINS - 400MM	
SECTION 3: BULK MAINS - 160MM	
SECTION 4 : RESERVOIR 4	
SECTION 5: PUMP STATION 2B (MECH)	
SECTION 6 : ELECTRICAL WORK	
SECTION 7 : COMPLIANCE AND TRAINING	
SUB TOTAL 1	
CONTINGENCY AT 10% *(Show 10% of the Sub-Total 1)*	
SUB TOTAL 2	
CONTRACT PRICE ADJUSTMENT AT 6% *(Show 6% of the Sub-Total 2)*	
SUB TOTAL 3	
VAT AT 15% *(Show 15% of the Sub-Total 3)*	
TOTAL OF SCHEDULE OF QUANTITIES CARRIED TO FORM OF OFFER (FORM C1.1)	

SIGNATURE OF TENDERER.....

ON BEHALF OF.....

PART C3: SCOPE OF WORKS

1. DESCRIPTION OF THE WORKS 78
1.1 Employers Objectives 78
1.2 Overview of the Works 78
1.3 Extent of the Works 78
1.4 Location of the Works 78
1.5 Temporary Works 78

2. ENGINEERING 79
2.1 Employers Design 79
2.2 Design Brief 79
2.3 Drawings 79
2.4 As-builts" Drawings 80
2.5 Design Procedures 80

3. PROCUREMENT 81
3.1 Preferential Procurement Procedures 81
3.2 Resource Standard Pertaining to Targeted Procurement 81
3.3 Scope of Mandatory Subcontract Work 81
3.4 Preferred Subcontractors 81
3.5 Sub Contracting Procedures 81

4. CONSTRUCTION 82
4.1 Applicable Standard Specifications for Construction Works 82
4.2 Variations to Standard Specification 82
4.3 Applicable National and International Standards 82
4.4 Particular / generic Specifications 82
4.5 Plant and Materials provided by the Employer 82
4.6 Services and Facilities Provided by the Employer 82
4.7 Other Services and Facilities 83

5. MANAGEMENT 84
5.1 Applicable SANS 1921 standards 84
5.2 Specification data to SANS 1921-1 84
5.3 Specification data to SANS 1921-2 88
5.4 Management Pertaining to Concrete Works 88
5.5 Recording of Weather 90
5.6 Management Meetings 90
5.7 Payment Certificates 90
5.8 Permits 90
5.9 Proof of Compliance with the Law 90

Annexure 3.A – Variations to the Standard Specifications 91
Annexure 3.B – Particular Specifications 133

1. DESCRIPTION OF THE WORKS

1.1 Employers Objectives

The Employer's primary objective is for the establishment of a reliable potable water supply scheme to serve the Mthonjaneni Sub Supply Area 2.

1.1.1 Secondary objectives of the Employer are:

a. To support the economic development of previously disadvantaged individuals through the provision of opportunities to them to economically participate in the contract works as sub-contractors.
b. To improve the plight of the venerable and marginalised members of the local community through the provision of employment opportunities on the project specifically aimed at them.

1.2 Overview of the Works

The works will involve the construction of Phase 1B of the regional bulk supply infrastructure in SSA 2.

1.3 Extent of the Works

The extent of the works is clearly defined in the Schedule of Quantities and on the drawings and will comprise in brief the completion, testing and commissioning of the following components of work:

a. The 500Kl Reservoir 4
b. The pipeline from Pumping Station (P/S) 2B to Reservoir 4 (approx. 350m long, 150mm diameter)
c. The installation of Mechanical and Electrical plant at P/S 2B
d. The pipeline from the tie-in point to Reservoir 2A (approx. 2,4km of 400mm diameter)

1.4 Location of the Works

The project is located primarily within Ward 5 in the Mthonjaneni Local Municipality. The supply area is approximately 15km southwest of Melmoth and is accessed by District Road D550. It is remote and roads are generally in a poor condition. Many of the households that are to receive water have no formal water supply

1.5 Temporary Works

Temporary works design will be submitted to the Employer for acceptance at least 21 days before the work is required on site.

Temporary works designs will not be approved for structural adequacy, that remains the liability of the temporary works designer.

Temporary works designs will show

a. dimensional accuracy.
b. concrete finish; and
c. health and safety requirements to be complied with.

2. ENGINEERING

2.1 Employers Design

The Employer has had the permanent works designed for the following aspects:

a. Pipeline hydraulics.
b. Reinforced concrete structures.

2.2 Design Brief

The appointed contractor will be responsible for the detail design of the internal piping inside P/S 2B, and for the detail design of the electrical and instrumentation works in accordance with the concept design prepared by the Engineer shown in the drawings and the specifications.

2.3 Drawings

The following drawings depicts the scope of works and the detail thereof, and has been utilized in compiling the schedule of quantities. One set of drawings must be kept on site at all times.

The drawings that form part of the Tender documents shall be used for Tender purposes only. The depths, pipe sizes and lengths of pipes as shown on drawings are subject to confirmation on site and the Contractor shall submit all such information to the Engineer for confirmation before he commences any construction work.

The drawings as listed below were prepared by the Employer are bound / herewith.

DRAWING DESCRIPTION	DWG. NUMBER
Bulk Supply Overall Layout	Z20536-MPA-C-DR-00-1B-2001
Existing Reservoir & Pump Station 2B Site Layout	Z20536-MPA-C-DR-02-1B-2001
Pump Station 2B Mechanical Layout	Z20536-MPA-C-DR-02-1B-2004
Reservoir 4 Site Layout	Z20536-MPA-C-DR-03-1B-2001
Reservoir 4 Pipework Schedule	Z20536-MPA-C-DR-03-1B-2002
Ø400 Bulk Gravity Main Overall Layout	Z20536-MPA-C-DR-04-1B-2000
Ø400 Bulk Gravity Main Sheet 1 of 6	Z20536-MPA-C-DR-04-1B-2001
Ø400 Bulk Gravity Main Sheet 2 of 6	Z20536-MPA-C-DR-04-1B-2002
Ø400 Bulk Gravity Main Sheet 3 of 6	Z20536-MPA-C-DR-04-1B-2003
Ø400 Bulk Gravity Main Sheet 4 of 6	Z20536-MPA-C-DR-04-1B-2004
Ø400 Bulk Gravity Main Sheet 5 of 6	Z20536-MPA-C-DR-04-1B-2005
Ø400 Bulk Gravity Main Sheet 6 of 6	Z20536-MPA-C-DR-04-1B-2006
400Ø Gravity Main Air Valve Details	Z20536-MPA-C-DR-04-1B-2012
400Ø Gravity Main Isolating Valve Details	Z20536-MPA-C-DR-04-1B-2013
400Ø Gravity Main Scour Valve Details	Z20536-MPA-C-DR-04-1B-2014
400Ø Gravity Main Road Crossing Details	Z20536-MPA-C-DR-04-1B-2015
Ø160 Rising Main from Reservoir 2B to Reservoir 4	Z20536-MPA-C-DR-06-1B-2001
160Ø Rising Main Air Valve Details	Z20536-MPA-C-DR-06-1B-2012
160Ø Rising Main Scour Valve Details	Z20536-MPA-C-DR-06-1B-2014
Preliminary P & ID	Z20536-MPA-E-DR-02-1B-2010
Pump Station 2B Lighting & Small Power Layout	Z20536-MPA-E-DR-02-1B-2011
Pump Station 2B MCC Single Line Diagram	Z20536-MPA-E-DR-02-1B-2012
Pump Station 2B Pump No 1 VSD Starter Schematic Diagram Power Circuit	Z20536-MPA-E-DR-02-1B-2013
Pump Station 2B Pump No 1 VSD Starter Schematic Diagram Control Circuit	Z20536-MPA-E-DR-02-1B-2014
Pump Station 2B Pump No 2 VSD Starter Schematic Diagram Power Circuit	Z20536-MPA-E-DR-02-1B-2015
Pump Station 2B Pump No 2 VSD Starter Schematic Diagram Control Circuit	Z20536-MPA-E-DR-02-1B-2016
Pump Station 2B Magnetic Flow Meter to Reservoir 4 Loop Diagram	Z20536-MPA-E-DR-02-1B-2017
Pump Station 2B Magnetic Flow Meter to Reticulation Loop Diagram	Z20536-MPA-E-DR-02-1B-2018

DRAWING DESCRIPTION	DWG. NUMBER
Pump Station 2B Pressure Transmitter Loop Diagram	Z20536-MPA-E-DR-02-1B-2019
Reservoir 2B Ultrasonic Level Detector Loop Diagram	Z20536-MPA-E-DR-02-1B-2020
Pump Station 2B Pressure Switch PS003 Loop Diagram	Z20536-MPA-E-DR-02-1B-2021
Pump Station 2B Pressure Switch PS004 Loop Diagram	Z20536-MPA-E-DR-02-1B-2022
Pump Station 2B Flow Switch FS003 Loop Diagram	Z20536-MPA-E-DR-02-1B-2023
Pump Station 2B Flow Switch FS004 Loop Diagram	Z20536-MPA-E-DR-02-1B-2024
Reservoir 4 Control Panel Single Line Diagram	Z20536-MPA-E-DR-02-1B-2025
Reservoir 4 Magnetic Flow Meter Loop Diagram	Z20536-MPA-E-DR-02-1B-2026
Reservoir 4 Ultrasonic Level Detector Loop Diagram	Z20536-MPA-E-DR-02-1B-2027
Pump Station 2B & Reservoir 4 Network Diagram	Z20536-MPA-E-DR-02-1B-2028
Reservoir 4 Lightning Protection and Earthing Layout	Z20536-MPA-E-DR-03-1B-2001
Reservoir 4 Concrete Layout & Sections	Z20536-MPA-S-DR-03-1B-2001
Reservoir 4 Concrete Details	Z20536-MPA-S-DR-03-1B-2002
Gate and Fencing Details	Z20536-MPA-Z-DR-00-1B-2002
Marker Post Details	Z20536-MPA-Z-DR-00-1B-2003
Project Sign Board	Z20536-MPA-Z-DR-00-1B-2004
Typical Headwall and Manhole Details	Z20536-MPA-Z-DR-00-1B-2007
Manhole Cover and Frame Details Sheet 1 of 3	Z20536-MPA-Z-DR-00-1B-2008
Manhole Cover and Frame Details Sheet 2 of 3	Z20536-MPA-Z-DR-00-1B-2009
Manhole Cover and Frame Details Sheet 3 of 3	Z20536-MPA-Z-DR-00-1B-2010
Disperser Details	Z20536-MPA-Z-DR-00-1B-2014
Road Deviation: typical signage sequence	Z20536-MPA-Z-DR-00-1B-2018

2.4 As-builts" Drawings

The Contractor shall provide the Engineer with "as-built" drawings at the end of the contract indicating all levels, positions, coordinates, sizes, etc.

For this purpose an additional set of drawings will be kept in the site office, for the exclusive use of keeping as-built information.

The completion certificate shall only be issued after the Engineer has received a properly completed set of “As-Built” drawings from the Contractor. No separate payment shall be made for this service, as all costs related thereto shall be deemed to be included in the related items.

2.5 Design Procedures

Nil required.

3. PROCUREMENT

3.1 Preferential Procurement Procedures

The Award Criteria Method will be followed in procuring the services of targeted enterprises.

3.2 Resource Standard Pertaining to Targeted Procurement

The procedure and standard pertaining to Targeted Procurement shall be according to the Particular Specification for Small Contractor Development

3.3 Scope of Mandatory Subcontract Work

a. Fencing
b. Gabion and Stone pitching
c. Pipeline from Pumping Station 2B to Reservoir 4

3.4 Preferred Subcontractors

Preferred sub contractors are those listed on the King Cetshwayo District Municipality Database. This does not preclude others not on the database who meet the minimum criteria for Targeted Enterprises.

3.5 Sub Contracting Procedures

The Contractor will follow the procedures for Sub Contracting as indicated in the particular specification for small contractor development.

4. CONSTRUCTION

4.1 Applicable Standard Specifications for Construction Works

Although not bound in, nor issued with this Document the standard specifications, with associated specification data, applicable to the Scope of Works are as follows:

- SANS 1200 A : General
- SANS 1200 AB : Engineer's Offices
- SANS 1200 C : Site Clearance Earthworks
- SANS 1200 D : (1988) Earthworks (Pipe
- SANS 1200 DB : Trenches) Gabions and
- SANS 1200 DK : pitching
- SANS 1200 DM : Roads Subgrade Concrete
- SANS 1200 G : (Structural) Medium-
- SANS 1200 L : Pressure Pipelines Bedding
- SANS 1200 LB : (Pipes)
- SANS 1200 LC : Cable Ducts
- SANS 1200 LE : Stormwater

4.2 Variations to Standard Specification

Variations to the Standard Specifications are contained in Annexure A of this document.

4.3 Applicable National and International Standards

The National and International standards as reference by the various specifications are applicable.

4.4 Particular / generic Specifications

The following Particular Specifications are applicable to this contract and can be found in Annexure B

- PA LABOUR INTENSIVE SPECIFICATIONS
- PB SMALL CONTRACTOR DEVELOPMENT
- PC HIV/AIDS REQUIREMENTS
- PD HEALTH AND SAFETY SPECIFICATION
- PE ENVIRONMENTAL MANAGEMENT PLAN
- PF PARTICULAR SPECIFICATION FOR VALVES
- PG PARTICULAR SPECIFICATION FOR PUMPS
- PH PARTICULAR SPECIFICATION FOR ELECTRICAL WORKS

4.5 Plant and Materials provided by the Employer

Nil

4.6 Services and Facilities Provided by the Employer

Water for testing: Reservoir 2B can be filled from the bulk supply mains already constructed to facilitate testing and commissioning of Pumping Station 2B, the rising Main to Reservoir 4, and Reservoir 4. The 400mm diameter pipe can be filled from the tie-in chamber where there is a 50mm valve fitted on the blank flange. Supply from the Treatment works is not reliable, and the Contractor must ensure Reservoir 2B is filled well in advance of commencing with testing activities. Similarly, the Contractor should notify the operations team well in advance of requiring water to fill the 400mm diameter pipe. The free issue is limited for 1 test per pipeline/ structure.

Reservoir 2A can be filled via the 400mm gravity main if it is complete. Should the 400mm gravity main not be complete water would have to be transported from the tie-in chamber, or the closest air or scour valve on the existing line.

4.7 Other Services and Facilities

Water: For domestic use at a camp site. Contractor to make own arrangements.

Electricity: Contractor to make own arrangements for electrical supply.

Sanitation:

a. Provision at the camp site as per the requirements for the Employers Agent stated in the General and Management section in the Scope of Works.
b. Provision at the work site as per the OHS Specification in the Scope of Works.
c. The Contractor shall provide adequate chemical toilet facilities for the use of the various workmen in accordance with the Regulations of the Department of Public Health and/or other authority and pay all charges in connection therewith; maintain same in a thoroughly clean and orderly condition; allow for moving the chemical toilets to new locations as necessary during the course of the Contract and finally remove such chemical toilets at completion and make good.

Solid Waste Collection:

There is no formal solid waste collection service in the area. The Contractor will apply the requirements of the Environmental Management Plan in the Scope of Works.

Fire Services:

There is no formal fire service is the area. The Contractor is to apply the requirements of the OHS Specification in the Scope of Works.

Telecommunication:

There is no formal land line telecommunication service available in the area. GSM appears available. The Contractor shall make his own arrangements for telecommunication.

5. MANAGEMENT

5.1 Applicable SANS 1921 standards

SANS 1921-1 (2004): Part 1: General engineering and construction works

SANS 1921-2 (2004): Part 2: Accommodation of traffic on public roads occupied by the contractor

SANS 1921-5 (2004): Part 5: Earthworks activities which are to be performed by hand

SANS 1921-6 (2004): Part 6: HIV/AIDS awareness

A substantial portion of the works is allocated to Labour Intensive Construction methods. The "Guidelines for the Implementation of Labour-Intensive Infrastructure Projects under Expanded Public Works Programme (EPWP)" shall apply.

The associated specification data are as follows:

5.2 Specification data to SANS 1921-1

5.2.1 Clause 4.1.7

The requirements for drawings, information and calculations for which the contractor is responsible are:

a. "As-builts" Drawings

   i. The Contractor shall provide the Engineer with "as-built" drawings at the end of the contract indicating all levels, positions, coordinates, sizes, etc.
   ii. For this purpose an additional set of drawings will be kept in the site office, for the exclusive use of keeping as-built information.
   iii. The completion certificate shall only be issued after the Engineer has received a properly completed set of "As-Built" drawings from the Contractor.
   iv. No separate payment shall be made for this service, as all costs related thereto shall be deemed to be included in the related items.

b. Drawings of the internal piping and assembly of pump Station 2B

c. Electrical and instrumentation design according to specifications and drawings provided

d. Shop details of pipe fittings

For any drawings other than "As-built" drawings provided by the Contractor the requirements are:

i. That ISO standard pages A4/3/2/1 or 0 be used for the presentation of information.
ii. That text be legible and no smaller than 2,0mm in height.
iii. That the prescripts of the latest ISO 10209/ SANS 10111-1 are applicable to drawing work and symbols.
iv. That scanned versions of drawings be in the PDF format at 600dpi resolution.
v. That CAD files be readable by the latest Autocad software.

5.2.2 Clause 4.1.12

Add to clause 4.1.12

"Any drawing issued during tender will be deemed as "for information"."

5.2.3 Clause 4.2.1

The responsibility strategy for the works are:

For the permanent works, Design by Employer

For detailed design of internal piping and fittings and electrical and instrumentation works of Pumping Station 2B, the detailed design for the electrical and instrumentation works for reservoir 2B and 4 Design by the Contractor based on the Engineers drawings and specifications.

5.2.4 Clause 4.2.2

The Structural engineer is: Philip Lin of MPAMOT Africa

5.2.5 Clause 4.2.3

Drawing and other information are to be submitted in accordance with the contractor's programme allowing sufficient time for approvals prior to the drawing being required on site.

5.2.6 Clause 4.2.4

Replace "five working days" with "14 days"

5.2.7 Clause 4.3

The planning, programme and method statements are to comply with the followings:

The Engineers Representative and Contractor shall discuss, and plan the site layout and establishment in detail, including the production of a sketch plan showing the construction site layout designed to avoid the impacts discussed further on. This plan must be approved by the Engineers Representative prior to construction commencing. Thereafter, the Contractor shall provide all method statements detailing the construction programme, methods and associated plant. These details must be approved before construction commences. Any changes to a proposed method that could have significant environmental consequences shall be agreed upon with the Engineers Representative first, before proceeding with the change.

The boundaries of each individual active construction areas are to be determined and pegged at the initial site meeting. Since portions of construction will occur in a populated rural area, it is important to ensure that the active construction areas are fenced/barrier taped to prevent unauthorized access to the construction site.

Sufficient digital photographs of all existing structures and obstructions along the pipeline route must be taken by the Contractor, compiled electronically, indexed and handed over to the Engineer before construction commences. A special payment item is included for a digital photo record in the Schedule of Quantities under other fixed-charge obligations.

a. The programme must allow for early completion or sequencing of the following:

   i. Mechanical and electrical installations should be delayed as far as practically possible.
   ii. The 400mm diameter gravity main construction should commence as soon as possible and be completed within 7 months to facilitate the provision of water to Reservoir 2A that forms part of another contract.

b. In addition to the content requirements indicated in the General Conditions of Contract, the following contents requirements will apply:

   i. The programme shall show and make allowance for normal rainfall as separate line items for each month.
   ii. Pipework shall be broken into portions not exceeding 500m lengths and a line item for each portion indicated on the programme.
   iii. Sub line items for each portion will as a minimum indicate when the following works items for that portion is programmed. Clearing, excavation, bedding, pipelaying, fittings, testing, backfill, rehabilitation, disinfection, road crossings and river crossings.
   iv. Concrete works shall be broken into portions based on casting. Each cast will be indicated as a line item on the programme.
   v. Sub line items for each cast will as a minimum show when the following works items for that cast is programmed. Preparation works, placement of cast in items, initial formwork, reinforcing, closing formworks, cast, curing, stripping and finishing.

c. The programme shall not only be in the form of a bar chart, but shall clearly show the anticipated

quantities, the production rates and value of work to be performed each month.

d. A network-based programme according to the precedence method shall also be provided showing the various activities and critical paths in such detail as may be required by the Engineer.

e. Failure to comply with these requirements will entitle the Employer's Agent to use a programme based on his own assumptions for the purpose of evaluating claims for extension of time or additional payments.

The Contractor is responsible for liaison with residents and house owners via the CLO and Project Steering Committee in respect of the programming of construction.

Should the programme be revised in terms of GCC 5.6.4.1. a proposal is to accompany the revised programme that shows what positive steps the Contractor intends to take to increase production.

5.2.8 Clause 4.3.3

Notice for covering up works to be inspected:

a. 24 hrs in the case of full-time site supervision by the Employer's Agent.
b. 48 hrs in the case of part-time site supervision by the Employer's Agent.

5.2.9 Clause 4.4

Quality Assurance (QA)

The Contractor will be solely responsible to produce work that complies with the Specifications to the satisfaction of the Engineer. To this end it will be the full responsibility of the Contractor to institute an appropriate Quality Assurance (QA) system on site. The Engineer will audit the Contractor's quality assurance (QA) system on a regular basis to verify that adequate independent checks and tests are being carried out and to ensure that the Contractor's own control is sufficient to identify any possible quality problems which could cause a delay or failure.

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

5.2.10 Clause 4.8

Add to clause 4.8

"4.8 1 All correspondence with queries regarding affected Eskom servitudes to be addressed to Mr SS Nsele on email NseleSi@eskom.co.za of the Lands & Rights Manager

4.8.2 KwaZulu-Natal Department of Transport Eshowe region. Telephone 035 474 2031

5.2.11 Clause 4.12.2

The samples of materials, workmanship and finishes that the contractor is to provide and deliver to the employer are:

a. Nil

5.2.12 Clause 4.12.2

The fabrication drawings that the Contractor is to provide and deliver to the Employer are:

a. Pipe fittings
b. Internal pipe assembly for Pumping Station 2B
c. MCC cabinet at pump station 2B and control panel at reservoir 4 drawings.

5.2.13 Clause 4.14.3

The office accommodation, equipment, accommodation for site meetings and other facilities for use by the employer and his agents are as specified in the amended SANS 1200 AB.

5.2.14 Clause 4.14.6

The requirements for the provision and erection of sign boards are:

a. Project sign board as per the drawing placed at the site as agreed with the Engineer.

5.2.15 Clause 4.17.1

The requirements for the termination, diversion or maintenance of existing services are:

a. Any diversion will be done with the least possible interruption of service to the users.

b. There are numerous existing water services throughout the site. These will be crossed and be worked adjacent to continuously. Two repair couplings of each expected diameter are always to be kept in the site store to effect emergency repairs.

5.2.16 Clause 4.17.3

Services which are known to exist on the site are:

Water, Roads and Electricity.

The Contractor shall make himself acquainted with the position of all existing services before any excavation or other work likely to affect the existing services is commenced.

No work may proceed on road crossings under the main roads until the necessary approvals are in place as confirmed by the Engineer. All work within the road reserve shall comply with the specifications of the Provincial Department of Transport as will be issued to the Contractor by the Engineer.

The Contractor will be held responsible for any damage to known existing services caused by or arising out of his operations and any damage shall be made good at his own expense.

Damage to unknown services shall be repaired as soon as possible and liability shall be determined on site when such damage should occur.

Prior to commencing construction activities in a particular area, the Contractor shall also diligently enquire of local landowners as to whether there are any other known services which have not been shown on the drawings but which may be affected by the construction activities in that area, and any such services shall be brought to the attention of the Engineer immediately

5.2.17 Clause 4.17.4

The requirements for detection apparatus are:

Nil, no full-time detection apparatus is required on site.

5.2.18 Clause 4.18

The additional health and safety requirements are:

Compliance with the health and safety specification attached in the Annexures to the Scope of Works.

5.2.19 Clause 4.22

The works to be undertaken by nominated and selected subcontractors comprise:

a. Nominated sub-contractors

   i. Nil, no nominated sub-contractors are proposed by the Employer.

b. Selected sub-contractors

i. Nil, no selected sub-contractors are proposed by the Employer.

5.3 Specification data to SANS 1921-2

5.3.1 Clause 2.

Add normative reference

"Southern African Development Community Road Traffic Signs Manual" abbreviated as SADC RTSM

5.3.2 Clause 4.3.2

The contractor shall design all temporary culverts.

5.3.3 Clause 4.4

Add to clause:

"Where the deviated traffic cause damage to existing roads the same will be repaired to a condition comparable to prior to the deviation."

5.3.4 Clause 4.6.1

The length of roads under half width shall not exceed 250m

5.3.5 Clause 4.10.1

the contractor shall provide the following traffic control devices

a. Traffic-control devices:

i. Flagmen
ii. Stop/Go signs

b. Temporary Signs required for deviations as per SADC RTSM.Vol 2 Chapter 13 including, but not limited to:

i. temporary signs;
ii. delineator plates and stands;
iii. traffic cones;
iv. portable barricades;
v. flashing lights;

5.4 Management Pertaining to Concrete Works

5.4.1 Requirements for Quality Assurance

The Contractor will be solely responsible to produce work that complies with the Specifications. To this end it will be the full responsibility of the Contractor to institute an appropriate Quality Assurance (QA) system on site. The Engineer will audit the Contractor's quality assurance (QA) system on a regular basis to verify that adequate independent checks and tests are being carried out and to ensure that the Contractor's own control is sufficient to identify any possible quality problems which could cause a delay or failure.

5.4.2 Test Certificates

The contractor will supply test certificates from accredited laboratories where tests on materials or products are required. The supplier / manufacturers literature is typically not acceptable to prove compliance with specifications.

5.4.3 Approval Procedures

5.4.3.1 Mix Designs

a. Mix designs will be submitted to the Employer for acceptance at least 28 days before casting is

planned.

b. Mix Designs for strength concrete will only be accepted if the test results for all the cubes of a set achieve the specified characteristic strength + 7.0MPa.

c. For mix design, 6 cubes will form a set to be tested at 28 days per mix design. The Contractor may elect additional cubes to be tested at earlier dates to aid in early indication of strengths.

d. Submissions of mix designs will include the supporting data of the source aggregates to indicate that the aggregates are also acceptable in terms of SANS 2001-CC1 and Particular Specification PSG.

5.4.3.2 Temporary works Designs

a. Temporary works design will be submitted to the Employer for acceptance at least 21 days before the work is required on site.

b. Temporary works designs will not be approved for structural adequacy, that remains the liability of the temporary works designer, however the submissions are to show:

   i. The expected load on each load bearing member,
   ii. What aspects were assumed to contribute to the load,
   iii. The assumed capacity of each load bearing member,
   iv. The basis for the assumed capacity of the load bearing member,
   v. The loading on all ground contact points.

c. Temporary works designs will show:

   i. dimensional accuracy;
   ii. concrete finish; and
   iii. health and safety requirements to be complied with.

5.4.3.3 Material Samples

Samples of materials proposed for incorporation into the concrete works will be made available on site at the site office of Employers Agent.

5.4.3.4 Casting Consent

a. Consent to cast concrete will be obtained from the designer or his authorised representative for each cast.

b. QMS requirements of the Contractor and the designer shall be complied with prior to the casting of concrete that serve a structural purpose.

c. The notice time for an inspection of the works ready for casting will be as per SANS 1921-1.

d. Casting shall not be planned to be on the same day as the inspection.

e. Inspections by the designer does not replace the superintendence by the Contractor. The works shall be in a ready state when inspections are to be done. The designer reserves the right to abandon an inspection when more than 5 errors are apparent.

f. Works that will be covered by formwork, reinforcing or be otherwise impractical to inspect just prior to casting will be called for inspection at appropriate times. Typical examples are, but are not limited to:

   i. Joint treatment before formwork is started;
   ii. Water stops before reinforcing is placed;
   iii. Column or wall reinforcing before formwork is closed;
   iv. Linings below reinforcing before reinforcing is placed.

5.4.4 Equipment

a. Sufficient equipment will be available on site to keep up with the required casting rates.

b. Where watertight concrete is cast the following key equipment will have spare units available

on site:

i. Mixing equipment
ii. Compaction equipment

5.5 Recording of Weather

Weather data will be measured and recorded by the Contractor daily. The parameters to be recorded are:

a. Min temperature
b. Max temperature
c. Rainfall.

i. The reporting of rainfall will be as per the Contract Data.
ii. For this purpose an approved rain gauge shall be provided by the Contractor.
iii. It shall be erected in a manner consistent with good rainfall measurements as per the standards applied by the SA Weather Bureau.

5.6 Management Meetings

Management meetings will take place monthly on a day of the month agreed between the Contractor and the Employer's Agent.

The Contractor's representative at management meetings will be duly authorised by the Contractor's signatory to the contract as having authority to make contractual decisions.

5.7 Payment Certificates

The Contractor will present payment certificates to the Employer's Agent on or before the day of the month agreed at the Management Meetings, failing which the payment certificate will stand over to the next pay cycle.

Where reports for labour, EPWP, targeted procurement etc. are required to be submitted, they are to be submitted with the payment certificate.

Payment certificates will include form for Indemnity for Materials where material on site is claimed.

5.8 Permits

The Employer has secured the following permits:

a. Environmental Approval for the works
b. Water use licencing from DWS for impacts to rivers and streams
c. General permission to occupy from the traditional local authority.
d. The Department of Labour Construction Permit

The Contractor is to obtain the following permits:

a. The specific permission to occupy/access any fenced of property.
b. Wayleaves from KZN DOT for various crossings and working in and alongside the road reserve.
c. Wayleave from Eskom for working along, or in close proximity, to overhead lines

5.9 Proof of Compliance with the Law

The onus for proof of compliance with any law of the country will be on the Contractor.

ANNEXURE C3.A: AMENDMENTS TO THE STANDARDIZED SPECIFICATIONS

INTRODUCTION

In certain clauses in the Standard Specifications, allowance is made for a choice to be specified in the project specifications between alternative materials or methods of construction, and for additional requirements to be specified to suit a particular contract.

Details of such alternative or additional requirements applicable to this contract are contained in this part of the project specifications.

The number of each clause and each payment item in this part of the project specifications is prefixed “PS” and numbered sequentially followed by a number corresponding to the relevant clause or payment item in the standard specification in parentheses.

New clauses and payment items not covered by clauses or items in the Standard Specifications have also been included.

SUB-CLAUSE REFERENCE

The sub-clause in brackets refers to the sub-clause in the particular standardised specifications of SANS 1200.

PSA GENERAL (SANS 1200A)

PSA3 MATERIALS (CLAUSE 3)

SANS MARK (SUB-CLAUSE 3.1)

All materials, where applicable, shall comply with the relevant SANS Specification (as amended) or particular specification as noted.

PSA.4 PLANT (CLAUSE 4)

PSA 4.4 PLANT FOR CONSTRUCTION PURPOSES (NEW SUB-CLAUSE 4.4)

The Contractor's plant for construction purposes shall be of modern design, adaptable for the purpose for which it is required, in sound condition, and ample in capacity for carrying out the Works expeditiously.

Should the Engineer be of the opinion that the plant in use is in any way unsuitable for carrying out the Works in a manner or at a rate commensurate with the requirements of the Contract, they shall have the right to call on the Contractor at any time during the progress of the works to provide additional or improved plant and tools as may be necessary to meet these requirements.

The pipelaying tractor wheel path should maintain a minimum distance of 0.8m from the edge of the paved carriageway to prevent damaging the asphalt surface. Note SANS 1200DB Clause 5.10 regarding damage to road surfaces.

PSA 5 CONSTRUCTION (CLAUSE 5)

PSA.5.2 DEALING WITH TRAFFIC (SUB-CLAUSE 5.2)

Add the following:

a. General

The temporary deviation of the public traffic together with providing access to persons occupying properties that fall within or adjoining the area over which the contractor is working, shall be the responsibility of the Contractor and at his cost.

The Contractor to ensure safe and easy passage of public traffic over sections of roads which he occupies. If for any reason, such access has to be closed for a certain period, arrangements have to be made with the persons affected and reasonable notice in writing of each period must be given to affected persons.

In addition, the Contractor shall provide, erect and maintain traffic signs that conform to the South African Road and Traffic manual in positions approved by the Engineer for the temporary deviation of traffic during construction.

All signposting shall be by the use of yellow background "Temporary Road Signs" as detailed in the latest edition of South African Road Traffic Signs Manual (SARTSM) Vol. 2, Chapter No 13, Roadworks Signage issued by the CSRA Road Traffic Signs Sub-Committee.

b. Materials

All construction vehicles shall be fitted with rotating beacons with an amber lens of minimum height 200mm, clearly visible from all directions, and a reverse direction warning buzzer. The beacons on construction vehicles shall not be switched on while vehicles are being operated on unrestricted sections of public road, but shall be switched on while construction vehicles are operating within the accommodation of traffic areas, as the vehicles decelerate to enter a construction area, and as the vehicles accelerate to the general speed of traffic when entering the road from a construction area. Beacons on items of plant shall operate continuously while the plant is working alongside sections of open road to public traffic. The beacons shall be so placed as to be clearly seen from all directions.

All flagmen and workmen, including supervisory staff, working on or near the roadway, shall wear

high visibility "day-glo" yellow reflectorised safety vests.

Rotating beacons on the Contractor's vehicles and plant, and high visibility vests shall not be paid for separately but shall be included in the rates covering the use of the vehicles.

c. Pedestrian Traffic

Safe pedestrian access shall be maintained by means of demarcating a pedestrian zone.

d. Maintenance

If the coefficient of retro-reflection of any portion of a sign falls below 80% of the value given in Table 1 of CKS 191-1987 (observation angle 0,33^{o}, entrance angle, 5,0^{o}) for the grade and colour of the material specified, the sign shall be considered defective. Signs for which the retro-reflectivity falls below this standard shall be replaced at the Contractor's cost. All maintenance of signs will be at the Contractor's cost.

e. Allowance in Programme

The Contractor's programme shall allow for traffic accommodation measures. The Contractor's tendered rates for the relevant items in the schedule of quantities shall include full compensation for all possible additional costs which may arise from this, and no claims for extra payment due to inconvenience as a result of the modus operandi will be considered.

Failure to maintain road signs, warning signs or flicker lights, etc, in a good condition shall constitute reason for the Engineer to suspend work on site.

The Contractor may not commence constructional activities before adequate provision has been made to accommodate traffic in accordance with the requirements of the latest addition of South African Road Traffic Signs Manual (SARTSM) Vol. 2, Chapter No 13, Roadworks Signage.

The Contractor shall submit his proposals in connection with all signs and accommodation of traffic to the Engineer for approval.

The Contractor shall ensure that the existing property accesses are maintained at all times. Where necessary the Contractor shall make allowance in the rates for completing the work required to the accesses out of normal hours.

The Contractor shall record in writing, take appropriate photographs with a date and time reference of all temporary road signs, barricades, delineators, flagmen and other devices in use for traffic accommodation purposes at the scene of an accident.

The Contractor shall advise, in writing, all property owners whose accesses are likely to be affected during the course of the work at least one month in advance of the date on which such work is likely to commence. A copy of each letter of advice shall be forwarded to the Engineer.

The Contractor shall ensure that the effects of his operations on pedestrian traffic flow on the minor cross and service roads are kept to a minimum.

PSA 5.3 PROTECTION OF STRUCTURES (SUB-CLAUSE 5.3)

Replace “Machinery and Occupational Safety Act, 1983 (Act No. 6 of 1983)” with “Occupational Health and Safety Act, Act no. 85 of 1993 as amended by Act 181 of 1993”

Replace “Mines and Works Act, 1956 (Act No. 27 of 1956)” with “Minerals Act, Act 50 of 1991”

Add the following:

The Contractor shall conduct a survey of the condition of all structures including houses within 60m of the centreline of the new pipeline before and after construction. This survey to include the following as a minimum:

- Date of survey (before and after);
- A GPS co-ordinate to geo-reference the structure;

- At least one digital photograph (before and after)

PSA 5.7 SAFETY (SUB-CLAUSE 5.7)

Add the following:

The conditions of the OHS is to be applied.

PSA 5.8 PROVIDING ACCESS TO PROPERTIES (SUB-CLAUSE 5.8)

Add the following:

Road crossing and access to properties must be provided by the Contractor at all times. The Contractor shall, at his own expense, provide suitable crossings for residents and other Contractors requiring access to the Site. Such temporary service trench crossing shall be in the form of portable bridges, temporary backfill or other approved means and shall be capable of permitting the safe passage of vehicles of means not exceeding 2 tons. The Contractor shall also be responsible for maintaining such crossings and for removing same when they are no longer required.

The Contractor may, with the approval of the Engineer, arrange with the occupiers of the affected properties to temporarily close off a portion of a street, road, foot-path or entrance, provided that the Contractor shall give due notice to the occupiers of the intended closure and its probable duration and shall as punctually as possible re-open the route at the prescribed time. Where possible the road 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, and traffic signs shall be provided by the Contractor to suit the specific conditions.

Items have been included in the Preliminary and General Sections of the Schedule of Quantities for the provision of access to properties.

Payment shall be a lump sum for providing access to all properties, which lump sum shall be full compensation for providing access to properties at all times and shall include for any additional costs due to construction under traffic, for making arrangements with the occupiers of properties to temporarily close off routes and for taking the necessary precautions to provide for the safe and easy passage of traffic through the areas under construction.

PSA 5.10WORKING AREAS (ADDITIONAL SUB-CLAUSE)

Add new Sub-Clause:

Working Width

The allowable working width for the pipeline shall not exceed 10m. The practical working width of the new pipeline is reduced to less than 10m in certain places due to the proximity of current and possible future buildings, roads etc.

In all areas of restricted working width (i.e. less than 10m) the contractor must take all additional precautions as necessary and in terms of the applicable regulations for the protection of any adjacent servitude width intrusions, including shoring where necessary. No additional payment will be made for working in restricted areas.

No clearing and grubbing shall be done other than on the written instruction of the engineer, who shall designate in detail the exact areas to be cleared and grubbed and the time when it shall be done. The contractor shall note that, in order to avoid re-clearing, the clearing and grubbing may have to be done at the last practicable stage of construction.

PSA.6 TOLERANCES (CLAUSE 6)

PSA.6.2 DEGREES OF ACCURACY (SUB-CLAUSE 6.2)

Add the following:

Unless otherwise specified, the Degree of Accuracy II shall be applicable to the whole of the Works.

PSA.7 TESTING (CLAUSE 7)

Add the following:

The following definitions apply:

Control Testing: means quality control tests carried out by the contractor to ensure that work is done according to specifications. The contractor shall be responsible for the execution of all control testing including concrete quality control and compaction tests, where necessary. The contractor may use his own laboratory, if approved, or an approved independent laboratory for the execution of the abovementioned tests.

All quality control tests to ensure that work is done according to specifications, will be for the contractor's account. It is assumed that these costs are included in the rates of items that are subjected to quality control tests.

All tests results shall as soon as available immediately be given to the Engineer for approval.

Acceptance Testing: means quality control tests carried out by the Engineer to ensure that the work is acceptable in accordance to the specifications. All acceptance quality control tests will be for the contractor's account if specifications are not met.

PSA.7.1.1. CHECKING (SUB-CLAUSE 7.1.1)

Control Testing will be for the contractor's account. These costs must be allowed for in the tendered rates of items that are subjected to quality control tests.

All control test results shall as soon as available immediately be given to the Engineer for approval.

PSA.7.2 APPROVED LABORATORIES (SUB-CLAUSE 7.2)

Add the following:

All testing laboratories used shall also be accredited by the South African National Accreditation System (SANAS).

PSA.8 PAYMENT (CLAUSE 8)

PSA.8.1 MEASUREMENT (SUB-CLAUSE 8.1)

Method of Measurement (Sub-Clause 8.1.1)

Add the following:

Non Standard Items

A number of Non-Standard Payment Items are included in the Schedule of Quantities in respect of items of work not described within the standardised, Project or Particular Specifications.

Measurement and payment items shall be in terms of this Clause.

The unit of measurement for each individual non-standard item shall be as indicated for that item within the Schedule of Quantities.

The tendered rates and prices for each particular item shall, unless otherwise stated in the “Short Description” of the item, include for everything necessary to construct the particular item complete in all respects and in accordance with the description thereof as set out in the column headed “Short Description” in the Schedule of quantities.

PSA.8.2 PAYMENT (SUB-CLAUSE 8.2)

PSA.8.2.1 FIXED-CHARGE AND VALUE-RELATED ITEMS (SUB-CLAUSE 8.2.1)

Add the following:

The amount, if any, by which the sum of the fixed-charge and value-related items exceeds five percent of the net total tendered amount (excluding contingencies and escalation) shall be regarded for payment purposes as time-related items and will be paid in accordance with clause 8.2.2. This is clause does not add to the value of time related costs where extension of time costs are calculated, it just impacts the method of payment of excessively high fixed and value related costs.

PSA.8.5. SUMS STATED PROVISIONALLY BY THE ENGINEER

Add clauses 8.51 and 8.5.2:

"8.5.1 Acceptance Testing

a. Establishment on Site ..... Unit : Provisional Sum
b. Testing Staff ..... Unit : Provisional Sum c. Pipe Testing ..... Unit : Provisional Sum d. Soils and Concrete Testing ..... Unit : Provisional Sum e. Provision of Troxler on Site ..... Unit : Provisional Sum f. Overheads and Mark-up ..... Unit: Percentage (%)

This sum shall be a provisional amount to cover the Engineer's Acceptance Tests. The amount invoiced shall be authorised by the Engineer and paid for by the Contractor before being paid for under this item. If any Acceptance Testing fails to meet the specified criteria, the test will be deemed to form part of the Contractor's Control Testing and shall be paid for by the Contractor.

The unit for (f) Overhead and mark up shall be the percentage (%) and shall be deemed to be full compensation for all the Contractor's additional costs and profit associated with this process.

8.5.2 Principal Controlled Construction Insurance (PCCI)

a. Cost of PCCI ..... Unit : Provisional Sum
b. Overheads and Mark-up ..... Unit: Percentage (%)

This sum shall be a provisional amount to cover the costs of the PCCI. The amount invoiced shall be authorised by the Engineer and paid for by the Contractor before being paid for under this item.

The unit for (b) Overheads and Mark up shall be the percentage (%) and shall be deemed to be full compensation for all the Contractor's additional costs and profit associated with this process.

PSA.8.8. TEMPORARY WORKS

Add Clause 8.8.1

"The sum tendered shall include full compensation for all obligations in connection with the providing access to residents and visitors as described in clause PSA.5.8, for the entire site and access roads affected by the works for the duration of the contract."

Add to Clause 8.8.2

"The sum tendered shall include full compensation for all obligations in connection with the accommodation of traffic and pedestrians for the entire site and access roads affected by the works for the duration of the contract.

It shall also include the supply of the signs and their supports to site and if necessary for storage until used, their erection, maintenance including the replacement of items that have become unserviceable, barriers, flagmen and other activities associated with the accommodation and control of traffic during construction not separately provided for in the Schedule of Quantities. Payment shall become due as soon as the sign is in stock in the Contractor's store on site or is in position on site. The number of signs, barriers or lamps shall be in accordance with the Engineer's instructions and the specifications.

The rate tendered shall include all incidental labour, materials and equipment required for the handling and erection as well as the shifting and re-erection as often as may be necessary of all

signs, barriers and other means of traffic control and accommodation that are necessary during the course of the contract.

The erection, removal or shifting of signs shall be covered in the tendered rate for the full tendered time for completion plus approved extensions, notwithstanding earlier completion of the works."

PSA.8.9 ADD NEW CLAUSE

"8.9 Cost of obtaining PTO and Digital Surveys

a. Obtaining Permission to Occupy (PTO)..... Unit: Sum
e. Detailed Digital Survey..... Unit: Sum

The sum tendered under this item (a) shall include full compensation for all costs incurred in complying with the requirements of obtaining a signed off PTO for each affected property as per the Proforma in C5.6. The sum tendered under this item (b) shall include full compensation for all costs incurred in complying with the requirements of PSA.5.3."

PSA 8.10ADD NEW CLAUSE

8.10 COMPLIANCE WITH TARGETED PROCUREMENT POLICY (NEW SUB-CLAUSE)

a. Allowance to comply with Targeted Procurement Policy mentorship, skills transfer and support during the construction phase ..... Unit: Sum

This item shall include all costs to comply with Targeted Procurement Policy mentorship and skills transfer during the construction phase as set out in Returnable Schedule RS023 and section PC Small Contractor Development of the Particular Specifications as well as any other necessary support for the Targeted Enterprises of whatever nature provided by the main Contractor.

PSA.8.11 ADD NEW CLAUSE

"8.11 COMMUNITY LIAISON OFFICER

a. Provision of CLO ..... Unit: Prov Sum
b. Overhead and and Mark-up on a) ..... Unit: %

The unit of measurement shall be the provisional sum. The item shall include costs for provision of the CLO for the duration of the contract and as stated in part C4, Site Information."

PSAB ENGINEERS OFFICE (SANS 1200 AB)

PSAB.3 MATERIALS (CLAUSE 3)

PSAB.3.1 NAME BOARDS (SUB-CLAUSE 3.1)

The name board shall be placed in a position designated by the Engineer.

The board shall remain the property of the Contractor who shall dismantle and remove the said board on completion of the contract.

PSAB.3.2 OFFICE BUILDING(S) (SUB-

CLAUSE 3.2) Replace Sub Clause 3.2 with the

following.

"3.2 Offices Facilities

Office facilities shall be provided and maintained for the duration of the Contract. The following variations and additional to the requirements of SANS 1200 AB shall apply.

- The office shall have a floor area of at least 12 m².
- The minimum glazed area shall be 3 m².
- The minimum window opening shall be 2,5 m².
- Three office chairs and one desk of 1,5 m² are required.
- Racks for hanging contract drawings shall be provided.
- 2 Carports with covered area not less than 36 m² and crushed rock floor.
- One air conditioner unit with cooling and heating capacity of at least 2,5 kW
- 1 x 'pedestal' type office fans
- Uninterruptible and backup power supply capable of running 2 PC's, 1 x printer and 1 x Office fans for 4 hours.
- A meeting room capable of seating 20 persons. Furnishings shall include a table and chairs for 20 persons, and one air conditioner unit with cooling and heating capacity of at least 2,5 kW.
- 1 x Lockable flush toilets (female/male) including the following and reserved for the Engineer will be required.
- Hand washbasin
- Paper towel dispenser
- Overhead water tank (min. 250l)
- Septic tank and soak away

In addition to the furniture listed under Clause AB.3.2 the following should also be provided.

- 1 lockable pressed metal cupboard for stationery, etc.
- Protective clothing (2 pair gumboots, 4 No. helmets).
- Tea and coffee shall be provided by the Contractor for the Engineer and the Engineer's staff, at reasonable intervals throughout any working day for the duration of the construction period.
- Each office shall be air-conditioned with a single wall-mounted unit with a capacity of not less than 6 600 BTU's.

The contractor shall provide, insure and maintain in good working order the following equipment on

site for the exclusive use of the Engineer's Representative with the following specifications:-

- 1 x HP or equivalent All in One Laserjet Printer (colour) capable of scanning documents and printing to A3 size
- Internet connection (Wireless Broadband of Fixed ADSL line with wireless access point)
- UPS (Uninterruptable Power Supply) that can support 1 x Printer and 2 x laptops

PSAB.4 PLANT (CLAUSE4)

PSAB.4.1 TELEPHONE (CLAUSE 4.1)

The Contractor shall arrange for and maintain cellular telephones and 3G network cards. The full amount to a maximum of R1000,00 each per month, shall be payable by the Contractor for the duration of the construction period.

The Contractor shall liaise with the Engineer prior to providing phones and 3G network cards.

(see also clause PSAB.8.2.1).

PSAB.5 CONSTRUCTION (CLAUSE 5)

PSAB.5.2 ENGINEER'S OFFICE(S) (CLAUSE 5.2)

Delete the 2nd sentence and replace with the following:

He shall keep the office(s), boardroom, training room, kitchen and toilets clean and shall provide adequate cleaning staff for this purpose throughout the contract period.

PSAB.5.6 SURVEY EQUIPMENT AND MATERIALS (ADDITIONAL

CLAUSE) Add the following new Sub-Clause:

The Contractor shall provide the following equipment on the site from the commencement to the completion of the works for use by the Engineer.

a. One recently calibrated approved automatic level of modern manufacture together with tripod;
b. One metric 5m levelling staff of approved design;
c. One staff angle bubble;
d. One spirit levels (one meter long);
e. One 2kg hammer with steel or wooden pegs when required;
f. One tape of length 30m;
g. One 5m steel pocket tapes.

PSC SITE CLEARANCE (SANS 1200C)

PSC.3 MATERIALS (CLAUSE 3)

PSC.3.1 DISPOSAL OF MATERIAL (SUB-CLAUSE 3.1)

Add the following to the second sentence of sub-clause 3.1

" after obtaining written approval from the Engineer."

Clarification to sub-clause 3.1:

Disposal of combustible material by burning will not be permitted.

OWNERSHIP OF CUT WOOD

Replace the second paragraph of sub-clause 3.1 with

"All wood and/or trees cut whilst cleaning site will remain the property of the Tribal Authority and must be placed next to the servitude, and shall not be removed by the Contractor or his employees or Sub-contractors unless written permission has been granted by the relevant Authority."

PSC.5 CONSTRUCTION (CLAUSE 5)

PSC.5.1 AREA TO BE CLEARED AND GRUBBED (SUB-CLAUSE 5.1)

Insert after the first sentence of sub-clause 5.1

"Any area cleared without the consent of the Engineer will not be measured in terms of this Clause and may result in further action being taken against the Contractor in terms of any contravention with the Environmental Management Plan. A penalty as indicated in the EMP may be imposed on the Contractor for areas cleared and/or grubbed which are not designated by the Engineer."

PSC.5.2.3.2 Preservation of Trees (Sub-Clause 5.2.3.2)

Clarification to Sub-Clause 5.2.3.2

The amounts are as stipulated in the Environmental Management Plan

PSC 5.3 CLEARING (CLAUSE 5.3)

Restoration of Fences

Add to 5.3(e)

Where existing fencing is encroaching on the pipeline servitude, such fencing shall be removed if permitted by the Engineer (in consultation with the ISD) and re-erected to a condition no worse than existed prior to the removal, on the formal cadastral boundary all as indicated on the respective land plans or as agreed with Tribal Authority.

Where an existing hedge is encroaching on the pipeline servitude, such a hedge shall be removed if permitted by the Engineer (in consultation with the ISD) and replaced on the formal cadastral boundary with a wire fence the same height as the hedge all as indicated on the respective land plans or as agreed with Tribal Authority.

Where fencing has to be removed in order to facilitate pipelaying operations the Contractor shall notify the affected property owner and photograph the fence in advance of the dismantling of the fence. All dismantled fencing materials shall be stockpiled neatly in a secure place and shall be safeguarded until the fence can be re-erected again.

The fence shall be re-erected where possible with the original fencing materials. The contractor shall make allowance in his rate of 15% of the fences taken down for reinstatement as new due to loss of material as a result of poor condition of the existing fences at the time of dismantling. For the period that the fence or hedge is dismantled and not yet re-erected, the Contractor shall erect, at the end of each day's operations, a temporary fence to close the gap in the existing fence or wall and shall maintain security adequate to prevent use of the temporary fence as a point of access by

unauthorised persons.

Temporary Fencing Closures (Additional Sub-Clause)

Where the pipeline route crosses an existing fence or wall, a section of fencing or wall not exceeding 10,0 m in length may be removed temporarily during construction and thereafter reinstated to a condition no worse than the original condition as soon as the pipeline has been installed and backfilled in the immediate vicinity of the crossing. For the period while the existing fence or wall is dismantled, the Contractor shall erect, at the end of each day's operations, a temporary wire fence, at least 1,5m high to close the gap in the existing fence or wall and shall maintain security adequate to prevent use of the temporary fence as a point of access by unauthorised persons.

PSC.5.6 CONSERVATION OF TOPSOIL (SUB-CLAUSE 5.6)

Clarification to sub-clause 5.6

Conservation of topsoil is required.

PSC.5.9 DEMARCATION

Add new clause 5.9

"5.9 DEMARCATION

Demarcation of Works Area. Where instructed the Contractor shall demarcate the works area of the pipeline servitude by stakes or wire fence as instructed. Such demarcation shall be for the minimum widths of the working area and not exceed the permissible working lengths as indicated in SANS1200DB. The demarcation will be relocated as work progresses along the route.

Demarcation by Stakes. Demarcation will be by means of wooden stakes, slats or droppers with minimum cross-section dimension of 30mm. These stakes will be at least 1m high, painted white and placed at least every 25m on either side of the linear feature.

Demarcation by Wire Fence Demarcation will be by means of temporary fencing on both sides of the working area and around the perimeter of all agreed additional working areas.

The fencing shall comprise 1.8m high Bonnox 4 x 4 Mesh fencing, or similar, with straining posts and straining wires as required and according to supplier's directions. Chevron tape shall be interwoven in a zigzag pattern from the top to the bottom of the fence thereby clearly marking off the working area.

Gates shall be provided by the Contractor at all points as required for construction access purposes. The Contractor shall be held responsible for the control of access at these gates at all times as well as to the worksite during removal and re-erection of fencing. No other opening in the fence shall be permitted and the Contractor shall be responsible for monitoring that unauthorised entry is forbidden."

PSC.8 MEASUREMENT & PAYMENT (CLAUSE 8)

PSC.8.2 SCHEDULED ITEMS (SUB-CLAUSE 8.2)

PSC8.2.5 Existing Fences

Add item

c. Re-instate fences previously taken down(Type of fence stated).....Unit: m

The measurement shall be the linear meter of fencing replaced, measured in place before removal.

The rate shall also cover the cost of transporting the stockpiled fencing materials previously removed

d. Temporary Fencing Closures .....Unit: m

The measurement shall be the linear meter of temporary fencing, measured once per closure.

The rate shall cover the cost for supplying materials, daily erecting and removing the temporary fence

and eventual removal from site.

PSA.8.2.12 Demarcation of Servitudes

Add items:

a. Demarcation of Servitude by Stakes (Additional Sub-Clause) .....Unit: m

The measurement shall be the linear meter of stakes placed.

The rate shall cover the cost for dealing with demarcation of servitude by stakes in the manner specified in PSC 5.3.3, and the subsequent replacement of stakes, if required.

b. Demarcation of Servitude by Wire Fence (Additional Sub-Clause)..... Unit: m

i. Supply of materials
ii. Erection of fencing
iii. Take down fencing

The measurement shall be the linear meter of fencing measured in place on site.

The rate for (a) shall include for the supply of all fencing materials and sundries described in PSC.5.3.4. The final quantity of fencing materials will be determined by actual quantity of fencing provided, which shall not exceed the quantity required to demarcate the maximum open trench work lengths.

The rate for (b) and (c) shall cover the cost for plant, labour and consumable materials required for the erection, taking down and transporting of fencing as specified in PSC.5.4 Consumable materials is regarded as items such as binding wire, fencing nails and incidental fencing materials excluding the fencing mesh, the posts, the braces, the droppers, the straining wire covered by (a).

PSD EARTHWORKS (SANS 1200 D)

PSD1 SCOPE

Add new paragraph to 1.1

This specification also covers the rehabilitation and re-instatement of the topsoil and vegetation following the disturbance caused by the activities of the works. Where there is a discrepancy between this Specification and the EMP, the EMP shall prevail.

PSD2 INTERPRERATIONS (CLAUSE 2)

Add to Sub-Clause 2.1.2

Any of the other SANS 1200 Specifications (latest editions) may form part of the Scope of Works.

PSD2.3 DEFINITIONS (SUB-CLAUSE 2.3)

The definition of hand excavatable materials is as contained in the Particular Specification for Labour Intensive Works

PSD3 MATERIALS (CLAUSE 3)

PSD3.1 CLASSIFICATION FOR EXCAVATION (SUB-CLAUSE 3.1)

Replace the clause 3.1.1 with

"Method of Classifying. The contractor may use any method he chooses to excavate any class of material. The chosen method of excavation shall not determine the classification of the excavation. The Engineer will decide on the classification of the materials excavated.

Classification of material other than "soft excavation" shall be agreed with the Engineer before excavation may be commenced. Payment for rock excavation will only be approved if the Engineer has classified the excavation as such in writing before commencement of the excavation.

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 for further excavation is warranted. Failure on the part of the Contractor to advise the Engineer thereof in good time shall entitle the Engineer to classify, at his discretion, such excavation as may have been executed in material of a different nature."

PSD4 PLANT (CLAUSE 4)

PSD4.6 Vibration loadings from use of Plant (Additional Sub-Clause)

Add new Sub-Clause:

The onus will be on the Contractor, when proposing to use heavy plant or equipment to complete work in close proximity to an existing structures, pipelines or services, to determine the effect of the vibration loading from the plant or equipment on the supporting ground or foundation and the structure, pipeline or service and take all necessary steps to ensure that the stability or integrity of the element concerned is not compromised by the particular selection and use of plant or equipment.

Any damages caused to existing elements directly or indirectly arising out of the use of plant and equipment in close proximity shall be made good, to the satisfaction of the Engineer by the Contractor at his own expense.

PSD5 CONSTRUCTION (CLAUSE 5)

PSD5.1 PRECAUTIONS (Sub-Clause 5.1)

PSD5.1.1.1 Safety (Sub-Clause 5.1.1.1)

Amend Sub-clause 5.1.1.1:

Replace all references to

"Machinery and Occupational Safety Act, 1983 (Act 6 of 1983) "

with

"Occupational Health and Safety Act (Act 85 of 1993)."

PSD5.1.1.2 Safeguarding of Excavations (Sub-Clause 5.1.1.2)

Delete the first three lines and substitute the following:

The Contractor or his Agent or Representative appointed in writing shall be deemed to be and shall be a person who is competent to pronounce on the safety of all bracing and shoring as set out in the Occupational Health and Safety Act (Act 85 of 1993).

PDS5.1.1.3 Explosives (Sub-Clause 5.1.1.3) (Refer to SANS 1921-1 Clause 4.7)

Add to clause 5.1.1.3

Blasting shall not be carried out without the prior written consent of the Engineer. Where consent to blasting is given, such consent shall in no way relieve the Contractor of any of his liabilities under the contract. This consent will not be given where in the opinion of the Engineer, blasting may give rise to unnecessary risk or damage to surrounding property when other means of excavation are available to the Contractor. Such action by the Engineer shall not entitle the Contractor to any additional payment for having to resort to other less economical methods of construction unless otherwise provided in the Contract Data or Bill of Quantities.

It shall be incumbent on the Contractor to make himself aware of restrictions to blasting imposed by electric transmission or telephonic lines, fuel pipelines, or other similar services. Where the presence and location of such services are known or are shown on the Engineer's drawings at tender stage the Contractor must make allowance in his rates and programme for restrictions and delays which may result from the restrictions imposed by the relevant authorities.

Before any blasting is undertaken, the Contractor, together with the Engineer shall examine and measure up any buildings, houses or structures in the vicinity of the proposed blasting and establish and record together with the owners thereof the extent of cracking or damage that may exist before commencement of blasting operations. It is advised that a photographic record will be required of neighbouring structures before blasting commences. These structures will be pointed out by the Engineer. It shall be the responsibility of the Contractor to make good at his own expense any further damage to such houses, buildings or structures which is a result of the blasting.

Where there is reasonable danger of damage to power and telephone lines or any other property, the Contractor shall suitably adapt his methods of blasting, the size of the charges and use adequate protective measures such as cover blasting in order to limit the risk of damage as far as possible.

PSD5.2 METHODS AND PROCEDURES (5.2)

PSD5.2.1.2 Conservation of Topsoil

Add the following to the first sentence:

"The conservation of topsoil for re-use shall be as specified in the Environmental Management Plan.

Topsoil shall typically be stockpiled as windrows along linear works and as heaps at structures within the dimension limits indicated in the EMP."

PSD5.2.2.1 Excavation for general earthworks and for structures (SUB-Clause 5.2.2.1)

Add the following:

"The Contractor shall afford the Engineer the opportunity to inspect each excavation once complete and prior any further works taking place in or on the excavation"

PSD5.2.2.3 Disposal (Clause 5.2.2.3)

Surplus material or unsuitable material shall be disposed of to a disposal site(s) in accordance with requirements of the Environmental Management Plan and approved by the Engineer. Spoil material shall be placed in layers less than 300mm thick and compacted to 90% Mod AASHTO, unless specified differently in the EMP.

There will be no allowance for limited overhaul.

PSD 5.2.4 Finishing

PSD 5.2.4.2 Topsoiling

Add the following:

HAND TRIMMING

Cut and fill slopes shall be shaped and trimmed to reflect the natural condition and contours as closely as possible. Cut and fill slopes shall be left as rough as possible and shall be shaped to contain ridges that would facilitate the accumulation of topsoil.

Prior to re-vegetation, the Contractor shall ensure that the area is clear of any building materials and other foreign debris.

All visible weeds shall be removed from the area before replacing topsoil. Compacted soil shall be ripped along the contour and hand-trimmed, topsoil shall then be spread evenly over the surface. The final prepared ground surface shall be furrowed to follow the natural contours of the land and not smooth.

PSD 5.2.4.3 Grass or other vegetation

Add the following:

HYDROSEEDING/HYDROMULCHING

Hydroseeding/hydromulching is expected to be the most suitable method of revegetation for most areas.

The hydroseeder shall be capable of pumping the specified seed mix, fertiliser, soil stabiliser, etc. at the specified rates over the areas to be seeded, according to the Method Statement approved by the ER.

The hydroseeder shall have an agitation system, which shall be sufficient to agitate, suspend and homogeneously mix the specified slurry.

The slurry distribution lines shall be large enough to prevent stoppage. The discharge line shall be equipped with hydraulic spray nozzles suitable for the even distribution of the slurry on the various slopes to be seeded.

Where hydroseeding was undertaken, the commencement of watering may be postponed until seeds have germinated and growth begins.

MAINTENANCE

The Contractor shall be responsible for ensuring that all re-vegetated areas remain free of all alien and indigenous weed species during the contract and establishment period.

Weeding, removal methods and storage of this material shall be undertaken in such a manner that prevents the re-infestation of the cleaned areas.

All dead plant material shall be removed immediately as it may become a fire hazard and disposed of at a registered landfill site.

The Contractor shall ensure that all plants are disease and pest free. Any methods used to control any diseases and/or pests, including the use of herbicides and pesticides, must be approved by the ER.

Re-vegetation of construction areas shall take place as soon as possible after completion of construction works. The timing of re-vegetation shall take cognisance of maintenance requirements and provision shall be made for any irrigation requirements.

No construction equipment, vehicles or unauthorised personnel shall be allowed onto areas that have been re-vegetated.

PSD5.2.5 Transport for Earthworks (sub-

Clause 5.2.5) Clarification to Clause 5.2.5.1

The freehaul distance is 5,0km and 0,15km for haulage by hand.

Clarification to Clause 5.2.5.2

Limited overhaul distance is 0km

PSD8 MEASUREMENTS AND PAYMENT (CLAUSE 8)

PSD8.1.1 BASIC PRINCIPLES (SUB-CLAUSE 8.1.1)

There will be no additional payment for:

The provision of lateral support;

Work in restricted areas.

Surplus and/or unsuitable materials shall be disposed of at sites to be arranged by the Contractor and to be approved by the Engineer.

PSD8.3.6 Overhaul (Sub-Clause 8.3.6)

In additional to the provisions of Clause 8.3.6, replace reference to Clauses 5.2.5.1 and 5.2.5.2, with Clauses PS.5.2.5.1 and PS.5.2.5.2

PSD8.3.11 Plant Protection

Add new items

a. Seed collection and storage ..... Unit: Sum

The unit of measurement shall be the sum.

The rate shall be deemed full compensation for all the Contractor's costs associated with seed collection and storage.

b. Search and Rescue ..... Unit: No.

The unit of measurement shall be the number of plants collected and successfully replanted.

The rate shall be deemed full compensation for all the Contractor's costs associated with the following:

- collection of plants and cuttings,
- storage and care in a suitable nursery established for the purpose, the cost of which is deemed to be included in this item,
- Replanting

PSD8.3.12 Rehabilitation

Add new Clause

a. Ripping of compacted and disturbed areas to 300mm depth ..... Unit: m^2

Payment on this item will only be made upon the written instruction from the Engineer for an area to be ripped. This operation would follow preparation measures as contained in the EMP. All areas deemed affected areas affected by the Engineer are to be carefully ripped as stated using suitable plant.

b. Hand trimming ..... Unit: m²

Payment on this item will only be made upon the written instruction from the Engineer for an area to be hand trimmed. Rate to include for all labour and tools required.

c. Topsoiling ..... Unit: m²

Topsoiling shall be to the requirements of SANS 1200D.8.3.10. and the EMP. The top 50mm of the lightly compacted topsoil shall be scarified by hand with suitable tools such as flat steel rakes and trimmed for preparation for grassing.

d. Alien vegetation clearing programme ..... Unit: m²

The rate shall be deemed to be full compensation for all costs associated with the alien vegetation clearing programme including initial, follow up and maintenance control in accordance with the requirements of the EMP.

e. Fertilizer (Type stated). .....Unit: ton

The measurement shall be the tonnage applied. The tonnage shall be agreed beforehand based on the area of soil to be fertilized at the authorized depth to the authorized application rate.

The rate shall be deemed to be full compensation for all costs associated with supplying and applying the stated fertiliser in accordance with the requirements of the EMP.

f. Hydroseeding ..... Unit: m²

The rate shall be deemed to be full compensation for all costs associated with the production and application of the specified mix in accordance with the requirements of the EMP, the continued irrigation of the hydroseeded area and the control of weeds, diseases and pests in accordance with in accordance with the EMP.

PSDB EARTHWORKS (Pipe trenches) (SANS 1200 DB)

PSDB.2 INTERPRERATIONS (CLAUSE 2)

PSDB .2.1 SUPPORTING SPECIFICATIONS (SUB-CLAUSE 2.1.2)

Add to the subclause:

In particular this specification is to be read in conjunction with SANS 1200D as amended by PSD.

PSDB 2.3 Definitions

Add to the subclause 2.3 :

Trench excavation by hand is:

All trench excavation where the material is classified as hand excavatable in PSD above in trenches having a depth of less than 1,5 metres.

PSDB.3 MATERIALS (CLAUSE 3)

PSDB.3.8 SOILCRETE (ADDITIONAL SUB-CLAUSE)

Add new clause 3.8

"3.8 SOILCRETE is defined as approved backfill material to which 5% cement by mass has been added and thoroughly mixed. Each such prepared quantity will be placed within 1 hour after having been mixed."

PSDB.4 PLANT (CLAUSE 4)

PSDB.4.2 CONTROL OF WATER (4.2)

The Contractor will encounter water & seepage water in some of the trench excavation. The Contractor is required to assess the condition and nature of the site and include the cost of water control in his rates.

PSDB.5 CONSTRUCTION (CLAUSE 5)

PSDB.5.1 PRECAUTIONS (CLAUSE 5.1)

PSDB.5.1.2 Stormwater, Seepage and Dewatering of Excavations (Sub-Clause 5.1.2)

Add the following:

Control of Water

Under no circumstances will any claim be entertained for dewatering, or water logged conditions.

PSDB.5.1.2.2 Special Water Hazards

In excessive water conditions, over excavation of 100mm will be allowed and backfilled with 13mm single diameter stone. The Engineer to specifically instruct in each of these instances, and payment will be made for this work.

PSDB.5.1.2.3 Sloping Ground (Sub-Clause 5.1.2.3)

Delete the Sub-Clause and substitute:

The Contractor shall be responsible throughout the duration of the Contract, inclusive of the Defects Liability Period, for the provision of all soil erosion preventative measures necessary to protect the trenches, pipeline(s) and land utilised by the Contractor during the Contract from any adverse effects of soil erosion, settlement, scour, etc., resulting from the construction of the Works.

Cross embankments, generally extending across the full width of the working strip, consisting of low earth mounds shaped to rounded form and so oriented as to have a fall of 1% along their length, shall be constructed with compacted material having a minimum density of 90% modified AASHTO density and minimum dimensions and maximum spacings dependent on the slope of the ground

along the length of the pipeline, as indicated in the following table:

Slope of Ground	Minimum Height	Minimum Base Width	Maximum Spacing
0% - 5%	No cross-embankments required		
5% - 10%	300 mm	1,2 m	40 m
10% - 15%	375 mm	1,5 m	30 m
Greater than 15%	450 mm	1,7 m	20 m

The height of the cross-embankments for a distance of 1 metre on either side of the trench centreline shall be raised 150 mm above the remainder of the cross-embankment to allow for settlement. In order to form a satisfactory drainage channel upstream of each cross-embankment (at a slope of 1%) the crown over the backfilled trench shall be removed for a distance of 0,5 m upstream of the cross-embankment.

The berms shall comprise excess fill material from the trench, hauled by wheelbarrow, placed and shall be hand stamped to a minimum 90% mod AASHTO in layers not exceeding 150mm.

Cross-embankments shall be constructed to the same minimum standards and dimensions indicated above wherever artificial slopes have been formed on the working strip or other areas used during construction and, with the approval of the Engineer, are permitted to be so left.

PSDB.5.1.2.4 Sack breakers in Trenches (Additional Sub-Clause)

In steeply sloping trenches (longitudinal slope > 15 %) and where otherwise ordered by the Engineer, the Contractor shall place sacks of earth as sack breakers or cross walls at 20m intervals around and above the pipe up to ground level, prior to backfilling, as a soil erosion measure. Such sacks shall be filled with selected material free of stones in excess of 50 mm maximum dimension. One sack breaker shall consist of these sacks packed tightly against the trench bottom, pipe and actual trench sides, and against each other to form a solid cross wall at least 0,5 m thick from the bottom of the trench to the surface.

Where required, an item will be included in the Bill of Quantities to cover the cost of the supply, installation and maintenance of sack breakers.

PSDB.5.3 SITE CLEARANCE (CLAUSE 5.3)

Grass and bushes shall be cleared by hand.

PSDB.5.4 EXCAVATION (CLAUSE 5.4)

Add the following:

Over Excavations

All over excavation will be backfilled to prescribed levels with selected granular material and compacted to 93% mod. AASHTO at the Contractors own expense.

Open Excavations

The length of open trenches at any time shall not exceed:

i. The lessor of the amount specified in the insurance policy or the Environmental Authorisation (EA). According to the EA the length of open trench is limited to 500m at any time and may not remain open for longer than 4 days.

ii. Where no distance is specified the length of open trench shall not exceed 500m.

In the event of a transgression of this requirement, the Engineer shall have the right to intervene and stop the excavation process until deemed necessary for the pipe laying team and backfilling team to meet the prescribed open trench lengths.

PSDB5.5 TRENCH BOTTOM

Add to clause 5.5

Where overbreak of hard rock excavation has occurred below the designated bottom of the trench such overbreak shall be backfilled to the level of the designated bottom of the trench with selected granular material compacted to 93% Mod AASHTO"

PSDB 5.6 BACKFILING (CLAUSE 5.6)

PSDB.5.6.1 General (Sub-Clause 5.6.1)

Add the following to the clause:

No thrust block or pipe requiring special wrapping or jointing may be covered by either the fill blanket or the main backfill until inspected and passed by the Engineer.

All trenches shall be overfilled and compacted to specification to allow for settlement and for erosion protection. The compacted overfill shall be to a vertical height of minimum 100mm. Rocks removed from the trenches during excavation shall be placed on top of overfill.

PSDB.5.6.2 Material for Backfilling (Sub-Clause 5.6.2)

Add to the Sub-clause:

Where the Environmental Specifications requires rehabilitation of excavated areas by means of vegetation, the final 150mm of the trench shall be backfilled with topsoil which was previously stockpiled. Care must be taken to ensure that the trench is slightly overfilled so that it does not become a rivulet in wet weather.

PSDB.5.6.6 Completion of Backfilling (Sub-Clauses 5.6.6)

Backfilling around the pipe shall not be allowed to fall more than 250m behind the laying of the pipe.

After the pipes have been laid, no backfilling shall be undertaken until the pipes have been inspected and approved by the Engineer.

The Contractor may use his discretion as to whether to backfill around joints before the pipeline is tested and should he decide to backfill the joints he shall be responsible for the locating of any leaks and no extra payment shall be made for any re-excavation and subsequent reinstatement.

PSDB.5.6.8 Transport for Earthworks for Trenches (Sub-Clauses 5.6.8)

Delete the Sub-Clause and substitute:

The requirements of Sub-Clause 5.2.5 "Transport for Earthworks" of SANS 1200 D as amended and as applicable shall apply.

Add the following:

Loading & Offloading

All loading shall be done by hand. Haulage equipment should be selected in a manner that allows loading by hand to the greatest extent possible. All material shall be spread by hand.

Haul

Excavation material shall be hauled to its point of placement by means of wheelbarrows where the haul distance is not greater than 150m.

PSDB.5.7.1 Compaction of Areas not subject to traffic loads (Sub-Clauses 5.7.1)

Add the following:

Hand Compaction of backfilling to trenches (areas not subject to traffic).

Backfilling to trenches shall be placed in layers of thickness (before compaction) not exceeding 100mm. Each layer shall be compacted using hand stampers to 90% Mod AASHTO such

i. that in excess of 5 blows of a dynamic cone penetrometer (DCP) is required to penetrate 100mm of backfill, provided that backfill does not comprise more than 10% gravel of size

less than 10mm and contains no insoluble boulders, or

ii. that the density of the compacted trench backfill is not less that of the surrounding undisturbed soil when tested comparatively with a DCP.

PSDB.5.7.2 Compaction of areas subject to traffic loads (Sub-Clauses 5.7.2)

Areas subject to traffic loads will be instructed by the Engineer in writing. No other areas will be considered for payment. The contractor will be expected to provide test results from an approved laboratory demonstrating that the additional compactive effort has been achieved. No additional payment will be made for these tests.

Add the following:

Small areas may be compacted by hand provided that the specified compaction is achieved. Appropriate rollers should be used where higher (than can be achieved by hand) levels of compaction are required for large areas.

PSDB.5.9 REINSTATEMENT (CLAUSE 5.9)

PSDB.5.9.2 Private Property and Commonage (5.9.2)

Add the following:

Grassing

All grassing shall be undertaking by sprigging, sodding, or seeding by hand.

PSDB.5.11 SHORING (NEW CLAUSE 5.11)

In view of the fact that the excavation will take place in open areas, no additional payment will be made for shoring. The measurement width will also remain as specified herein although the Contractor may wish to batter the sides to avoid the need for shoring.

The provision for shoring shall be deemed to be included in the relevant rates for excavation. The Contractor's attention is drawn to the need to operate safely and to ensure that trenches are either shored or battered to a safe slope.

PSDB.7 TESTING (CLAUSE 7)

PSDB.7.1 ADDITIONAL CLAUSES AFTER CLAUSE 7.1

The costs for all process control tests, regardless whether the compaction is sufficient or not, shall be for the Contractors account, unless the Contractor has agreed to a shared laboratory.

The following are the minimum frequencies for the process control tests to be done by the Contractor:

a. Pipe bedding: one density test on each 50m pipe trench, for pipes greater than 50mm in diameter.
b. Normal trench backfilling: one density tests on every second layer for every 50m of pipe trench, for pipes greater than 50mm in diameter.
c. Backfilling in areas subject to vehicle loads: one test on each layer at each road crossing.

The position of these minimum numbers of tests shall be determined by the length of the pipe trench and the position thereof shall be noted on the test results.

In the event of a test failure, additional tests shall be carried out 50m on either side of the location of the failed test or as directed by the Engineer. These additional tests shall be paid for by the Contractor.

The results of all control tests shall be submitted to the Engineer and shall indicate to the satisfaction of the Engineer that the compaction of the whole section complies with the Specification.

The Engineer reserves the right to order the Contractor to do additional control tests at any position on any layer.

In the event that these additional tests indicate that the work complies with the specification, the tests shall be paid for by the employer after the submission of invoices by the contractor. However if these tests indicate that the work does not comply, the costs of the tests shall be for the Contractor's account.

PSDB.8 MEASUREMENT AND PAYMENT (CLAUSE 8)

The following partial payments shall apply:

On excavation and backfill:

trench excavation	–70%
backfill completed	–30%

On pipe laying:

pipe installed before testing	–80%
testing of pipes	–20%

PSDB.8.3 SCHEDULED ITEMS (SUB-CLAUSE 8.3)

PSDB 8.3.2 Excavation

Add to clause 8.3.2 a) after last paragraph

In addition to the activities listed in 8.1.1, excavation shall also include for the cost of preparing and compacting the trench bottom to a minimum of 90% Mod AASHTO density in all materials irrespective of whether the base has been loosened or not during excavation.

Add to clause 8.3.2.b)2) after "…in the case of rock,"

"the backfill of overbreak and "

PSDB.8.3.3.5 Soilcrete

Add new Item.3.3.5

a. Extra-over 8.3.2.a) to Backfill with Soilcrete ..... Unit: m³

The volumes will be computed from the dimensions authorised in the instruction to apply soilcrete backfill

The tendered extra over rate shall cover the additional cost over 8.3.2.a) to backfill with Soilcrete and shall include for all costs associated the additional effort, plant and materials to produce, handle and place soilcrete as described in clause PSDB.3.8 and deal with any surplus materials.

PSDB.8.5 Cross Embankments

Construct cross-embankments where required with excess material from trenches to heights of: (Provisional)

b. h=300mm ..... Unit: m³
c. h=375mm ..... Unit: m³
d. h=450mm ..... Unit: m³

The volume for cross cut berms will be the calculated volume from the minimum dimensions in the specifications or where larger dimensions were specifically instructed, such dimensions will be used.

The tendered extra over rate shall include for all costs associated with constructing cross embankments as described in clause PSDB.5.1.2.3'

PSDB.8.6 Sack Breakers

a. Construct Sack Breakers/ cross walls in trenches for depths (Provisional) : ..... Unit: No.

Separate items are scheduled for various widths of trench and for various depth ranges

The number of sack breakers will be the actual number of sack breakers constructed in the stated width x depth ranges.

The tendered extra over rate shall include for all costs associated with constructing sack breakers as described in clause PSDB.5.1.2.4

PSG: CONCRETE (STRUCTURAL) (SANS 1200 G – 1982)

PSG.3 MATERIALS

PSG.3.3 WATER

Add the following:

Water shall comply with SANS 51008:2006: Mixing water for concrete

PSG.3.4 AGGREGATES

PSG.3.4.1 Applicable Specifications

Add to this Sub-Clause as follows:

Aggregates to be used should comply with SABS 1083.

PSG.3.4.4 Adsorption and Coefficient of Expansion

Add new sub clause:

Aggregates to be used should have an adsorption, as measured in accordance with BS812: Part 2: 1985, generally not greater than 3%

Coarse aggregates shall have a low coefficient of thermal expansion.

PSG.4 PLANT

PSG.4.5 FORMWORK

PSG.4.5.3 Ties

Add to this Sub-Clause as follows:

Sleeves and ferules are to be drilled out and filled with a cementitious mortar to achieve an effective seal. The cost of this is deemed to be included in the formwork rate.

PSG.5 CONSTRUCTION

PSG.5.5 CONCRETE

PSG.5.5.1. Quality

PSG.5.5.1.7 Strength concrete

With reference only to watertight concrete (i.e. concrete for reservoirs and any other elements specified on the drawings), add to this Sub-Clause as follows:

c) Cement type

d) Maximum water/cement ratio.

e) Cement content limits

Specifications for Grade 35/19 concrete are as follows:

a)	28 day strength :	35 MPa
b)	Maximum nominal aggregate size:	19.0mm
c)	Cement blend:	70% OPC and 30% PFA
d)	Maximum water/cement ratio:	0.5
e)	Cement content limits:	360Kg – 450 Kg

Concrete mixes are to be designed by an approved laboratory.

Concrete mix designs with 28 day strength results from cubes taken from a trial mix are to be submitted to the Employer's Agent for approval prior to use. Such approval by the Employer's Agent

will not relieve the Contractor of any of his obligations.

The Contractor shall include in his tender rates all the costs of the laboratory and all other costs incurred in designing and adjusting the concrete mix.

With reference to all other concrete, add to this Sub-Clause as follows:

Concrete mixes are to be designed by an approved laboratory

Concrete mix design with 7, 14 and 28 day strength results from cubes taken from a trial mix to be submitted to the Employer's Agent for approval prior to use. Such approval by the Employer's Agent will not relieve the Contractor of any of his obligations.

The Contractor shall include in his tender rates all the costs of the laboratory and all other costs incurred in designing and adjusting the concrete mix.

PSG.5.5.1.8 No-fines concrete

Add new sub clause:

No fines concrete is to comprise 8 parts 19.0mm stone to 1 part sand with the addition of water to allow the cement to coat each stone.

The surface is to be wood floated with the addition of a dry mix mortar to the surface to provide a thin sealed skin.

Compaction is to be by hand-tamping.

No-fines concrete shall be protected from damage by traffic as necessary.

PSG.5.5.3 Mixing

Mixing at construction site

With reference only to watertight concrete (i.e. concrete for reservoirs and any other elements specified on the drawings), replace item g of this Sub-Clause as follows:

f) Concrete may not be retained in the mixer for more than 20 minutes. Water may not be added to regain slump.

PSG.5.5.5 Placing

Add new sub clause:

PSG.5.5.5.10 Structural Concrete to Reservoirs

During the whole or any time that the placing of concrete is being carried out, the concreting operation shall be under the supervision of a suitably experienced person.

The wall footings shall be cast with wall starters to form a horizontal wall construction joint as shown on the drawings. The construction joint between footing bays shall also be as shown on the drawings. At least 3 days shall elapse between pouring adjacent wall footings.

Due to the height of the walls, the tapered geometry, and the requirement for durable water tight concrete it is recommended to cast the walls in two lifts.

As soon as possible after the removal of the formwork in vertical joints or after the concrete has set in horizontal joints the surface laitance of the concrete shall be removed in order to expose the large aggregate and leave a solid surface.

Openings may be left in the formwork on the outside face only for pouring and vibrating of the concrete provided they are closed properly and do not impair the concrete finish.

When concreting walls care shall be taken to ensure that there is no loose matter on the concrete surface and that it is slightly wetted in order to assist the new concrete adhering to the existing concrete.

The Contractor's attention is particularly drawn to the fact that the walls form part of a water retaining structure and that no honeycombing will be tolerated. In order to ensure this, the mix proportions of the first 250mm depth of concrete placed in contact with the horizontal joint may be adjusted, with the approval of the Engineer, by reducing the amount of coarse aggregate. The Engineer's representative may instruct the use of trunking in placing the concrete to avoid losses of fines due to adherence to reinforcement and formwork. The concrete shall be placed evenly over the surface to be covered without reliance on vibration to transport it horizontally. Special care shall be given in order to ensure full compaction at waterstops.

The floor shall be cast in panels as detailed on the drawings. Consecutively cast panels shall not adjoin one another. The floor panels shall be cast in a checkerboard pattern with a minimum of 3 days between the pouring of adjacent panels.

The column and column head shall be cast in one lift. The base of the column may be cast first provided a centrally placed starter is incorporated.

The Contractor may propose alternative means of construction which shall be subject to the approval of the Engineer. If the Engineer accepts any alternative means of construction it shall in no way result in increased costs.

PSG.5.5.7 Construction joints

PSG.5.5.7.3

With reference only to watertight concrete (i.e. concrete for reservoirs and any other elements specified on the drawings), replace this Sub-Clause as follows:

The surfaces of concrete at construction joints are to be prepared strictly in accordance with the following:

1. The surface of the concrete is to be removed until approximately 35% of the concrete area exposed is coarse aggregate either by:

   a) By jetting with a high pressure (>500KPa) pressure washer or by blowing off using a mixture of water and air at a pressure of at least 500KPa, at a concrete age between 4 and 8 hours, or

   b) by scabbling, at a concrete age between 12 and 24 hours, Scabbling is to be carried out with a scabbler and not light breakers etc.

2. All surfaces are to be kept wet continuously until the adjacent concrete is placed.

3. All surfaces are to be thoroughly clean and damp prior to placing adjacent concrete.

4. For the purpose of cleaning before concreting, the Contractor is to use a compressor with suitable oil traps in the hoses.

5. Concrete shall be at least 12 hours old before placing adjacent concrete.

6. Where concrete is more than 7 days old, a proprietary wet to dry epoxy resin adhesive approved by the Employer's Agent may be applied to the concrete surface.

7. Tops of walls and columns shall be treated as per item 1) above before the reinforcement of the slab or roof is placed in position.

PSG.5.5.8 Curing and protection

With reference only to watertight concrete (i.e. concrete for reservoirs and any other elements specified on the drawings), amend this sub-clause as follows:

Delete d) and e).

Delete last 2 sentences of sub-clause and replace as follows:

Curing shall continue for at least 10 days.

PSG.5.5.13 Grouting

Add the following sub-clauses:

PSG.5.5.13.1 Surfaces to receive grout are to be prepared in the same way as construction joints.

PSG.5.5.13.2 Liquid grout

Liquid grout shall have a maximum water cement ratio of 0.45.

Surfaces to receive grout are to be thoroughly scabbled, cleaned and saturated with water.

PSG.5.5.13.3 Grouting of pipes or specials in gaps in surrounding concrete

Pipes or specials are to be thoroughly clean.

Concrete is to be carefully worked around puddle flanges and fully compacted with a vibrator to completely fill all gaps.

PSG.5.5.13.4 Mortar

Where mortar is used in a structural application surfaces shall be prepared in the same way as construction joints (Ref PSG. 5.5.7) Mortar shall be cured with wet hessian for 2 days.

PSG.6 TOLERANCES

PSG.6.2 PERMISSIBLE DEVIATIONS

PSG.6.2.1 Specified PDs

Add to the sub-clause:

Degree of accuracy II shall apply, except for the following:

i. Top levels of walls and columns which shall be + 5mm
ii. Pipes cast in to structure shall have a PD of +3mm for location of faces of flanges or ends of pipes and *-1mm/m in alignment of the pipes. In addition, where a pipe cast into the structure is to join another pipe also cast into the structure, the PD of one pipe relative to the other shall be +3mm for location of face of flanges or ends of pipes and *-1mm/m in alignment of the pipes.
iii. Overflow gallery top of wall to be flat and level within 1mm tolerance.

PSG.7 TESTS

PSG.7.2 TESTING

Add the following sub-clauses:

PSG.7.2.6 Testing for water tightness (New sub-clause)

PSG.7.2.6.1 Testing of structure

For a test of liquid retention, the structure should be cleaned and initially filled to the normal maximum level with clean water at a uniform rate of not greater than 2 m in 24 h. When first filled, the liquid level should be maintained by the addition of further liquid for a stabilizing period of 21 days while absorption and autogenous healing take place.

After the stabilizing period the level of the liquid surface should be recorded at 24 h 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, should not exceed the lesser of $1/500^{th}$ of the average water depth of the full tank or 10mm. Notwithstanding the satisfactory completion of the test, any defects resulting in seepage to the outside faces of the liquid-retaining walls should be repaired. Any necessary remedial treatment of the concrete, cracks, or joints shall be carried out from the liquid face. When a remedial lining is applied to inhibit leakage at a crack it should have adequate flexibility and have no reaction

with the stored liquid. Approval of such a lining will be at the discretion of the Engineer. The Contractor shall submit a method statement for the remedial work for approval by the Engineer. Plastering the surfaces as a remedial measure will not be allowed.

Should the structure not satisfy the 7-day test, then after the completion of the remedial work it shall be refilled and if necessary left for a further stabilizing period; a further test of 7 days' duration shall then be undertaken in accordance with this clause.

Cost of remedial work and re-testing shall be carried by the Contractor.

Backfilling may not commence without approval of the Employer's Agent following successful testing of the structure.

If leaks appear during the defects liability period these shall be repaired and the structure retested at the expense of the contractor.

PSG.7.2.6.2 Testing of roof

The roofs of liquid-retaining structures should be watertight and shall be tested by having water applied by a continuous hose or sprinkler system to provide a sheet flow of water over the entire area of the roof for not less than 6 h. The roof shall be considered satisfactory if no leaks or damp patches show on the soffit. Should the structure not satisfy this test, then remedial work shall be carried out after which it shall be retested in accordance with this clause. The roof insulation and covering shall be completed as soon as possible after satisfactory testing. Cost of remedial work and re-testing shall be carried by the Contractor.

PSG.8 MEASUREMENT AND PAYMENT

PSG.8.1.3.1 d)

Replace this Sub-Clause as follows:

Backfill to overbreak in rock for floor of reservoir with 5/19 concrete will be paid for at a nominal thickness of 50mm. Excavation for overbreak in rock for floor of reservoir will be paid for as excavation at a nominal thickness of 50mm.

Backfill to rock overbreak to vertical faces of outlet, scour and overflow chambers with 10/19 concrete will be paid for at a nominal thickness of 300mm.

Backfill to rock overbreak to vertical faces of wall bases with 10/19 concrete will be paid for at a nominal thickness of 150mm.

PSG.8.9 Testing for water tightness.

Add new Sub-Clause:

a. Testing of structure in accordance with 7.2.6.1..... Unit: Sum
b. Testing of roof in accordance with 7.2.6.1 ..... Unit: Sum

Rate shall include all materials, equipment labour and supervision.

PSG.8.10 Infilling of box outs in walls around pipes.

Add new Sub-Clause:

a. Infilling of box outs in walls around pipes..... Unit: No.

Rate shall include scabbling of existing surfaces, formwork, reinforcement and concrete including all materials and workmanship.

PSL MEDIUM PRESSURE PIPELINES (SANS 1200 L)

PSL 3 MATERIALS

PSL 3.1 GENERAL

In general pipe types on the Mthonjaneni project will be as follows:

- 160mm diameter pipe from Pumping station 2B to Reservoir 4 will be:
  - HDPE
  - Jointing will be by butt welding
  - Due to the sensitivity of the terrain to erosion the 160mm rising main must be installed exclusively by labour intensive construction. No mechanical plant will be allowed to move along the pipe route without permission from the Employer's Agent. All excavation, transporting of the pipe, laying, and backfilling should be done by manual labour.
  - Pipeline to be laid at minimum radius of 4.5m for horizontal and vertical deflections, to minimise the use of custom bends.
- 400mm diameter pipe from the tie-in point to reservoir 2A will be
  - Manufactured of steel grade X42 to API 5L
  - Shall have 3LPE coating in accordance with ISO 21809
  - Shall be cement mortar lined
  - Joints shall be sleeve welded (spigot and socket)
  - Internal joint repairs to the mortar lining shall be as specified in Clause PSL 3.9.8.
  - External joint repairs at welds, and buried in-line tees or bends shall be coated utilising the Canusa-CPS Wrapid Bond coating system consisting of Wrapid Bond (Inner wrap) and Wrapid Coat (Outer wrap) and profiling mastic as applicable to cater for complex geometries. The system will be applied in accordance with the manufacturer's instructions.
- Specials
  - Specials at reservoirs or chambers will have galvanised, or have epoxy coating and lining. Below ground it will be tape wrapped, above ground epoxy coated pipes shall receive a UV resistant polyurethane topcoat.

PSL 3.1.1 STACKING OF PIPES AND PIPE SPOOLS (NEW SUB-CLAUSE)

Add to Clause 3.1

"The Contractor shall take due care when stacking pipe or pipe spools at the workplace. Pipes must never be stored directly on the ground, but shall be stacked on dunnage and to heights according to manufacturer's recommendations.

JOINTING MATERIALSPSL.3.8.2.1 Flexible couplings (Sub-Clause 3.8.2.1)

Delete the Sub-Clause and replace with the following:

Flexible couplings where scheduled, shall be of the sleeved couplings or similar approved without central registers, unless otherwise specified. Coupling shall be protected by an approved epoxy coating. The plain end of the steel pipe shall be properly prepared before corrosion protection so as to accept the flexible coupling.

At flexible couplings the pipe ends shall be at least 10mm apart to accommodate any pipe expansion.

PSL 3.8.3 Flanges and accessories (Sub-Clause 3.8.3)

Add to new Sub-Clause:

Full face insertions are to be used for flat face flanges. Insertions for raised face flanges shall fit neatly into the bolt ring. All gaskets shall be 3mm thick.

Gaskets shall be manufactured from “Klinger 200” or other approved material which complies with the requirements for Grade B of B.S. 2815.

All gaskets shall be 3 mm thick and cut so that the annular section is completely within the bolt circle, i.e. ring gaskets with no boltholes.

Care should be taken to ensure that all gaskets are packed properly and are not damaged by bending. For larger sizes the gaskets shall be suitably supported by wooden frames during transit and while in store.

Any item of pipework that is found to have flanges that are incorrectly drilled shall be rejected. Reaming of boltholes to oversize dimensions in order to make a particular piece fit shall not be permitted.

PSL 3.8.4 Loose flanges (Sub-Clause 3.8.4)

Add to Sub-Clause:

All bolts and nuts shall comply with SANS 135 unless otherwise specified or detailed.

PSL 3.9 CORROSION PROTECTION (CLAUSE 3.9)

PSL.3.9.2.2 Steel Pipes of Nominal Bore over 150 mm

(c) Concrete lining or coating

Add to Sub-Clause:

Cement Mortar Lining to AS1281

(1) Thickness (No reference)

The thickness of linings on pipes shall generally be as tabled below, except where specified to the contrary in the Schedule of Quantities or on the drawings.

PIPE OD IN MM	**THICKNESS OF LINING IN MM**	
	NOMINAL	**MAXIMUM**
up to 300	8	11
above 300 to 900	10	13
above 900 to 1 400	13	16
above 1 400 to 2 000	17	20

In all instances, tolerances for lining thickness shall be plus 3 mm minus 0 mm.

The thickness of lining on specials shall generally comply with the above, provided the minimum cover of mortar over reinforcement mesh shall not be less than 10 mm.

(2) Preparation of Surfaces

After bare pipes and specials have been tested and inspected for compliance with the applicable specification and after application of coating, if applicable, surface shall be prepared as follows :

(a) Welded spatter, loose rust and loose mill scale shall be removed by chipping and/or scraping.

(b) Gross deposits of grease, oil, bitumen or other contaminants shall be removed by

scraping and wiping with rag soaked in white spirit or similar toxic free solvent.

(c) Other contaminants shall be removed by manual or mechanical cleaning. The standard of cleaning shall not less than Grade St 2 or Grade Sa 1 of SIS 05 59 00 as appropriate.

(d) Residual dust and debris on the pipe surface shall be 0,2% maximum when tested in accordance with SANS Method 769.

(3) Shop Applied Linings - Centrifugal Spun

Within twenty four hours of having been grit blasted and provided the pipe surfaces are kept dry, free of dust, oil and other deleterious contaminants and provided ambient temperatures are above 20 degrees C the pipe shall be transported to a suitable spinning machine. The coating, if applicable, shall be suitably protected against mechanical damage during the handling and spinning operation. Before being placed in the spinning machine, the pipe shall be suitably braced with external stiffening rings, which shall not be removed until the appropriate one of the following periods has elapsed from the time of placing of the lining :

(a) 72 hours when water curing is used.

(b) 36 hours when steam curing is used.

End gauge rings shall be securely attached to the pipe ends to control the lining thickness, to act as top end to prevent mortar leakage and to stiffen and hold the pipe ends round.

Each pipe shall be rotated in a spinning machine with its axis horizontal during and for a suitable period after the placing of the lining. The speed of rotation shall be such as to produce a uniform distribution of the cement mortar over the interior surfaces of the pipe. Sufficient mortar to line completely one pipe to the appropriate nominal thickness shall be mixed in one batch, and it shall be of such consistency as to minimise segregation during spinning. The mortar shall be placed in the pipe immediately after mixing and before initial set has taken place, and in a manner providing uniform longitudinal distribution of the batch from end to end of the pipe.

The ends of the lining shall be finished uniform and square or slightly bevelled as required. All water and laitance expelled during spinning shall be removed in such a manner that the surface of the lining is smooth, level and true. After the lapse of a suitable period after spinning (as determined by experiment), the spun lining shall be given a steel trowelled or smoothing bar finish. A second trowelling may be necessary to remove all laitance and produce a smooth and hard finished surface.

The concrete shall give upon testing the compressive strength specified in the relevant clauses of BS534.

(4) In-situ applied linings

(a) Standard:

Shall be carried out generally in accordance with the provisions of the latest issue of AWWA C602 for “Cement Mortar Lining of Water Pipeline - 4 in (100mm) and larger - In Place”, subject to the modifications, amendments and amplifications in this Specification.

(5) Lining of Specials

Bends, tees and other specials than cannot be lined by machine shall be manually lined. In case where the nominal diameter exceeds 600 mm the lining shall be reinforced by steel mesh tack-welded to the inside of the pipe in such a way that it is not in contact with the pipe except where welded. The steel mesh shall be of 2,5 mm diameter steel wire at 100 mm x 50 mm, or equivalent spacing. The minimum cover over the mesh shall be 10 mm.

(6) Finish

The lining shall be well finished with a smooth surface free from excessive laitance and surface

irregularities. Projections exceeding a height of 1,5 mm shall be removed by trowelling before the concrete has set, or by grinding after the lining has cured.

The thickness of the laitance, if any, shall not exceed 105 of the thickness of the lining, or 1,25 mm, whichever is less.

The effective surface roughness of the lining when measured in terms of the Colebrook-White "K" friction coefficient for lining surface effective roughness shall be guaranteed by the suppliers and shall not be more than 0,13 mm when actually measured in the field after completion of the pipeline. No rougher surface will be acceptable.

(7) Curing

(a) Water Curing

Immediately after the placing of the concrete, the pipe shall be so sealed as to prevent loss of contained water, and the concrete shall be kept continuously moist for a period of at least 7 days. During this period steps shall be taken, when necessary, to prevent the temperature of the steel shell facing falling below 2 degrees C.

(b) Steam Curing

Pipes that have shop applied linings, and that have not been coated with bitumen or coal tar may be steam cured.

Immediately after application of the concrete lining, the ends of the pipe shall be completely sealed. After the lined pipe has been standing for not less than 2 hours, steam shall be injected into it so as to raise the temperature at a rate not exceeding 28 degrees C per hour until the temperature of the lining is within the range 55 -70 degrees C. Steaming shall continue for a further 6 hours, the temperature of the lining being maintained within the range specified.

Steaming shall be discontinued and the pipes shall remain sealed for a further 2 days from the time that the temperature of the pipe has fallen to ambient. During this period precaution shall be taken to prevent the temperature of the steel falling below 2 degrees C.

During the curing cycle, excluding the 2 day holding period, the temperature of at least one pipe out of that day's production, shall be recorded by a suitable automatic recording instrument. If the temperature record reveals that the requirements set out above have not been achieved, then the pipes shall be subjected to the full period of water curing as specified above.

(c) General

Concrete lined pipes shall not be transported for a period of 10 days after the date of lining.

(9) Pipe Ends

Where lining takes place before welding, i.e. not in-situ but on site or in the shop, the following shall apply:

(a) For flanged pipes and specials and pipes intended for jointing by couplings and bell mouth welding, concrete lining shall be ended flush with pipe ends with a 6 mm bullnosing of edges by means of a nosing tool.

(b) For pipes to be butt welded, the lining shall terminate 100 mm from the internal end of each pipe and the end of the lining shall be bevelled to form an angle of approximately 85 degrees between the clear end of the pipe barrel and the lining end. The unlined surface of 100 mm wide from each end, may be protected by strips of pressure sensitive plastic tape, firmly pressed into the surface to exclude all air and moisture, and to give temporary protection between the work and butt welding on the site.

(10) Repair of Defects

All defective concrete shall be removed and the surrounding area of concrete chipped back to a position where the concrete is firmly bonded to the steel. The edges of the firm surrounding concrete shall be bevelled to form an angle of 85 degrees with the portion of pipe barrel under repair. The pipe surface shall be cleared from all signs of concrete and dust. The pipe surface and surrounding concrete shall then be given one coat of cement/water grout and the fresh mortar applied by hand while the grout coat is still wet. The mortar shall be of the same mix and consistency as the lining. The repair area shall be built up to the full thickness of the lining, care being taken to ensure complete filling of the bevelled edges with the mortar.

PSL.3.9.7 Corrosive Protection of Buried Flanged and Flexible Joints (New clause)

All buried flanges and flexible joints shall, in addition to being epoxy coated, be protected as described below. This specification is based on a "Denso" system. Alternative products will be subject to the approval of the Engineer.

Surface Preparation

The entire joint and at least 500 mm of pipe either side of the joint shall be cleaned of mud and other deleterious matter.

Priming

The cleaned joint and pipe shall be primed with "Denso Priming Solution", or if moisture is present, "Denso S105 Paste". The priming shall extend to at least 400 mm beyond either side of the joint.

Application of Mastic Blankets

Narrow strips cut from "Denso Mastic Blankets" shall be applied to the joint to achieve a smooth profile with a 50 mm splayed fillet being formed at the joint/pipe interface. Care shall be taken, particularly at bolts, to avoid the formation of air pockets. Complete "Denso Mastic Blankets" shall then be applied (mastic side down) to the joint until the joint is completely enveloped.

The blanket shall be overlapped at least 50 mm and the blanket shall extend at least 150 mm along the barrel of the pipe on each side of the joint. The ends of the blanket shall be bound to the barrel of the pipe on each end with 100 mm side "Denso Tape". "Denso Tape" overlaps shall be 500 mm and shall extend 100 mm onto the blanket and 150 mm onto the pipe barrel.

Application of Protective Sheeting

The entire joint shall be wrapped with 350 micron polyethylene sheeting which shall end 400 mm beyond the joint. The protective sheeting shall be secured to the pipe barrel and along the seam with 48 mm wide "Denso Adhesive Tape".

PSL.3.9.8 Internal Repairs – Cement-mortar Lined Pipes (New clause)

1. The internal surface of the bellmouth shall be power or hand wire brushed from the pipe end to the cement mortar lining to remove dirt, scale, rust and other foreign matter.

2. Any grease and oil shall be removed from the pipe surface with a non-volatile solvent (eg “Aquasolve”, “Arc Nr 261 Safety Solvent Cleaner” or similar approved). The surface shall then be cleaned with water and dried and a 50 mm wide x 20 mm thick band of “Epidermix 338” or similar approved shall be applied internally on the uncoated steel adjacent to the cement lining.

3. The plain end of the adjoining pipe shall be pushed into the bellmouth in such a way that the Epidermix band is compressed and makes contact with the transverse face of the concrete lining of both pipes. The excess lining material which is squeezed into the pipe shall be removed by drawing a plug which is 5 mm smaller in diameter than the bore of the pipe, across the joint. The plug shall be so shaped as to apply a smooth even surface to the lining material at the joint.

b) Pipes larger than 500 mm diameter

1. The exposed steel surface shall be power or hand wire brushed to remove dirt, scale, rust and other foreign matter. Burrs, weld spatter etc shall be filed away.
2. Any grease and oil shall be removed from the pipe surface with a non-volatile solvent (eg "Aquasolve", "Arc Nr 261 Safety Solvent Cleaner" or similar approved), flushed with potable water and completely dried.
3. The joint shall then be made good with "Epidermix 338" or similar approved, neatly formed to meet the adjacent cement mortar.
4. The requirements of Clause C (a).4 shall similarly apply to pipes larger than 500 mm diameter.

PSL.3.9.9 **Cathodic Protection** (New Clause)

A provisional sum has been allowed in the Schedule of Quantities to provide for a cathodic protection survey to be undertaken and for cathodic protection to be installed. The survey will be undertaken once the pipeline has been laid and protection will be installed as recommended by the survey.

Precise details of the location of elements of the Cathodic Protection System will be confirmed by the Engineer's Instructions on site, but the following points are noted:

a) Continuity bonding is required around all in-line valves.

b) Monitoring test points are to be installed in the line valve chambers, where shown.

c) Insulating flanges are required at all inlet and outlet pipes positions as indicated on the drawings. These are to be fabricated to the dimensions and details shown.

d) Continuity bonds will be created using ISO 14555 stud welding (Tip Discharge Technique)

e) Valve chambers shall be cross, and continuity bonded outside using two 16mm^2 PVC/PVC (black) SANS 1507 certified cable.

PSL 3.10 VALVES (CLAUSE 3.10)

Replace clause 3.10 with the following: -

All valves or meters fitted to the pipework shall be in accordance with Particular Specification PH

PSL4.1 HANDLING AND RIGGING

Add new Sub-Clause:

Strict supervision shall be maintained by the Contractor at all times when handling pipes and equipment. Equipment is to be lifted at the recommended points specified by the manufacturer. Pipe is to be lifted with a spreader bar and slings. Due care shall be taken when fitting and placing slings to ensure that ancillary items do not get crushed during lifting. Pipe coating is to be protected by padding or otherwise from scuffing damage during lifting.

It is prohibited to handle pipes with chains or any other device involving metal contact with the pipe coating.

PSL 5 CONSTRUCTION (CLAUSE 5)

PSL 5.1 LAYING

PSL5.1.1 General (Sub-Clause 5.1.1)

Add New Sub-Clause:

Pipe laying personnel: The laying of pipes and ancillary fittings shall be performed only by a qualified person who is registered as an artisan in the plumbing, pipe fitting, or drain laying trade or who is

qualified by reason of having attended and passed the course on pipe laying of the Civil Engineering Industry Training Board. The Contractor shall provide proof of this requirement.

PSL5.1.4 Keeping Pipelines Clean

Add the following:

The end cap must be able to withstand a pressure of 5 m head of water externally when fitted.

PSL.5.1.3.1 Cleaning of Valves and Fittings (Additional Sub-Clause 5.1.3.1)

Add New Sub-Clause:

All flanges, valves, fittings and equipment are to be installed in pipe work only after they have been thoroughly cleaned. Flange faces shall be approved by the engineer before being incorporated into the permanent works.

PSL.5.1.4.2 Pipe Radii (Sub-Clause 5.1.4.2)

Add the following: -

Where rigid pipes have been indicated as being laid to radii the maximum deflection angle at any flexible coupling may be no more than 50% of that permissible deflection as specified by the manufacturer for that diameter and class coupling.

Where uPVC pipes have been indicated as being laid with radii to accommodate changes in grade or horizontal alignment these radii must be taken up over a minimum of 3 pipe lengths for deflection angle less than 9º and one extra pipe length per 3º thereafter.

JOINTING METHODS

PSL5.2.2 Flanged Joints (Sub-Clause 5.2.2)

Add to Sub-Clause:

Flanges to fittings or joints will generally be to SANS 1123. It is possible, however, that the Employer may supply valves with flanges which have not been drilled according to these standards. The Contractor shall be responsible for checking the flange drilling of all fittings supplied by the Employer and for supplying flanges drilled to match. No additional payment is to be made for this work and the Contractor is to allow for such in his rates.

Contractors are to allow in the rates for the supply and installation of mild steel pressed washers (two per bolt) for all flanged fittings. The washers shall have an ID of 2 mm greater than that of the bolt. Tenderers are to ensure that the length of the bolt includes allowance for the washers.

All bolts, nuts and washers used are to be electro galvanised and yellow passivated.

PSL 5.2.3 Welding (Steel Pipelines of Diameter 600 mm or greater)

Pipes of 400mm diameter for the project will be welded.

Add the following to L 5.2.3:

<u>Welding Procedures</u>

Prior to the commencement of field welding, welding procedures shall be established and approved by the Engineer and thereafter such welding procedures shall be adhered to during subsequent construction and shall not be altered unless specifically authorised by the Engineer.

Tenderers shall, if required by the Engineer, provide a detailed description of all aspects of the welding technique to be employed both in jointing pipes in assemblies above trench level and in executing in-situ welds whether above or below ground level. The information required shall include a drawing of the prepared end for sleeve or butt-welding of flanges and pipes and shall describe the backing rings which must be removed. Records shall be kept by the Contractor to enable each weld to be subsequently identified with the welder concerned.

Procedure Qualification Tests

Before the Contractor commences routine field welding the procedure tests laid down in API 1104 clause 1.4 shall be carried out.

The minimum number of root bead welds, the minimum number of second bead welders and the type of clamp used (internal or external) shall be given in the description of the welding technique as specified above.

The Contractor shall maintain a record of all welders employed on the works giving particulars of each individual welder's qualification tests carried out in terms of API 1104, the cost of which shall be borne by the Contractor. Qualification testing of welders shall be conducted in the presence of the Engineer or his representative.

Before a welder is employed on tack or root welds, he shall carry out a test tack and root weld on a pipe of the same materials and under conditions as close as possible to those experienced on the actual pipeline.

If icicles are present in the bore of the pipes or the weld metal projects more than 5 mm the welder shall not be permitted to undertake tack or root welding. The completed test weld pieces shall be visually examined and then radiographed. Should the weld appear sound it shall be subjected to approved root and face bend tests. Test pieces shall be retained by the Contractor and marked so that they can be identified with the welder carrying out the test.

Weather

Field welding shall not be performed when the surfaces to be welded are wet or during periods of high wind unless the operator and the work are properly protected and sheltered in an approved manner.

Preparation of Joint

Where scarf cutting of the pipe ends is required in the field the pipe ends shall be prepared by machining or machine flame cutting. Hand flame cutting shall not be permitted except under the following circumstances;

Field Welding

Steel pipes may be cut by hand flame as follows:

(a) In the case of cement lined steel pipe, the cement lining shall be chipped back 50 mm after the initial cut and the pipe then re-cut ±10 mm from the original cut in order to remove any "blow-back".

(b) In the case of epoxy lined steel pipe, all damaged lining shall be removed and reinstated in compliance with the Clause 3.9.2.3.

(c) All flame cuts shall be made good by grinding to form the correct gap between steel sections prior to welding.

(d) Bevels may be cut by flame provided they are made good by grinding.

When jointing pieces by butt-welding the number of tack welds applied shall be kept to a minimum to be effective in holding the pipe ends securely and to maintain the required root gap prior to welding but shall in any case be not less than four.

Double ending of pipework shall not be allowed on 12m pipe lengths.

PSL 5.5 Thrust blocks (5.5)

Add to Clause 5.5:

"The Contractor may not backfill any thrust block until it has been approved by the Engineer in writing.

All anchor blocks to be cured for a minimum of three days before pressuring the pipeline."

PSL 5.10 DISINFECTION OF POTABLE WATER PIPELINES (CLAUSE 5.10)

Add to clause 5.10

Test to SANS 241:2015 shall be conducted on the portable water used to determine the pre-application properties to allow comparisons to be made to the after application results.

Clarification to clause 5.10.c)

The requirements for potable water of the local authority is SANS 241:2015.

PSL5.11 Add to Clause 5.11

Marker posts are to be manufactured, marked and placed as indicated on the drawings. The contractor is to submit a sample for approval prior to mass producing the markers.

PSL 7 TESTING (CLAUSE 7)

PSL 7.1 GENERAL

Add the following to L 7.1:

Inspection

Facilities shall be provided to the Engineer so that he may be able to inspect, during the process of welding, any layer of weld metal. He may require any defective welds either to be cut out and rewelded or repaired at his discretion. The Contractor shall clean thoroughly all welds prior to inspection. The Engineer may require a number of completed joints, selected at random, to be cut for mechanical tests or to be selected for visual inspection, micro examination or examination by other means. When the Engineer orders the Contractor in writing to cut out and test joints the Contractor shall be paid for such work at day work rates.

If as a result of inspection and testing, the work of any welder is found to be unsatisfactory, the welder shall not be permitted to continue welding under this contract.

Standards of Acceptability

The completed welds shall comply with the requirements of clause 6.0 of API 1104. Work on which unauthorised repairs have been carried out may be rejected.

Repairs to Minor Faults

Faulty welds shall be rectified in accordance with clause 7.0 of API 1104.

All costs relative to the repair of faulty joints, including removal and replacement of the backfill and making good the wrapping and lining shall be borne by the Contractor.

PSL 7.2 INITIAL TESTS ON WELDED STEEL PIPES

PSL 7.2.1 Dye-Penetrant Test

Add the following to L 7.2.1:

All fillet welds shall be dye penetrant tested. Any reduction in the percentage of welds to be tested shall be at the sole discretion of the Engineer

PSL 7.2.2 Radiographic Examination

Add the following to L 7.2.2:

All butt welds shall be radiographically tested. Any reduction in the percentage of welds to be tested shall be at the sole discretion of the Engineer.

PSL 7.3 STANDARD HYDRAULIC PIPE TEST

Pressure and Time of Test (Sub-Clause 7.3.1)

Add to the Sub-Clause:

The Contractor shall provide a method statement and testing programme at the beginning of the contract for the approval of the Engineer. The Contractor shall allow in his programme for testing in sections of maximum 1km.

All fittings required on the pipe shall be installed and operational at the time of testing.

PSL 7.3.1 Test Pressure and Time of Test

PSL 7.3.1.1 *Add the following*

Static Test

When the pipeline is filled with water, all scours and hydrants shall be opened fully for one minute or until the water emerges clean.

Pressure Test

A suitable pump shall be connected to the pipeline at a mutually agreed point.

The pressure in the pipeline under test shall be raised slowly by means of the pump and measured by a pressure gauge connected to the pipeline.

The hydraulic testing of the pipelines is to be carried out in two stages:

a) The pressure test as described above, shall be carried out with the pipeline fully blanked and all valves in the open position. All costs relating to this work inclusive of scouring, supplying and installing blank flanges, spade pieces etc are to be included in the rate for testing.

b) On successful completion of the pressure test as per (a) above, the Contractor shall remove all temporary blank flanges, spade pieces, etc. and pressurise the line to maximum working pressure against closed valves. Should any valve not be drop tight at this pressure the Contractor shall advise the Engineer in writing of all defects encountered. The duration of this test shall be 2 hours. (An item has been allowed for this work in the Schedule of Quantities).

All tests shall be carried out in the presence of the Engineer at such times and in such manner as he may direct.

The hydraulic testing of pipelines against closed valves shall not be allowed and provision shall therefore be made by the Contractor for the supply of all necessary bull-noses and blank flanges.

Water for testing shall be made available free of charge in the first instance but for the subsequent tests shall be charged to the Contractor's account.

Water should be available at the tie-in point of the pipe that was already laid. There is however limited capacity in the system and filling of pipelines should be planned with due notice to the operational manager of the scheme.

The Contractor shall, at his own cost, provide a suitable means of conveying water from this connection to the mains to be tested, as well as a connection on the new pipeline in order that it may be filled. This connection shall be capped or removed to the satisfaction of the Engineer upon completion of the hydraulic test. Payment of this shall be allowed for under the rates for the hydraulic testing of the pipeline.

PSL 7.3.1.3 The Contractor should take cognizance of this restriction and will be required to submit a method statement for the testing of the pipe at the beginning of the project.

PSL7.4 TESTS ON EPOXY COATINGS

A DCVG survey shall be carried out on the 400mm diameter 3LPE coated pipe before the issue of the Completion Certificate and the Contractor will be required to repair all defects discovered by the

survey at his own cost.

The cost shall include excavation, repair materials, bedding, backfill and reinstatement to the satisfaction of the Engineer.

The Contractor shall ensure that the full length of the pipe to be placed in the trench is patched and holiday-tested prior to the pipe being laid in the trench. Holiday testing of the joints in the trench shall be carried out on completion of the welding and the required non-destructive testing by the Contractor.

PSL7.5 Commissioning (Additional Sub-Clause 7.5)

Add New Clause:

The pipeline will be considered commissioned and practically complete once all associated structures are sufficiently complete to carry out their structural and/or hydraulic function, the hydraulic test of the entire pipeline is successfully complete and the disinfection process has been successfully concluded.

PSL.8 MEASUREMENT AND PAYMENT (CLAUSE 8)

Add new clause 8.1.1

A maximum payment of 80 % of the tendered rate shall be made for the completed section of pipeline and fittings which has not yet been hydraulically pressure tested and disinfected. A further payment of 10% of the tendered rate will be made upon successful completion of the pressure testing for the relevant section of pipeline. The final 10% of the tendered rate will be made upon completion of disinfection of the pipeline. These payments will themselves be subject to the deduction of overall retention in accordance with the conditions of contract.

PSL.8.2.1 Amend Clause 8.2.1 as follows:

In the fourth sentence after "…pipes complete with couplings," add " linings and coatings"

PSL.8.2.2 EO for the Supply, Laying and Bedding of Specials (Sub-Clause 8.2.2)

Add to the Sub-Clause:

The rates tendered shall cover the cost extra over item 8.2.1 for supplying in accordance with PSL.3.4.4 including design, galvanizing, internal lining and external coating, transport, handling, installing, supporting and hydraulic testing for:

a. In Line Tees
b. In Line Reducers
c. In Line Elbows and Bends
d. In Line Flanges
e. Other In Line Specials such as spacers, spool pieces, etc. as specified.

The rate will also be inclusive of gaskets, fasteners, washers, bolts, nuts, painting and field wrapping of joints.

The Contractor will only receive payment for a scarfed bend if the pipe is cut to fabricate the scarf bend.

PSL.8.2.11 Thrust Blocks

Add to clause 8.2.11

"The rate for concrete will include the additional excavation required to achieve sizing requirements"

PSL.8.2.17 Pipe Marker Posts

Add New Sub-Clause:

a. Pipeline marker posts ..... Unit : No

The standard marker post rate shall include the supply and erection of painted, inscribed posts as detailed on the drawings and positioned as indicated by the Engineer on site. The rate shall be inclusive of erection and shall include for all necessary excavation, mass concrete footing and formwork.

PSL.8.2.18 Working in Sleeves

Add New Sub-Clause:

a. Extra Over for Pipe Laying in Sleeves ..... Unit : No

The rate shall cover the costs for fabrication and attachment to pipe of skids to pipe, including making good of coatings and linings, extra trench width and associated extra excavation and backfill, concrete sleeve and grouting.

b. Grouting of sleeved pipes ..... Unit m^3

The volume measured will be the volume contained by the internal diameter of the sleeve for the length of the sleeve and subtracting the volume of the installed pipe or pipes.

Separate items will be scheduled for each type of grouting to be applied.

The rate will cover the costs to supply, mix, inject, place and contain at the ends of the sleeve a grout mixture as described in the scheduled item.

PSLB PIPE BEDDING (SANS 1200LB)

PSLB.3 MATERIALS (CLAUSE 3)

PSLB.3.1SELECTED GRANULAR MATERIAL (CLAUSE 3.1)

In the second line delete "19 mm" and substitute "6,7 mm".

PSLB.5 CONSTRUCTION (CLAUSE 5)

PSLB.5.1GENERAL (SUB-CLAUSE 5.1)

PSLB.5.1.4 COMPACTING (CLAUSE 5.1.4)

In the second line substitute “90%” with “93%”

Add to Sub-Clause 5.1.4:

No heavy compaction equipment will be permitted for compaction of any bedding above the pipeline. Impact pressures from compaction effort above flexible pipes will remain less than 100kPa. The use of complete saturation of the material as a method of achieving the specified compaction may, subject to the Engineer's approval, be used. However, in this regard, the risk of floatation of the pipe remains the Contractors risk.

Prior to the commencement of pipe laying the Contractor will be required to submit, to the Engineer, for his approval, his proposed methods of placing, and compacting methods which he proposes to implement in order to ensure compliance with the specification.

PSL 5.3 PLACING AND COMPACTING OF FLEXIBLE PIPE BEDDING (Clause 5.3)

Class C bedding shall be used for all flexible pipes unless otherwise specified or detailed.

PSLB.5.2.5 STONE DRAINAGE LAYER BENEATH BEDDING (ADDITIONAL SUB-CLAUSE)

Add new Sub-Clause:

Where indicated on the drawings, or as otherwise indicated by the Engineer, a layer of commercially sourced single sized 19/13 mm stone shall be placed beneath the bedding layer to act as a drainage channel for excessive groundwater. This layer shall be wrapped in “Bidim GRADE A4 or similar” geofabric filter surround extending the full width of the trench and provided with outlet pipes if and where indicated.

PSLB.5.3PLACING AND COMPACTING OF FLEXIBLE PIPES (SUB-CLAUSE 5.3)

Class C bedding shall be used for all flexible pipes unless otherwise specified or detailed.

PSLB.8 MEASUREMENTAND PAYMENT (CLAUSE 8)

PSLB.8.1 PRINCIPLES (CLAUSE 8.1)

PSLB.8.1.3 Volume of Bedding materials (Sub-Clause 8.1.3)

Add the following to Clause 8.1.3

The volume of the bedding will exclude the volume of the pipe.

The length of bedding will exclude structures with dimensions of more than 1 000mm parallel to the pipeline.

PSLB.8.2SCHEDULED ITEMS (CLAUSE 8.2)

In all parts of Clause 8 replace the words

“within a freehaul distance of 0,5km”

with

“within the freehaul distance”

PSLB8.2.1 Provision of Bedding from Trench Excavations

The rate for a, b and c shall include costs for the grading analysis tests.

All costs for providing the water required for the saturation of the material, temporary retaining measures to prevent backfill material from " flowing " away from point of application, and or retaining measures to terminate a specific backfill section for whatever reason, shall be deemed to be included in the tendered rates for supply, place and compact of bedding material.

PSLB8.2.2.3 Supply of Bedding by Importation from commercial sources

Add to sub clause 8.2.2.3

c. 19,0mm single size stone..... Unit: m³

The rate for item c) will include for the additional handling to place the stone into the drain.

The rate for a, b and c shall include costs for the grading analysis tests.

All costs for providing the water required for the saturation of the material, temporary retaining measures to prevent backfill material from " flowing " away from point of application, and or retaining measures to terminate a specific backfill section for whatever reason, shall be deemed to be included in the tendered rates for supply, place and compact of bedding material.

The additional excavation for stone drains will be measured as removal of unsuitable excavation below the bottom of the trench. The stone filling will be paid for per cubic metre and the geofabric filter will be paid for per square metre. All measurements in this connection will be to a width equal to the widths described in SANS1200DB clause 5.5 and depths as ordered. Overlap for geofrabric will be assumed to be 200mm.

PSLB8.2.6 Supply only of Geofabric

d. Non woven polyester Grade A4 geofabric (Provisional) ..... Unit: m²

The unit of measurement shall be measured in accordance with the authorized dimensions.

The rate shall include for the supply, delivery to the trench, handling and placing of the geofabric. The rate will include for any wastage.

PSLB8.2.7 Extra Over item 8.2.1 for sieving or screening

e. For yield over 80% m3
f. For yield between 60% and 80% m3
g. For yield between 40% and 60% m3

The unit of measurement shall be the cubic meter (m³) of bedding produced, measured in accordance with the authorized dimensions on the drawings. Yield will be determined as volume of bedding produced divided by volume of material applied to the sieve, this done at sample points of maximum 250m apart of sample size of minimum 2 wheelbarrow loads.

The tendered rate shall be deemed full compensation for additional sieving of material excavated from the trench, required to meet bedding grading requirements.

[Category]

ANNEXURE C3.B: PARTICULAR SPECIFICATIONS

PA	LABOUR INTENSIVE SPECIFICATIONS	134
PB	SMALL CONTRACTOR DEVELOPMENT	145
PC	HIV/AIDS REQUIREMENTS	166
PD	HEALTH AND SAFETY SPECIFICATION	179
PE	ENVIRONMENTAL MANAGEMENT PLAN	180
PF	PARTICULAR SPECIFICATION FOR VALVES	181
PG	PARTICULAR SPECIFICATION FOR PUMPS	192
PH	PARTICULAR SPECIFICATION FOR ELECTRICAL WORKS	195

PA LABOUR INTENSIVE SPECIFICATIONS

PA.1 GENERIC LABOUR INTENSIVE SPECIFICATION

PA.1.1 SCOPE

This specification establishes general requirements for activities which are to be executed by hand involving the following:

a. trenches having a depth of less than 1.5 meters
b. storm water drainage
c. low-volume roads and sidewalks

PA.1.2 PRECEDENCE

Where this specification conflicts with any other standard or specification referred to in the Scope of Works to this Contract, the requirements of this specification shall prevail.

PA.1.3 HAND EXCAVATEABLE MATERIAL

Hand excavatable material is material:

a. granular materials:
    i. whose consistency when profiled may in terms of table 1 be classified as very loose, loose, medium dense, or dense; or
    ii. where the material is a gravel having a maximum particle size of 10mm and contains no cobbles or isolated boulders, no more than 15 blows of a dynamic cone penetrometer is required to penetrate 100mm;

b. cohesive materials:
    i. whose consistency when profiled may in terms of table 1 be classified as very soft, soft, firm, stiff and stiff / very stiff; or
    ii. where the material is a gravel having a maximum particle size of 10mm and contains no cobbles or isolated boulders, no more than 8 blows of a dynamic cone penetrometer is required to penetrate 100mm;

Note:

A boulder is solid particles larger than 200mm. A cobble is solid particles between 60 and 200mm. Gravel is solid particles between 4 and 60mm

A dynamic cone penetrometer is an instrument used to measure the insitu shear resistance of a soil comprising a drop weight of approximately 10kg which falls through a height of 400mm and drives a cone having a maximum diameter of 20mm (cone angle of 60º with respect to the horizontal) into the material being used.

Consistency of Materials when Profiled

GRANULAR MATERIALS		COHESIVE MATERIALS	
CONSISTENCY	DESCRIPTION	CONSISTENCY	DESCRIPTION
Very loose	Crumbles very easily when scraped with a geological pick.	Very soft	Geological pick head can easily be pushed in as far as the shaft of the handle.
Loose	Small resistance to penetration by sharp end of a geological pick.	Soft	Easily dented by thumb; sharp end of a geological pick can be pushed in 30-40 mm; can be moulded by fingers with some pressure.
Medium dense	Considerable resistance to penetration by sharp end of a geological pick.	Firm	Indented by thumb with effort; sharp end of geological pick can be pushed in upto 10 mm; very difficult to mould with fingers; can just be penetrated with an

			ordinary hand spade.
Dense	Very high resistance to penetration by the sharp end of geological pick; requires many blows for excavation.	Stiff	Can be indented by thumb-nail; slight indentation produced by pushing geological pick point into soil; cannot be moulded by fingers.
Very dense	High resistance to repeated blows of a geological pick.	Very stiff	Indented by thumb-nail with difficulty; slight indentation produced by blow of a geological pick point.

PA.1.4 COMPACTION OF BACKFILLING TO TRENCHES (AREAS NOT SUBJECT TO TRAFFIC)

Backfilling to trenches shall be placed in layers of thickness (before compaction) not exceeding 100mm. Each layer shall be compacted using hand stampers:

a. to 93% MOD AASHTO density;
b. such that in excess of 5 blows of a dynamic come penetrometer (DCP) is required to penetrate 100 mm of the backfill, provided that backfill does not comprise more than 10% gravel of size less than 10mm and contains no isolated boulders, or
c. such that the density of the compacted trench backfill is not less than that of the surrounding undisturbed soil when tested comparatively with a DCP.

PA.1.5 EXCAVATION

All material in trenches and elsewhere having a depth of less than 2.0 metres including topsoil classified as hand excavatable shall be excavated by hand. Harder material may be loosened by mechanical means prior to excavation by hand.

The excavation of any material which presents the possibility of danger or injury to workers shall not be excavated by hand.

PA.1.6 CLEARING AND GRUBBING

Grass and small bushes shall be cleared by hand.

PA.1.7 SHAPING

All shaping shall be undertaken by hand.

PA.1.8 LOADING

All loading shall be done by hand, regardless of the method of haulage.

PA.1.9 HAUL

Excavation material shall be hauled to its point of placement by means of wheelbarrows where the haul distance is not greater than 150 m.

PA.1.10 OFFLOADING

All material, however transported, is to be off- loaded by hand, unless tipper-trucks are utilized for haulage

PA.1.11 SPREADING

All material shall be spread by hand.

PA.1.12 COMPACTION

Small areas may be compacted by hand provided that the specified compaction is achieved.

PA.1.13 GRASSING

All grassing shall be undertaking by sprigging, sodding, or seeding by hand.

PA.1.14 MANUFACTURED ELEMENTS

Elements manufactured or designed by the Contractor, such as manhole rings and cover slabs, precast concrete planks and pipes, masonry units and edge beams shall not individually, have a mass of more than 320kg. In addition the items shall be large enough so that four workers can conveniently and simultaneously acquire a proper hand hold on them.

PA.1.15 STONE PITCHING AND RUBBLE CONCRETE MASONRY

All stone required for stone pitching and rubble concrete masonry, whether grouted or dry, must to be collected, loaded, off loaded and placed by hand.

Sand and stone shall be hauled to its point of placement by means of wheelbarrows where the haul distance is not greater than 150m.

Grout shall be mixed and placed by hand.

PA.2 EPWP SPECIFICATION

PA.2.1 Requirement of expanded public works programme

PA.2.2 EPWP Special Project Specification

The “Guidelines for the Implementation of Labour-Intensive Infrastructure Projects under the Expanded Public Works Programme (EPWP)” shall apply.

PA.2.3 Employment of unskilled and semi-skilled workers in labour intensive works

PA.2.4 Requirements for the sourcing and engagement of labour

Unskilled and semi-skilled labour required for the execution of all labour intensive works shall be engaged strictly in accordance with prevailing legislation and SANS 1914-5, Participation of Targeted Labour.

PA.2.5 The minimum rate of pay set for the EPWP is not the prescribed rate of pay on this contract and the contractor will need to negotiate with the labour in this respect, taking guidance from the legislative minimum wage for the Construction Industry.

PA.2.6 Tasks established by the contractor must be such that:

a. the average worker completes 5 tasks per week in 40 hours or less; and
b. the weakest worker completes 5 tasks per week in 55 hours or less.

PA.2.7 The contractor must revise the time taken to complete a task whenever it is established that the time taken to complete a weekly task is not within the requirements of PB2.2.3.

PA.2.8 The Contractor shall, through all available community structures, inform the local community of the labour intensive works and the employment opportunities presented thereby. Preference must be given to people with previous practical experience in construction and / or who come from households:

a. where the head of the household has less than a primary school education;
b. that have less than one full time person earning an income;
c. where subsistence agriculture is the source of income.
d. those who are not in receipt of any social security pension income

PA.2.9 Use of local labour

a. The funds for this project have been made available by The Municipal Infrastructure Grant Programme (MIG) through the King Cetshwayo District Municipality, the condition being that as much local labour is used where possible. For this project only the contract manager and key personnel shall be imported. All the other labour shall be from the local community. Special Conditions of Contract which indicate the minimum requirements in terms of employment targets and reporting, must be fully complied with. The rates tendered by the contractor will be assumed

to have specifically included for these terms.

b. The contractor will during the period allowed for site establishment directly after the introductory meeting with the community, set up a meeting with the Labour Desk, which meeting must be scheduled prior to the date of physical commencement of the works. The purpose of this meeting is to maximize the use of local labour force for any task on the project for which local expertise might be available.

c. To achieve this, the contractor shall at the introductory meeting, having completed his preliminary planning for the project, submit to the Chairman of the Labour Desk a list of possible people that could be utilized on the project.

d. At the first meeting following the introductory meeting referred to in the first paragraph, the Labour Desk will submit the names and details of labourers from the local community complying to the contractor's requirements. The contractor will during the period of site establishment and before the commencement of any physical work allow for three consecutive meetings with the Labour Desk and local people in order to interview candidates and to negotiate suitable rates. Each meeting must be minuted and an attendance register kept. The contractor must through this exercise prove that he has exhausted all means to maximize the use of local labour.

e. A specific item for this exercise is allowed for in the fixed cost section of the Preliminary and General section. The contractor must further allow in his construction programme a specific item for this exercise since no construction work will commence prior to completing these. This task may however run concurrent with the time allowed for general site establishment. In programming this task, the contractor must take cognizance of local customs and the speed at which communication in these rural communities takes place. A minimum period of three weeks is recommended for this task, but the contractor must make his own estimate in this regard.

f. The engineer will certify no payment under the above item unless the minutes of each meeting mentioned above, together with attendance registers, are submitted to the engineer.

g. The engineer or facilitator or duly authorized representative from either the engineer or the facilitator might attend these meetings as an observer, but will not be involved in any recruitment, negotiations or sub-contract price negotiations whatsoever.

PA.2.10 Community Liaison Officer (CLO)

a. It may be required of the Contractor to appoint a Community Liaison Officer for the duration of the contract. This person will be a resident of the area and will be sourced in conjunction with and appointed with the approval of the local community structures, the Engineer and the Employer.

b. The function of the Community Liaison Officer will in brief be to keep residents and consumers fully informed of the extent, programme and duration of the contract at all times, as well as all planned interruptions to supply, whilst all complaints and enquiries by residents, consumers or the public at large are to be directly communicated to him for attendance by the Contractor. Payment will be effected as measured on a monthly basis.

c. The Ward Councillor shall generally be responsible for the selection of the CLO. The Ward Councillor in whose ward work is to be done will identify a community liaison officer for the project and make that person known to the contractor within two days of being requested to do so. The selected CLO will be accountable to the Contractor.

d. The CLO shall be employed on a full day basis, for the duration of the contract. When not undertaking specific CLO duties, the CLO will be expected to undertake any other work allocated by the Contractor.

PA.2.11 The minimum skills for a CLO shall include:

a. An ability to work with others

b. An ability to communicate in English and Zulu

c. An ability to communicate in writing

d. Sound interpersonal skills

Previous experience in community facilitation, knowledge of construction work and relevant labour legislation would be an advantage.

The contractor will be required to enter a written contract with the CLO that specifies:

a. The hours of work and the wage rate of the CLO (200% of the Civil Engineering Industry minimum wage rate)
b. The duration of the appointment
c. The duties to be undertaken by the CLO which could include
    i. Assisting in all respects relating to the recruitment of local labour and advising them of their rights.
    ii. Acting as a source of information for the community and councillors on issues related to the contract.
    iii. Keeping the contractor advised on community issues and issues pertaining to local security.
    iv. Assisting in setting up any meeting or negotiations with affected parties.
    v. Keeping a site diary of any labour or community issue that may arise.
    vi. Any other duties that may be allocated by the contractor.
    vii. Monitoring and reporting on general Health and Safety issues on site.
    viii. Assisting in AIDS/HIV awareness programmes.

It must be noted that the CLO has no authority to issue any instructions to the Contractor.

Responsibility for the identification of a pool of suitable labour shall rest with the CLO, although the contractor shall have the right to choose from that pool. The contractor shall have the right to determine the total number labourers required at any one time and this may vary during the contract.

The Contractor shall have the right to replace labour that is not performing adequately. Should occasion arise, it must be done in conjunction with the CLO.

The CLO needs to be seen as neutral by all parties and therefore should endeavour not to take sides should a conflict arise.

PA.2.12 Specific provisions pertaining to SANS 1914-5

PA.2.13 Definitions

Targeted labour: Unemployed persons who are employed as local labour on the project.

PA.2.14 Contract participation goals

There is 40% contract participation goal for the contract.

The wages and allowances used to calculate the contract participation goal shall, with respect to both time-rated and task rated workers, comprise all wages paid and any training allowance paid in respect of agreed training programmes.

PA.2.15 Terms and conditions for the engagement of targeted labour

Further to the provisions of clause 3.3.2 of SANS 1914-5, written contracts shall be entered into with targeted labour.

PA.2.16 Variations to SANS 1914-5

The definition for net amount shall be amended as follows: Financial value of the contract upon completion, exclusive of any value added tax or sales tax which the law requires the employer to pay the contractor.

The reporting schedule shall in addition reflect the status of targeted labour as women, youth and persons with disabilities and the number of days of formal training provided to targeted labour.

PA.2.17 Training of targeted labour

PA.2.18 The contractor shall provide all the necessary on-the-job training to targeted labour to enable such labour to master the basic work techniques required to undertake the work in accordance with the requirements of the contract in a manner that does not compromise worker health and safety.

PA.2.19 The cost of the formal training of targeted labour, will be funded by the provincial office of the Department of Labour. This training should take place as close to the project site as practically possible. The contractor, must access this training by informing the relevant provincial office of the Department of Labour in writing, within 14 days of being awarded the contract, of the likely number of persons that will undergo training and when such training is required. The employer must be furnished with a copy of this request.

PA.2.20 A copy of this training request made by the contractor to the DOL provincial office must also be faxed to the EPWP Training Director in the Department of Public Works – Cinderella Makunike, Fax Number 012 328 6820 or email cinderella.makunike@dpw.gov.za Tel: 083 677 4026

PA.2.21 The contractor shall be responsible for scheduling the training of workers and shall take all reasonable steps to ensure that each beneficiary is provided with a minimum of six (6) days of formal training if he/she is employed for 3 months or less and a minimum of ten (10) days if he she is employed for 4 months or more.

PA.2.22 The contractors shall do nothing to dissuade targeted labour from participating in the above mentioned training programmes.

PA.2.23 An allowance equal to 100% of the task rate or daily rate shall be paid by the contractor to workers who attend formal training, in terms of PB2.4.4 above.

Proof of compliance with the requirements of PB2.4.2 to PB2.4.6 must be provided by the Contractor to the Employer prior to submission of the final payment certificate.

PA.2.24 Extended Public Works Programme apparel, tools and safety

PA.2.25 Apparel and tools for EPWP workers

The Employer's Agent will provide each EPWP worker with two orange overalls with markings as specified by the EPWP programme manager.

A list of all apparel and tools to be provided to each NYS worker shall be provided to the Contractor by the EPWP programme manager after consultation with the training provider and the Contractor.

The Contractor shall provide the EPWP workers with all such listed tools and apparel necessary for their on-site work, including appropriate safety apparel, as well as with safe storage facilities on site, the cost of which shall be refunded to the Contractor through the provisional sums included in the Schedule of Quantities for this purpose. The EPWP workers shall be responsible for the safe on-site storage of all tools and apparel issued to them, using the storage facilities provided on site by the Contractor.

Certain specified apparel and tools issued to the EPWP workers will become the property of the EPWP workers after the completion of their cycle of work on the project, in order to enable them to continue to practise their trade on future projects. Such apparel and tools shall be specified and authorised by the Employer's Agent.

PA.2.26 Personal & Other Protective Equipment (Sections 8/15/23 of the OHS Act)

The Contractor is required to identify the hazards in the workplace and deal with them. He must either remove them or, where impracticable take steps to protect workers and make it possible for them to work safely and without risk to health under the hazardous conditions.

Personal Protective equipment (PPE) should, however, be the last resort and there should always first be an attempt to apply engineering and other solutions to mitigating hazardous situations before

the issuing of PPE is considered.

Where it is not possible to create an absolutely safe and healthy workplace the Contractor is required to inform employees regarding this and issue, free of charge, suitable equipment to protect them from any hazards being present and that allows them to work safely and without risk to health in the hazardous environment.

It is a further requirement that the said equipment be maintained by the Contractor, that he instructs and trains the employees in the use of the equipment and ensures that the prescribed equipment is used by the employee/s.

Employees do not have the right to refuse to use/wear the equipment prescribed by the employer and, if it is impossible for an employee to use or wear prescribed protective equipment through health or any other reason, the employee cannot be allowed to continue working under the hazardous condition/s for which the equipment was prescribed but an alternative solution has to be found that may include relocating or discharging the employee.

The Contractor may not charge any fee for protective equipment prescribed by him/her but may charge for equipment under the following conditions:

- Where the employee requests additional issue in excess of what is prescribed
- Where the employee has patently abused or neglected the equipment leading to early failure
- Where the employee has lost the equipment

All employees shall, as a minimum, be required to wear the following PPE on any civil construction projects:

- Protective overalls
- Protective footwear
- Protective headwear (as and when determined by the Safety Officer)
- Eye/face protection (as and when determined by the Safety Officer)

As and when determined by the Safety Officer

- Protective earplugs and earmuffs;
- Respiratory masks;
- Disposable safety apparel;
- Kidney belts;
- Safety harnesses; and
- Any other protective equipment identified.

All PPE provided to local labour working on the Expanded Public Works Programme shall be branded in accordance with the EPWP CI Manual. Typical elements which shall be branded include:

- Protective overalls
- Reflective vests
- Protective headwear

PA.2.27 EPWP signboard

The Contractor will be required to erect a signboard displaying the EPWP logos, indicating that this project is part of the EPWP. All costs related to the provision, erection and subsequent removal of the signboard shall be refunded to the Contractor through the provisional sum included in the Schedule of Quantities for this purpose.

PA.2.28 Job Creation Reporting for EPWP

In order to assist the Employer in complying with the goals of creating EPWP job opportunities, the Contractor must provide the following information for reporting purposes:

PA.2.29 Type of project data required per project

Every EPWP project shall collect and keep specific project data for the purpose of EPWP progress reporting. The data that is required to be kept and maintained for each project includes:

PA.2.30 Beneficiary data

A beneficiary list must be maintained for every project. The data required in this beneficiary list is indicated below. This data shall be recorded, checked and signed off by the Contractor on a weekly basis, and shall be submitted to the Employer at each monthly site meeting. The beneficiary list shall contain the following data and shall be kept and maintained on site for audit purposes:

a. Beneficiary identity – name, surname, initials, date of birth and identity number (or other unique identifier) plus certified copy of ID book (or other unique identifier).
b. Beneficiary profiles – nationality, gender, age, educational level and disability status.
c. Monthly work data for beneficiaries – daily wage to be received, number of calendar days training attended and number of calendar days worked.

PA.2.31 Project work data

This generally seeks to confirm the number of people at work daily on the project. The following data must be recorded and maintained on site by the Contractor, in order that it can be provided by the Employer to the National Department of Public Works upon request when the latter is undertaking sample auditing. The documentation that should be kept includes:

a. Daily attendance register – register for each day showing all the workers that were registered being at work on that day. Attendance registers shall be completed on site on a daily basis and signed off by the Contractor on a weekly basis.
b. Summary of monthly attendance.

PA.2.32 Project payment data

This generally seeks to confirm what was paid, for how much work and to whom. It is required that the Contractor adopt one of the following methods as standard procedure for recording and maintaining this information:

a. Payment register – this is a list of the workers showing the wages paid to each worker, and signed off by each worker as proof of receipt and acceptance of payment. Information on this register must include the name of the worker, either an identity number or other unique identifier, the number of calendar days that the pay period covers, the wage rate and the total wages paid.
b. Alternatively, Bank records showing the transfers to each worker account, signed off by the Contractor as proof of payment – these bank records must specifically show the name of the worker, either an identity number or other unique identifier, the period which the pay covers and the total wages paid.

The project payment data, as recorded and maintained by the Contractor in terms of either (a) or (b) above, must be available and applicable for the entire period for which the Employer claims an incentive reward for person-days of work created in terms of the project.

PA.2.33 Employment output data

a. The Contractor shall submit to the Employer at each monthly site meeting the data necessary to enable the Employer to calculate the following employment output data:Number of work opportunities created (where one work opportunity = paid work created for one individual on an EPWP project, for any period of time).
b. Number of person-days of work created (where one person-day = one day of work carried out by one individual.The total number of person-days of work created on a particular EPWP project shall be obtained by summing the total number of person-days worked by each individual employed during the course of that EPWP project

c. Number of Full Time Equivalents (FTEs) created (= total number of person-days of work created

on the EPWP project divided by 230 working days). In terms of EPWP policy, one year of work created for one individual is assumed to comprise a total of 230 days of paid work carried out by that individual.

d. Average duration of work opportunities created (= total number of person-days of work created on the EPWP project divided by the number of work opportunities created on that EPWP project).

e. Average daily wage rates paid (= accumulated total of the wages paid to all individuals employed on an EPWP project divided by the total number of person-days of work created on that EPWP project).

PA.3 MEASUREMENT AND PAYMENT

The following payment items shall be used to effect the payments for the EPWP programme.

PA.3.1 Payments associated with the EPWP programme:

Item **Unit**

a. Provision of the following

i. Prescribed tools ..... Provisional Sum
ii. EPWP PPE branded apparel ..... Provisional Sum

h. Provision, erection and removal of the EPWP signboard ..... Provisional Sum
i. Handling costs and profit in respect of sub-items (a) & (b) ..... Percentage (%)

The provisional sums provided under sub-items (a) and (b) shall be expended in accordance with Clause 6.6 of the General Conditions of Contract 2015.

The provisional sum under sub-item (a) shall be used to cover all costs associated with the provision of the necessary tools and apparel, including safety apparel, for the EPWP workers, and the facilities for the safe storage thereof, all as authorised by the Employer's Agent.

The provisional sum under sub-item (b) shall be used to cover all costs associated with the provision and erection of the signboard displaying the EPWP logo and indicating that this project is part of the EPWP, all in accordance with the details provided by the EPWP programme manager and as authorised by the Employer's Agent. The provisional sum shall also be used to pay for the removal of the signboard on completion of the contract.

The tendered percentage under sub-item (c) is a percentage of the total amount of expenditure approved by the Employer's Agent under the provisional sum sub-items (a) and (b) and shall include full compensation for attendance by the Contractor, for the handling costs of the Contractor, and for the profit in connection with payments made by the Contractor with respect to the EPWP programme implementation.

The Contractor shall note that no direct payment will be made to cover the Contractor's costs associated with implementing the on-site work programme for the EPWP employees, for planning, organising, directing, controlling and administrating their day to day activities, including the setting of daily tasks, record keeping and any on-site liaison, training and mentoring required, and for the associated job creation reporting, and such costs shall therefore be built into the other rates tendered for the various items of work scheduled throughout the Schedule of Quantities.

PA.3.2 Payments associated with Training for the local workers programme:

a. Provision of training by an accredited training provider including training material in the form of manuals, stationary etc ..... Provisional Sum
b. General Skills Training in reading and interpreting construction drawings and specifications. Batching and mixing concrete by volume. Concrete handling, placing and surface finish ..... Provisional Sum
c. Handling costs and profit in respect of sub-items 2(a) & (b) ..... Percentage (%)

PA.3.3 Compliance with Expanded Public Works Programme (EPWP)

a. Contractor's obligation in respect of compliance with the Expanded Public Works Programme EPWP .....Lump Sum

b. Contractor's time related obligations in respect of compliance with the Expanded Public Works Programme (EPWP) .....Lump Sum

The provisional sum provided under sub-item (a) shall be expended in accordance with Clause 6.6 of the General Conditions of Contract 2015.

The provisional sum under sub-item (a) shall be used to cover all costs associated with the provision of training for the EPWP workers, including the cost of procuring the services of the accredited trainers and their delivery of the training courses to the EPWP workers, and the provision of all training materials including all stationery and study materials.

The rate under sub-item (b) shall be used to cover all costs associated with the provision of training for the EPWP workers, including the cost of procuring the services of the accredited trainers and their delivery of the training courses to the EPWP workers, and the provision of all training materials including all stationery and study materials. Payment shall be made upon the successful training of the EPWP worker and after issue of a Certificate of Training being issued.

The tendered percentage under sub-item (c) is a percentage of the total amount of expenditure approved by the Employer's Agent under the provisional sum sub-items (a) and (b), and shall include full compensation for attendance by the Contractor, for the handling costs of the Contractor, and for the profit in connection with payments made by the Contractor with respect to the provision of training for the EPWP workers.

PA.3.4 COMMUNITY LIAISON OFFICER

a. Provision of CLO ..... Unit: Prov Sum

The unit of measurement shall be the provisional sum. The item shall include costs for provision of the CLO for the duration of the contract and as stated in Part C1.2, Contract Data.

b. Overheads cost and markup ..... Unit: Percent

PRO FORMA Sample Employment Contract

EXPANDED PUBLIC WORKS PROGRAMME

CONTRACT OF EMPLOYMENT BETWEEN

CONTRACTOR

Name:

Address:

ID:

AND

WORKER

Name:

Details:

ID:

I am pleased to confirm that you have been appointed to work on a task based employment contract within a Special Public Works Programme (SPWP) project. Within this employment contract you will undertake numerous groups of tasks.

This employment contract must be read in conjunction with the standard terms and conditions of employment on SPWP attached herewith.

The project where you will be employed is located at……..……..

This employment contract will start on ……..……

You must be aware that this employment contract is a limited term contract and not a permanent job. This employment contract may be terminated for any one of the following reasons:

The contractor does not get additional contracts from the SPWP.

Funding for the programme in your area comes to an end.

You repeatedly do not perform in terms of the tasks set out in your work programme.

You have worked a maximum of 24 months within a 60 month cycle.

You will be employed as a……..…….. within the team.

While you are working you will report to ……..……..

Payment

You will be paid a fixed amount of R…….…….. for completing a fixed amount of work.

The amount of work required for the agreed rate of pay will vary from task to task. You will be informed at the beginning of each task or group of tasks how much work you are expected to complete per day.

You will only be paid for work completed.

In addition to the conditions above, all the terms and conditions of employment on SPWP apply to your employment. If you breach any of these terms your contract may be terminated.

Signatures:

Signed on this ……..…….. day of ……..……..……..

Contractor: ……..……..…… Date: ……..……..……..…...

Worker: ……..……..…… Date: ……..……..……..…...

Witness: ……..……..…… Date: ……..……..……..…...

PB SMALL CONTRACTOR DEVELOPMENT

PB.1 SCOPE

This section covers construction aspects relating to the processes by which the construction industry develops emerging small contractors.

In terms of this contract, the Contractor shall effect such development by subcontracting portions of the Works to Targeted Sub-contractors such that the combined accumulated monetary value of the work undertaken and achieved by such Targeted Sub-contractors equals or exceeds the monetary value of the target set by the Employer for such work.

PB.1.1 Objective

The objective of King Cetshwayo District Municipality's Targeted Procurement Policy is to bring about meaningful transformation in the built environment construction industry through the following:

- Meaningful Economic Participation;
- Transfer of Technical, Management and Entrepreneurial Skills; and
- Creation of sustainable Large Black Sub-contractors

PB.1.2 Targeted Procurement Goals

Targeted Procurement is defined here as the value of goods, services and works to be paid to one or more targeted sub-contractors(s). The targeted procurement goal is specified as a minimum percentage of the net value of the Bill of Quantities. The net value of the Bill of Quantities is the value of the Bill of Quantities exclusive of the following:

- Contingencies
- VAT
- Contract Price Adjustment

a. The Interim Targeted Procurement Goal at any time is 40% of the net value of the interim Bill of Quantities measured at that time.

b. The Interim Targeted Procurement Achieved at any time is the sum of the payments made to the targeted subcontractors at that time expressed as a percentage of the net value of the interim Bill of Quantities measured at that time.

c. The Final Targeted Procurement Goal is 40% of the net value of the Bill of Quantities re-measured at the date of the Certificate of Completion.

d. The Final Targeted Procurement Achieved is the sum of the payments made to the targeted subcontractors up to the date 30 days after the date of the Certificate of Completion.

e. The values of works for targeted procurement exclude any additional work instructed by the Engineer.

f. No work may commence on any part of the work allocated to targeted procurement until a subcontracting agreement with a suitable targeted subcontractor has been signed by both parties.

PB.1.3 Application

The targeted procurement calculation is to be based on the Tender Value (excluding VAT, contingencies and CPA) less the cost of special materials to be procured by the Contractor, but including the Contractor's mark-up value of these materials.

Rates paid to targeted subcontractors must be no less than the rate in the Bill of Quantities.

PB.1.4 Reporting

For each monthly invoice submitted by the main Contractor, on a contract where the targeted procurement is applicable, the split between the Developed Enterprise(s) and the targeted subcontractor(s) hours and costs per function must be clearly articulated to enable the targeted procurement objectives to be easily and regularly monitored.

PB.1.5 Eligibility Criteria

- Tenders that do not offer a minimum targeting of 40% according to the requirements mentioned above will be deemed ineligible.
- CIDB registration is a requirement for both main and targeted subcontractors.
- Eligibility criteria for the Developed and targeted subcontractors shall be separated.
- The onus is on the developed enterprise to ensure that their targeted partner meets the criteria for targeted procurement. The eligible targeted subcontractors shall be nominated from the CSD within the KCDM boundaries.

PB.1.6 Eligibility criteria for Targeted Procurement

- Developed enterprise must not have equity holding, either directly or through a 'flow through' principle.
- At least three targeted subcontractors shall be utilized. Of these at least one shall have a CIDB grading of maximum 4CE, at least one shall have a CIDB grading of maximum 6ME or 6EP, and one may have a CIDB grading of maximum 7ME or 7EP.
- Registered on the Central Supplier Database (CSD).
- Must be at least 51% black owned

PB.1.7 Documents to be utilized to enable evaluation of Tenders

Tenderers must refer to schedule RS020.

PB.1.8 Monitoring of Contractual Obligations

a. Agreement between developed and targeted subcontractor to be submitted within 30 days from date of award clearly providing detailed work packages to be performed by the targeted subcontractors;
b. Payment Certificates from the targeted subcontractor indicating work packages performed to be submitted to the Engineer monthly;
c. Site visits

Interviews will be conducted by the Employer with targeted partner's staff to cover:

- Confirmation that targeted partner has been paid for services rendered
- Confirmation of skills transfer
- Performance management
- Penalties for not achieving the minimum targeted procurement goals.
- The Contractor shall make available to the Employer all necessary payment records and statements to demonstrate that payments to targeted subcontractor have been made. Payments will be deemed not to have been made in the absence of such documentation.
- The interim penalty will be 50% of the shortfall between Interim Targeted Procurement Achieved and the Interim Targeted Procurement Goal.
- The final penalty will be 50% of the shortfall between the Final Targeted Procurement Achieved and the Final Targeted Procurement Goal.
- If the interim penalty exceeds the final penalty, the difference will be refunded.

PB.2 APPLICABLE LEGISLATION

The following Acts, as amended from time to time, are predominant amongst those which apply to the construction industry and are listed here for reference purposes only:

- The Constitution of South Africa;
- Public Finance Management Act No. 1 of 1999;
- Preferential Procurement Policy Framework Act No. 5 of 2000;
- Construction Industry Development Board Act No. 38 of 2000;
- Broad-Based Black Economic Empowerment Act No. 53 of 2003.

PB.3 TARGETED SUB-CONTRACTING

PB.3.1 Objective

Government's objective for this contract in terms of its broad-based black economic empowerment initiatives is to develop emerging small contractors that qualify as Targeted Sub-contractors as defined above.

PB.3.2 Targeted sub-contracting Targets

Targeted sub-contracting is the process by which the Employer implements Government's objectives. The Employer sets a target for construction by specified entities, the rand value of which is based on the services and work undertaken by the specified entities. The target rand value will be measured as that specified target percentage of the Contractor's final certified value of work completed (excluding CPA and VAT) measured at the date of issue of the Certificate of Completion. The Contractor is obliged to commit to or exceed the target stated in section C1.2.2 Contract Data, Part A: Data Provided by the Employer.

PB.3.3 Record keeping and Portfolio of Evidence

The Contractor shall assume responsibility for the compilation and maintenance of comprehensive records detailing each Targeted Enterprise's progress during construction, starting from the award of a subcontract to a Targeted Enterprise until the successful completion of the subcontract work or termination of the subcontract.

The Contractor shall keep comprehensive records of the training given to each trainee and, at the successful completion of each training course, each trainee shall be issued with a certificate indicating the course content as proof of attendance and completion. The Contractor shall keep a register of certificates issued. Whenever required, the Contractor shall provide copies of such records to the Employer's Agent.

The Contractor is also required to develop and/or maintain a portfolio of evidence for each Targeted Enterprise as described in clause PC4 below.

PB.4 TENDER PROCESS FOR TARGETED SUBCONTRACTOR PROCUREMENT

The Contractor shall refer to the schedule of quantities contained in these Particular Specifications and to any other construction activities required to execute the Works in terms of this contract to determine how he intends to unbundle or package specific subcontracts for Targeted Sub-contractors and shall present his proposal to the PMT for approval.

The Contractor shall be responsible for compiling the tender documents that will enable him to engage the Targeted Sub-contractors.

In compiling the subcontract tender documents, the Contractor shall also include in each tender document any Tender Rules that may be relevant, and shall also include the proposed subcontract agreement. The Contractor shall compile each subcontract tender document in such a manner that it shall facilitate the achievement of all objectives and principles pertaining to the development of the Targeted Sub-contractors.

Draft tender documents shall be approved by the PMT before the Contractor invites tenders from Targeted Sub-contractors, who will be invited in consultation with the PMT and the local PSC.

The PMT shall conduct a compulsory briefing session to explain the Works required and the tender process to the Targeted sub-contracting.

Tenders for the subcontracted works must close at a stipulated time and date. Tenders shall be placed in a suitable formal Tender Box of design approved by the PMT, located at the Contractor's site office. The tender opening shall be conducted by the PMT.

The Contractor shall evaluate the tenders and shall submit the tender adjudication report for each

subcontract to the PMT for review prior to award of each subcontract.

It shall be a condition of tender that the subcontractors appointed as Targeted Sub-contractors are registered with the Construction Industry Development Board (CIDB) in a contractor grading designation equal to 1CE or 2CE or 3CE or 4CE or 5CE or 6CE and are also registered by the CIDB as Potentially Emerging (PE).

It shall also be a condition of tender that Targeted Sub-contractors shall include in their tender submission the following documentation:

a. Valid letter of good standing from the Department of Labour.
a. A tax compliance status report.
b. A BEE verification certificate
c. Bank account details certified by the bank.
d. Certificate of registration of the tenderer in the required CIDB contractor grading designation, confirming the tenderer's registration Status as "Active" at the closing date of tender.

The tender documents shall also contain the proposed subcontract agreement, which shall also include for:

a. An entitlement of the subcontractor to receive such training as is contemplated in this contract.
b. An obligation on the Targeted Enterprise to participate and co-operate in such training as is provided for in this contract.
c. The allowable sources from which workers may be drawn in terms of the contract.
d. The terms and conditions relating to the recruitment, employment and remuneration of workers engaged on the contract.
e. The training to be provided to the temporary workforce.
f. The terms and conditions relating to payment of the Targeted Enterprise subcontractor.

PB.5 PROJECT MANAGEMENT TEAM (PMT)

PB.5.1 Appointment

A Project Management Team (PMT) is to be set up comprising a representative from each of the Employer, the Employer's Agent and the Contractor.

PB.5.2 Duties and functions of the PMT

The duties and functions of the PMT are as follows:

a. determine the scope and extent of the works to be included in any particular subcontract;
b. determine the target tender price according to the scope of work, and adjust the target rates where relevant;
c. monitor the management of the tender process for the subcontracts to be executed by the Targeted Sub-contractors;
d. adjudicate and approve tenders for Targeted Enterprise subcontracts;
e. monitor the management of the subcontracts involving Targeted Sub-contractors;
f. monitor the training, mentoring and development of Targeted Sub-contractors.

PB.6 GENERAL RESPONSIBILITIES OF THE CONTRACTOR TOWARDS TARGETED SUBCONTRACTORS

PB.6.1 Obligations

The Contractor shall ensure that he complies with the following obligations:

a. institute a quality assurance system;
b. provide adequate training, coaching, guidance, mentoring and assistance to Targeted Sub-contractors;

c. provide financial support and other assistance to ensure that the Targeted Sub-contractors are able to meet their obligations and commitments with respect to their subcontracts, including

acquisition of labour, equipment and materials; and

d. ensure that the contract participation goals and objectives are achieved.

PB.7 MANAGEMENT OF TARGETED SUBCONTRACTORS

The Contractor shall conclude the subcontract agreements, and provide the necessary management support to the Targeted Subcontractors. Failure by the subcontractor to comply with the terms and conditions of the subcontract agreement shall result in penalties being applied or the subcontract terminated.

PB.7.1 Compilation of subcontract conclusion agreement

The Contractor in liaison with the PMT shall be responsible for the conclusion of each subcontract agreement. The agreement shall be in accordance with the provisions of subclause 4.4 of the General Conditions of Contract for Construction Works 3rd Edition 2015 and shall be consistent with the terms and conditions in this contract. The agreement shall be subject to approval by the Project Management Team.

PB.7.2 Quality of work and performance of the subcontractor

a. The Contractor shall closely monitor and supervise all Targeted Sub-contractors and shall train, mentor, guide and assist each Targeted Enterprise in all aspects of management, execution and completion of his subcontract. This shall typically include assistance with planning of the works, guidance on sourcing and ordering of materials, guidance on labour relations, guidance with monthly measurements and invoicing procedures. The extent and level of such training, mentoring, guidance and assistance to be provided by the Contractor shall be commensurate with the basic level of subcontract applicable and shall be directed at enabling the Targeted Enterprise to achieve the successful execution and completion of their subcontract.

b. The Contractor shall closely monitor and supervise all Targeted Sub-contractors and shall give reasonable warning to the Targeted Enterprise when any contravention of the terms and conditions of the subcontract has occurred or appears likely to occur. The Contractor shall, whenever feasible, give the Targeted Enterprise reasonable opportunity to make good any such contravention, or to avoid such contravention, and shall render all reasonable assistance to the Targeted Enterprise in this regard.

PB.7.3 Dispute avoidance and resolution procedures

a. When taking any disciplinary action or imposing a penalty as provided for in the subcontract, the Contractor shall explain fully to the Targeted Enterprise that such actions are provided for in the subcontract. If such action is contemplated this shall be discussed with the PMT before any action is taken.

b. If the subcontractor, in the opinion of the Employer's Agent, fails to comply with any of the criteria listed below, the Employer's Agent shall issue a written warning to the Contractor, stating all the areas of non-compliance. A copy of the letter of warning shall be forwarded to the Employer. The criteria are as follows:

i. acceptable standard of work as set out in the specifications;
ii. progress in accordance with the time constraints in the subcontractor's tender document;
iii. punctual and full payment of the workforce and suppliers;
iv. site safety; and
v. accommodation of traffic.

c. The subcontractor shall have 21 days from the date of receipt of the letter of warning by the Contractor to address and rectify the issues raised by the Employer's Agent, with the exception of the above subclauses (b)(iv) and (v) for which the reaction time shall be in accordance with the relevant specifications for those aspects of the Works but shall not be longer than 24 hours. Failure by the subcontractor to comply with deadline set, will be sufficient grounds for the Contractor to apply a penalty, or terminate the subcontract provided that the PMT is satisfied

that the Contractor has made every effort to correct the performance of the subcontractor.

d. The Targeted Enterprise shall have the right to dispute any ruling given or deemed to have been given by the Contractor, Employer's Agent or Employer. Provided that, unless the Targeted Enterprise shall, within 21 days after his receipt of a ruling or after a ruling shall have been deemed to be have been given, give written notice (hereinafter referred to as a Dispute Notice) to the Contractor, referring to this clause, disputing the validity or correctness of the whole or a specified part of the ruling, he shall have no further right to dispute that ruling or the part thereof not disputed in the said notice.

PB.8 SPECIFIC WORK TO BE CARRIED OUT BY TARGETED SUBCONTRACTORS

This shall follow the declaration at time of tender.

PB.9 TRAINING, COACHING,GUIDANCE AND MENTORING

PB.9.1 Obligations

This section provides details of the Contractor's obligations of implementing the National Skills Development Strategy. This strategy sets priorities for the skills development of workers. The Sector Education and Training Authorities (SETA) and provincial offices of the Department of Labour will play key roles in transforming the vision of the strategy into reality.

Supervision is included as part of the contractor's general obligations for the administration and management of the Targeted Sub-contractors. However training, coaching, guidance and mentoring are not included as part of the Contractor's general obligations unless specific provision to that effect has been made in the project specifications.

The Contractor shall, from the commencement of the contract, provide a structured development programme designed to improve the entrepreneurial and basic business management skills of identified Targeted Sub-contractors and hired labour that show initiative, as well as to improve their specific task skills (engineering skills) commensurate with the applicable levels of subcontract that will enable the Targeted Sub-contractors to achieve the successful execution and completion of their subcontracts. The ultimate objective of training, coaching, guidance and mentoring is to develop the Targeted Enterprise subcontractors as far as their potential allows.

PB.9.2 Definitions

a. Training:

Training refers to the process of teaching a learner – usually in a classroom or simulated work environment situation. Training usually takes place with one teacher/trainer and several learners. Principles and theory are taught. Demonstrations are given. Assignments are then set to ensure that the learner is able to apply what has been taught. Training is done by a specialist in the subject, who is also qualified to train.

Example: Use of a dumpy level

Training would involve the theory of how a dumpy level works and how to calculate levels. A demonstration of how to set up and read a level could be given.

b. Coaching:

Coaching refers to hands-on training and is mostly on a one-on-one basis of tangible and measurable skills. It is typically on-site training, or learning-on-the-job. Coaching is training by the process of "watch-do-correct-practice". The coach does the task while the learner watches and asks questions. Then the learner does the same task while the coach watches. The learner is corrected until the coach feels that he has the gained competence in the function. The learner is then left to practise the task or skill, which the coach oversees. Coaching is imparting a skill usually manual or physical. A coach is usually a person doing the same type of work on a higher or more competent level, or a person who has a mastery of the skill/task. While training gives the theory or shows/explains the

principles, coaching helps the learner become competent and master a skill. A coach is often in the direct reporting line, i.e. someone in authority. Coaching could be part of the management function and would make the job run more smoothly.

Example: Use of a dumpy level

Coaching would involve taking the learner onto site, setting up a dumpy level, reading levels. Then the coach would get the learner to do the job, while the coach checked the setting up and reading. Once the learner understands and can do the tasks, the coach checks periodically to ensure the learner is still doing the job properly.

The desired outcome of coaching is for the learner to "fit-the-mould", and to do things the same way and to the same standard as the coach.

c. Guidance:

Guidance is anticipating where one might go wrong, or where one is doing a task in a complicated, inefficient or ineffective way, and giving advice as to how to achieve a better result. Guidance is mostly given by a person in the direct reporting line, but can be given by anyone. Guidance is not imparting skills, but suggesting ways to improve performance.

Example: Use of a dumpy level

A person who knows how to use a dumpy level would be given guidance as to where he would next set up the level to limit the number of set-ups. Guidance could be an extension of coaching.

d. Mentoring:

Mentoring is developing a person on a long-term career path. It is mostly about imparting skills that are often intangible and non-measurable. A mentor is seldom anyone in the direct reporting line – although he could be a person several levels higher in that reporting line. Mentoring is more about developing a relationship and taking a personal interest in an individual. A mentor looks out for that individual and gives him advice that cannot be found in a book or in the normal course of business. The sort of issues a mentor discusses with the protégé include company politics, how to pick up work before others get wind of it, how to position one's company to get a better competitive advantage, how to tender such that the tender is lowest but the profit is as good as or better than the next person, how to determine and assess risk. Mentoring helps the protégé think strategically, sharpen entrepreneurial skills and grow – both personally and in terms of the company. A mentor helps the protégé to develop insight and shrewdness. It is more about business skills to survive long-term than the technical, tactical or day-to-day activities of doing business.

The desired outcome of mentoring is for the protégé to develop his own style, i.e., to shape his own "mould".

e. Supervision:

Supervision is instruction regarding the work to be performed, and ensuring it is carried out to specification and to the satisfaction of the supervisor. It is not instruction on how the work is to be performed, but rather on what work has to be performed, and usually has specific time frames.

PB.9.3 Assessment of Targeted Enterprise potential

It is the responsibility of the Contractor to determine the level of development required by each Targeted Enterprise. This will require that the Contractor determine the level at which the Targeted Enterprise can operate competently and determine the skills already acquired by the Targeted Enterprise subcontractor in terms of training and on-the-job experience. In some circumstances Adult Basic Education Training (ABET) will need to be started before any formal training can commence. The assessment of each appointed Targeted Enterprise is to be produced by the Contractor for discussion at the first Project Management Team meeting following the appointment of the Targeted Enterprise.

PB.9.4 Development Plan

Within a month of the first PMT meeting on the Targeted Enterprise assessments, the Contractor is to present a development plan, specific to each Targeted Enterprise. The development plan is to be reviewed by the PMT for appropriateness before being implemented.

The development plan is to include the following:

- specify the development needs of each Targeted Enterprise contracting entity – the systems the entity lacks;
- specify the development needs of the individuals comprising the entity – the skills the individuals within the entity lack;
- the level to which that activity will be developed within the period of the contract;
- whether training, coaching, guidance and/or mentoring is to be given in each activity;
- the person/s responsible for each activity.

PB.9.5 Identification and general training of potential Targeted Sub-contractors

a. The progression of training, coaching and mentorship may need to start with the identification and general training of potential Targeted Sub-contractors and hired labour that show initiative, and should end with their acquisition of sufficient management skills that will equip them to compete confidently for subcontract work beyond the duration of this contract. In addition, generic skills shall be taught where the need for these has been identified as being necessary amongst Targeted Enterprise workforces and hired labour.

b. Before commencing with any structured training the Contractor shall submit his intended programme to the Project Management Team for approval of its subject content and proposed trainers, and the Contractor shall, if so instructed by the PMT, alter or amend the programme and/or course content.

The Contractor shall be responsible for the provision of everything necessary for the delivery of the various training workshops and modules including:

i. Provision of a suitable fully serviced training venue facility as specified in this Part PC;
ii. Procurement of suitable accredited trainers;
iii. Provision, in conjunction with the accredited trainers, of all the necessary training materials, including stationery and study materials; and
iv. Transportation of the learners to and from the training venue facility (it is therefore in the Contractor's interest that the training venue facility be provided on the site in order to reduce these transportation costs).

Payment to the Contractor for carrying out the training function shall be effected through the pay items provided in this Part PC.

PB.9.6 Activities

The tasks for each of the activities making up the development plan are described below in further detail.

PB.9.7 Technical

PB.9.7.1 Technical Administrative Functions

a. General Tasks

i. Understanding and interpreting drawings

On Pipeline Construction Contracts, the reading of drawings is required at high levels of Targeted Enterprise development. The relevant drawings that would need to be understood include all relevant pipeline and concrete brick wall details for construction. Understanding and interpreting drawings includes the following:

- Understanding the cross referencing to drawings from the contract documents and the bill of quantities;
- Understanding the layout of the drawings;
- Understanding the plan view and elevations and cross sections;
- How to interpret, accurately lay out and construct the details.

iv. Setting out construction works:

This skill requires an understanding of the function and use of instruments such as the dumpy level, the theodolite, and procedures such as stringing a line.

v. Technical know-how of all relevant Pipework construction activities, and typically includes:

- Traffic control/safety precautions;
- Environmental management;
- Clearing and grubbing;
- Excavations and backfilling;
- Pipe bedding;
- Pipe laying;
- Pre-cast and in-situ cast concrete works (including reinforcing where applicable);
- Masonry brick laying;
- Plastering and bag washing;
- Gabion and pitching
- Finishing up and tidying of works.

The development plans shall maximise the exposure of each Targeted Enterprise to as many activities as is practicable.

vi. Task organization:

This activity involves the correct supervision of labour and organisation of tasks to ensure that labour is utilised most effectively. This includes the following:

- Allocation of the appropriate number of people for the task;
- Availability on site of the correct type and amount of material and equipment at the point of use;
- Planning tasks ahead so that labour does not stand around waiting.

vii. Task prioritization:

Task prioritization must cover an understanding of critical paths, including identifying which tasks can be postponed and which are urgent. It includes planning and monitoring so that time targets are achieved. It must also cover gaining an understanding of the penalties applicable to late completion of tasks.

viii. Work schedule:

This is the ability to produce daily work plans and will assist with task organization. Daily work plans need to be developed into weekly and monthly work plans and vice versa. These plans assist in material ordering, plant scheduling, labour allocation, timeous completion of the work, and keeping track of profits/losses.

ix. Effectiveness:

Effectiveness is ensuring that a job gets done right, or properly.

Effectiveness is doing the right things.

x. Efficiency:

Efficiency is ensuring that the job is done with the least effort and cost possible.

Efficiency is doing things right.

xi. Quality control:

Quality control requires knowledge of specifications and tolerances and ensuring that the work adheres to these, as well as understanding the requirements of the Employer.

xii. Measuring work done for payment certificates:

This is the ability to measure actual work done and to translate these measurements into a payment certificate. Knowledge must be gained of how to calculate escalation, how to claim for VOs and how to handle other claims.

xiii. Site meetings:

Knowledge needs to be gained of the following:

- The importance of site meetings;
- Identifying the relevant personnel to attend site meetings;
- Preparing for a site meeting;
- Understanding progress reports including why they are important and how to prepare them;
- Recording issues discussed at the meeting;
- Implementing and follow through of issues recorded;
- Understanding the process of the meeting and when to bring up various concerns is needed.

xiv. Handling site instructions and VOs:

This is the ability to distinguish between site instructions and variation orders and how to respond to such instructions.

b. Materials Tasks

i. Materials planning:

This includes the following:

- Determining the quantity of materials required for each task and planning ordering;
- Determine appropriate lead times to ensure that everything required to do a job is on hand;
- Quantity take-offs for pricing a bill at higher levels of development.

xv. Receiving, storing and handling materials:

Receiving includes checking materials delivered against the delivery note and the order placed. Storage involves knowing what quantities and type of materials to store, planning accessibility, and safety of materials from theft, the weather, etc. Handling of materials needs to be carried out to ensure no wastage or damage.

xvi. Waste control:

This includes the importance of waste control to reduce costs and the management of reducing waste of materials in storage and in use.

xvii. The handling/installation of precast units:

Knowledge of precast units, handling and installation must be gained.

c. Equipment Tasks

i. Machine Analysis:

This is the analysis of the use of equipment. It includes calculating fuel and hourly costs. This will enhance an understanding of the effective use of equipment, how to reduce costs and provide a background for pricing of equipment for tenders.

xviii. Maintenance Schedule:

This covers the importance of maintenance of equipment and how to schedule this so that there is minimal disruption in day-to-day work.

xix. Appropriate and correct use of tools and equipment:

Provide coaching on the correct use of tools and equipment.

xx. Care of tools and equipment:

Care of tools and equipment includes the proper handling, cleaning, storage, stacking, etc.

The coaches of the above listed activities are generally the Foreman, Site Clerk, Mechanic, Construction Manager, Plant Manager or Contracts Manager.

PB.9.7.2 Technical Management Functions

a. General Tasks

i. Site set-up:

This involves gaining an understanding of site set-up procedures and principles, including establishing a site office and facilities, providing access to the site, initial layout of the works, storage facilities, security, etc.

xxi. Construction program / work plan:

Knowledge of how to develop a construction program / work plan, monitor and assess the production, and correct the programme where necessary.

xxii. Understanding tests:

Understanding what tests are required, reading and interpreting results relating to specifications and quality, and how to make the corrections required.

xxiii. Productivity:

Recording productivity and understanding the principles. Knowing where to make corrections and how to implement solutions.

b. Material Tasks

i. Materials schedule:

This involves gaining knowledge of how to develop a materials schedule from a Bill of Quantities, the Drawings and any other relevant contractual document. It also includes linking the works program to an ordering schedule, and sourcing of suitable materials.

c. Equipment

i. Determine appropriate levels of equipment:

The determination of the appropriate type and number of tools, and equipment required.

xxiv. Proper use of equipment:

This is gaining knowledge, understanding and competency in the proper use of equipment.

xxv. Productivity of equipment:

The productivity of equipment must be understood to know how this affects his ability to perform.

xxvi. Allocation of equipment:

This involves the ability to competently allocate equipment to the various tasks.

xxvii. Waste control:

Waste control is an essential aspect of running a site well and making a profit. The principles

of this, together with the practical ways to control waste need to be understood.

The coach/mentor of these activities is generally the Construction Manager, Contracts Manager, or Equipment Supplier.

PB.9.8 Financial

PB.9.8.1 Financial Administrative Functions

a. Basic Finance:

This includes knowledge of the definition and difference between debtors and creditors as well as gaining competency in basic bookkeeping. Knowledge of keeping and managing accounts and other financial documents also needs to be developed. A basic financial course may be appropriate to develop in this area.

b. Bank account:

The opening of a bank account, making deposits, the difference between stop-orders and debit-orders, overdraft facilities and generally managing a bank account needs to be understood. This can also be done through a course, and/or with a supportive bank manager, and/or with the appointed coach/mentor.

c. Orders and systems:

This will require the setting up of systems and procedures that will take into consideration delivery lead-times, non-availability of items, alternate sources, preparation of storage areas ready for delivery, and the area/volume of storage space.

d. Invoices:

The development of systems within the Targeted Enterprise entity that will check materials received versus what was ordered, check quantities delivered, and check actual prices paid against quotes/tender prices.

e. Stock Control:

The importance of controlling stock needs to be understood. Systems to implement stock control need to be imparted.

f. Payroll:

This involves the establishment of a payroll system within the Targeted Enterprise entity. This could include developing an internal system, outsourcing the payroll or learning a commercially acquired payroll system. The system needs to record days worked, pay rate, legal deductions and a leave register.

g. Legal requirements:

The financial requirements of legal obligations of companies must be imparted to the Targeted Enterprise subcontractor. This includes payment of company tax, VAT (Value Added Tax), Skills Development Levy (SDL), Work Unemployment Insurance Fund (UIF), Workman's' Compensation (WC), and any applicable municipal levies as well as the applicable minimum wages for the area (also refer below to G1009.7.5 Legislative).

h. Payment certificates:

This includes the compilation and submission of a payment certificate. As well as knowing how to determine work done to date, how to present it in terms of the Bill of Quantities, and how to claim for materials on site.

PB.9.8.2 Financial Management Functions

a. Claims and VOs:

The following types of claims may be applicable: Claims for additional work done, inclement weather, etc., claims for Variation Orders implemented. Understanding claims includes knowing when a claim can be submitted, the procedure and paperwork for the submission of a claim and which claims are worth pursuing.

b. Cash Flow:

The concept of cash flow, as well as the development of cash flow projections and the monitoring of the cash flow are vital aspects of running a business. Included under this topic is knowing how long it takes from placing an order for material until payment is due, and time lags between ordering materials and using the materials and receiving payment for work done. The concept of sufficient working capital also needs to be imparted.

c. Costing System:

Costing systems must be set up and understood. Aspects include capturing costs, monitoring profit, analysing costs and using this information to determine productivity levels.

d. Tendering:

A knowledge is required of how to build up rates, how to obtain prices, how to negotiate better discounts, how to be creative to achieve the desired result more cost effectively, how to calculate and accommodate P&Gs, and what Provisional Sums are and how they are handled.

e. Budgeting:

The difference between tendering and budgeting must be understood as well as gaining skills on how to develop a budget. Knowledge of how to monitor actual expenses against budgeted expenses, how to analyse the differences, and the value budgeting is needed.

f. Risk assessment:

This involves learning how to assess the financial risks associated with the job in terms of his performance and profitability and the management of these risks. This becomes increasingly important as the Targeted Enterprise grows.

g. Insurance:

This includes an understanding of why insurance is required, how to obtain insurance, the benefits and costs, insurance providers and what can be claimed from different types of insurance. The different types of insurance to be included are Short term insurance, Public Liability and Contractors All Risk insurance.

h. Interest Rates:

Interest Rates can have a dramatic impact on the profit margins. Therefore an understanding must be gained of what interest rates are, how they impact on profit margins, how to cater for fluctuating interest rates in preparing a tender, and how to find and/or negotiate the best interest rates.

i. Bridging Finance:

This includes understanding what bridging finance is and the different forms of bridging finance. Guidance should be given on when bridging finance should be used, where it can be obtained, what securities are needed, and how to go about securing funds.

j. Sureties:

This involves understanding what Sureties are, why and when they are needed, how they can be obtained, what they cost and how they can be redeemed.

k. Procurement of Plant and Equipment:

The difference between purchasing, leasing, hire purchase and hiring plant needs to be

understood. Also included is gaining knowledge of all aspects of these options as well as the benefits and implications for the business for each option.

l. Procurement:

Procurement of materials includes sourcing suppliers, getting quotes, placing an order and negotiating discounts. The managing contractor can assist in introducing higher level Targeted Sub-contractors to the relevant materials suppliers.

m. Subcontract:

At the lower levels, this will involve the Targeted Enterprise understanding the subcontract agreement between himself and the managing contractor and the obligations of this document. With a Targeted Enterprise operating at a higher level, this will include sourcing other subcontractors, as well as interpreting the tender/quote, adjudication and awarding of subcontracts.

n. Productivity:

This includes taking production rates and translating them into financial terms to help build up rates for tendering and to monitor profit margins.

The coach and/or mentor for these functions are typically the Bookkeeper, Site Clerk, Foreman, Construction Manager, Contracts Manager, Accountant, Estimator and Buyer.

PB.9.9 Human Resources

PB.9.9.1 Human Resource Administrative Functions

a. Labour Supervision:

This involves the supervising of labour effectively. This includes knowing the level of competencies of labour, being able to motivate workers to ensure that productivity levels are achieved and maintained. It also includes the allocation of tasks to labour.

b. Team Sizes:

This is ensuring the size of the work team is appropriate for the matching activity and understanding that teams that are too large are unproductive and teams that are too small are not effective.

c. Productivity:

The principles of productivity and how it is best achieved for various tasks is to be understood and applied. It also involves being able to determine realistic productivity levels, such as square metres of grass cut with a machine per hour, length of guardrail installed per day, etc.

d. Time sheet:

A system of time sheets which accurately records the time each employee spends on the job needs to be in place.

e. Leave Registers:

A system for recording leave needs to be in place, which includes the dates that leave was taken, what type of leave it was and whether the employee qualifies for paid or unpaid leave in terms of legislation.

f. Employee records:

This involves knowing and complying with legislation for conditions of employment. Employment contracts must be in place for all labour employed and a formal system of keeping employee records must be established. Employee records must be in line with legislation including recording of employee details and copies of identification documents, termination of

service procedures, certificates of service etc.

g. Disciplinary procedure:

Knowledge of the legal aspects of Disciplinary procedures is essential. The ability to set up these procedures, and ensure that all staff understand and adhere to them is required. Warning systems must include records of verbal warnings, warning forms, disciplinary hearings, dispute resolutions and termination procedures.

h. Training:

This involves understanding the concept of the Skills Development Levy, and how to claim from CETA for training provided. Service Providers have CETA funded Skills Facilitators available to assist Targeted Sub-contractors in identifying training needs and compiling work place skills plans (WPSP) at no cost to the Targeted Enterprise. An understanding of the importance of providing training for staff with regards to AIDS awareness, Safety, Productivity, Development and Accountability is essential.

i. Community Liaison:

The management and importance of Community Liaison must be understood.

PB.9.9.2 Human Resource Management Functions

a. Labour recruitment:

Employment of labour with the appropriate skills is essential. Therefore sourcing of appropriate labour and knowledge of how to assess the range of skills and level of competency in potential employees needs to be gained.

b. Labour allocation:

Allocation of labour is a skill that needs continual refining. It requires knowing the specific strengths of staff employed, the numbers of labourers and level of skill required for specific tasks, as well as being able to build effective cohesive teams that understand their roles without continual supervision.

c. Labour schedules / planning:

This involves learning how to compile labour schedules from the works program and the consequent allocation of staff to the work planned.

d. Histogram / manpower plan:

A manpower plan includes establishing how many people are needed on the job at what times. This is an important skill even at the most elementary level. As the Targeted Enterprise develops, the management of moving people from site to site in such a way that there are neither too many nor too few labourers and/or supervision becomes an important skill to obtain.

e. Management of supervision:

This activity involves understanding the principles of supervision, and how to effectively manage to ensure that these principles are applied and/or developed by the appointed supervisor.

f. Productivity:

Productivity applies to labour as well as tasks and plant. Skills must be developed on how to determine appropriate levels of labour productivity and how to ensure that staff achieves these levels.

g. Labour Law:

A basic understanding of labour legislation, specifically Labour Relations Act (LRA), and Basic Conditions of Employment Act (BCEA). Employment Contracts, and Termination of Service is

essential as well as an understanding of the implications of these laws on business.

h. Accountability systems:

This requires that accountability systems are developed and implemented for supervisory staff.

Coaching, guidance and mentoring on the above listed functions are typically undertaken by the Foreman, Construction Manager, Site Clerk, HR Manager, Trainer and Contracts Manager.

PB.9.10 Contractual

PB.9.10.1 Contractual Administrative Functions

a. Relationships and communication:

This involves the development and maintenance of good relationships and the establishment of good communication systems within the Targeted Enterprise business. This includes communication between the Targeted Enterprise and the other role players such as the Managing contractor, the Employer's Agent and the Employer. An understanding of the importance of good communication is also important. Good communication starts with the right attitude, and involves listening as well as talking. It is also listening to what is not being said. Allowances need to be made for differences in culture and economic backgrounds.

b. Setting up contractual administration requirement (systems):

Contractual administration systems need to be established and implemented. This includes the use and importance of site dairies and keeping rainfall/weather records, as well as developing progress reports.

c. Implementing EMP:

This activity involves understanding the design and implementation of an Environmental Management Plan.

PB.9.10.2 Contractual Management Functions

a. Contract Law:

Knowing and understanding the content and implications (including costs) of the Conditions of Contract and the Specifications that will be required. This will include understanding the content and implications of penalty clauses.

b. Risk Assessment:

This activity involves being able to assess the contractual risks associated with the contract both in terms of performance and in terms of the risks associated with the Employer.

c. Managing Contract Administration:

Managing Contract Administration ensures that all the required reports, such as accident reports and progress reports are completed and submitted.

d. Administration of subcontractors:

Identification and separation of the responsibilities of the managing contractor from the responsibilities of the subcontractors needs to be understood and applied. The management of subcontractors to ensure that contractual obligations are met is essential knowledge to be gained by higher level Targeted Sub-contractors.

e. Subcontractor agreements:

Understanding the contents of the subcontract agreement between the Targeted Enterprise and the contractor is an important skill to be learnt.

f. Disputes:

This activity involves understanding the procedures used in handling disputes or disagreements with the Contractor and/or the Employer.

The Contracts Manager and Construction Manager would normally be involved in this function.

PB.9.11 Legislative

PB.9.11.1 Legislative Administrative Functions

a. Legal Registrations:

The legal requirements for registration of companies must be imparted to the Targeted Enterprise subcontractor. This includes company tax, VAT (Value Added Tax), PAYE, Skills Development Levy (SDL), Unemployment Insurance Fund (UIF), Workman's' Compensation (WC), and any applicable municipal levies. An understanding of what each registration is, what benefits he gets from being registered, and how to register must be developed.

PB.9.11.2 Legislative Management Functions

a. Labour Law:

Knowledge of the labour legislation and the implications for the business is required. This includes Skills Development Levy (SDL), Work Place Skills Plans (WPSP), Unemployment Insurance Fund UIF), Workman's' Compensation (WC), Labour Relations Act (LRA), Basic Conditions of Employment Act (BCEA), and the applicable minimum wages for the area.

b. OHS Act:

All aspects of the OHS Act (dealing with safety and health) and the implications must be understood. A safety officer who has the appropriate level of understanding and knowledge must be appointed within each Targeted Enterprise.

c. Environmental Management Plan:

An environmental management plan needs to be submitted regarding how the environment will be managed for the duration of the contract, and what restoration will take place at the end of the contract. An understanding of the importance and content of this plan must be gained.

d. Adjudication/Arbitration:

This activity involves knowing what legal recourse is available when disputes/disagreements are not resolved. This knowledge must include the processes to be followed and where to go to implement proceedings.

These functions will generally require the input of the company lawyer, company accountant, HR manager, Health and Safety Specialist, and Environmental Specialist.

PB.9.12 General

PB.9.12.1 Administrative Functions

a. Filing systems:

This activity includes establishing company filing systems that are efficient and effective. It also includes knowing the importance of filing, what must be filed and how it should be filed.

b. Office set-out:

Knowledge of the layout of the site office buildings position and the organisation of the offices and systems within the buildings is to be imparted.

c. Record keeping:

This activity involves developing knowledge of what records need to be kept and how best to keep them.

d. Good housekeeping:

Good housekeeping is about developing a work approach of keeping the site tidy, cleaning putting away tools and working in an orderly way. Developing good housekeeping assists a company in working efficiently and improving profit margins.

e. Communications with staff:

The importance of good communication with staff needs to be understood as well as the effects of good relations with the staff in terms of loyalty and productivity. An understanding must also be gained that good communication enhances supervision and management of the work.

f. Communications on site:

This activity involves establishing communication systems between the site and the office and understanding that effective communication on site leads to good relations and contributes to the smooth running of the site.

The Construction Manager, site clerk and HR Manager will train/coach or mentor the above listed functions.

PB.9.13 Portfolio of Evidence

The Contractor is to develop and/or maintain a portfolio of evidence for each Targeted Enterprise. The Portfolio of Evidence is a collection of proof of the training, coaching, guidance and mentoring inputs provided to the Targeted Enterprise and is similar to a log book used by technical students completing experiential training. It is a living document which records the development progress of the Targeted Enterprise and will need to be updated continually throughout the duration of the contract. It remains the property of the Targeted Enterprise and they take it with them to their next contract.

The Portfolio of Evidence should include the following documentation:

- The development path designed for each Targeted Enterprise;
- The training courses completed by the Targeted Enterprise;
- The hours of guiding, coaching and mentoring received for each activity listed in the development plan;
- A list of outcomes achieved at each level for each activity;
- Six-monthly progress reports on the development provided (inputs) versus the actual progress made (output) by the Targeted Enterprise;
- A list of competencies.

PB.9.14 Training Requirements

Only qualified trainers employed by training agencies that are accredited by the relevant Sector Education and Training Authorities (SETA), or other institutions recognised by the Department of Labour shall deliver any training. “Accredited training” refers to both the trainers as well as to the training material. Certificates affirming the successful participation in the various courses shall be presented to each attendant.

The Contractor shall facilitate in the delivery of training by instructing and motivating the hired labour and relevant Targeted Sub-contractors regarding attendance and participation. All training shall take place within normal working hours, or as agreed with the trainees.

PB.9.15 Development training

The Contractor will arrange training to support the development of the Targeted Enterprise. This training must be provided by training providers accredited with the relevant SETA pertaining to the course material being presented. The training will take place at hours agreed with the trainees, possibly on a part time basis after hours.

The following training courses are recommended to support the development programme detailed in the contract document:

- NQF Level 2: Construction Contractor - Business owner and administration officer;
- Tender training NQF Level 3 – Business owner / Technical expert;
- Computer literacy training - Business owner and admin officer – Microsoft Windows, email, Microsoft Word and Microsoft Excel;
- General bookkeeping relevant to construction - Business owner and admin officer;
- Tendering NQF Level 4 and 5 – Business owner / Technical expert;
- Construction supervision (Roadworks) NQF Level 4 – Business owner / Technical expert.

PB.9.16 Safety Training

The Targeted Enterprise safety representative is to be fully trained in all aspects of safety and his duties in this regard. The owner of the Targeted Enterprise is to be trained on their responsibilities regarding safety regulations.

PB.9.17 Engineering skills training

The focus of training provided on the contract should be to support the development of the Targeted Enterprise. Engineering skills training will only be approved by the PMT when appropriate.

The Targeted Enterprise, their workforce and hired labour that show initiative will be entitled to receive structured training that will improve on-task skills necessary for the execution and successful completion of the works. The Contractor, in conjunction with the Employer's Agent, shall monitor the progress of the hired labour and each Targeted Enterprise closely and shall identify those who, in their collective opinion, will benefit from structured engineering skills training as may be provided for in the contract, and where required

by the Employer's Agent shall make recommendations in this regard. The final list of candidates shall be decided between the Contractor and the Employer's Agent, and those selected shall receive formal engineering skills training in a programmed and progressive manner throughout the duration of the contract.

The training programme shall offer complete courses that could comprise some or all of the following modules:

a. Use and maintenance of hand tools;
b. Operation of equipment;
c. Manufacture and installation of minor precast concrete units;
d. Erect, dismantle and maintain formwork;
e. Basic concrete skills;
f. Excavation, backfill and compaction;
g. Bricklaying;
h. Erosion protection using stone pitching, gabions or renos.

PB.9.18 Training venue facility

The training venue facility to be provided by the Contractor shall be constructed, furnished and fully serviced for the duration of the contract in accordance with section SANS1200A. The facility shall accommodate a class of up to 25 learners and shall comprise the following:

Lecture room (interior area)	48 m²
Ablutions (male)	6 m²
Ablutions (female)	6 m²
Chairs for learners (individual chairs, with backs)	25 off
Desk area for 25 learners (500 mm width)	12,5 m²
Chairs for trainers and management (individual chairs, with backs)	5 off
Table area for trainers and management	3 m²
220/250 volt power points	6 off

Double 80 watt fluorescent light fittings complete with ballast and tubes	6 off
Single incandescent light fittings complete with 100 watt globes	4 off
Wash hand basins complete with taps and drains	4off
Fire extinguishers, 9,0 kg, all purpose dry powder type, complete, mounted on wall with brackets	2 off
Air conditioning units with 2,2 kW minimum capacity, mounted and with own power connection	4 off
Voltage stabilizers	2 off
Floodlights complete with poles and 500 Watt minimum globes and controlled by photocells	2 off
White boards (3 m x 1,5 m)	1 off
Venetian blinds	12 m²

PB.10 MEASUREMENT AND PAYMENT

PB.10.1 Procurement of Targeted Enterprise subcontractors as described in Part PC:

a. Contractor's charge for the management and execution of the Targeted Sub-contractors procurement process:

i. Procurement process for the appointment of Targeted Subcontractors ..... Sum

The unit of measurement shall be the number of individual subcontract agreements concluded with Targeted Enterprise subcontractors in accordance with the procurement process described in this Part PC. Each tendered rate shall be in full compensation for the management and execution of the Targeted Subcontractor procurement process.

PB.10.2 Construction Works for Targeted Sub-contractors:

a. Contractor's charge for the management of the Targeted Subcontractors appointed in terms of Part PC..... Sum
b. Supply of materials and small plant to assist Targeted Subcontractors appointed in terms of Part PC..... Sum

PB.10.3 Transgression Fines

a. Non-compliance with the development, mentorship and skills programme..... Sum

PB.10.4 Training of learners employed by Targeted Subcontractors:

a. Generic skills:

i. Training costs.....Prime cost (PC) sum
ii. Handling costs and profit in respect of sub-subitem (i) above .....percentage(%)

b. Entrepreneurial skills:

i. Training costs.....Prime cost (PC) sum
ii. Handling costs and profit in respect of sub-subitem (i) above.....percentage(%)

c. Engineering skills:

i. Training costs.....Prime cost (PC) sum
ii. Handling costs and profit in respect of sub-subitem (i) above.....percentage(%)

d. Transportation and accommodation costs of selected learners only, while receiving off-site training:

i. Transportation and accommodation costs.....Provisional sum (Prov. Sum)
ii. Handling costs and profit in respect of sub-subitem (i) above.....percentage (%)

The Contractor's own personnel shall be permitted to attend the training courses provided for the learners employed by the Targeted Enterprise subcontractors only to the extent that the venue and its facilities can efficiently and comfortably accommodate the additional number of learners. All additional costs relating to such attendance by the Contractor's own personnel shall be carried by

the Contractor and shall not be considered for payment in terms of item PC10.4, including for any additional costs related to the accredited trainers and their delivery of the training courses, the provision of additional training materials, and the wages of the learners from the Contractor's own personnel for the duration of the courses.

PC HIV/AIDS REQUIREMENTS

PC.1 SCOPE

This specification contains all requirements applicable to the Contractor for creating HIV/AIDS awareness amongst all the Workers involved in this project for the duration of the construction period, through the following strategies:

- Raising awareness about HIV/AIDS through education and information on the nature of the disease, how it is transmitted, safe sexual behaviour, attitudes towards people affected and people living with HIV/AIDS, how to live a healthy lifestyle with HIV/AIDS, the importance of voluntary testing and counselling, the diagnosis and treatment of Sexually Transmitted Infections and the closest health Service Providers
- Informing Workers of their rights with regard to HIV/AIDS in the workplace
- Providing Workers with access to condoms and other awareness material that will enable them to make informed decisions about sexual practices

PC.2 DEFINITIONS AND ABBREVIATIONS

PC.2.1 Definitions

Service Provider: The natural or juristic person recognized and approved by the Department of Public Works as a specialist in conducting HIV/AIDS awareness programmes.

Service Provider Workshop Plan: A plan outlining the content, process and schedule of the training and education workshops, presented by a Service Provider which has been approved by the Representative/Agent

Worker: Person in the employ of the Contractor or under the direction or supervision of the Contractor or any of his Sub-contractors, who is on site for a minimum period of 30 days in all

PC.2.2 Abbreviations

HIV : Human Immunodeficiency Virus

AIDS : Acquired Immune Deficiency Syndrome

STI : Sexually Transmitted Infection

PC.3 BASIC METHOD REQUIREMENT

The Contractor shall, through a Service Provider, conduct onsite workshops with the Workers

The Service Provider shall develop and compile a Service Provider Workshop Plan to be presented at the workshops and which will be best suited for this project to achieve the specified objectives with regard to HIV/AIDS awareness.

The Service Provider Workshop Plan shall be based on the following information provided by the Contractor:

- Number of Workers and Sub-contractors on site
- When new Workers or Sub-contractors will join the construction project
- Duration of Workers and Sub-contractors on site
- How the maximum number of Workers can be targeted with workshops
- How the Contractor prefers workshops to be scheduled, e.g. three hourly sessions per Worker, or one 2.5 hour workshop per Worker
- Profile of Workers, including educational level, age and gender (if available)
- Preferred time of day or month to conduct workshops
- A Gantt chart reflecting the construction programme, for scheduling of workshops
- Suitable venues for workshops

The Contractor shall submit the Service Provider Workshop Plan for approval within 21 days after the tender acceptance date. After approval by the Representative/Agent, the Contractor shall make available a suitable venue that will be conducive to education and training.

The Service Provider Workshop Plan shall address, but will not be limited to the following:

PC.3.1 The nature of the disease;

PC.3.2 How it is transmitted;

PC.3.3 Safe sexual behaviour;

PC.3.4 Post exposure services such as voluntary counselling and testing (VCT) and nutritional plans for people living with HIV/AIDS;

PC.3.5 Attitudes towards other people with HIV/AIDS;

PC.3.6 Rights of the Worker in the workplace;

PC.3.7 How the Awareness Champion will be equipped prior to commencement of the HIV/AIDS awareness programme with basic HIV/AIDS information and the necessary skills to handle questions regarding the HIV/AIDS awareness programme on site sensitively and confidentially;

PC.3.8 How the Service Provider will support the Awareness Champion;

PC.3.9 Location and contact numbers of the closest clinics, VCT facilities, counselling services and referral systems;

PC.3.10 How the workshops will be presented, including frequency and duration;

PC.3.11 How the workshops will fit in with the construction programme;

PC.3.12 How the Service Provider will assess the knowledge and attitude levels of attendees to structure workshops accordingly;

PC.3.13 How the video will be used;

PC.3.14 How the Service Provider will elicit maximum participation from the Workers;

PC.3.15 A questions and answers slot (interactive session)

The Service Provider Workshop Plan shall encompass the Specific Learning Outcomes (SLO) as stipulated

PC.4 HIV/ AIDS AWARENESS EDUCATION AND TRAINING

PC.4.1 Workshops

The Contractor shall ensure that all Workers attend the workshops

The workshops shall adequately deal with all the aspects contained in the Service Provider Workshop Plan. A video of HIV/AIDS in the construction industry, which can be obtained from all Regional Offices of the Department of Public Works, is to be screened to Workers at workshops. In order to enhance the learning experience, groups of not exceeding 25 people shall attend the interactive sessions of the workshops

PC.4.2 Recommended practice

PC.4.3 Workshop Schedule

Presenting information contained in the Service Provider Workshop Plan can be divided in as many workshop sessions as deemed practicable by the Contractor, provided that all Workers are exposed to all aspects of the workshops as outlined in the Service Provider Workshop Plan

Breaking down the content of information to be presented to Workers into more than one workshop session however, has the added advantage that messages are reinforced over time while providing opportunity between workshop sessions for Workers to reflect and test information. Workers will also have an opportunity to ask questions at a following session

PC.4.4 Service Providers

A database of recommended Service Providers is available from all Regional Offices of the

Department of Public Works.

PC.4.5 HIV/AIDS Specific Learning Outcomes and Assessment Criteria

Workers shall be exposed to workshops for a minimum duration of two-and-a-half hours. In order to set a minimum standard requirement, the following specific learning outcomes and assessment criteria shall be met

PC.4.6 UNIT 1: The nature of HIV/AIDS

After studying and understanding this unit, the Worker will be able to differentiate between HIV and AIDS and comprehend whether or not it is curable. The Worker will also be able to explain how the HI virus operates once a person is infected and identify the symptoms associated with the progression of HIV/AIDS

Assessment Criteria:

a. Define and describe HIV and AIDS
b. List and describe the progression of HIV/AIDS

PC.4.7 UNIT 2: Transmission of the HI virus

After studying and understanding this unit, the Worker will be able to identify bodily fluids that carry the HI virus. The Worker will be able to recognize how HIV/AIDS is transmitted and how it is not transmitted

Assessment Criteria:

a. Record in what bodily fluids the HI virus can be found
b. Describe how HIV/AIDS can be transmitted
c. Demonstrate the ability to distinguish between how HIV/AIDS is transmitted and misconceptions around transmittance of HIV/AIDS

PC.4.8 UNIT 3: HIV/AIDS preventative measures

After studying and understanding this unit, the Worker will comprehend how to act in a way that would minimize the risk of HIV/AIDS infection and to use measures to prevent the HI virus from entering the bloodstream

Assessment Criteria:

a. Report on how to minimize the risk of HIV/AIDS infection
b. Report on precautions that can be taken to prevent HIV/AIDS infection
c. Explain or demonstrate how to use a male and female condom
d. List the factors that could jeopardize the safety of condoms provided against HIV/AIDS transmission

PC.4.9 UNIT 4: Voluntary HIV/AIDS counselling and testing

After studying and understanding this unit, the Worker will be able to recognize methods of testing for HIV/AIDS infection. The Worker will be able to understand the purpose of voluntary HIV/AIDS testing and pre- and post-test counselling

Assessment Criteria:

a. Describe methods of testing for HIV/AIDS infection
b. Report on why voluntary testing is important
c. Report on why pre- and post-test counselling is important

PC.4.10 UNIT 5: Living with HIV/AIDS

After studying and understanding this unit, the Worker will be able to recognize the importance of caring for people living with HIV/AIDS and be able to manage HIV/AIDS

Assessment Criteria:

a. List and describe ways to manage HIV/AIDS
b. Describe nutritional needs of people living with HIV/AIDS
c. Describe ways to embrace a healthy lifestyle as a person living with HIV/AIDS
d. Explain the need for counselling and support to people living with HIV/AIDS

PC.4.11 UNIT 6: Treatment options for people with HIV/AIDS

After studying and understanding this unit, the Worker will be familiar with the various treatments available to HIV/AIDS infected or potentially HIV/AIDS infected people

Assessment Criteria:

a. Discuss anti-retroviral therapy
b. List methods of treatment to prevent HIV/AIDS transmission from mother-to-child
c. Describe the need for treatment of opportunistic diseases for people living with HIV/AIDS
d. Describe post exposure prophylactics

PC.4.12 UNIT 7: The rights and responsibilities of Workers in the workplace with regard to HIV/AIDS

After studying and understanding this unit, the Worker will be able to identify the rights and responsibilities of the Worker living with HIV/AIDS in the workplace. The Worker will recognize the importance of accepting colleagues living with HIV/AIDS and treating them in a non-discriminative way

Assessment Criteria:

a. Discuss the rights of a person living with HIV/AIDS in the workplace
b. Discuss the responsibilities of a person living with HIV/AIDS in the workplace
c. Report on why acceptance and non-discrimination of colleagues living with HIV/AIDS is important

PC.4.13 Displaying of plastic laminated posters and distribution of information booklets

The Contractor shall obtain a set of four laminated posters conveying different key messages and information booklets, which are available from all Regional Offices of the Department of Public Works

The above-mentioned posters and information booklets have been prepared to raise awareness and to share information about HIV/AIDS and STI's

Posters or display stands shall be displayed on site as soon as possible, but not later than 14 days after the date of site handover

Posters shall be displayed in areas highly trafficked by Workers, including toilets, rest areas, the site office and compounds

The posters on display must always be intact, clear and readable

Information booklets must be distributed to all Workers as soon as possible, but not later than 14 days after site handover, or as soon as the Worker joins the site

PC.5 PROVIDING WORKERS WITH ACCESS TO CONDOMS

The Contractor shall provide and maintain condom dispensers and make both male and female condoms, complying with the requirements of SABS ISO 4074, available at all times to all Workers at readily accessible points on site, for the duration of the contract. The Contractor may obtain condom dispensers from the Department of Health and condoms may be obtained from the Local Clinic or the Department of Health.

At least one male and one female condom dispenser and a sufficient supply of condoms, all to the approval of the Representative/Agent, shall be made available on site within 14 days of site hand over. Contractors should note that arrangements to obtain condoms from the Department of Health Clinics prior to site hand over may be necessary, to ensure that condoms are available within 14 days of site handover.

Condoms shall be made available in areas highly trafficked by Workers, including toilets, the site office and compounds

PC.6 ENSURING ACCESS TO HIV/AIDS TESTING AND COUNSELING FACILITIES AND TREATMENT OF SEXUALLY TRANSMITTED INFECTIONS (STI)

The Contractor shall provide Workers with the names of the closest Service Providers that provide HIV/AIDS testing and counselling and Clinics providing Sexually Transmitted Infection (STI) diagnosis and treatment. Information on these Service Providers and Clinics must be displayed on a poster of a size not smaller than A1 in an area highly trafficked by Workers.

PC.7 APPOINTMENT OF AN HIV/AIDS AWARENESS CHAMPION

Within 14 days of site handover the Contractor shall appoint an Awareness Champion from amongst the Workers, who speaks, reads and writes English, who speaks and understands all the local languages spoken by the Workers and who shall be on site during all stages of the construction period. The Contractor shall ensure that the Awareness Champion has been trained by the Service Provider on basic HIV/AIDS information, the support services available and the necessary skills to handle questions regarding the HIV/AIDS programme in a sensitive and confidential manner

The Awareness Champion shall be responsible for:

PC.7.1 Liaising with the Service Provider on organising awareness workshops;

PC.7.2 Filling condom dispensers and monitoring condom distribution;

PC.7.3 Handing out information booklets;

PC.7.4 Placing and maintaining posters

PC.8 MONITORING

The Contractor shall grant to the Representative/Agent reasonable access to the construction site, in order to establish that the Contractor complies with his obligations regarding HIV/AIDS awareness under this contract

The Contractor must report problems experienced in implementing the HIV/AIDS requirements to the Representative/Agent

The attached SITE CHECKLIST (SCHEDULE A) shall be completed and submitted at every construction progress inspection to the Representative/Agent

The attached SERVICE PROVIDER REPORT (SCHEDULE B) shall be completed and submitted on a monthly basis to the Department's Project Manager, through the Representative/Agent

The attached CONTRACTOR HIV/AIDS PROGRAMME REPORT (SCHEDULE C), a close out programme report, shall be completed by the Contractor at the end of the contract.

SCHEDULE A

HIV/AIDS PROGRAMME : SITE CHECKLIST

When did construction commence _

Name of Departmental Project Manager ____

Please refer to HIV/AIDS Programme activities during the reporting period

Tick the block if Contractor satisfactorily complied with specifications																				
DATE	PI				PI				PI				PI				PI			
	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M
Programme implemented within 14 days of site handover																				
Awareness champion on site																				
HIV/AIDS awareness service provider report																				
Male condom dispenser																				
Sufficient male condoms available																				
Male condom dispenser in a highly trafficked area																				
Female condom dispenser																				
Sufficient female condoms available																				
Female condom dispenser in a highly trafficked area																				
All four types of posters displayed																				
Posters in a good condition																				
Posters in a highly trafficked area																				
Posters displayed on local support services: clinic & VCT centre																				
Support service poster/s in highly trafficked area																				
Support service poster/s in a good condition																				
Workers on payroll (at PI)																				
Sub-Contractors who will be on site for longer than 30 days (at PI)																				
Workshop attendees																				
Number of workshops held																				
Scheduled workshops according to approved workshop plan																				
Booklets distributed																				
Male condoms distributed																				
Female condoms distributed																				

_____					

Representative/Agent _____ Contractor					

Date of progress inspection (dd/mm/yy) ____

Reporting period: (dd/mm/yy)_____to (dd/mm/yy) ___

Deviations from HIV/AIDS awareness programme plan:

Corrective actions

_____ _____
Representative/Agent Departmental Project Manager

_____ _____
Date Date

SCHEDULE B

HIV/AIDS AWARENESS PROGRAMME: SERVICE PROVIDER REPORT

Reporting period: (dd/mm/yy)_____to (dd/mm/yy) ___

Number of workshops conducted in reporting period _____

Number of scheduled workshops according to approved workshop plan _

Deviations from workshop plan:

State reasons for deviating from workshop plan:

Corrective actions:

_____ _____

Service Provider Contractor

_____ _____

Date Date

HIV/AIDS AWARENESS PROGRAMME : WORKSHOP CONTENT ADDRESSED

Fill in the applicable information with regard to each workshop conducted

DATE	W/S				W/S				W/S				W/S				W/S				W/S				W/S			
	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M
Content of workshop: *(Mark the content included)*																												
SLO1																												
SLO2																												
SLO3																												
SLO4																												
SLO5																												
SLO6																												
SLO7																												
HIV/AIDS in construction video																												
Indicate the duration of the workshop in hours																												
Total number of Workers																												
Indicate workshop venue																												

HIV/AIDS AWARENESS PROGRAMME: ATTENDANCE REGISTER

Fill in your name and indicate attendance by ticking the appropriate date

DATE		W/S				W/S				W/S				W/S				W/S				W/S				W/S			
		D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M
No	NAMES																												

SCHEDULE C

CONTRACTOR HIV/AIDS PROGRAMME REPORT

Project name ____

Project Location __

Contract value of project (R) _

Municipality Project Manager _____

HIV/AIDS Programme duration: (dd/mm/yy) ____ to (dd/mm/yy) ____

AWARENESS MATERIAL

Describe location of posters displayed during the programme __

_____

Comments on posters ____

_____

_____

Indicate total number of booklets distributed _

Comments on booklets ___

_____

_____

CONDOMS

Indicate total number of male condoms distributed ___

Indicate total number of female condoms distributed __

Describe where male condom dispenser was placed __

Describe where female condom dispenser was placed _____

HIV/AIDS WORKSHOPS

Indicate the total number of HIV/AIDS workshops conducted

Indicate the duration of workshops _

Indicate the total number of Workers that participated in the HIV/AIDS workshops _____

Indicate the total number of Workers that were exposed to the video on HIV/AIDS in the Construction Industry

_____

Comments on HIV/AIDS workshops on site _

_____

GENERAL

Briefly describe programme activities and satisfaction with outcome ____

_____

_____

Additional comments, suggestions or needs with regard to the HIV/AIDS awareness programmes on site

_____

_____

_____

Please indicate if your company has a formal HIV/AIDS policy focusing on HIV/AIDS awareness raising and care and support of HIV/AIDS Workers

Yes	No	Currently developing one

Please indicate if, to your knowledge, you have lost any workers during the duration of the project to HIV/AIDS related sicknesses. One or more of the following might indicate an HIV/AIDS related death:

Excessive weight loss Coughing or chest pain Vomiting
Reactive TB Pain when swallowing Meningitis
Hair loss Persistent fever Memory loss
Severe tiredness Diarrhoea Pneumonia

Number of HIV/AIDS-related deaths _____

_____ _____
Contractor Date

_____ _____
Departmental Project Manager Date

PD HEALTH AND SAFETY SPECIFICATION

PD.1.1 The Occupational health and safety specification for Mthonjaneni SSA2 are as per Annexure C5.3

This specification shall be read with the Occupational Health and Safety Act (Act No 85 and amendment Act No 181) 1993, and the corresponding Construction Regulations 2014, and all other safety codes and specifications referred to in the said Construction Regulations.

Penalties for late submission of the Health and Safety File shall be as indicated in the Bill of Quantities.

PD.2 MEASUREMENT AND PAYMENT

a. Contractor's initial obligation in respect of the Occupational Health and Safety Act (OHS) & Construction Regulations ..... Unit: Sum

The rate shall be deemed full compensation for all the Contractor's initial obligations as described in the Particular Specification PI. Payment will be made once all the obligations have been met.

b. Contractor's time related obligations in respect of the Occupational Health and Safety Act (OHS) & Construction Regulations ..... Unit: Sum

The rate shall be deemed full compensation for all the Contractor's on-going obligations as described in Particular Specification PD. Interim payments will be made throughout the duration of the contract, provided that the Contractor meets his obligations to the satisfaction of the Engineer.

Penalties for late submission of Health & Safety File

c. Initial once off penalty ..... Unit: No.
d. Time related penalty ..... Unit: Week

The sum deducted under this item shall be the amount as stated in the specifications and in the Bill of Quantities, and shall be deducted for non-compliance. The unit of measurement for (b) shall be the week. The non-compliance penalty shall be as stated in the Bill of Quantities for each week or part thereof. A daily prorata penalty shall be levied for late compliance over part of a week. The sum deducted under this item shall be the amount as stated in the specifications and in the Bill of Quantities, and shall be deducted for time related non-compliance after the initial penalty in (a) above. Notwithstanding these penalties, the Engineer may stop work, if in his opinion, the non-compliance is evident

.

PE ENVIRONMENTAL MANAGEMENT PLAN

Environmental Management Programme (EMP) attached in Annexure C5.7.

PE.1 COMPLIANCE WITH ENVIRONMENTAL SPECIFICATION

The contractor is deemed not to have complied with the Environmental Specifications if:

Within the boundaries of the site, site extensions and access roads there is evidence of contravention of clauses;

Environmental damage occurs due to negligence;

The contractor fails to comply with corrective or other instructions issued by the Project Manager or Clerk of Works within a specified time period;

The contractor fails to respond adequately to complaints from the public.

Application of a penalty clause will apply for incidents of non- compliance. The penalty imposed will be per incident. The penalties will be imposed per incident or violation will be as stated in Annexure1 of the EMP.

PE.2 MEASUREMENT AND PAYMENT

PE.2.1 Principles

It is a condition of this contract that Contractors who submit tenders for this contract, shall make provision in their tenders for the cost of compliance with the requirements of the EMP during the construction process. All associated activities and expenditure are deemed to be included in the Contractor's tendered rates.

PE.2.2 Payment items

a. Contractor's initial obligation in respect of the Environmental Management Plan (EMP) and Environmental Regulations ..... Unit: Sum

The unit of measurement shall be Sum. The rate shall be deemed full compensation for all the Contractor’s initial obligations as described in the EMP. Payment will be made once all the obligations have been met.

b. Contractor's time related obligations in respect of the Environmental Management Plan (EMP) and Environmental Regulations ..... Unit: Sum

The unit of measurement shall be the Lump Sum. The rate shall be deemed full compensation for all the Contractor’s on-going obligations as described in the EMP. Interim payments will be made throughout the duration of the contract, provided that the Contractor meets his obligations to the satisfaction of the Environmental Control Officer (ECO).

c. Provision of Environmental Liaison Officer (ELO) .....Unit: Month

The unit of measurement shall be the month or part thereof. The rate shall be deemed full compensation for all the Contractor’s costs associated with providing an ELO. Payment will be made provided that the ELO meets his obligations to the satisfaction of the Environmental Control Officer (ECO).

PF PARTICULAR SPECIFICATION FOR VALVES

PF.1 SCOPE AND DEFINITIONS

PF.1.1 SCOPE

This Particular Specification covers the requirements for Water Meters, Strainers, Resilient Seal Gate Valves, Wedge Gate Valves, Butterfly Valves, Air Release and Vacuum Break Valves, Check Valves, Combined Function Control/Check Valves, and Level Control Valves.

PF.1.2 NOTES PERTAINING TO THIS PARTICULAR PROJECT

All isolation valves shall be gate valves geared for slow closing, unless otherwise stated on the drawings. If butterfly valves are indicated on the drawings, the valves shall be of the high performance, resilient seat, double eccentric type, in ductile cast iron with flanged end connections, face-to-face acc. to SANS 1849/BS EN 558-1.

Valves to be motorised are identified on the Control and Automation drawings

All motorised valves shall be supplied with proximity sensors or limit switches which shall be included in the price of the valve.

PF.1.3 DEFINITIONS

The definitions as contained in SANS 191 and 664: 2011 are applicable to this specification.

PF.2 CONSTRUCTION

PF.2.1 GENERAL

PF.2.2 QUALITY CONTROL PLAN (QCP)

A comprehensive Quality Control Plan (QCP) shall be prepared by the Contractor and submitted to the Engineer for approval. This QCP shall be based upon ISO 9002.

PF.2.3 INFORMATION TO BE SUBMITTED TO THE ENGINEER

The following information shall be submitted to the engineer:

- A detailed drawing of the sealing arrangement. This drawing shall show the profile of the locating ring, the profile of the resilient seal and the extent of the weld deposit on the outside edge of the disc.
- Full particulars of the resilient seal.
- The face-to-face dimension(s) of the valve(s).
- Make and details of the gearbox.
- Possible configurations of the butterfly valve and manual gearbox. Overall dimensions of the valve, gearbox, hand wheel and, where applicable, the preferred direction of flow shall be shown.
- The method of connecting the disc to the stub-riving shaft (splined, keyed or pinned).
- Details of lifting lugs, which are required to be fitted to all valves that have a mass in excess of 100kg, and to be hot dip galvanized to SANS 1461.

PF.2.4 TESTING AND CERTIFICATION

The Contractor shall give the Engineer at least 7 days notice of commencement of performance tests. The Employer or his agent reserves the right to witness all performance tests carried out on the valve.

Upon delivery, all valves shall be supplied with a copy of the relevant factory test certificate, which reflect inter alia the test pressure and valve serial number. Original factory test certificates together with the Quality Control Plan, duly signed by both the Contractor and the Engineer for each valve shall be issued on completion of delivery of the valve consignment.

Valve bodies shall be pressure tested to twice the rated working pressure of the valve.

PF.2.5 VALVE INFORMATION PLATES

Each valve shall have a plate made of corrosion-resistant metal securely fixed to the body with corrosion-resistant fastenings, on which the following information shall be stamped :-

- The Manufacturer's name
- Size of Valve
- Class of Valve
- Arrow indicating the direction of flow, where relevant
- The contract number
- The serial number
- The material designations of the body and trim (see material specifications below)

PF.2.6 PROTECTION DURING TRANSIT AND STORAGE.

Each valve shall be so protected as to minimize the possibility of damage during transit and storage. The gates of wedge gate valves shall be placed in the closed position. The body ends of all new valves shall be effectively sealed to prevent entry of foreign matter.

PF.2.7 OPERATION

All isolation valves shall be clockwise closing when viewed from above. Clockwise closing valves shall be fitted with hand-wheels or caps painted green.

PF.2.8 COATINGS AND RESISTANCE TO CORROSION

All new valves are to be epoxy coated internally and out. Coating may be either by an approved solvent based epoxy system or an approved fusion bonded epoxy system as specified below:

Contractors will be required to submit details of their proposed suppliers, coating specification and the coating system to be applied, to the Engineer for approval, before ordering the valves.

a. Solvent Based Epoxy Coating System
b. The epoxy shall be of the type Carboline 891 ;Plascogard KSIR 88; Sigmaguard EHB; AEBECOTE 330 or similar approved.

The dry film thickness (D.F.T) shall be as follows:

- Coating : 350 microns ± 50 microns; and
- Lining : 250 microns ± 50 microns

The applied coating and lining shall comply with the requirements of the table below.

No	Property	Requirements	Test Method	Frequency
1	Visual	The lining shall be smooth, free from excessive runs, sags, orange peel, occlusion or other visible defects.	Use an experienced observer.	Each Valve
2	Coating Thickness	Minimum : 200 microns Maximum : 500 microns	SANS Method 141	Minimum 6 readings/ Valves per batch
3	Electrical Insulation Defects	Nil defects when tested at 90 Volts 2 Megaohms	SANS Method 1217 – Section 8:12	One Valve per batch
4	Degree of Cure	No softening or discolouration	20 double rubs with cotton wool swab soaked in MEK	One valve per batch
5	Adhesion	Destructive testing not recommended		

c. Fusion Bonded Epoxy Powder Coating System
d. The Epoxy coating shall be a fusion bonded epoxy powder coating of the type InterponPCL 331, Vedoc V VPC 2001 or similar approved.

No	Property	Requirements	Test Method	Frequency
1	Visual	Smooth glossy or semi glossy finish, free from excessive runs, sags, orange peel, occlusion or other visible defects	Use an experienced observer	Each Valve
2	Coating Thickness	Min. 200 max. 500 microns	SANS Method 141	Minimum 6 readings/valve
3	Electrical Insulation Defects	Nil defects at 3500 Volts. For conditions for repair see Clause 3.3	SANS 1217 section 8.12.2	One Valve per batch
4	Impact Resistance	No defects at 2 joules	SANS 1217 section 8.7	Random 5% of Valves
5	Degree of cure : Dynamic Test	No softening or discolouration	20 double rubs with cotton wool swab soaked in MEK	One Valve per batch

The cured fusion bonded epoxy powder coating shall meet the requirements specified in Table 3.

Where extended spindles are used these shall be galvanised.

PF.2.9 PROXIMITY SENSORS/LIMIT SWITCHES

If specified, the proximity sensors or limit switches shall detect both the open and closed position of the valve (Separate sensors for open and closed position). Each sensor/limit switch shall include a minimum of one normally open (NO) and one normally closed (NC) potential free contact, contacts are to be rated at 0.5 amp (minimum). The sensors/limit switches shall be supplied complete with any special or equipment-specific sensor cables, connectors etc. Cables must be a minimum of 5m in length. The sensors shall include visible status indication. Sensors shall be suitable for 24VDC. The sensors/limit switches shall be rated IP67 (minimum).

PF.2.10 WATER METERS AND STRAINERS

Water meters and associated in-line strainers shall be those manufactured by either Meinecke or similar approved suitable for data logging where applicable and complying with the description given on the drawings, or similar.

a. Bulk meters (NB 150mm)

Water meters tendered for under this category must be of the in-line through-flow Woltman type, mechanical turbine flanged bulk water meters and must conform to the following dimensions and specifications:

Nominal Bore	Body Lengths	Flange Specs	Working Pressure Maximum	Temp Maximum
150mm	300mm	BS4504 Table 16	1600kPa	50ºC

All Woltman type mechanical meters supplied in terms of this contract shall perform to an accuracy of better than ±2% error over the meter's operating range; i.e. between Qt and Qp (Qn). The performance characteristics of the meters offered must be equal to or better than the values listed below:

Size DN	Qstart m3/h	Qmin m3/h	Qt m3/h	Qn (Qp) m3/h	Qmax (Qs) m3/h
150mm	1,0	1,8	4	450	600

Meters must be fitted with robust glass/copper dry dial registers, which comprise 6 digit cyclometer-type totalisers, registering in kiloliters (kl) or m3. These registers must be sealed to IP68 to prevent ingress of dirt or moisture, and must function under water, in the event of manholes flooding. The registers, which are to be fitted as standard with a pickup probe. The probe must be able to provide one high frequency opto-type pulse output function and two low frequency reed-type pulse output functions. Only meters which allow for very easy fitment and removal of the reed-and opto-type pulsars, normally associated with data logging, without having to break the verification seals, will be

acceptable;

No consideration will be given to meter types, which necessitate the use of special tools or fitment of any form of gland in the process of connecting pulser units, or, meters which require a register-change to switch from one volume unit per pulse to another

Meters must preferably offer an upgrade path to AMR (Automatic meter reading), which facilitates the fitment of “intelligent” registers at a later stage. The Contractor is to provide full details of the meter capability in this regard and furnish examples of systems already operating successfully in South Africa.

Meters must be data logger compatible with loggers which have a proven track record and have a purpose-written software, to be used in conjunction with their bulk water meters, for network management;

Cover bolts must be of stainless steel material to facilitate easy removal of mechanisms. Meter bodies must be coated with a high quality sintered epoxy powder coating, both internally and externally, with a minimum coating thickness of between 200 and 300 microns.

Although most of the meters will be install horizontally, it must be possible to install the meters vertically (with flow in the upward direction) or in an inclined position (with flow in the upward direction), should site conditions make this necessary;

The performance of the meters offered shall not be affected by outside magnetic influences;

A place must be provided for on the meter body, which can be drilled and tapped, for connecting a pressure transducer, for data logging, should the need arise; and

Ability for meter mechanisms to be exchanged – or to fit new, calibrated mechanisms into used or existing meter bodies, without loss of measuring accuracy to be substantiated. This is of particular importance to facilitate cost effective ease of maintenance to the meters in the future, without the need to remove meter bodies from the pipeline.

Prior to any meter being ordered or delivered to site, the Contractor shall deliver to the Engineer a sample of a typical bulk meter that he proposes to use and which complies with this specification. The Engineer will then investigate whether the meter is compliant with the specification before authorizing the use of such meters. If the meter does not comply with the specification in all respects, the Engineer may reject such meter in which case the Contractor will have to source meters of the required quality and all costs associated therewith will be for the Contractor’s account.

The sample shall be accompanied by the following control sheet:

Item	
Name of official meter distribution company:	
Overview of company with particular emphasis on service capabilities, calibration facilities and their track record in South Africa:	(To be attached)
Meter specification sheets (including head loss across meter, minimum upstream/downstream straight pipe lengths and compliance with this specification):	(To be attached)
Test certificate:	(To be attached)

PF.2.11 GATE VALVES

Gate valves up to class 25 shall be resilient seal gate valves.

PF.2.12 RESILIENT SEAT GATE VALVES

Resilient seal gate valves (RSV) shall comply with SANS 664 (latest amendment) with classes and flange drillings as detailed or scheduled elsewhere. Where plain ended valves are required, the ends shall be suitable for the type of pipe specified. The valves shall be designed for droptight closure over the full range of pressures from zero to maximum working pressure.

The typical application of resilient seal valves is for valves in “normally open” locations (eg air valves,

isolating valves, in-line valves <250NB where the maximum differential pressure across the valve is not likely to exceed 16 Bar under normal operating conditions. Resilient seal valves shall not be used in terminal positions (eg as scour valves) without the approval of the Engineer.

In addition, they shall comply with the following:

a. General

Gate valves shall be flanged or socketed and be resilient seated and shall be of the non-rising spindle type.

The valves shall be capable of sealing drip tight bi-directionally over the full range of pressures from zero to maximum working pressure.

b. Gate design

The gate shall be fully rubber encapsulated inside and out to ensure drip tight sealing and to avoid corrosion and shall be provided with a 10 year replacement warrantee. The gate shall further have a drain hole, preventing stagnant water or impurities from collecting.

Rubber utilized in the coating of the wedge shall be inert and shall not impart odour, taste and colour and shall be suitable for drinking water applications. The gate nut shall not be fixed to the wedge, thereby reducing opening torques.

c. Gate and body design

The gate shall have optimally placed guides of wear resistant plastic so as to reduce the torques as well as to reduce wear between the rubber and the coating on the body. The bore of the body shall be straight through design in order to allow cleaning with a badger.

d. Valve bonnet

The valve shall utilize 3 independent bonnet seals which shall include a set of stem steels embedded in non-corrosive material, a back seal to prevent leakage when changing seals and a wiper ring to protect against debris entering the valve

Two friction washers (sizes 50mm to 200mm) and thrust ball bearings (250mm to 600mm) shall be incorporated to ensure smooth spindle operation as well as to reduce opening and closing torques.

e. Spindle

Spindles shall be made of stainless steel. The stem threads shall be rolled to maintain steel structure and increase strength and to ensure smooth thread edges and consequently a low operating torque. The spindle seat consist of 2 nitrile rubber O rings located in a corrosion resistant housing. A wiper ring shall also be provided.

f. Body and assembly

The rubber bonnet gasket shall fit in the recess in the valve bonnet preventing blow out of the seal under surge conditions. The bonnet bolts shall pass through the gasket and be sunk into the bonnet and be sealed for corrosion protection.

An edge protecting ring shall permanently be fitted around the body of the bonnet joint in order to protect the coating during transportation and installation. The body of the valve shall be fusion bonded epoxy coated to a minimum DFT of 250 microns.

Unless otherwise specified caps for key operation will be required for buried valves and hand wheels on valves situated in accessible chambers. Extension spindles and brackets shall be provided where detailed and hand wheels shall be clearly marked with the direction of opening.

PF.2.13 WEDGE GATE VALVES

Wedge gate valves shall comply with the requirements of SANS 664 (latest amendment) with classes

and ends as elsewhere specified.

The typical application for wedge gate seal valves is for valves in “normally closed” locations (eg scour valves) and for valves in the normally open position (eg in-line valves <250NB) where the maximum differential pressure across the valve is likely to exceed 16 Bar under normal operating conditions.

Channel-guides and shoes shall be fitted to valves falling within the following pressure and size ranges:

PRESSURE	VALVE SIZE
Class 10	600mm and above
Class 16	350mm and above
Class 25	350mm and above
Class 40	All sizes
Class 100	All sizes

The spindles shall be of the non-rising type and shall be manufactured of solid stainless steel.

Gearing shall be chosen to limit the total effort at the hand wheel or valve key to 400 Newtons.

The valves shall be capable of being easily operated by one man against the maximum unbalanced pressure and the total effort required to operate the valve shall not exceed 400 Newtons (i.e. a simultaneous push-pull of 200 Newtons each) on the ends of tee key 900mm long resulting in a maximum torque of 180Nm.

In order to comply with the above requirements it has been found that the following are normally necessary for larger sizes of valves:

a) Class 16 (PN 16) valves in sizes 80mm, 150mm and 300mm should be fitted with ball thrust collars; and

b) Class 25 (PN 25) valves in size 80mm, 150mm should be fitted with either ball thrust collars or spur gears, while 250mm and 300mm sizes should be fitted with ball thrust collars and 3 to 1 gears.

c) Class 40 (PN 40) valves in sizes 80mm, 150mm and 200mm should be fitted with either ball thrust collars or spur gears, while 250mm and 300mm sizes should be fitted with ball thrust collars and 3 to 1 gears.

While other forms of anti-friction devices may be acceptable it is the Contractor’s responsibility to ensure that the required torque is not exceeded.

Unless otherwise specified buried valves shall be provided with caps for key operation and valves in chambers with hand wheels.

The valves shall be provided with Type C trim with pinned seat rings. The gate shall be full length. The body of the valve shall be epoxy coated to a minimum DFTof 250 microns inside and out.

The gland packing shall be of the “Maxmech Style M57”, Chesterton 1724” or similar approved.

PF.2.14 BUTTERFLY VALVES

These shall be solid cast body type for bolting to flanges and shall be of perfect closure. The valves shall be fitted with gearbox operated hand wheels or ratchet locating hand-levers, stainless steel shafts and discs and natural rubber or neoprene seals and shaft seals.

The valves shall conform to the requirements of BS 5155:1984. The class of valve shall be as specified. Specifications and test certificates shall be provided.

General

This part of the specification applies to valves other than those specified by make and model or similar approved. Tender rates for valves specified by make and model or similar approved shall be based on the model specified and alternatives may then be proposed during the contract. 50% of any savings arising from the use of alternative products shall be passed on the Employer.

Valve Performance

The valve shall be suitable for flow in both directions. Additionally the valves shall seal drop tight at the full rated pressure with the pressure applied from either side of the valve.

Valve Material and Design

Valve body materials of construction shall comply with the following requirements:

VALVE BODY MATERIALS AND TEST PRESSURES			
WORKING PRESSURE (bar)	BODY TEST PRESSURE (kPa)	DROP TIGHTNESS TEST PRESSURE (kPa)	VALVE BODY AND DISC
<= PN 25	5000	2750	Ductile iron (minimum grade 420/12 to BS 2789)
<= PN 40	6000	4400	Cast Steel (minimum grade 480 to BS1504-161)

Note: The definitions of BS 5155/1974 shall apply.

A replaceable, carefully machined and polished stainless steel seat shall be bolted to the body with stainless steel studs. The seat shall be sufficiently wide to permit at least 10mm “lead” distance on each side for the resilient seal.

A replaceable EPDM or nitrile high strength continuous resilient seal shall be clamped to the disc with a removable stainless steel locating ring that shall in turn be secured to the disc with stainless steel studs. The disc shall be entirely stainless steel. The cross sectional profile of the resilient seal locating ring shall provide maximum protection against tear out during operation (see Clause 3.2). Designs where the resilient seal is clamped to the valve body rather than the disc will also be considered provided that all performance and operational requirements of this specification are met.

The valve seal and seat shall be replaceable without otherwise dismantling the valve.

All stainless steel components shall be Grade 316 stainless steel. The resilient seal shall be “non-stick” and shall be stable and not deteriorate under conditions of continuous submersion in the medium indicated.

The valve shall be suitable for installation with the main shaft in the horizontal position and the hand wheel shaft shall be vertical.

The valve shall be of the off-centre stub shaft type and may be of double or triple eccentric configuration.

The stub-shafts shall be fabricated from high strength stainless steel that shall be located in bronze bushes. Shaft sealing shall be achieved with two O-rings per stub shaft. Whilst pinning of the disc to the drive shaft will be considered, the preferred method of connection is to positively spline or key internally the disc to the driving shaft (see clause 7).

Flanges shall be drilled off-centreline in accordance with the SANS 1123 edition 2.1 of May 2000 to the pressure rating specified in the schedule.

- Gearbox Specification
- Unless otherwise stated the valve shall be fitted complete with a manual gearbox of robust construction of the combined spur/worm type.
- The gearbox shall be rated to enable the valve to be easily operated by one man against the maximum, unbalanced pressure, and the effort required to operate the valve shall not exceed a torque of 180Nm.
- Shear pins shall be fitted to gearboxes in order to provide protection to the valve.

- Position indicators shall be fitted to the gearbox and shall clearly indicate the fully open and closed positions.

PF.2.15 AIR RELEASE AND VACUUM BREAK VALVES

PF.2.15.1 General

Air valves shall be the double purpose air release valves / vacuum break type.

The air release and vacuum break valve shall be of a compact single chamber design with solid cylindrical High Density Polyethylene control floats housed in a tubular stainless steel or corrosion protected body with epoxy powder coated cast iron, or s/steel ends secured by means of stainless steel tie rods.

Ball type air valves are not acceptable.

Large orifice sealing shall be effected by the flat face of the control float seating against a nitrile rubber 'O' Ring housed in a dovetail groove circumferentially surrounding the large orifice. Discharge of pressurized air shall be controlled by the seating and unseating of a small orifice on a natural rubber seal affixed to the control float.

PF.2.15.2 Performance and Testing Requirements

The valve design shall be proven and performance criteria shall have been confirmed by a recognized independent authority.

The valve shall have an integral surge alleviation mechanism which shall operate automatically to limit transient pressure rise or shock induced by closure due to high velocity air discharge or the subsequent rejoining of separated water columns. The limitation of pressure rise must be achieved by deceleration of approaching water prior to valve closure. Relief mechanisms that act subsequent to valve closure cannot reach in the low millisecond time span required and are therefore unacceptable.

Valves shall react immediately to negative pipeline pressure in order to prevent the formation of unacceptably high negative pressure conditions. The Contractor may be required to demonstrate this function in an approved manner on one valve of each size or 1% of the valve consignment, whichever is greater.

Valves shall be capable of discharging high volumes of air through the large orifice under positive line pressure filling conditions. Under these conditions valves shall function to close at a discharge rate corresponding to a flow in the pipeline of 0.4m/s. Valves shall be capable of in-taking high volumes of air under negative line pressure conditions. In addition, the valve shall be capable of releasing small quantities of dis-entrained air at all line pressures up to the rated working pressure of the valve. The Contractor may be required to demonstrate these functions in an approved manner on one valve of each size or 1% of the valve consignment, whichever is greater.

During air discharge conditions, the large orifice shall close when the filling rate of the pipe exceeds 0.3m/s in order to minimize transient pressure effects. The design shall include for means to release intermediate volumes of air once the large orifice has closed under such conditions. This may be achieved by means of a secondary orifice or other approved manner. The Contractor may be required to demonstrate this function in an approved manner on one valve of each size of 1% of the valve consignment, whichever is greater.

The valve shall seal drop tight at all line pressures from 0.5 Bar up to the rated working pressure of the valve. The Contractor may be required to demonstrate this function in an approved manner on one valve of each size or 1% of the valve consignment, whichever is greater.

ALL valve bodies shall be pressure tested to one and a half times the rated working pressure of the valve. The valve design shall incorporate an over pressure safety feature that will fail without an explosive effect, such as normally the case when highly compressed air is released suddenly. This

feature shall consist of easily replaceable components such as gaskets, seals or the like.

The intake/discharge orifice shall be equivalent in cross-sectional area to the nominal size of the valve and shall have a discharge coefficient of >=0.7.

The valve floats and seals shall require minimal maintenance and it shall be possible to carry out such minimal maintenance without removing the valve from the pipeline.

Air valves on the suction line are to close drip tight at head of 3m

PF.2.15.3 Design and Material Requirement

The air valve shall comply with the following (variations to these requirements may be considered provided that all performance requirements (see Clause 2) are met, the materials of construction are of similar durability to that specified and the Engineer is satisfied that the valve design is proven and appropriate to this application):

- The valve shall be of compact single chamber design.
- The floats shall be of HDPE or similar approved maintenance free material.
- Flat seals shall be nitrile rubber or similar approved.
- The valve body and flanges shall be stainless steel (grade 304).
- The discharge/intake port shall be protected by a stainless steel screen that shall not impair the discharge characteristics of the valve.
- End Connections and Flange Drilling: The valve end shall be flanged. Unless otherwise indicated, flanges shall be drilled to SABS 1123/2000 Version 2.1; with flange table as indicated in the Project Specification.

PF.2.16 NON RETURN (CHECK) VALVES

PF.2.16.1 Valve Performance

The valve shall be a nozzle type check valve.

The valve should fully open at low flow rates to minimize pressure drop during normal operating conditions and respond rapidly to changes in velocity that the disc is at the point of closure before reverse flow occurs.

Kv values shall be greater than or equal to those shown in the table below:

Size	Kv
400	6500
700	17000

PF.2.16.2 Valve Design

The non-slam check valve should be double flanged and of a nozzle type design.

The closing disc should have a ring-shaped design to minimise the mass of the moving parts.

The disc should be guided utilizing friction free stainless steel helical springs and radial guides to ensure rapid slam free closure.

The valve body and diffuser design should create a venturi shape to create a pressure differential across the disc to assist in opening the valve and ensuring a high pressure recovery resulting in a low pressure drop across the valve.

Valves that would comply with this specification are the long bodied versions manufactured by Vent-o-Mat. If in doubt tenderers should base their prices on these models.

PF.2.16.3 Valve Material

ITEM DESCRIPTION DUCTILE IRON

1 VALVE BODY ASTM A536 65-45 -12 (DUCTILE IRON)

2 FLOW DIFFUSER	ASTM A536 65-45 -12 (DUCTILE IRON)
3 VALVE DISC	ASTM A350 CF 8M
4 SEAT RINGS (WELD DEPOSIT)	AISI 316
5 SPRING GUIDE	AISI 316
6 RADIAL GUIDE	AISI 420 3/4 HA RD
7 HELICAL SPRING	ASTM A313 -98
8 TIE BOLT	ASTM A193 B 8M
9 FASTENERS	ASTM A193 B 8M

PF.2.16.4 Corrosion Protection

General

All cast steel, ductile iron or mild steel surfaces of valves and gearboxes shall be coated (external) and lined (internal, valves only) with a solvent based epoxy coating system as specified in clause PH2.1.7 above.

Prior to any valve being ordered or delivered to site, the Contractor shall deliver to the Engineer a sample of a typical control valve that he proposes to use and which complies with this specification. The Engineer will then investigate whether the valve is compliant with the specification before authorizing the use of such valve. If the valve does not comply with the specification in all respects, the Engineer may reject such valve in which case the Contractor will have to source valves of the required quality and all costs associated therewith will be for the Contractor's account.

The sample shall be accompanied by the following control sheet:

Item	
Name of valve supply company:	
Overview of company with particular emphasis on service capabilities, calibration facilities and their track record in South Africa:	(To be attached)
Valve specification sheets (detailing compliance with this specification):	(To be attached)
Test certificate:	(To be attached)

PF.2.17 LEVEL CONTROL VALVES BY BERMAD OR SIMILAR APPROVED

PF.2.17.1 Valve Manufacture

The valve shall be of equal or superior quality to that manufactured by Bermad. Alternatives proposed must be supported by a list of current users, data sheets and drawings. If in doubt tenderers should base their prices on the Bermad model.

PF.2.17.2 Valve Performance

The Level Control Valve shall be double chambered to power fully open at pre-set low level, and to shut off at pre-set high level regardless of valve differential pressure.

PF.2.17.3 Main Valve

The main valve shall be a centre guided, diaphragm actuated globe valve of either oblique (Y) or angle pattern design. The body shall have a replaceable, raised, stainless steel seat ring. The valve shall have an unobstructed flow path, with no stem guides, bearings, or supporting ribs. The body and cover shall be ductile iron. All external bolts, nuts, and studs shall be Duplex® coated. All valve components shall be accessible and serviceable without removing the valve from the pipeline.

PF.2.17.4 Actuator

The actuator assembly shall be double chambered with an inherent separating partition between the lower surface of the diaphragm and the main valve. The entire actuator assembly (seal disk to top cover) shall be removable from the valve as an integral unit. The stainless steel valve shaft shall be

centre guided by a bearing in the separating partition. The replaceable radial seal disk shall include a resilient seal and shall be capable of accepting a V-Port Throttling Plug by bolting.

PF.2.17.5 Control System

The control system shall consist of a 4-Way, “last position”, adjustable bi-level, hydraulic float pilot assembly, an isolating cock valve, (for 10” valves and larger: two accelerators), and a filter. All fittings shall be forged brass or stainless steel. The assembled valve shall be hydraulically tested.

PF.2.17.6 Quality Assurance

The valve manufacturer shall be certified according to the ISO 9001 Quality Assurance Standard. The main valve shall be certified as a complete drinking water valve according to NSF, WRAS, and other recognized standards

PF.2.17.7 Payment

The rate shall include the supply, installation and testing of all the necessary equipment for the functioning of the valve and control system.

PF.2.18 EQUILIBRIUM FLOAT LEVEL CONTROL VALVES

PF.2.18.1 Valve Manufacture

The valve shall be of equal or superior quality to the Vosa Series 7354 Equilibrium Float Valve. Alternatives proposed must be supported by a list of current users, data sheets and drawings.

PF.2.18.2 Valve Performance

The valve shall perform in a similar manner to the Series 7354. In particular, alternatives proposed must demonstrate similar slow closing characteristics.

Prior to any valve being ordered or delivered to site, the Contractor shall deliver to the Engineer a sample of a typical control valve that he proposes to use and which complies with this specification. The Engineer will then investigate whether the valve is compliant with the specification before authorizing the use of such valve. If the valve does not comply with the specification in all respects, the Engineer may reject such valve in which case the Contractor will have to source valves of the required quality and all costs associated therewith will be for the Contractor’s account.

The sample shall be accompanied by the following control sheet:

Item	
Name of valve supply company:	
Overview of company with particular emphasis on service capabilities, calibration facilities and their track record in South Africa:	(To be attached)
Valve specification sheets (detailing compliance with this specification):	(To be attached)
Test certificate:	(To be attached)

PG PARTICULAR SPECIFICATION FOR PUMPS

PG.1 SCOPE

This section of the specification covers the supply, delivery, transport, handling, storage, erection, installation, commissioning, testing, adjustment, handing over in complete working order and upholding during the Defects Liability period of the pumping equipment for Pumpstation 2B for pumping potable water to Reservoir 4.

PG.2 PARTICULAR REQUIREMENTS OF PUMPS

Two (2) pumps shall be supplied. (1 Duty / 1 Standby).

The pumps shall be of the multistage type in ring section design of Grundfos manufacture or similar and equal approved.

The design of the pumpstation building and manifold was based on horizontal multi-stage pumps. Should the contractor be unable to meet the minimum 75% pump efficiencies with horizonal multi stage pumps, vertical multi-stage pumps can be considered and the manifold must be adjusted to suit. Contractor to price for the adjusted manifold.

The pump casings and guides shall be made of high-grade cast iron, the impellers and diffusers shall be of bronze and the shafts shall be made of stainless steel with mechanical seals. Bearings shall be waterproof and with suitable provision for grease lubrication. The rotating assembly shall be properly balanced so as not to give rise to end thrust or alternatively suitable thrust bearings shall be provided. All parts shall be of ample dimensions and strength, properly machined and assembled to ensure perfectly free running.

Refer to pump duty table below for the minimum efficiency that the pumps must comply with. Each pump shall be driven by a 4-pole premium (highest) efficiency motor. The impeller shall be trimmed to suit the maximum flow of 40 m^3/h at full speed (2934 rpm) and therefore the motor must be sized accordingly.

Number of pumps operational	Pump rate at maximum head	Maximum head	Static Head	Minimum Pump Efficiency
1	40 m^3/h	92 m	89.9 m	75 %

The electric motor and frame shall be sized to cope with the maximum power requirements of the associated pump and impeller combination and shall be selected at 15 % (-2% tolerance) above the maximum power required for the impeller used when one pumpset is operating on its own when the supply reservoir is at low level.

The pump and motor sets must be directly coupled with a rubber coupling similar or equal to Fennerflex, properly set up within the tolerances specified. After installation, the pump and motor shall be laser aligned by a firm specialising in machine alignment. A certificate confirming such laser alignment per pumpset must be submitted to the Engineer.

Vertical multistage pumps shall be fitted with an isolating ball valve and air release valve for the removal of trapped air upon start up and recommissioning.

The pump mounting frames shall be bolted down with three anchor bolts on each side and one anchor bolt each on cross members under the pump and motor respectively. Four jacking bolts shall be used for alignment. After levelling the baseplate shall be grouted into position.

Drawings of the frames must be approved before manufacture.

The complete pump/motor unit must be mounted on a common baseplate with a removable protecting cover mounted over the drive coupling, or as specified by the pump supplier.

The shaft keys must be machined down where it extends beyond the coupling. Provision must be made for witness performance testing of the pumps at the suppliers / manufacturer's facility.

Pump and power curves and points of duty must be submitted with the tender.

PG.3 PIPING AND PIPE FITTINGS

a) Piping

The Tenderer shall include for the supply and delivery to site and for the installation and testing of the purpose made piping as indicated on drawing no.Z20536-MPA-C-DR-02-1B-2004.

All piping shall be hot dip galvanised and Copon epoxy coated mild steel to SANS 62 medium wall or SANS 719 with 4.5 mm wall thickness. The Copon epoxy coating shall be in three layers inside and out to a TDFT of 350 micron after being shot-blasted to SA2½. All underground piping shall be covered in “Denso” tape and paste.

All piping shall be flanged and drilled to SANS 1123 as follows:

- Suction pipework : Table 1000/3.
- Delivery pipework : Table 1600/3

The layout of pipe-work shall be such as to facilitate dismantling, inspection and maintenance.

The pipes must be properly supported and so arranged that all stresses created in the pipeline by static and dynamic forces, including recoil shock, will be taken up by suitable anchors. Pipes support to be provider as per supplier design.

The Tenderer shall submit drawings showing the dimensions and layout of all pipe-work, as well as any openings, sleeves and other builder’s work required, once the tender has been awarded.

b) Isolating Valves

All isolating valves shall be of the wedge gate type with gearbox with hand-wheels. The valves shall be rated according to the pipe ratings as per paragraph 3(a).

c) Non-Return Valves

Non-return valves shall be of the swing check type. The valves shall be rated according to the pipe ratings as per paragraph 3(a).

d) Air Release Valves

The air release valves shall be of the double acting type. The valves shall be rated according to the pipe ratings as per paragraph 3(a). All air-release valves must be supplied with an isolating gate valve, rated as per the air release valve.

PG.4 PRESSURE GAUGES : PUMP STATIONS

Each pumpset shall be fitted with one pressure gauge each on the suction and discharge of the pumpsets. These must be mounted on steel gauge stands and connected with high pressure nylon pipe fitted in galvanised conduit. Fitting of pressure gauges directly onto pipe-work shall not be allowed. Using pressure take off point directly on the pumps will not be allowed, suitable connections must be made on the pipework.

The pressure gauge shall be 100 mm diameter, glycerine filled with stainless steel bodies with a pressure range, as listed below:

High Lift pumps

Suction : -50 to 200 kPa

Discharge : 0 to 1 600 kPa

PG.5 NUTS, BOLTS, READY-BAR AND PACKINGS

Nuts, bolts, washers (2 per bolt set), and ready-bar (threaded rod) shall be hot dipped galvanised. Bolts and ready-bar lengths shall allow for at least two screw threads to be visible when tightened.

When bolts or ready-bars are cut the ends must be treated with a corrosion protective coating.

Packings (gaskets) shall be of the full-face type with pre-punched holes for bolts and/or ready-bar. The packings shall not be less than 3 mm thick (uncompressed).

PG.6 CORROSION PROTECTION

Pipework to be protected as per drawings MMD-Z20536-C-DR-02-1B-1505.

PG.7 SITE TESTING OF PUMPING PLANT

On completion of erection of the pumps and of rendering them operational, the Contractor shall make suitable arrangements to test them in the presence of the Engineer.

Each pump shall be tested individually over its whole range of delivery. Where pumps are to operate in parallel, tests shall also be carried out to check these operating conditions.

The rate of delivery during testing shall be determined by cutting off the flow to or from the sump or reservoir concerned and timing the drop or rise in water level therein as applicable.

During tests, the average values of voltage and current drawn by the motor shall be noted and recorded. Motor efficiencies and power factors shall be used as supplied by the maker.

The test results shall be compared with the tendered pump characteristics and the following tolerances will be allowed:

Delivery rate : 0 + 10%

Overall efficiency : -5%

In the event of the pumps failing to achieve the tendered performance in regard to discharge or efficiency within the tolerance allowed, then the Employer shall have the right to reject the pumps, to recover all monies paid to the Contractor under the Contract for such pumps and to confiscate the surety by way of agreed and liquidated damages; whereupon the Contractor at his own expense shall remove all rejected plant where ordered to do so by the Engineer. Alternatively the Engineer shall have the right to negotiate with the Contractor a reduction in the price of the pumping plant based on the increased power consumption over a twelve (12) year life.

PG.8 SPARES

The Tenderer shall submit a complete list of all spare parts, which are not regularly kept in stock by the supplier and which the Tenderer considers to be necessary for the replacement of wearing parts.

PG.9 PLANT DRAWINGS

Drawings of all plant, equipment (in position) supplied and installed under this contract shall be submitted by the Contractor in hard copy format (3 x copies) as well as in electronic format.

PH PARTICULAR SPECIFICATION FOR ELECTRICAL WORKS

PH.1 SCOPE OF CONTRACT

This section specifies the requirements for the manufacture, supply, delivery, installation and commissioning of the Electrical Work for King Cetshwayo District Municipality, Greater Mthonjaneni SSA2, Water Supply Project Phase 1.

Background Information

The Contractor shall provide all labour, supervision, installed and consumable materials, equipment, tools, services and every permanent or temporary item necessary for the manufacture, supply, delivery, unloading, installation, commissioning and putting into service of the specified deliverables.

The work comprises of the following:

The scope of work includes the following main items. The list does not include all that is required to provide a complete installation. The tenderer shall allow for all items of equipment required to provide a complete installation.

SUPPLY INSTALLATION AND COMMISSIONING

- Motor Control Centres.
- PLC's
- Earthing.
- Lightning protection.
- Excavation & backfilling of cable trenches.
- LV cable and termination.
- Cable trench excavation & backfilling.
- Cable PVC warning tape.
- Cable route markers.
- Local emergency stop stations for motors.
- Fibre Optic cable.
- Fibre Optic Splicing.
- Instrumentation cable and termination.
- Network cable and termination.
- Ethernet Switches
- Motor stop start stations including pedestals.
- Ultrasonic level detectors including support brackets.
- Pressure transmitters.
- Pressure switches.
- Flow switches
- Magnetic flow meters.
- Field Equipment Boxes (FEB's) for Level and Flow transmitters.
- Float switches.
- Junction boxes.
- Earth conductors.
- Cable ladders.
- PLC programming.
- HMI configuration.
- Lighting and small power.
- Pepper spray security system.
- AS built drawings & cable schedules.
- FAT of all equipment and the issuing of relevant test certificates as per specification.
- & M manuals
- Pressure tests of all cables after installation

Equipment and work shall comply fully with all the requirements given in the applicable Standardised specifications and drawings.

Equipment shall be of the highest quality and shall be suitable for continuous operation over long periods of time. Minimum maintenance and high, sustained efficiency is essential.

The contract also provides for the servicing and maintenance, by the Contractor, of the installed equipment, from the time that it is put into service, until the final Certificate has been issued.

PH.2 APPLICABLE STANDARDIZED SPECIFICATIONS

NO	DESCRIPTION	DETAILS
1	Hot-dip (galvanised) zinc coatings heavy duty	SABS 763 – 1988
2	Quality systems	SABS ISO 9001, Parts I, II and III
3	National colour standards for paint	SABS 1091
4	Rotating electrical machines (Parts 1 to 18) (Applicable to low voltage motors)	SABS IEC 60034
5	Electric welded low Carbon steel pipes for aqueous fluids (ordinary duties)	SABS 719
6	Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1 900/3 300 V)	SABS 1507 : 1990
7	The selection, handling and installation of electric power cables of rating not exceeding 33 kV	SABS 0198 Parts 1-12
8	Induction motors Part 2: Low-voltage three-phase standards motors	SABS 1804-2 :2001
9	Induction motors Part 1: IEC requirements	SABS 1804-1 :2001
10	Code of Practice for the wiring of premises	SABS 0142-1 :2006 (SANS 10142-1: 2006)
11	Low voltage switchgear and control gear assemblies Part 1 : Requirements for type-tested and partially type-tested assemblies	SABS 1473-1 (SANS 60439 – 1 : 2004)
12	Safety of distribution boards	SABS 1765
13	Earthing of low-voltage (LV) distribution systems	SABS 0292 :2001
14	Uninterruptible Power Systems	SABS 1474 :1988
15	Parts I, II and III: Quality systems	SABS ISO 9001
16	Cable standard	SANS 1507 (Part 1-3) Electric cables with extruded solid dielectric insulation
17	National colour standards for paint	SABS 1091
18	Low voltage switchgear and control gear assemblies Part 1 : Type-tested and partially type-tested assemblies	SABS IEC 60439-1 :
19	The design and installation of an earth electrode	SABS 0199 :1985
20	Earth rods and couplers	SABS 1063 :1998
21	Specification for ISO metric black hexagon bolts, screws and nuts	BS 4190
22	Low voltage switchgear and control gear assemblies Part 2 : Particular requirements for busbar trunking systems (busways)	SABS IEC 60439-2:

NO	DESCRIPTION	DETAILS
23	Low Voltage Switchgear and Control Gear Part 1: General Rules	SABS IEC 60947-1
24	Low Voltage Switchgear and Control Gear Part 2: Circuit Breakers	SABS IEC 60947-2
25	Low Voltage Switchgear and Control Gear Part 3: Switches, disconnectors switch-disconnectors and fuse-combination units	SABS IEC 60947-3
26	Low Voltage Switchgear and Control Gear Part 4 : Contactors and motor-starters Section 1 : Electromechanical contactors and motor-starters	SABS IEC 60947-4-1
27	Specification General requirements for rotating electrical machines. Part 133	BS 4999
28	Classification of insulating materials	IEC 60085
29	Miniature Substations	NRS 004
30	Transformers	SABS 780
31	Miniature Substations	NRS 004
32	Occupational Health & Safety Act (Act 85 of 1993)	OHS Act

PH.3 LIST OF DRAWINGS

The following drawings form part of the Tender Document.

These drawings are for tender purposes only, and a set of construction drawings will be issued to the successful Tenderer at the commencement of the project.

DRAWING NUMBER	DRAWING TITLE
Z20536-MPA-E-DR-02-1B-2010	Preliminary P&ID
Z20536-MPA-E-DR-02-1B-2011	Pump Station 2B Lighting & Small Power Layout
Z20536-MPA-E-DR-02-1B-2012	Pump Station 2B MCC Single Line Diagram
Z20536-MPA-E-DR-02-1B-2013	Pump Station 2B Pump No 1 VSD Schematic Diagram Power Circuit
Z20536-MPA-E-DR-02-1B-2014	Pump Station 2B Pump No 1 VSD Schematic Diagram Control Circuit
Z20536-MPA-E-DR-02-1B-2015	Pump Station 2B Pump No 2 VSD Schematic Diagram Power Circuit
Z20536-MPA-E-DR-02-1B-2016	Pump Station 2B Pump No 2 VSD Schematic Diagram Control Circuit
Z20536-MPA-E-DR-02-1B-2017	Pump Station 2B Magnetic flow meter to Reservoir 4 Loop Diagram.
Z20536-MPA-E-DR-02-1B-2018	Pump Station 2B Magnetic flow meter to Reticulation 4 Loop Diagram.
Z20536-MPA-E-DR-02-1B-2019	Pump Station 2B Pressure Transmitter Loop Diagram.
Z20536-MPA-E-DR-02-1B-2020	Reservoir 2B Ultrasonic Level Detector Loop Diagram.
Z20536-MPA-E-DR-02-1B-2021	Pump Station 2B Pressure Switch PS003 Loop Diagram
Z20536-MPA-E-DR-02-1B-2022	Pump Station 2B Pressure Switch PS004 Loop Diagram
Z20536-MPA-E-DR-02-1B-2023	Pump Station 2B Flow Switch FS003 Loop Diagram.
Z20536-MPA-E-DR-02-1B-2024	Pump Station 2B Flow Switch FS004 Loop Diagram.
Z20536-MPA-E-DR-02-1B-2025	Reservoir 4 Control Panel Single Line Diagram.
Z20536-MPA-E-DR-02-1B-2026	Reservoir 4 Magnetic Flow Meter Loop Diagram

Z20536-MPA-E-DR-02-1B-2027	Reservoir 4 Ultrasonic Level Detector Loop Diagram.
Z20536-MPA-E-DR-02-1B-2028	Pump Station 2B & Reservoir 4 Network Diagram.

PH.3.1.1 As Built Drawings

The Contractor shall be required to mark up cable schedules and drawings with the “as built” information and return one print to the Engineer with all “as built” information entered thereon.

Information to be submitted by the successful tenderer in respect of electrical equipment.

The successful Tenderer shall submit three paper prints of each of the following drawings, in respect of the MCC, Control Panel, network diagram including switches, FEB’s including pedestals, local stop station pedestals & pepper spray security system to the Engineer for approval prior to manufacture. The format of the schematic line diagrams shall be similar to the format indicated in the tender diagrams.

a. Outline and general arrangement drawings, showing main overall dimensions and construction details.
b. Wiring diagrams.
c. Schematic line diagrams.

Prints of the following shall be supplied by the successful Tenderer in respect of each of the final As Built drawings.

a. Outline and general arrangement drawings of the MCC, Control Panel, network diagram including switches, FEB’s including pedestals, local stop station pedestals & pepper spray security system.
b. Wiring diagrams
c. Schematic line diagrams.

In general before commencement of manufacture, electrical / layout drawings must be submitted to the Engineer for approval / comment on all electrical equipment.

PH.4 400V MCC’s / DB’s CIRCUIT BREAKERS AND CONTACTORS

The preferred Circuit Breakers and Contactors are Merlin Gerin and Telemecanique respectively or similar approved.

PH.5 LOW VOLTAGE MOTOR CONTROL CENTRES

PH.5.1 SCOPE

This specification covers the general technical requirements and the standards of equipment and materials in the design of Low Voltage Motor Control Centres (MCC’s), where the voltage does not exceed 400 volts.

PH.5.2 REFERENCES

The construction of MCC’s and the equipment therein, shall comply with the latest revisions and amendments of the relevant SABS, IEC and British Standards except that should any conflict occur, the requirements of this specification shall apply.

PH.5.3 GENERAL

The design, construction and layout of the MCC's shall comply fully with the requirements of this specification and any Project Specification and or schematic drawings issued. Where conflict occurs, the requirements of the Project Specification and or drawings shall apply.

Each MCC shall be provided with an incoming feeder capable of carrying the connected load of the MCC, and each MCC shall be fully interlocked in the starting and tripping sequences.

The General Arrangements of each MCC and of a typical cubicle showing the equipment layout shall be approved by the Engineer, in writing, prior to manufacture, and all MCC's shall be inspected by the Engineer before delivery to site.

The Tenderer shall submit the following information with his Tender.

- General Arrangement drawings of each MCC, showing the internal equipment layouts, foundation details and approximate weight. All major dimensions shall be in millimetres.
- A schedule indicating the manufacture, type and rating of all the equipment being offered.

MCC's shall be so constructed that they may be split into smaller sections suitable for transportation, with each section being provided with eyebolts for lifting purposes.

PH.5.4 ENCLOSURE

Motor Control Centres shall be the product of specialist manufacturers of this type of equipment. They shall be floor standing, bottom or top entry as specified in the Project Specification, dust, damp and vermin proof, multi-tier, industrial pattern and of multi-section construction. They shall be of folded heavy gauge 3CR12 sheet steel design, with a recessed plinth of channel or heavy gauge sheet steel angle section, the construction being such that the rigidity of the frame, doors and rear covers is adequate.

Sheet 3CR12 steel used in the construction of MCC's shall be a minimum of 2mm thickness, folded and braced as necessary to provide a rigid support for all components. Joints of any kind in steel metal work shall be seam welded, and all welding slag ground off and welding pits wiped clean with plumbers metal. All panel doors and covers shall be properly fitted and square within the frames. Holes in panels for fixing screws shall be accurately positioned to allow entry of screws without distortion of the panels. Only fixing screws of the correct length shall be used, the cutting to length of any screw once installed is not acceptable.

All cover fixings shall be by means of captive screws, dome nuts are not acceptable.

Sheet steel may be drilled and tapped to take fixing screws up to 6mm diameter. For screws or bolts of larger diameter, hank nuts shall be used. Self threading screws shall not be used in the construction of these boards.

After fabrication is complete, all metal work shall be derusted, degreased and painted inside and out with at least one coat of metal primer and two coats of epoxy based enamel. The interiors shall be finished white and the exterior shall be light orange (colour ref. 826 to SA8S 1091) unless otherwise stated in the Project Specification.

All doors and removable covers shall be rendered dust proof by means of suitable seals fixed to the frame. The IP rating of the MCC's shall be IP 42.

PH.5.5 LAYOUT OF EQUIPMENT

The MCC's shall be carefully laid out ensuring ample space for wiring and components giving due consideration to accessibility and operational efficiency and the making-off of incoming and outgoing cables. A minimum of 300mm clear vertical space shall be allowed between the gland plate and any terminal block. The distance between the wiring channel and any terminal to which the wires from that channel are being made-off, shall not be less than 75mm.

The equipment shall be arranged within boards to exhibit a neat appearance, with all items of equipment and their labels, mounted level and plumb. Any label shall be mounted on the centre lines of its associated equipment, in an unambiguous position.

Each motor drive shall be housed in a separate cubicle, except where there may be an abundance of fractional kW motors, and therefore for optimum space utilisation, multiple drives are acceptable in a single cubicle.

Each tier and each cubicle shall be physically isolated from the adjacent tier or cubicle.

All cubicle equipment shall be mounted on a removable rigid sheet steel chassis plate, bolted to the supporting frame. Chassis plates shall be so designed as to facilitate easy removal or replacement. All control wiring and wiring external to the chassis, shall terminate on to a single terminal block mounted on the chassis plate. No wiring shall be connected to equipment on the chassis other than via the terminal block.

The layout of all equipment on the chassis plate shall be arranged so that any item of equipment, or any connection to an item of equipment, may be removed and or replaced with the chassis in situ. The side of any piece of equipment to which connections are made, shall not be closer than 50mm to the vertical or horizontal partitions.

The layout of chassis plates for each size of cubicle shall be identical to allow for the quick interchange of chassis plates.

All power connections shall terminate onto suitably rated terminals, situated not less than 300mm and not more than 450mm above the gland plate and located in the cabling compartment so as to allow easy access to all terminations, even after the installation of all cables.

Where it is possible for personnel to touch live components with the cubicle door open, these components shall be disconnected from the supply before the door can be opened. This shall be achieved by installing a disconnector, operated via a "vari-depth" handle fitted to the cubicle door, so that the door can only be opened when the disconnector is in the "off' position. It shall not be possible to close the disconnector when the cubicle door is open.

Spare cubicles shall be equipped with all necessary connections, terminals, and other fixed accessories to facilitate their future use. Contactors, MCB's and controls however shall not be fitted. The blank door shall be labelled "Spare".

PH.5.6 BUSBARS

Busbars shall be of high conductivity hard drawn copper, of rectangular and uniform cross-section supported on suitably sized insulators. Busbars and down droppers on all 400 volt MCC's, shall be rated in accordance with the recommendations of the Copper Development Association, and to withstand the stresses associated with the fault level called for in the Project Specification, for one second duration.

The busbars and down droppers shall be screened to prevent accidental contact when the rear covers are removed. Where this is impractical they shall be completely insulated by means of PVC sleeving or tape. Busbars and down droppers shall be phase colour coded, and spaced at not less than 25mm phase to phase, and 20mm phase to earth, for a 400 volt supply.

Busbars shall be joined together by bolted overlaps, the bolt arrangements shall be those recommended by the Copper Development Association. Bolts used for jointing and for fixing take-offs, shall be of high tensile phosphor bronze not less than 9,5mm in diameter. All bolts shall be provided with wide flat washers at each end, and with spring washers under the nuts. Busbar supports shall be of glazed porcelain or glass fibre reinforced polyester. Spacers where required shall be of "Tufnel" or equivalent. The spacing of bus bar supports shall be adequate for the MVA rating of the MCC.

Multiple busbars shall be arranged with air gaps between individual sections, equal to the section thickness.

Busbar extensions shall be provided on the incoming circuit breaker to facilitate the connections of the incoming cables, and to act as a heat sink in dissipating the heat generated internally, and at the terminals of the circuit breaker.

PH.5.7 WIRING AND TERMINALS

All motor control centres shall be pre-wired in the factory to terminal blocks installed in the cabling compartment of each starter unit and marshalling cubicle. Access to the terminal blocks in the starter cubicle shall be gained by removal of the cable compartment cover. With the exception of the terminal blocks, no live parts shall be accessible.

Wiring channels shall be provided in all boards, running both horizontally and vertically, and of sufficient capacity for all main and subcircuit wiring. Internal wiring run via slotted plastic trunking shall not occupy more than 50% of the trunking cross sectional area.

All secondary wiring between the various units of the MCC shall be provided using 600/1000 volt grade, PVC insulated stranded copper conductor, of minimum size 1,5mm2. The wiring shall be run neatly and harnessed with an approved strapping and secured to substantial supports. A suitable strain relieving clamp system shall be provided on both the panel and door side of the harness.

Compression crimp type terminations shall be used for all wiring connections to instruments, relays and other devices. Where clamp type terminals are provided pin type ferrules shall be used. Spade or "C" type lugs shall be used elsewhere.

All crimping shall be done with the maker's special tools which shall not release until the full crimping pressure has been achieved. The ends of the conductors of 50mm2 cross-sectional area and upwards shall be crimped by hydraulic machine.

Wiring shall be provided with a neoprene sleeve or ferrule at each end indicating the respective wire numbers. All cable and wire markers shall be so positioned that positive identification can be achieved without the need for manual adjustment or alignment. Split type ferrules will not be accepted.

Where an MCC is to be split for transportation, the wiring shall be continuous with the wires being disconnected at the relevant terminal blocks and rolled back.

Terminal blocks shall be used for conductors up to 10mm2 only, and shall be of nylon construction, flexible to avoid damage to screw holes, and clamped to rolled metal sections allowing for the addition or movement of terminal units. The terminal screws shall be of tinned non-ferrous metal, captive in the blocks, and shall operate through serrated copper clamping washers onto the conductors. Terminal blocks shall be similar and equal to "Klippon" type SAK series.

Short circuiting type terminal blocks shall be fitted for all current transformer secondary leads.

Where the cross-sectional area of conductors differs considerably, the terminal strips shall be provided with a suitable proportion of the correctly sized terminal ways. No strands shall be cut from the larger conductors to permit termination into an undersized terminal.

No more than one conductor shall be connected to anyone terminal and if several conductors are to be commoned this shall be achieved by means of bridging pieces on the terminal strip.

No isolating link type terminals shall be used for motor or earth connections.

Ample space shall be provided for incoming and outgoing cable tails and for access to cable terminations.

Terminal blocks shall be formed with channels to accept snap-in plastic labels bearing the circuit designations, and all terminal blocks shall be clearly identified with the terminals being numbered from the top in descending order. Connection diagrams shall indicate the connection numbers, and terminal numbers.

PH.5.8 COMPONENTS

Indicating instruments shall be flush panel instruments to BS 89, of first grade accuracy, with not less than 96mm dials. Current transformers shall be to BS 3938, of suitable grade and burden in each case. Where a current transformer serves also for metering purposes it shall be of Class 1.

Current transformers shall be so mounted as to ensure adequate ventilation and easy replacement. A duplicate transformer nameplate label shall be fixed to the chassis plate should the current transformer label be obscured from the front.

Hours run meters shall be provided where called for on the drawings. These shall be 48mm square, flush mounted, operating on 220 volts, 50Hz, with a minimum capacity 999999 hours. A key operated reset shall be a standard feature.

LED cluster lamps are preferred for indicating lamps in place of filament lamps.

PH.5.9 CONTROL VOLTAGE

The control voltage shall be 230 volts a.c., single phase. This 220 volt supply shall be provided from the red phase and neutral and shall be protected by a double pole moulded case circuit breaker or as indicated in the relevant schematic diagram.

PH.5.10 INCOMING FEEDER

A separate cubicle shall be provided in each MCC to accommodate the Main Incoming Feeders. This shall comprise circuit breakers suitably rated, incorporating a manually operated spring assisted closing mechanism, shunt trip coil, thermal overcurrent and instantaneous short circuit tripping devices with facilities for padlocking in the "off' position.

The live side of the circuit breakers shall be suitably screened to ensure that no live conductors are exposed when the panel cover is removed.

The following shall also be provided for each feeder:

One power meter including Ethernet Port.

One 96 mm flush fitting voltmeter, scaled 0 to 400 volts, and connected to the busbar side of the circuit breaker.

One set of HRC fuses for voltmeter protection

Three 96mm flush fitting, thermal maximum demand ammeters, suitably scaled

Three current transformers for ammeter operation.

One set of main circuit labels and drilled cable glands to accommodate the cables detailed in the schedules, if applicable.

If required, earth leakage protection shall be provided by means of a 2000 mA, IDMT earth leakage relay, complete with core balance current transformer.

Test blocks for current and voltage circuits with inherent current transformer short circuiting features shall be provided on all incoming feeders.

4 x surge arrestors.

The preferred power meter is the Schneider PM710 including Ethernet port.

PH.5.11 BASIC D.O.L MOTOR STARTER

The basic D.O.L motor starter cubicles shall be equipped as follows. The final details and ratings of equipment will be given in the Project Specification or on the schematic diagrams.

One triple pole moulded case circuit breaker, as specified, capable of interrupting the maximum through fault current. The circuit breaker shall be operated by a "vari-depth" handle, padlockable in the "off' position, and having a safety interlock so that the compartment door may only be opened when the circuit breaker is in the "off' position. The circuit breaker shall also be equipped with an auxiliary switch to isolate the control supply within the cubicle when the circuit breaker is opened.

One triple pole, air break, heavy duty contactor with inherent undervoltage release feature and fitted with auxiliary contacts as indicated in the typical schematic diagram.

One triple pole, combined thermal overload and differential action single phasing protection relay, equipped with hand reset feature. The relay shall be equipped with double break normally open and normally closed auxiliary contacts for interlocking and indication purposes.

One Allen Bradley E3 Plus Intelligent Motor Management overload unit or similar approved.

One 96 mm flush fitting, direct or current transformer operated ammeter suitably scaled, if required.

One current transformer for ammeter operation, if required. To be provided where the rating of the circuit exceeds 25 amperes. Outgoing terminals shall be provided where remote ammeter indication is required.

One rotary type change over switch, "Manual/PLC"

One amber "Overload Trip" indicator lamp

One green "Run" indicator lamp

One red "Stop" indicator lamp

One running hour meter

An earth leakage protection shall be provided by means of a 250mA instantaneous earth leakage protection relay with core balance transformer and hand reset relay.

The basic DOL starter must also be equipped with a motor stop button and motor start button.

The control of the DOL starter must be by hard wiring between the DOL starter and PLC.

Allowances must be made for the following PLC I/O per drive.

<u>24V DC input</u>

- Motor running
- Motor overload trip.
- Pump trip (if thermistors are installed on the pump)
- Motor trip (if thermistors are installed in the motor)
- PLC selected.

<u>Digital output.</u>

- Motor Start

The preferred switchgear is Schneider or similar approved.

PH.5.12 BASIC VSD MOTOR STARTER

The basic VSD starter drive is indicated on the schematic diagrams.

The VSD starter cubicle must be equipped with an extraction fan, filter, line chock, output chock,

graphic display, manual / PLC selector switch, motor stop button, motor start button, instantaneous earth leakage protection relay with core balance transformer and hand reset

relay, overload trip indication lamp, run indicator lamp, stop indicator lamp & running hour meter.

The control of the VSD must be by hard wiring between the VSD and PLC.

Allowances must be made for the following PLC I/O per drive.

24V DC input

- Motor running
- VSD healthy
- Motor overload trip.
- Pump trip (if thermistors are installed on the pump)
- Motor trip (if thermistors are installed in the motor)
- PLC selected.

Analog output

- Speed reference

Analog input

- Speed feedback

Digital output.

- Motor Start

The preferred VSD is the Schneider Altivar 61 including, EMC filter for industrial environments, line chock, output chock and graphic display or similar approved. The VSD must be mounted inside the starter cubicle, and the graphic display must be mounted on the door of the starter drive. The VSD and the graphic display must communicate with each other via a communications cable.

PH.5.13 BASIC SOFT STARTER MOTOR STARTER

The basic soft starter must be equipped with an extraction fan, graphic display, manual / PLC selector switch, motor stop button, motor start button, instantaneous earth leakage protection relay with core balance transformer and hand reset relay, overload trip indication lamp, run indicator lamp, stop indicator lamp & running hour meter.

The control of the soft starter must be by hard wiring between the soft starter and PLC.

Allowances must be made for the following PLC I/O per drive.

230V AC input

- Motor running
- Soft start healthy
- Motor overload trip.
- Pump trip (if thermistors are installed on the pump)
- Motor trip (if thermistors are installed in the motor)
- PLC selected.

Digital output.

- Motor Start

The preferred soft starter is the Schneider Altistart 22 including graphic display or similar approved.

PH.5.14 TYPE TWO CO-ORDINATION

All starter drives must have protective / switching devices that are selected to be compliant to type 2 co-ordination (circuit breaker, contactor, overload relay, soft start or VSD).

PH.5.15 OUTGOING FEEDERS

The outgoing feeder panels shall be equipped as follows:

One Triple pole moulded case circuit breaker with thermal and magnetic overcurrent protection, capable of interrupting the maximum through fault current. The circuit breaker shall be operated by a "vari-depth" handle, padlockable in the "off' position, and having a safety interlock so that the compartment door may only be opened when the circuit breaker is in the "off' position.

One 96mm flush fitting, direct or current transformer operated ammeter suitably scaled.

One current transformer for ammeter operation. To be provided where the rating of the circuit exceeds 25 amperes.

If required, earth leakage protection shall be provided by means of a 250 mA instantaneous earth leakage protection relay with core balance transformer and hand reset relay.

PH.5.16 MARSHALLING CUBICLE

A marshalling cubicle shall be provided in each MCC, all "hard wire" field and starter interlocking and PLC control shall be done via the marshalling cubicle, which shall also house the HMI, Ethernet Switch, PLC and all interposing relays.

PH.5.17 CABLING

Cables shall be top or bottom entry as indicated on the drawings. A base / plinth of 100mm shall be located at the bottom of the MCC, and glanding cubicles of 275mm shall be located between the plinth and various tiers. A vertical cable tier / way of 400mm shall be located between the tiers that house starter drives to allow for easy installation of cables and connections to the terminals.

PH.5.18 EARTHING

Each cubicle in the MCC shall be provided with an earthing stud connected directly to the MCC earth bar. This main earth bar shall be copper of with a minimum cross-section of 20mm x 6mm, running the entire length of the MCC and be complete with two terminal studs, one at each end for connection to the main earthing system.

PH.5.19 PANEL NUMBERING SYSTEM AND LABELS

a. The tiers on each MCC shall be numbered consecutively from left to right, when facing the front of the MCC. The cubicles in each tier will then be allocated consecutive letters of the alphabet, starting with the letter A and reading from top to bottom. Each letter shall be prefixed with the tier number.
b. The top of each rear access cover shall be clearly labelled with the tier number. Each cubicle shall be fitted with a circuit designation label on its front cover.
c. In addition to the identifying label mounted on the front panel for each starter cubicle, a similar label shall be mounted at the rear of each cubicle to be visible when the rear covers are removed and shall indicate the tier number, cubicle letter and the circuit designation.
d. Components such as circuit breakers, isolators, indicating lamps, switches, relays, instruments, test blocks, fuses, etc., shall be clearly identified with engraved labels indicating their function.
e. Where a multiple drive cubicle is supplied, a label listing all the drives in that cubicle shall be provided on the door of that cubicle
f. Labels shall be of plastic "sandwich" board material, the legends being engraved through the front layer to the contrasting inner layer. The lettering shall not be less than 6mm high in sans-serif capitals, black lettering on a white background shall be selected to ensure maximum legibility. All labels shall be secured by at least two bolts, or rivets per label, and shall be accurately level and on the centre line of their subjects.

g. Glued labels, adhesive embossed plastic tape or paper labels are not acceptable.
h. All label inscriptions shall be in English, unless otherwise stated in the Project Specification, and all label designation lists shall be approved by the Engineer prior to engraving.

PH.5.20 INSPECTION AND TESTING

All MCC's shall be inspected by the Engineer or his representative, when fully assembled and complete with all equipment, prior to despatch from the suppliers' works.

The following tests will be required, at the Inspectors' discretion, prior to despatch from the suppliers' works:

a. High Voltage pressure tests
b. Primary current injection tests of all protection relays
c. "Megger" insulation tests
d. I/O testing of all PLC I/O.
e. Complete functional and operational tests.

PH.5.21 DELIVERY AND ERECTION

The Electrical Contractor shall be responsible for the delivery to site, off-loading, erection and cold commissioning of all the MCC's.

PH.6 EARTHING

The earthing of the transformers, mini substations and lightning protection of buildings must be undertaken by a specialist earthing vendor.

The specialist vendor must initially undertake a soil resistivity survey (Wenner Method) and determine the corrosiveness and resistivity of the soil. The results of this survey will ultimately determine the size of BCEW and the number of copper electrodes.

However, a guide that must be followed in regards to the earth conductor and earth spikes is as follows.

Earth conductor: 70mm2 BCEW.

The earth conductor between the relevant earth electrode and the transformer must be 70mm2 black insulated copper conductor.

Earth spikes: 16mm (OD) x 3 metre (L) mild steel, A grade copper coated electrodes.

CAD welding must be used to connect the earth conductor to the earth spikes.

The final resistance of the earthing systems must be less than 1 ohm.

The specialist earthing vendor must issue a certificate of compliance (resistance test certificate) for the earthing systems.

The following specifications will apply.

SANS 62305. 2007
SANS 10199. 2004
SANS 10313. 2008
SANS 10142-1 2003

The separate earth conductors installed alongside 600/1000V PVC/SWA/PVC cables must be BCEW.

PH.7 PVC/SWA/PVC AND PVC/PVC CABLES

The Electrical Contractor shall supply, install, connect and test all the cables called for in the schedules and where shown on the drawings. Cables shall be 600/1000 volt grade, PVC insulated, steel wire armoured and PVC sheathed, with stranded copper conductors or as called for in the cable schedules, constructed in accordance with SABS 150. The armouring of any armoured cable is not acceptable as an earth conductor. Single core cables shall be un-armoured and run in trefoil formation.

All PVC/SWA/PVC or PVC/PVC cable terminations shall be Exe corrosion guard cable glands (IP68) similar and equal to those manufactured by “Pratley” or “CCG”. Glands shall be complete with earthing ferrules, locknuts, bushes and shrouds.

Conductors shall be terminated onto equipment using compression lugs of the correct size and suitable for the application. Manual crimping shall be done with the Maker’s special tools which will not release until the full crimping pressure has been achieved, the ends of conductors of 50mm2 cross sectional area and greater shall be crimped by hydraulic machine.

Each and every run of cable shall be a single length without joints, save that where a run exceeds the standard drum length or where the length of cable is increased after installation, a through box will be permitted.

Cable joints shall be made by using kits approved by the cable manufacturer, and by personnel trained in the use of these kits. Tenderers shall specify in the appropriate schedule the type of cable joint to be used.

If epoxy resin filled boxes are to be used, preference will be given to transparent resin types. The type of joint used shall not impair the mechanical and electrical properties of the cables. All conductor and armouring wires shall be carried through the joint, and adequately crimped ferrules and lugs shall be used. The Engineer reserves the right to cut open any made joint to ensure the integrity of the joint, and should such an inspection reveal inadequate jointing procedures, the right to insist the re-jointing of all cables at the Electrical Contractor’s expense. This applies to joints in all types of cable. Adequate measures shall be taken to prevent the ingress of moisture into any joint.

Drums of cable shall be delivered to site with there end seals intact and shall be off-loaded and stored in an approved manner. Any damaged cable shall be removed from site and replaced with undamaged cable at the Electrical Contractor’s expense.

Cable drums shall be supported on an axle and supporting jacks, and when the cable is unreeled, the direction of rotation indicated on the drum flanges shall be observed. Rolling of drums along the ground is not permitted.

PH.8 FIBRE OPTIC CABLE

The Fibre Optic cable must be PVC/SWA/PVC 4 core multi-mode.

Multimode 10/100Mbits, 1300nm, 50/125µm.

Characteristics.

- PVC / SWA / PVC.
- Core binder.
- Aramid strength member.
- Interstitial water blocking material.
- Gel filled loose tubes.
- GRP centre strength member.

Installation.

All splices shall be done using fusion splicing (i.e. the process of using localised heat to fuse the ends of two optical fibres together).

OTDR tests shall be performed on all cores from both ends of the cable and be submitted to the Engineer for approval.

All splices with a loss of more than 0.1 dB shall be rejected by the Engineer.

3 to 6 metres of slack shall be allowed for at each terminating point on the Fibre Optic Cable.

Each section of cable shall have a label indicating the cable number at each end.

The contractor shall ensure that all cable routes are marked up correctly and comprehensively on the respective plant layout drawing.

Testing.

The contractor shall use a OTDR to test the Fibre Optic Cable.

The contractor shall ensure that the OTDR is within the calibration period as recommended by the manufacturer.

The test result information for each link shall be recorded in the memory of the OTDR upon completion of the test.

A paper copy of the test results shall be provided to the Engineer that lists all the links that have been tested with the following information.

The overall Pass / Fail evaluation of the link under test including the Attenuation worst case margin (margin is defined as the difference between the measured value and the test limit value).

The date and time of when the test results were saved in the memory of the equipment.

Accessories.

For each core that is spliced, the contractor shall supply all connectors, accessories and ancillaries required to ensure the correct operation of the equipment. This shall include but not be limited to all mid couplers, pigtails and patch leads.

Cable markers.

The cable markers shall be manufactured from concrete. Two aluminium plates must be mounted to the concrete marker (one on top and the other on the side).

The letters FO must moulded on the side of the cable marker.

Cable marker size: 900mm high, 250 x 150 x 50mm.

Cable markers shall be painted with yellow Plascon Hi sheen road marking paint, SABS 731, Ref TP41.

Cable markers shall be installed every 50 metres and at each cable bend or turn.

The bottom tapered section of the cable marker must be firmly compacted into the ground.

Cable direction must be indicated with an arrow on top of the aluminium plate.

Cable numbers must be engraved on the side aluminium plate.

Standards.

All IEEE Standards.

All SABS Standards.

PH.9 NETWORK CABLE

The Ethernet IP cable shall be Cat 5 FTP 0.515mm2 4 pair Ethernet IP cable.

PH.10 INSTRUMENTATION CABLE AND WIRING

Instrumentation power cabling shall be PVC/SWA/PVC.

Instrumentation signal cabling shall be Dekoron type M872 individually & overall screened pairs and Dekoron type M755 multi cores or similar approved.

Instrumentation signal cable shall have 500mm of orange heat shrink fitted over the outer sheath of the cable where the cable enters or exists an instrument junction box, field equipment box or MCC.

PH.11 CONTROL CABLES

Control cables shall have a minimum cross section of 1.5mm2 for each core. All cables shall be PVC/SWA/PVC 600/1000 volt type.

PH.12 CABLE NUMBERING

The contractor shall fit a cable number at each cable gland. The cable number shall be in accordance with the Specification. The cable numbers shall be equal to the type manufactured by Bowthorpe Hellerman or similar approved.

PH.13 CABLE ROUTE MARKERS

Approved concrete proprietary cable markers indicating the voltage must be planted above all cable runs and bends.

The cable markers shall be manufactured from concrete. Two aluminium plates must be mounted to the concrete marker (one on top and the other on the side).

The letters 400V must moulded on the side of the cable marker.

Cable marker size: 900mm high, 250 x 150 x 50mm.

Cable markers shall be painted with yellow Plascon Hi sheen road marking paint, SABS 731, Ref TP41.

Cable markers shall be installed every 50 metres and at each cable bend or turn.

The bottom tapered section of the cable marker must be firmly compacted into the ground.

Cable direction must be indicated with an arrow on top of the aluminium plate.

Cable numbers must be engraved on the side aluminium plate.

The cable markers shall be supplied by the Contractor.

PH.14 CABLE LADDER

Cable ladders shall be O-Line 3CR12 OL55 & 76 cable ladder or similar approved. All nuts and bolts must be stainless steel. Cable ladder must be duplex coated (exterior polyester) and the colour must be electric orange.

Wherever possible all cable racks shall be installed in a vertical orientation to prevent accumulation of spillage and dust. Adequate space being provided behind the rack for the fixing of nuts and cable ties, etc.

Cable racks shall be fixed to the building structure by means of stand-off supports at approximately two metre intervals, and also at the ends (joints) of each fabricated length. Supports shall be galvanised after fabrication.

Each run of cable rack shall be bonded across all sections and be electrically continuous throughout. Where the electrical continuity cannot be guaranteed, a continuous bare copper conductor shall be provided for each run of cable tray and each section shall be bonded to this conductor. In addition all cable racks shall be bonded to the switchboard to which the cables it carries are connected.

PH.15 LAYING OF CABLES

When laying cables in trenches excavated in soft or hard rock or containing sharp stones, rocks or other items most likely to injure cables, the following precautions shall be taken:

a. Before laying the cables all rocks, stones, etc shall be removed from the bottom of the trench. The floor of the trench shall be evenly covered with a layer of sifted backfill or sand to a level which is 100mm above the highest unevenness of the trench. The cost of this work shall be included in the contractor's price. The laying of cables shall not be commenced until the trenches have been inspected and approved. The cable shall be removed from the drum in such a way that no twisting, tension or mechanical damage is caused, and must be adequately supported at short intervals during the entire operation. Particular care must be exercised where it is necessary to draw cables through pipes and ducts to avoid abrasion, elongation or distortion of any kind. The ends of such pipes and ducts shall be sealed in an approved manner after drawing in of cables.
b. The cable shall be covered with a 150mm layer of sifted backfill of sand. All trenches shall be backfilled with damp soil, in layers not more than 150mm thick. Each layer shall be individually compacted in order to obtain the same degree of permeability as that of the surrounding undisturbed soil.
c. A distance of 300mm shall exist between instrumentation and power cable.

Tenderers are to note that:

Pickable Material -

Shall mean ground or rock that can be loosened by handpick and includes hard shale, compact ouklip and boulders from 75mm in diameter up to 0.03m² in volume.

PH.16 POWER METERS

Power Meter must include for an Ethernet IP port.

The preferred meter is the Schneider PM5000 series including a RJ45 Ethernet IP port or similar approved.

PH.17 HMI

The preferred touchscreen HMI that must be mounted on the front panel of Pump Station 2B MCC is the Schneider Harmony 12.1 inch (Width = 12.32inch / 313mm, Height = 9.25inch / 235mm, Depth = 1.97inch / 50mm) touchscreen HMIST6600 or similar approved. The HMI must be able to communicate on Ethernet IP.

The HMI must be supplied with its own download software, and with development software that will be downloaded onto the laptop for the HMI configuration.

PH.18 PLC'S

The PLC CPU (4MB internal memory including an 8MB SD card) must incorporate an Ethernet port, and the number of I/O modules must be able to accommodate the I/O indicated on the drawings. 20% spare I/O is required

The preferred PLC is Modicon M340 as supplied by Schneider or similar approved.

The preferred PLC equipment is as follows:

CPU BMXP342020 or similar approved.

12 slot chassis BMX XBP or similar approved.

230V AC Power Supply BMX CPS 2000 or similar approved.

24V DC 16 Digital Input module BMX DDI 1602 or similar approved.

230V AC 8 Digital Input module BMX DAI 0805 or similar approved.

Potential free 8 Digital Output module BMX DRA 0805 or similar approved.

4-20mA 8 Analog Input module BMX AMI 0810 or similar approved.

4-20mA Analog Output module BMX AMO 0410 or similar approved.

20 way terminal block BMX FTB 2000 or similar approved.

28 way terminal block BMX FTB 2800 (AI) or similar approved.

All spare I/O must be wired to the terminals in the marshalling tier.

Allowances must be made for PLC I/O for all instrumentation and motor starters that are indicated on the various MCC single line diagrams.

The PLC I/O required for Reservoir 4 are as follows:

230V AC input

230V present.

Analog input

Reservoir level.

Flow rate.

The PLC I/O required for the Pepper spray security system are as follows:

24V DC input

Pepper spray armed.

Pepper spray activated.

Pepper spray service required. (Once the unit has sprayed six times it must transmit a signal that the unit needs to be serviced).

PH.19 HMI CONFIGURATION

Allowances for the HMI configuration has been made in the schedule of materials under provisional sums

PH.20 PLC PROGRAMMING

Allowances for the PLC programming has been made in the schedule of materials under provisional sums

PH.21 ULTRASONIC LEVEL DETECTORS

The level detector will have the following minimum specification:

Each detector will consist of a separate transmitter and temperature compensated transducer.

The transmitter shall be mounted in an FEB while the transducer will be installed on top of the reservoir.

The transducer shall be installed on a robust stainless steel mounting bracket, which will support the transducer at a fixed height above the water and allowing the transducer a clear “view” right to the bottom of the reservoir.

The meter shall have a range of up to 10m. The cable between the transducer and the transmitter in the FEB shall be 3 core screened cable with a maximum length of 20m (supplied by vendor).

The meter shall have a continuous digital display of height, bar graph display of percentage of how full the reservoir is.

The meter shall have six built-in relays which can be programmed for pump control, alarms, auto pump cycling at desired levels. The meter shall have an isolated 4-20mA output linear to level over the calibrated range. Each meter will be supplied with an approved lightning

protection unit for the 230V AC supply and output signal lines. The lightning protection units will be installed and wired to the manufacturer's specifications.

The preferred meter is the Endress & Hauser or similar approved.

TRANSMITTER: Endress & Hauser Prosonic FMU90.

SENSOR: Endress & Hauser FDU91.

PH.22 MAGNETIC FLOW METERS.

All magnetic flow meters shall consist of a separate indicating transmitter and sensor. Integral units are not acceptable. The flow range of the 150mm and 200mm magnetic flow meters will be 0 – 10 litres / second.

The preferred transmitter and sensor is Endress & Hauser Proline or similar approved.

TRANSMITTER

- All flow measurements in full pipelines must be done by using electro-magnetic flow (mag-flow) measurement, which is converted into a flow value where accuracy of measurement is required for dosing and/or custody transfer of flow. Where measurement for flow distribution or flow diversion is required (i.e. where high accuracy is not essential), non-intrusive flow measurement using external sensors can be applied. These systems must incorporate either ultrasonic time of flight or Doppler principles. Ultrasonic time of flight systems can be used on clean water with low contents of air bubbles or other entrained gasses and suspended solids of less than 10,000 milligrams/litre. Doppler systems can be used on liquids with entrained particles or gasses of 100 microns or larger and suspended solids in excess of 75 milligrams / litre
- All instrument transmitter enclosures must have at least an IP 65 or higher rating
- The instrument must be equipped with an isolated, active, 4 – 20mA output which will be connected to a maximum 500 ohm load. This output must be user-programmable.
- The instrument must be equipped with at least one SPDT relay, or an output that can be used to drive a relay, for totalised flow pulses. This output must be user-programmable for the units-per-pulse
- The transmitter must be suitable for use with a 230V AC, 50/60 Hz power supply.
- The transmitter for electro-magnetic flow meters must have an accuracy of at least 0.5%, or better, of the measured value for flow velocities which are greater than 0.5 meters/second. Transmitters of flow meters for flow distribution/diversion can have an accuracy of less than 0.5% but they must not be less accurate than ±2% of the full scale for Doppler meters and not less than ±2% of the measured value for time of flight meters. For both Doppler and time of flight meters these accuracy requirements apply to flow velocities of 0.5 meters/second or greater. Repeatability must not be less than 1% of the measured value.
- The transmitter must have an LCD or LED display showing instantaneous flow and totalised flow.

SENSOR / TRANSDUCER

- The sensor lining for electro-magnetic flow meters used in sludge or non-corrosive liquids must be Neoprene or Rubber, suitable for operating in temperatures ranging from -10ºC to +80ºC.
- The sensor lining for electro-magnetic flow meters used in corrosive or heated liquids must be PTFE, suitable for operating in temperatures ranging from -20ºC to +150ºC.
- The sensor must have a protection rating of at least IP 68 or higher.
- The sensor tube material for electro-magnetic flow meters must be at least 304, 316 or 3CR12 grade stainless steel.
- The sensor electrode material for electromagnetic flow meters must be at least 304, 316 or Hastelloy C grade stainless steel.
- The sensor for electromagnetic flow meters must have either a grounding electrode or earth rings fitted.

- Where process flow in the pipeline cannot be stopped or isolated by any other means, isolation hand valves must be fitted on either side of electro-magnetic flow meters for removal/replacement of the flow meter.
- The sensor material for flow meters used for flow distribution/diversion must be stainless steel.
- Magnetic flow meters must be equipped with an “Empty Pipe” detection which is configurable to stop the 4-20mA flow indication and/or operate a potential free contact, or an output that can be used to drive a relay, for PLC interfacing
- Electro-magnetic flow meters must not be a wafer-type. I.e. the sensor tube or wafer must be housed in a flanged stainless steel unit which can readily be bolted onto flanges in the pipe where it must be installed

PH.23 PRESSURE TRANSMITTER.

The instrument must be 24V DC loop powered and connected to the PLC Analog Input module.

All pressure measurements must be done by using a threaded instrument with a flush diaphragm sensor to ensure that there are no parts protruding into a pipe and which can lead to snagging of material in the medium being measured.

The sensor must be suitable for an operating temperature range of -10ºC to +100ºC.

The sensor must be equipped with automatic temperature compensation.

The sensor must have an overpressure safety of not less than 1.33 times the measuring range.

The sensor diaphragm material must be ceramic.

The pressure range is 0 -10 bar.

The preferred transmitter is Endress & Hauser or similar approved.

PH.24 PRESSURE SWITCH.

Pressure switches must be equipped with two potential free digital outputs (2xNO) of which the pressure operating value can be adjusted. The pressure range is 0 -10 bar. The potential free digital outputs will be wired to the PLC 24V DC Digital Input module, and to the manual mode of the motor control circuit.

PH.25 FLOW SWITCH.

Flow switches must be equipped with two potential free digital outputs (1xNO & 1xNC). The potential free digital outputs will be wired to the PLC 24V DC Digital Input module, and to the manual mode of the motor control circuit.

PH.26 INSTRUMENTATION LIGHTNING SURGE PROTECTION.

Each core (excluding the earth core) of the instrumentation signal and power cables for the ultrasonic level detector transmitters, magnetic flow meters, pressure transmitter, pressure switches & flow switches shall be terminated at each end on a lightning surge arrestor.

The terminal strips in the PLC panel shall be fitted with the arrestors.

PH.27 LOCAL EMERGENCY STOP STATIONS

Local emergency stop stations shall be installed next to motors.

These enclosures shall be manufactured from 3CR12 steel and powder coated with a protection rating of IP55.

The enclosure shall be equipped with a mushroom head emergency stop push button (push and latch / turn to release) with a protection rating of IP65.

The complete stop station shall have a protection rating of IP55 after all equipment and cables have been installed. The final colour shall be in accordance with the NOSA recommendations.

Support Steel Work (Local Stop / Start Stations).

The support steel work for local stop stations must be manufactured from PFC 100 x 50 x 6mm 3CR12 U channel. This vertical 1600mm U channel must be anchored to a 250 x 10mm 3CR12 base plate. The base plate must be strengthened by 8 x 100mm 3CR12 gusset plates.

The entire frame must be coated with a polyester powder coating.

PH.28 LIGHTNING PROTECTION

The electrical contractor must employ the services of a specialist lightning protection vendor to undertake the lighting protection of the various buildings. Drawings must be submitted to the Engineer for approval before the installation commences. Upon completion of the installation a certificate of compliance must be issued to the Engineer.

Allowances for lightning protection has been made in the schedule of materials under provisional sums

PH.29 LUMINAIRES

All luminaires shall bear the SANS S mark and the specific SANS A mark.

The preferred luminaires are as follows or similar approved.

1.5m IP65 49W LED Polycarbonate diffuser luminaire.	Beka Vapourline VLNLED49N1 or similar approved.
1.5m IP65 Emergency 49W LED Polycarbonate diffuser luminaire.	Beka Vapourline VLNLED49N1/E1 or similar approved.
17W LED Bulkhead.	Beka Series 30 SILNW17W or similar approved.

PH.30 ETHERNET SWITCHES

The Switch must be an 8 Port Managed Ethernet Switch, 6 TX & 2 FX Multimode Ports.

The preferred Ethernet Switch is Schneider TCSESM083F2CU0 or similar approved.

PH.31 LAPTOP

The laptop must be a 15inch, Core I7 Processor, 16GB Ram, 1TB Hard Drive including Windows 11 & one time purchase Office 2021 home & business. The HMI development software must also be downloaded onto the laptop.

PH.32 PEPPER SPRAY SECURITY SYSTEM.

- The pepper spray security system shall be sized for an 8 x 4.5 x 2.8m room, and consist of the following.
- Door magnet including wiring to the pepper spray unit.
- External visual and audio activation / arming / disarming indication including wiring to the pepper spray unit.
- Remote transmitter for arming and disarming.
- Pepper spray canister must be able to spray six times before a service is required.
- Potential free contacts for Pepper spray armed, Pepper spray activated & Pepper spray service required. (Once the unit has sprayed six times it must transmit a signal that the unit needs to be serviced).
- Battery backup.

PH.33 FIELD EQUIPMENT BOXES

FEB's shall be constructed of:

3CR12 steel, powder coated.

The FEB shall be equipped with a removable chassis plate upon which the field instrumentation equipment including surge arrestors etc shall be mounted.

The front door of the FEB shall be a hinged door with an armour plate glass window mounted in a rubber seal. The equipment mounted in the FEB shall be located such that the display can be read without opening the door. The door shall be fitted with a lockable latch.

The FEB shall be equipped with removable, bottom entry, gland plate. All cabling to and from the equipment mounted in the FEB shall be glanded off on these gland plates.

Power and signal cable cores shall be terminated on rail mounted surge arrestors mounted in the FEB.

The FEB's shall be numbered using white / Black / White traffolyte labels with 10mm high lettering. Each FEB shall carry a five digit number – being the number of the transmitter housed therein.

A prototype of the FEB proposed shall be submitted to the Engineer for approval before purchasing / manufacturing.

FEB's shall contain the lightning arrestors for the power and signal cables to the field mounted instrument transmitters.

Support Steel Work (FEB's).

The support steel work for FEB's must be manufactured from PFC 100 x 50 x 6mm 3CR12 U channel. This vertical 1600mm U channel must be anchored to a 250 x 10mm 3CR12 base plate. The base plate must be strengthened by 8 x 100mm 3CR12 gusset plates.

The entire frame must be coated with a polyester powder coating.

PH.34 POWER FACTOR CORRECTION

The 20kVAr automatic power factor correction unit indicated on the single line diagram for Pump Station 2B MCC is based on a motor load of 45kW (3 x 15kW). This unit must automatically maintain a power factor of 0.95. The unit must consist of a controller that monitors the VAr's and switches contactors in and out that are connected capacitor banks.

PH.35 TELEMETRY

Telemetry is not part of this scope of work. The water levels at the reservoirs and the pumps that are indicated on the P&ID will be automatically controlled by a telemetry system under a future project.

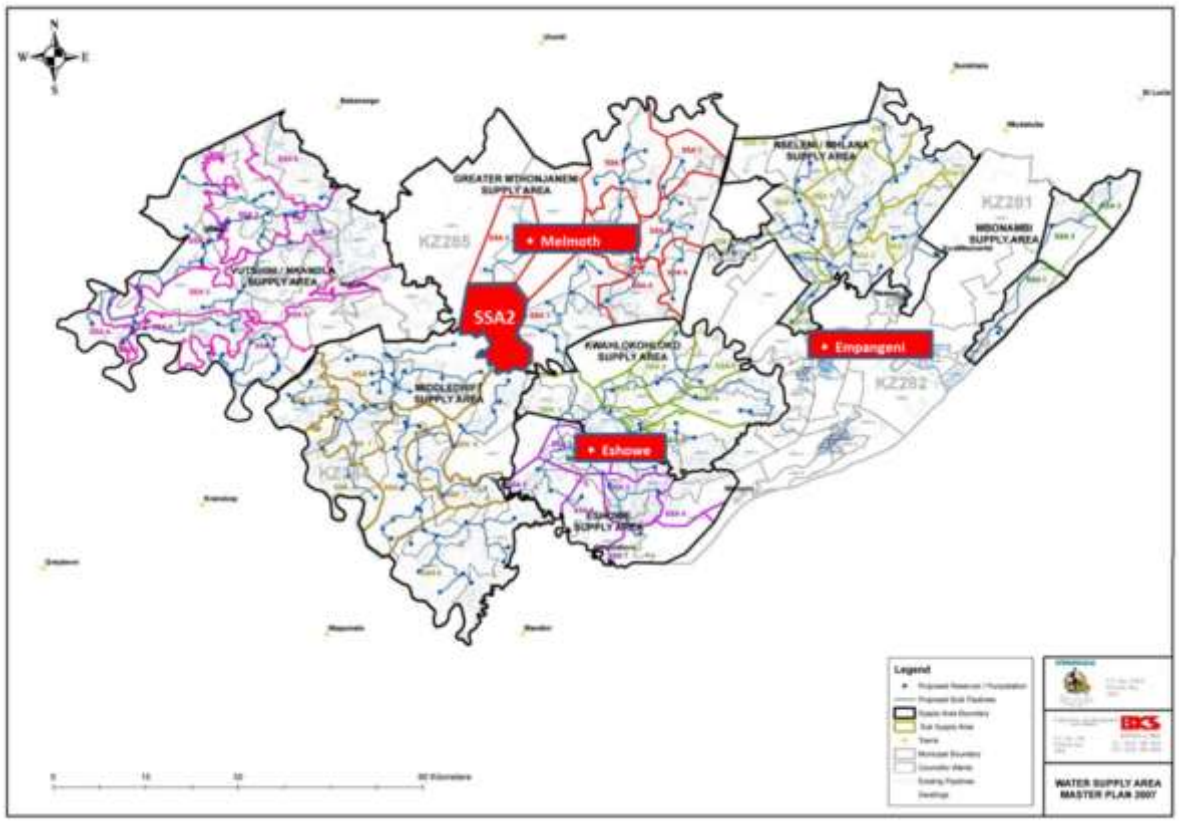
However, in the interim due to construction taking place and time constrains a permanent fibre optic cable will be installed between Reservoir 2B / Pump Station 2B and Reservoir 4.This will enable the control of water levels at the two Reservoirs and control of the pumps at Pump Station 2B.

The new MCC at Pump Station 2B will include a HMI which will enable monitoring of the pumps at Pump Station 2B and the water levels at the two reservoirs.

PART C4: SITE INFORMATION

1. Site Location and Accessibility

The project is located primarily within Ward 5 in the Mthonjaneni Local Municipality. The supply area is approximately 15km southwest of Melmoth and is accessed by District Road D550. It is remote and roads are generally in a poor condition. Access to the site is per normal vehicle on tar and dust or gravel roads. Access could become problematic during the rainy season. Refer to locality sketch below.



2. Nature of the Ground and Subsoil Conditions

The Contractor will be expected to make his own assessment in this regard and to price the rates accordingly.

The existing ground conditions are detailed in the geotechnical investigation report that will be available on request

3. Existing services

There are underground and overhead existing services on site. The contractor must verify all existing services with the municipality before any excavations are done. All indicated services must be protected against damage and any damage caused to such services will be repaired at the cost of the contractor.

Services on site are:

Electrical Overhead – throughout the site

Water supply underground – throughout the site. Known pipes are schematically indicated in the existing network drawing.

Roads stormwater systems

PART C5: ANNEXURES

Annexure C5.1: Drawings

Annexure C5.2: Health and Safety Specification

Annexure C5.3: Baseline Risk Assessment

Annexure C5.4: Signboard

Annexure C5.5: Proforma Permission To Occupy (PTO)

Annexure C5.6: PCI Policy

Annexure C5.7: Environmental Management Plan

Annexure C5.8: Geotechnical Report

Annexure C5.1: Drawings

NOTE Drawings are contained in Book2

Annexure C5.2: Health and Safety Specification

PROJECT HEALTH AND SAFETY SPECIFICATION – MTHONJANENI SSA 2 PROJECT – BULK SUPPLY PIPELINES AND RESERVOIRS PHASE 1B

25/04/2022

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Revision Record

Revision	Date	Originator	Reviewer	Sign off	Description
1	25 April 2022	T. Pillay (MPAMOT)	Dirk Van Schalkwyk		Revisions for Phase 1B

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Contents

Introduction 1
DEFINITIONS 1
Part 1 – SPECIFIC PROJECT INFORMATION 5
1.1 Background of the health and safety specification 5
1.2 Purpose of the health and safety specification 5
1.3 Implementation of the health and safety specification 6
1.3.1 Client Duties 6
1.3.2 Designer Duties 7
1.4 Project details 8
1.5 Existing environment 8
1.6 Available Drawings 8
1.7 Project Health and Safety Requirements 9
1.8 Interface and Restrictions by Client 11
1.9 Safety file return to client 11
Part 2 – OTHER REQUIREMENTS 12
2.1 Duties of the Principal Contractor in terms of Construction Regulations 2014 12
2.1.1 Health And Safety Plan 15
2.2 Management and Supervision of Construction Work 15
2.3 Notification of Intention to Commence Construction Work 16
2.4 Assignment of Contractors Responsible Persons to Manage Health and Safety on Site 17
2.5 Competency for Contractors Responsible Persons 17
2.6 Compensation of Occupational Injuries and Diseases Act of 1993 (COIDA) 17
2.7 Occupational Health and Safety Policy 17
2.8 Health and Safety Organogram 17
2.9 Risk Assessments 17
2.10 Health and Safety Representatives 18
2.11 Health and Safety Committee 19
2.12 Medical Certificate of Fitness 19
2.13 Health and Safety Training 19
2.15 Competency 19
2.16 General Record Keeping 19
2.17 General Inspection, Monitoring and Reporting 20
2.18 Emergency Procedures 20
2.19 First Aid Box and First Aid Equipment 20
2.20 Accident / Incident Reporting and Investigation 20
2.21 Hazards and Potential Situations 21
2.22 Occupational Health and Safety Signage 21
2.23 Management of Contractors by Principal Contractor 21

2.24 Stacking of Materials 21
2.25 Housekeeping and General Safeguarding on Construction Sites 21
2.26 Construction Vehicles and Mobile Plant 21
2.27 Electrical Installations and Machinery on Construction Sites 22
2.28 Use and Temporary Storage of Flammable Liquids on Construction Sites 23
2.29 Precautions on Construction Sites 23
2.30 Construction Employees' Facilities 24
2.31 Fall protection 24
2.32 Excavation if required 25
2.33 Demolition Work 25
2.34 Scaffolding 25
2.35 Hazardous Chemical Substances (HCS) 26
2.36 Noise Induced Hearing Loss 26
2.37 Personal Protective Equipment (PPE) 26
2.38 Fire Extinguishers and Fire Fighting Equipment 27
2.39 Lifting Machinery and Tackle 27
2.40 Ladders and Ladder work 27
2.41 General Machinery 27
2.42 Portable Electrical Tools 28
2.43 Night Work 28
2.44 Occupational Health 28
2.45 Weather 28
PART 3 – OTHER HEALTH AND SAFETY SPECIFICATION REQUIREMENTS 28
ANNEXURE A – TASK COMPLETION FORM 30
ANNEXURE B – CONTRACTOR'S RESPONSIBLE PERSONS 31
ANNEXURE C – PROPOSED CONTRACTOR HEALTH AND SAFETY FILE INDEX 33
ANNEXURE D – HEALTH AND SAFETY COSTS (ANTICIPATED) 34
ANNEXURE E – MONTHLY ACCIDENT / INCIDENT STATISTICS 36
BASELINE RISK ASSESSMENT ..... **Error! Bookmark not defined.**
ISSUE REGISTER ..... **Error! Bookmark not defined.**

INTRODUCTION

PLEASE NOTE THAT THE REQUIREMENTS OF THE CONSTRUCTION REGULATIONS 2014 WILL BE APPLIED TO THIS PROJECT. THESE REGULATIONS PLACE ADDITIONAL LEGAL DUTIES UPON PRINCIPAL CONTRACTORS AND CONTRACTORS. ALTHOUGH THIS HEALTH AND SAFETY SPECIFICATION INCLUDES MUCH OF THE CONTENT OF THESE NEW REQUIREMENTS, THE CONTRACTOR WILL BE DEEMED TO BE FAMILIAR WITH THE REQUIREMENTS OF THESE REGULATIONS, AND TO HAVE FACTORED IN ALL THE DUTIES PLACED UPON CONTRACTORS AND PRINCIPAL CONTRACTORS IN THE TENDER.

This Health and Safety Specification contains clauses that are generally applicable to construction activities, as well as imposing pro-active controls associated with activities that impact on Health and Safety as it relates to plant and machinery. Compliance to the requirements of the Occupational Health and Safety Act 1993 is in addition to the requirements of this Health and Safety Specification and is part of the Principal Contractor's responsibility. The Client will monitor that the Principal Contractor comply with the requirements of such legislation.

The purpose of this section "*Specific Project Information*" is to provide health and safety information about specific project risks known by the Client, Architect and Designers to be applicable to this project, and which are not necessarily common knowledge to the Principal Contractor. The Principal Contractor must consider all information in this section and ensure that their tenders include adequate resources and competence to deal with the matters detailed herein so that all relevant risks are dealt with in a way which complies with legislation and the ethical concerns for the safeguarding of employees, contractors and other persons affected by the construction activities.

DEFINITIONS

Definitions (as per the Construction Regulations 2014) applicable to this Health and Safety Specification:

"agent" means a competent person who acts as a representative for a client.

"angle of repose" means the steepest angle of a surface at which a mass of loose or fragmented material will remain stationary in a pile on the surface, rather than sliding or crumbling away;

"bulk mixing plant" means machinery, appliances or other similar devices that are assembled in such a manner so as to be able to mix materials in bulk for the purposes of using the mixed product for construction work;

"client" means any person for whom construction work is being performed;

"competent person" means a person who has, in respect of the work or task to be performed, the required knowledge, training and experience and, where applicable, qualifications, specific to that work or task: Provided that where appropriate qualifications and training are registered in terms of the provisions of the National Qualification Framework Act, 2000 (Act No.67 of 2000), those qualifications and that training must be regarded as the required qualifications and training; and is familiar with the Act and with the applicable regulations made under the Act;

"construction manager" means a competent person responsible for the management of the physical construction processes and the coordination, administration and management of resources on a construction site;

"construction site" means a workplace where construction work is being performed;

"construction supervisor" means a competent person responsible for supervising construction activities on a construction site;

"construction vehicle" means a vehicle used as a means of conveyance for transporting persons or material, or persons and material, on and off the construction site for the purposes of performing construction work;

"construction work" means any work in connection with:

The construction, erection, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure; or

the construction, erection, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system; or the moving of earth, clearing of land, the making of excavation, piling, or any similar civil engineering structure or type of work;

"construction work permit" means a document issued in terms of regulation 3;

"contractor" means an employer who performs construction work;

"demolition work" means a method to dismantle, wreck, break, pull down or knock down of a structure or part thereof by way of manual labour, machinery, or the use of explosives;

"design" in relation to any structure, includes drawings, calculations, design details and specifications;

"designer" means a competent person who-

- prepares a design;
- checks and approves a design;
- arranges for a person at work under his or her control to prepare a design, including an employee of that person where he or she is the employer; or
- designs temporary work, including its components;
- an architect or engineer contributing to, or having overall responsibility for a design;
- a building services engineer designing details for fixed plant;
- a surveyor specifying articles or drawing up specifications;
- a contractor carrying out design work as part of a design and building project; or
- an interior designer, shopfitter or landscape architect;

"excavation work" means the making of any man-made cavity, trench, pit or depression formed by cutting, digging or scooping;

"explosive actuated fastening device" means a tool that is activated by an explosive charge and that is used for driving bolts, nails and similar objects for the purpose of providing fixing;

"fall arrest equipment" means equipment used to arrest a person in a fall, including personal equipment, a body harness, lanyards, deceleration devices, lifelines or similar equipment;

"fall prevention equipment" means equipment used to prevent persons from falling from a fall risk position, including personal equipment, a body harness, lanyards, lifelines or physical equipment such as guard-rails, screens, barricades, anchorages or similar equipment;

"fall protection plan" means a documented plan, which includes and provides for -

- all risks relating to working from a fall risk position, considering the nature of work undertaken;
- the procedures and methods to be applied in order to eliminate the risk of falling; and
- a rescue plan and procedures;

"fall risk" means any potential exposure to falling either from, off or into;

"health and safety file " means a file, or other record containing the information in writing required by these Regulations;

"health and safety plan" means a site, activity or project specific documented plan in accordance with the client's health and safety specification;

"health and safety specification" means a site, activity or project specific document prepared by the client pertaining to all health and safety requirements related to construction work;

"material hoist" means a hoist used to lower or raise material and equipment, excluding passengers;

"medical certificate of fitness" means a certificate contemplated in regulation 7(8);

"mobile plant" means any machinery, appliance or other similar device that is able to move independently, and is used for the purpose of performing construction work on a construction site;

"National Building Regulations" means the National Building Regulations made under the National Building Regulations and Building Standards Act, 1977 (Act No. 103 of 1977), and promulgated by Government Notice No. R. 2378 of 30 July 1990, as amended by Government Notices No's R. 432 of 8 March 1991, R. 919 of 30 July 1999 and R. 547 of 30 May 2008;

"person day" means one normal working shift of carrying out construction work by a person on a construction site;

"principal contractor" means an employer appointed by the client to perform construction work;

"Professional Engineer or Professional Certificated Engineer" means a person holding registration as either a Professional Engineer or Professional Certificated Engineer in terms of the Engineering Profession Act, 2000 (Act No. 46 of 2000);

"Professional Technologist" means a person holding registration as a Professional Engineering Technologist in terms of the Engineering Profession Act, 2000;

"provincial director" means the provincial director as defined in regulation 1 of the General Administrative Regulations, 2003;

"scaffold" means a temporary elevated platform and supporting structure used for providing access to and supporting workmen or materials or both;

"shoring" means a system used to support the sides of an excavation and which is intended to prevent the cave-in or the collapse of the sides of an excavation;

"structure" means-

- any building, steel or reinforced concrete structure (not being a building), railway line or siding,
- bridge, waterworks, reservoir, pipe or pipeline, cable, sewer, sewage works, fixed vessels, road, drainage works, earthworks, dam, wall, mast, tower, tower crane, bulk mixing plant, pylon, surface and underground tanks, earth retaining structure or any structure designed to preserve or alter any natural feature, and any other similar structure;
- any false work, scaffold or other structure designed or used to provide support or means of access during construction work; or
- any fixed plant in respect of construction work which includes installation, commissioning,
  decommissioning or dismantling and where any construction work involves a risk of a person falling; "suspended platform" means a working platform suspended from supports by means of one or more separate ropes from each support;

"temporary works" means any false work, formwork, support work, scaffold, shoring or other temporary structure designed to provide support or means of access during construction work;

"the Act" means the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993);

Reference should be made to the following documentation in conjunction with this safety specification (including existing surveys, drawings, and reports):

- Specification
- Drawings of Engineer
- Tender and Contract Data

1 PART 1 – SPECIFIC PROJECT INFORMATION

1.1 BACKGROUND OF THE HEALTH AND SAFETY SPECIFICATION

Historically, the Construction Industry has had a poor health and safety record. Due to the complex and potentially dangerous operations being undertaken, there is a high risk of incidents, accidents, and injuries. In many instances poor adherence to the Act and Regulations has resulted in severe consequences for Health and Safety performance. The Client is determined that the highest Health and Safety standards will prevail throughout the Contract and that there will be full commitment from all parties involved.

To achieve this goal the Client has prepared this Health and Safety Specification. The Health and Safety Specification sets out guidelines and minimum levels of awareness and guidance for Health and Safety requirements for the project. Contractual responsibility for adhering to these requirements rests with the Principal Contractor. All employees are encouraged to be pro-active in compliance.

The Client is committed to ensuring the highest Health and Safety standards for all work undertaken within the Contract.

All Contractors on this Project and their employees are fully responsible and accountable for compliance with all Health and Safety requirements.

IMPORTANT NOTE:

Compliance with the Occupational Health and Safety Act and Regulations shall not be limited to this Health and Safety Specification and definitions contained in this document.

Contractors shall be conversant with the requirements and effects of Health and Safety legislation upon their activities, in particular the Construction Regulations, 2014, and the Occupational Health and Safety Act, 1993, and to have made adequate resource in their tender submission to comply with all legislative requirements. All other applicable regulations to this contract shall also be managed.

The Contractor's appointed Health and Safety Officer will be responsible for the auditing of the implementation of the Health and Safety Specification and maintaining the document control and record systems associated with the Health and Safety Specification. The Client will conduct Health and Safety audits of the works too.

1.2 PURPOSE OF THE HEALTH AND SAFETY SPECIFICATION

The purpose of this site-specific Health and Safety Specification is to comply with legal requirements and to provide health and safety information about specific project risks known by the Client, Designer and Engineer to be applicable to this project. This document also provides minimum health and safety requirements, standards and expectations that the contractor and sub-contractors must adhere to.

The Contractor must take into account all information in this specification and ensure that their tenders include adequate resources and competence to deal with the matters detailed herein so that all relevant contents are dealt with in a way which is in compliance with legislation and the ethical concerns for the safeguarding of employees, contractors and other persons affected by the construction activities.

The Health and Safety Specification will be implemented during construction of the works and any construction activity that the Client has control over.

This will also assist in ensuring that all the costs related to the compliance with Occupational Health Act 85 of 1993 and the Construction Regulations 2014, as well as this Health and Safety Specification, are taken into consideration at Tender stage.

No advice, approval of any document required by the Health and Safety Specification such as hazard identification and risk assessment action plans or any other form shall be construed as an acceptance by the Client of any obligation that absolves the Contractor from achieving the required level of performance and compliance with legal requirements.

Further, there is no acceptance of liability by the Client which may result from the Contractor failing to comply with the Health and Safety Specification unless the Client has issued an instruction to any requirement, i.e. the Contractor remains responsible for achieving the required performance levels.

1.3 IMPLEMENTATION OF THE HEALTH AND SAFETY SPECIFICATION

This Health and Safety Specification forms an integral part of the Contract, and Principal Contractor shall make it an integral part of their Contracts with Contractors and Suppliers. Principal Contractors employed by the Client are to ensure that the provisions of the Health and Safety Specification are applied both on the site and in respect of all off site activities relating to the project, in particular in transport activities and project dedicated off site fabrication works.

The Principal Contractor shall enforce the provisions of the Health and Safety Specification amongst all contractors and suppliers for the project.

The Principal Contractor shall sign the acknowledgment on the last page of this safety specification that he/she has familiarized him/herself with the content of the Health and Safety Specification and shall comply with all obligations in respect thereof.

The successful Principal Contractor will be required to compile a Health and Safety Plan based on the requirements of the Occupational Health Act 85 of 1993 and these Specifications, which will need to be approved by Client prior to commencement with construction work.

1.3.1 CLIENT DUTIES

In terms of the Construction Regulations 2014 the Client has legal duties.

The Client must:

- Prepare a suitable, sufficiently documented and coherent site-specific Health and Safety specification for the intended construction work, based on the baseline risk assessment.
- Include the health and safety specification in the tender documents
- Ensure that potential principal contractors submitting tenders have made adequate provision for the cost of health and safety measures.
- Ensure that the principal contractor to be appointed has the necessary competencies and resources to carry out the construction work safely

- Take reasonable steps to ensure co-operation between all contractors appointed by the client to enable each of those contractors to comply with the regulations
- Ensure, before work commences, that every principal contractor is registered and in good standing with the compensation fund, or with a licensed compensation insurer as contemplated in the Compensation for Occupational injuries and Diseases Act, 1993 (Act no 130 of 1993) .
- Appoint each principal contractor in writing for the project, or part thereof
- Discuss and negotiate with the principal contractor the contents of the principal contractor's safety plan and thereafter finally approve that plan for implementation
- Ensure that a copy of the principal contractor's health and safety plan is implemented and maintained and communicated with the work force.
- Ensure that periodic health and safety audits and document verification are conducted at intervals mutually agreed upon between the principal contractor and any contractor, but at least once every 30 days
- Ensure that a copy of the health and safety audit report is provided to the principal contractor within 7 days after the audit
- Stop any contractor from executing a construction activity which poses a threat to the health and safety of persons which is not in accordance with the principal contractor's health and safety plan for site
- Where changes are brought about to the design or construction work, make sufficient health and safety information and appropriate resources available to the principal contractor to execute the work safely
- Ensure that the health and safety file is kept and maintained by the principal contractor.
- Where the client requires additional work to be performed as a result of a design change or error in construction due to the actions of the client, the client must ensure that sufficient safety information and appropriate additional resources are available to execute the required work safely.
- Where more than one principal contractor is appointed, the client must take reasonable steps to ensure co-operation between all principal contractors and contractors to ensure compliance with the Regulations
- Where the Client has appointed a Client Agent for the project, their details for this project are contained in the Project Directory section of this health and safety specification.
- The Client shall, at least once every 30 days, conduct health and safety audits to ensure compliance with Health and Safety legislation, including the Principal Contractor's Health and Safety plan and this Health and Safety Specification.
- All Health and Safety documentation held by the Principal Contractor shall be available for inspection on site. The Principal Contractor shall provide any additional information required by the Client who shall verify the results with the Contractor being audited.

1.3.2 Designer Duties

It must be noted that the Designer also has Health and Safety duties assigned in terms of the Construction Regulations. Where the contractor fulfils a design function in terms of this project (refer to "definitions" section of this document), these duties will also apply. Please refer to Regulation 6 of the Construction Regulations 2014.

Please note that the designer of temporary works must ensure that:

- all temporary works are adequately designed so that it will be capable of supporting all anticipated vertical and lateral loads that may be applied;

- the designs of temporary works are done with close reference to the structural design drawings issued by the contractor, and in the event of any uncertainty consult the contractor;
- all drawings and calculations pertaining to the design of temporary works are kept at the office of the temporary works designer and are made available on request by an inspector; and
- the loads caused by the temporary works and any imposed loads are clearly indicated in the design.

1.4 PROJECT DETAILS

Description of works: Refer to Scope of Works of the tender document
Anticipated Construction Duration: 12 months
Provisional Start Date: September 2022
Completion Date: October 2023

1.5 EXISTING ENVIRONMENT

The project is located primarily within Ward 5 in the Mthonjaneni Local Municipality. The supply area is approximately 15km southwest of Melmoth and is accessed by District Road D550. It is remote and roads are generally in a poor condition. Many of the households that are to receive water have no formal water supply. Hazards specific to this project due to its location include:

- Safety of the public
- Noise and dust control
- Steep slopes
- Overhead services – 22kV powerline in vicinity of the site, or along pipe routes
- Proximity of sites to existing roads, road users, and pedestrians
- Restrictions to access – in some areas off-road vehicles will be required

1.6 AVAILABLE DRAWINGS

Refer to tender documents.

1.7 PROJECT HEALTH AND SAFETY REQUIREMENTS

Significant health and safety hazards identified by Designer and Client:

1. Protection of members of public, proper hoarding and access control is critical;
2. Excavation if required must be barricaded and shored to standard.
3. Work at elevated position and heights.
4. Lifting Operations / Falling Materials;
5. Movement of construction vehicles;
6. Noise;
7. Dust;
8. Workers and material movement;

Normal construction hazards expected are as follows:

- Electric Tools
- Excavations
- Fire Risks
- Flammable Liquids
- Formwork (limited)
- Fragile Materials
- Hand tools
- Hazardous Substances
- Lifting Operations
- Manhole Rings and Pipes
- Manual Handling of General Items
- Members of Public
- Confined spaces
- Noise and Dust
- Overhead Services (Persons working below)
- Plant/Vehicle and Equipment
- Temporary Work (include False Work, Scaffold and Shoring)
- Transportation of Workers
- Underground Services
- Working at Heights
- Working with Cartridge Tools
- Welding
- X-ray testing of welds
- Electrical installations

NOTE: Please refer to end of this Health and Safety Specification for the baseline risk assessment for these risks and minimum control measures required to address the risks.

ACTIVITIES REQUIRING APPROVED METHOD STATEMENTS (FOR HEALTH AND SAFETY)

- Fall protection plan;
- Blasting
- Pressure testing of pipelines
- Commissioning of electrical installations
- Working in confined spaces

Method Statements are required for all tasks and must be approved by the Client Safety Manager. This must align with the HSSRA For the activity.

Other requirements to be discussed with the appointed Principal Contractor upfront

CONTRACTOR SAFETY OFFICER PROVISION

Records of safety audits undertaken by the Contractor's Safety Officer must be kept on site in the safety file and non-conformances reported by the Safety Officer to the Contractor's management team. All nonconformances identified by the Safety Officer must be investigated and corrective action taken by the Contractor to prevent re-occurrence.

A full-time safety officer is required on site.

Full time safety officers must be registered with SACPCMP.

Audit findings must be shared at the monthly progress meeting with the Client Team.

VEHICLE/PLANT AND PEDESTRIAN MANAGEMENT

Designated area for pedestrians to and from site office and building site

ENVIRONMENTAL CONDITIONS
Protection of environment is critical

ARRANGEMENTS FOR ACCESS, PARKING, DELIVERIES, ETC

Access to site by Construction Vehicles: Access routes to be determined

Access to site by Construction Workers and Visitors: To report to site camp first and be escorted.

ARRANGEMENTS FOR SITE CAMP, ABLUTIONS
Site camp location and set up
Restrictions / requirements: To be discussed before commencement
Storage areas: To be discussed and agreed.

Ablutions and Welfare Arrangements
Contractor to supply ablutions and facilities in line with the Construction Regulations 2014, refer to section 2.30 of this health and safety specification regarding the below. Please note that toilets should be provided with built in facilities for hand washing. The Contractor is responsible to provide the following:

- Toilets
- Washing facilities
- Drinking Water
- Shelter
- Eating Areas
- Changing facilities

PROTECTION OF SITE AGAINST UNAUTHORISED ACCESS BY PUBLIC

Excavation Fencing: Fencing (not danger tape) around excavations is critical

General Fencing of Site: Fencing around site camp required.

Warning Notices: to be provided by Principle Contractor, at site camp, deep excavations, (to name a few)

PERSONAL PROTECTIVE EQUIPMENT (PPE)
The Client requires the Contractor to ensure that employees (and others under his/her control) wear the following minimum PPE:
Overalls: Yes – Branded.
Safety Harnesses: Yes, when working higher than 2.5m
Hard Hats: Yes
Reflective Vests: Supervisors and Health and Safety officials (officer & representative)
Goggles / gloves / ear defenders / respiratory protection: Yes, when activity requires same. This must be in line with HSSRA and SWP.
Safety Footwear: Steel cap boots, exception gum boots for concrete works steel toe capped

HAZARDOUS SUBSTANCES
The following materials and substances have, or may have, to be used in the works and are identified as potentially posing special health and / or safety hazards during the project. Appropriate measures will need to be specified for their control:
MSDS Is required for all Hazardous Substances brought to site.
Petrol;

Diesel; Cement; Hydraulic oil; Cleaning Products Paints Cement Solvents Refrigerant / Gases

1.8 INTERFACE AND RESTRICTIONS BY CLIENT

The following Project Client activities will continue during construction: None by the Client
The following Client safety rules and/or requirements are to be observed: • Protection of public is critical, the site camp and all excavation / dangerous situations to be fenced. • Health and Safety Plans, Method Statements and Fall Protection Plan to be submitted and approved prior to gaining access to site. • All workers and professional team are to receive induction prior to commencement of work on site. This induction must include COVID-19 Measures that will be put in place. • All workers must be able to be identified as inducted, otherwise need to leave the site; Contractors should provide a sticker for their hardhats confirming that induction was completed. • No workers of contractors will be allowed on site without supervision. • Safe working at heights and elevated positions is of utmost importance. • No persons to work under ladders or scaffold whilst persons are working overhead. • Danger areas need to be demarcated efficiently. • The Contractor shall exercise strict control over all personnel and compliance to the OHS act requirements; • Non-compliance in this regard can lead to contractual consequences. Personnel found non-compliant will face disciplinary action by the contractor and may lead to dismissals. • The contractor has the duty to enforce all legal requirements in accordance with the OHS act. Please also refer to tender document.
Restrictions on times, access or other restrictions by Client: As per contract document.

1.9 SAFETY FILE RETURN TO CLIENT

The Safety File for the Project is to be handed over by the Principal Contractor to the Client upon Project Completion in a hard copy format and CD for the selected documentation items.

2 PART 2 – OTHER REQUIREMENTSDUTIES OF THE PRINCIPAL CONTRACTOR IN TERMS OF CONSTRUCTION REGULATIONS 2014

A Principal Contractor must:

- provide and demonstrate to the client a suitable, sufficiently documented and coherent site specific health and safety plan, based on the client's documented health and safety specifications, which plan must be applied from the date of commencement of and for the duration of the construction work and which must be reviewed and updated by the principal contractor as work progresses;

- open and keep on site a health and safety file, which must include all documentation required in terms of the Act and these Regulations, which must be made available on request to an inspector, the client, the client's agent or a contractor; and on appointing any other contractor, in order to ensure compliance with the provisions of the Act –

    - provide contractors who are tendering to perform construction work for the principal contractor, with the relevant sections of the health and safety specifications pertaining to the construction work which has to be performed;

    - ensure that potential contractors submitting tenders have made sufficient provision for health and safety measures during the construction process;

    - ensure that no contractor is appointed to perform construction work unless the principal contractor is reasonably satisfied that the contractor that he or she intends to appoint, has the necessary competencies and resources to perform the construction work safely;

    - ensure prior to work commencing on the site that every contractor is registered and in good standing with the compensation fund or with a licensed compensation insurer as contemplated in the Compensation for Occupational Injuries and Diseases Act, 1993;

    - appoint each contractor in writing for the part of the project on the construction site

    - take reasonable steps to ensure that each contractor's health and safety plan is implemented and maintained on the construction site;

    - ensure that the periodic site audits and document verification are conducted at intervals mutually agreed upon between the principal contractor and any contractor, but at least once every 30 days;

    - stop any contractor from executing construction work which is not in accordance with the client's health and safety specifications and the principal contractor's health and safety plan for the site or which poses a threat to the health and safety of persons;
- where changes are brought about to the design and construction, make available sufficient health and safety information and appropriate resources to the contractor to execute the work safely;
- discuss and negotiate with the contractor the contents of their health and safety plan and finally approve that plan for implementation;

- ensure that a copy of both the principal contractor and contractor's health and safety plan is available on request to an employee, an inspector, a contractor, the client or the client's agent; hand over a consolidated health and safety file to the client upon completion of the construction work, to include a record of all drawings, designs, materials used and other similar information concerning the completed structure;
- in addition to the documentation required in the health and safety file include and make available a comprehensive and updated list of all the contractors on site accountable to the principal contractor, the agreements between the parties and the type of work being done;
- ensure that all his or her employees have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner in the form of Annexure 3.

A contractor must prior to performing any construction work:

- provide and demonstrate to the principal contractor a suitable and sufficiently documented health and safety plan, based on the relevant sections of the client's health and safety specification and provided by the principal contractor, which plan must be applied from the date of commencement of and for the duration of the construction work and which must be reviewed and updated by the contractor as work progresses;

- open and keep on site a health and safety file, which must include all documentation required in terms of the Act and these Regulations, and which must be made available on request to an inspector, the client, the client's agent or the principal contractor;

- before appointing another contractor to perform construction work be reasonably satisfied that the contractor that he or she intends to appoint has the necessary competencies and resources to perform the construction work safely;

- co-operate with the principal contractor as far as is necessary to enable each of them to comply with the provisions of the Act;

- as far as is reasonably practicable, promptly provide the principal contractor with any information which might affect the health and safety of any person at work carrying out construction work on the site, any person who might be affected by the work of such a person at work, or which might justify a review of the health and safety plan.

Where a contractor appoints another contractor to perform construction work, the duties that apply to the principal contractor will apply to the contractor as if he or she were the principal contractor.

A principal contractor must take reasonable steps to ensure co-operation between all contractors appointed by the principal contractor to enable each of those contractors to comply with these Regulations.

No contractor may allow or permit any employee or person to enter any site, unless that employee or person has undergone health and safety induction training pertaining to the hazards prevalent on the site at the time of entry.

A contractor must ensure that all visitors to a construction site undergo health and safety induction pertaining to the hazards prevalent on the site and must ensure that such visitors have the necessary personal protective equipment.

A contractor must at all times keep on his or her construction site records of the health and safety induction training and such records must be made available on request to an inspector, the client, the client's agent or the principal contractor.

A contractor must ensure that all his or her employees have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner in the form of Annexure 3 (a template of which can be found in the Construction Regulations, 2014).

2.2 HEALTH AND SAFETY PLAN

As a minimum the following topics must be addressed / included:

- Project Directory;
- Sub-Contractor Directory;
- Project Safety Statement;
- Behaviour Safety systems (i.e. be your brother's keeper principal);
- Project Particulars.
- Management Structure for Project.
- Health and Safety standards for the project.
- Existing environment.
- Appointed Persons (Supervision / Health and Safety);
- Security Procedures.
- Registers.
- Contractor Co-ordination.
- Housekeeping and Waste Disposal Arrangements.
- Noise;
- Training requirements;
- Plant and Equipment;
- Safety monitoring arrangements;
- Selection of Contractors Procedures;
- Activities with risk to Health and Safety (Risk Assessment);
- Hazardous Substances;
- First Aid and Medical Procedures;
- Fire and Emergency Procedures;
- Accident and Incident Reporting and investigation;
- Welfare and Site facilities;
- Personal Protective Equipment;
- Signage;
- Health and Safety File arrangements;
- Method Statements (Demolition / Formwork);
- Safe Operating Procedures / Safe Work Procedures;
- Fall Protection Plan (if applicable);
- Demolition method statement (if applicable);
- Safety Representatives and Safety Committees;
- Medical certificates of fitness

Minimum requirements for a Health and Safety File:

Refer Annexure C.

2.3 MANAGEMENT AND SUPERVISION OF CONSTRUCTION WORK

A principal contractor must, in writing, appoint one full-time competent person as the construction manager with the duty of managing all the construction work on a single site, including the duty of ensuring occupational health and safety compliance, and in the absence of the construction manager an alternate must be appointed by the principal contractor.

A principal contractor must upon having considered the size of the project, in writing appoint one or more assistant construction managers for different sections thereof: Provided that the designation of any such person does not relieve the construction manager of any personal accountability for failing in his or her management duties in terms of this regulation.

Where the construction manager has not appointed assistant construction managers, or, in the opinion of an inspector, a sufficient number of such assistant construction managers have not been appointed, that inspector must direct the construction manager in writing to appoint the number of assistant construction managers indicated by the inspector, and those assistant construction managers must be regarded as having been appointed.

No construction manager appointed in terms of the Regulations may manage any construction work on or in any construction site other than the site in respect of which he or she has been appointed.

A contractor must, after consultation with the client and having considered the size of the project, the degree of danger likely to be encountered or the accumulation of hazards or risks on the site, appoint a full-time or part-time construction health and safety officer in writing to assist in the control of all health and safety related aspects on the site: Provided that, where the question arises as to whether a construction health and safety officer is necessary, the decision of an inspector is decisive.

No contractor may appoint a construction health and safety officer to assist in the control of health and safety related aspects on the site unless he or she is reasonably satisfied that the construction health and safety officer that he or she intends to appoint is registered with the SACPCMP and approved by the Chief Inspector and has necessary competencies and resources to assist the contractor.

A construction manager must in writing appoint construction supervisors responsible for construction activities and ensuring occupational health and safety compliance on the construction site.

A contractor must, upon having considered the size of the project, in writing appoint one or more competent employees for different sections thereof to assist the construction supervisor, and every such employee has, to the extent clearly defined by the contractor in the letter of appointment, the same duties as the construction supervisor: Provided that the designation of such employee does not relieve the construction supervisor of any personal accountability for failing in his or her supervisory duties.

Where the contractor has not appointed such an employee, or, in the opinion of an inspector, a sufficient number of such employees have not been appointed, that inspector must instruct the employer to appoint the number of employees indicated by the inspector.

No construction supervisor appointed may supervise any construction work on or in any construction site other than the site in respect of which he or she has been appointed: Provided that if a sufficient number of competent employees have been appropriately designated on all the relevant construction sites, the appointed construction supervisor may supervise more than one site.

2.4 Notification of Intention to Commence Construction Work

The Contractor shall notify the Provincial Director of the Department of Labour of the intention to commence construction work at least 7 days prior to the works commencing if the intended construction work will:

- Include work at height where there is a risk of falling

2.5 Assignment of Contractors Responsible Persons to Manage Health and Safety on Site

The Contractor shall submit management and supervisory appointments as well as any relevant appointments in writing (as stipulated by the Construction Regulations 2014 and the Occupational Safety and Health Act 1993), prior to commencement of work (refer to Annexure B at the end of this Health and Safety Specification).

2.6 Competency for Contractor's Responsible Persons

The Contractor's responsible persons shall be competent in health and safety and be familiar with the Occupational Health and Safety Act 1993, and applicable regulations. Valid proof of pertinent health and safety courses attended by such persons will be required to be presented to the Client.

2.7 Compensation of Occupational Injuries and Diseases Act of 1993 (COIDA)

The successful Contractor shall submit to the Client a valid letter of good standing with the Compensation Insurer prior to appointment.

2.8 Occupational Health and Safety Policy

The Contractor shall submit their Health and Safety Policy, prior to construction commencement, signed by the Chief Executive Officer. The Policy must outline objectives and how they will be achieved and implemented within the company operations.

2.9 Health and Safety Organogram

The Contractor shall submit an organogram, prior to construction commencement, outlining the Health and Safety Site Team that will be assigned to the project, if successful with the tender. In cases where appointments have not been made, the organogram shall reflect the position. The organogram shall be updated when there is a change in the site team.

2.10 Risk Assessments

Risk Assessment

The Contractor must, before commencement of any construction work, and during construction work, have risk assessments performed by a competent person appointed in writing, which risk assessments form part of the health and safety plan to be applied on the site and must include:

- All risk assessments must be accompanied by a Method Statement.
- The identification of the risks and hazards to which persons may be exposed to.
- An analysis and evaluation of the risks and hazards identified; based on a documented method.
- A documented plan and applicable safe work procedures to mitigate, reduce or control the risks and hazards that have been identified;

- A monitoring plan; and the Principal Contractor must ensure that, as far as is reasonably practicable, ergonomic related hazards are analysed, evaluated and addressed in a risk assessment.
- The Principal Contractor must ensure that all employees under his control are informed, instructed and trained by a competent person regarding any hazard and the related work procedures and/or control measures before any work commences and thereafter at the times determined in the risk assessment monitoring and review plan of the relevant site.

The Principal Contractor must ensure that all contractors are informed regarding any hazard that is stipulated in the risk assessment before any work commences and thereafter at the times determined in the risk assessment monitoring and review plan of the relevant site.

The Contractor must consult with the health and safety committee or with a representative trade union or representative group of employees if no health and safety committee exist, on the monitoring and review of the risk assessments for the site.

The Contractor must ensure that copies of risk assessment for this site are available on site for inspection purposes by interested parties (inspector, the client, any contractor, any employee, a representative trade union, a health and safety representative or safety committee member.

A Contractor must review the relevant risk assessment where changes are affected to the design and/or construction that result in a change to the risk profile, or when an incident has occurred.

Preventative measures must first address the elimination of the hazard or risk. Should PPE be required to reduce risk, the equipment or clothing to be used must be SABS approved.

In general the Contractor must ensure that the Risk Assessment involves identifying the hazards present in a work activity on site. This is followed by an evaluation of the extent of the risk involved taking into account those precautions already being taken.

The following general principle should be followed when conducting a risk assessment:

- All relevant risks and/or hazards should be systematically addressed;
- The risk assessment should address what happens in the workplace during the work activity.
- All employees and those who may be affected must be considered, including maintenance staff, security guards, visitors and subcontractors.

A review plan:

- The risk assessment should highlight those groups and individuals who may be required to work alone or who have disabilities.
- The risk assessment process should consider the existing safety measures and controls.
- The level of detail on a risk assessment should be appropriate to the level of risk.
- All Risk Assessments for the Project must be reviewed by the Client Safety Manager and approved prior to the commencement of any works.

2.11 Health and Safety Representatives

The Contractor shall ensure that Health and Safety Representative(s) is/are elected and trained to carry out his / her functions. The appointment must be in writing. The Health and Safety Representative shall carry out regular inspections, keep records and report to the supervisor to take appropriate action. He / she shall attend Health and Safety Committee Meetings. The Health and Safety Representative shall be part of the team that will investigate incidents, accidents and non-conformances.

2.12 Health and Safety Committee

Where two or more health and safety representatives have been appointed on site, the Contractor shall ensure that monthly health and safety meetings are held with such representatives and minutes are kept on record. Meetings must be organized and chaired by the Contractor's Health and Safety Committee Chairperson. Minutes of these meetings must be available for the employees of the contractor to refer to.

2.13 Medical Certificate of Fitness

The contractor must ensure that ALL their employees on site have a valid medical certificate of fitness, specific to the construction work being performed, issued by an occupational health practitioner in the form of an Annexure 3 template (refer to the Construction Regulations 2014 on the Department of Labour website for a sample of this form).

2.14 Health and Safety Training

The Contractor shall conduct a training needs analysis to ascertain what health and safety training is required. A plan of action should be devised and forwarded to the Client for records. Once the identified people have attended the training, the Contractor must provide the Client with copies of certificates obtained.

Induction

No Contractor may allow or permit any employee or person to enter site unless they have undergone health and safety induction training pertaining to the hazards prevalent on site at the time of entry. This includes visitors to site. The Contractor must ensure that visitors to site have the necessary protective equipment (PPE). A copy of attendance registers of all employees who attend inductions shall be kept. The Site-specific safety induction must include all COVID-19 measures that are in place and that shall be enforced.

Awareness

The Contractor shall conduct periodic toolbox talks on site, preferably weekly or before any hazardous work takes place. The talks shall cover the relevant activity and an attendance register must be signed by all attendees. This record of who attended and the content of the topic will be kept on the site health a safety file as evidence of training.

2.15 Competency

After the Contractor has identified the training to be conducted as part of the competency requirement, and based on Risk Assessment, he shall send the relevant persons on appropriate courses and keep certificates of training for reference. Familiarity with the Health and Safety Act and Regulations is an integral part of the definition of competence.

2.16 General Record Keeping

The Contractor shall keep and maintain Health and Safety records to demonstrate compliance with the Health and Safety Specification and the Occupational Health and Safety Act. The contractor shall ensure that all records of incidents, training etc. are kept on site. All documents shall be available for inspection by the Client, or the Department of Labour's Inspectors.

2.17 General Inspection, Monitoring and Reporting

The Contractor shall carry out inspections as required by **Annexure C** in this Health and Safety Specification, as well as by health and safety legislation.

2.18 Emergency Procedures

The Contractor shall submit a detailed Emergency Procedure for approval by the Client prior to commencement on site. The procedure shall detail the response plan including the following:

- List of key personnel;
- Details of emergency services;
- Actions or steps to be taken in the event of the emergency; and
- Information on hazardous materials / situations, including each material's hazardous potential impact or risk on the environment or human and measures to be taken in the event of an accident. Emergency procedure(s) shall include, but shall not be limited to, fire, spills, accidents to employees, use of hazardous substances, dangers as a result of riot / service deliver protests / intimidation, etc. The Contractor shall advise the Client in writing of any on-site emergencies, together with a record of action taken, within 24 hours of the emergency occurring. A contact list of all service providers (Fire Department, Ambulance, Police, Medical and Hospital, etc) must be maintained and available to site personnel.

2.19 First Aid Box and First Aid Equipment

The Contractor shall provide first aid box/es and appoint, in writing, First Aider(s) for this project in line with the results of the Contractor's risk assessment for the project, this health and safety specification as well as the provisions of the General Safety Regulations. The appointed First Aider(s) are to be sent for accredited first aid training before starting on site. Valid certificates are to be kept on site.

First Aid box/es must be adequately stocked at all time, accessible and be controlled by a qualified First Aider. If required by the Client, the Contractor shall have a stretcher on site to be used in case of a serious incident.

2.20 Accident / Incident Reporting and Investigation

The Contractor shall, in addition to the prescribed requirements of the Occupational Health and Safety Act and General Safety Regulations, investigate, record and report all Section 24 reportable incidents to the Client within 24 hours of the incident occurring. Incident investigations shall be conducted by the Principal Contractor's appointed Accident Investigator – this Investigator must be a competent person or persons who have sufficient knowledge to carry out an investigation.

In the event of a fatality or a permanent disabling injury the Contractor must submit proof of reporting of incident to Department of Labour as well as proof of preventative measures to the Client. The Client reserves the right to conduct investigations into any incidents that they deem fit and the Contractor is required to provide full co-operation in this regard.

On a monthly basis accident / incident statistic must be given through to the Client in a similar format as Annexure F.

All incidents that may occur on site must be reported by the end of the same shift to the Site Safety Officer and the client's safety manager. Following the incident investigation, a safety stand down will be held to inform staff of the incident as well as all lessons learnt.

Staff should be encouraged to report incidents, accidents, near misses and positive interventions and a reward should be considered by the Principal Contractor.

2.21 Hazards and Potential Situations

The Contractor shall immediately notify other Contractors of any hazardous or potentially hazardous situations, which may arise during performance of the activities.

2.22 Occupational Health and Safety Signage

The Contractor shall ascertain and provide adequate on-site health and safety signage. This signage shall include, but shall not be limited to, Hard Hat / Helmet Area; Safety Shoes to be worn on site; Dust Masks to be worn in areas where there might be exposure to excessive dust; Ear Plugs / Muffs to be worn where there might be noise exposure over 85 db; Gloves; Safety Goggles; Safety Harness etc. The Contractor shall be responsible to maintain the quality and replacement of signage.

2.23 Management of Contractors by Principal Contractor

The Principal Contractor shall ensure that all contractors under his control are complying with the respective Health and Safety Plans, as well as Health and Safety Legislation.

2.24 Stacking of Materials

In addition to the provisions for the stacking of articles in the General Safety Regulations, 2003, the contractor must ensure that:

- a competent person is appointed in writing with the duty of supervising all stacking and storage on a construction site;
- adequate storage areas are provided;
- there are demarcated storage areas; and
- storage areas are kept neat and under control.

2.25 Housekeeping and General Safeguarding on Construction Sites

A contractor must, in addition to compliance with the Environmental Regulations for Workplaces, 1987, promulgated by Government Notice No. R. 2281 of 16 October 1987, ensure that suitable housekeeping is continuously implemented on each construction site, including-

- the proper storage of materials and equipment.
- the removal of scrap, waste and debris at appropriate intervals.
- ensuring that materials required for use, are not placed on the site so as to obstruct means of access to and egress from workplaces and passageways.
- ensuring that materials which are no longer required for use, do not accumulate on and are removed from the site at appropriate intervals;

2.26 Construction Vehicles and Mobile Plant

A contractor must ensure that all construction vehicles and mobile plant-

- are of an acceptable design and construction;

- are maintained in a good working order;
- are used in accordance with their design and the intention for which they were designed, having due regard to safety and health;
- are operated by a person who-
    - has received appropriate training, is certified competent and in possession of proof of competency and is authorised in writing to operate those construction vehicles and mobile plant;
    - has a medical certificate of fitness to operate those construction vehicles and mobile plant, issued by an occupational health practitioner in the form of Annexure 3.
    - have safe and suitable means of access and egress;
- are properly organized and controlled in any work situation by providing adequate signalling or other control arrangements to guard against the dangers relating to the movement of vehicles and plant, in order to ensure their continued safe operation;
- are fitted with structures designed to protect the operator from falling material or from being crushed should the vehicle or mobile plant overturn;
- are equipped with an acoustic warning device which can be activated by the operator;
- are equipped with an automatic acoustic reversing alarm; and are inspected by the authorised operator or driver on a daily basis using a relevant checklist prior to use and that the findings of such inspection are recorded in a register kept in the construction vehicle or mobile plant.
- A contractor must ensure that-
- no person rides or is required or permitted to ride on a construction vehicle or mobile plant
- otherwise than in a safe place provided thereon for that purpose;
- tools, material and equipment are secured and separated by means of a physical barrier in order to prevent movement when transported in the same compartment with employees;
- vehicles used to transport employees have seats firmly secured and adequate for the number of employees to be carried; and all construction vehicles or mobile plant travelling, working or operating on public roads comply with the requirements of the National Road Traffic Act, 1996.

2.27 Electrical Installations and Machinery on Construction Sites

A contractor must, in addition to compliance with the Electrical Installation Regulations, 2009, and the Electrical Machinery Regulations, 1988, promulgated by Government Notice No.1593 of 12 August 1988, ensure that –

- before construction commences and during the progress thereof, adequate steps are taken to ascertain the presence of and guard against danger to workers from any electrical cable or apparatus which is under, over or on the site.
- all parts of electrical installations and machinery are of adequate strength to withstand the working conditions on construction sites.
- the control of all temporary electrical installations on the construction site is designated to a competent person who has been appointed in writing for that purpose;
- All temporary electrical installations used by the contractor are inspected at least once a week by a competent person and the inspection findings are recorded in a register kept on the construction site; and
- all electrical machinery is inspected by the authorized operator or user on a daily basis using a relevant checklist prior to use and the inspection findings are recorded in a register kept on the construction site.
- All damaged electrical equipment must be reported in the same shift to the store person.

2.28 USE AND TEMPORARY STORAGE OF FLAMMABLE LIQUIDS ON CONSTRUCTION SITES

A contactor must, in addition to compliance with the provisions for the use and storage of flammable liquids in the General Safety Regulations, 2003, ensure that –

- where flammable liquids are being used, applied or stored at the workplace concerned, it is done in a manner that does not cause a fire or explosion hazard, and that the workplace is effectively ventilated;
- no person smokes in any place in which flammable liquid is used or stored, and the contractor must affix a suitable and conspicuous notice at all entrances to any such areas prohibiting such smoking;
- an adequate amount of efficient fire-fighting equipment is installed in suitable locations around the flammable liquids store with the recognized symbolic signs;
- only the quantity of flammable liquid needed for work on one day is taken out of the store for use;
- all containers holding flammable liquids are kept tightly closed when not in actual use and, after their contents have been used up, are removed from the construction site and safely disposed of;
- where flammable liquids are decanted, the metal containers are bonded and earthed; and no flammable material, including cotton waste, paper, cleaning rags or similar material is stored together with flammable liquids
- Liquids must not be decanted into cold drink bottles etc.

2.29 PRECAUTIONS ON CONSTRUCTION SITES

A contractor must, in addition to compliance with the Environmental Regulations for Workplaces, 1987, ensure that –

- all appropriate measures are taken to avoid the risk of fire.
- sufficient and suitable storage is provided for flammable liquids, solids and gases.
- smoking is prohibited and notices in this regard are prominently displayed in all places containing readily in confined spaces and other places in which flammable gases, vapours or dust can cause danger-
- only suitably protected electrical installations and equipment, including portable lights, are
- used.
- there are no flames or similar means of ignition.
- there are conspicuous notices prohibiting smoking.
- oily rags, waste and other substances liable to ignite are without delay removed to a safe
- place; and adequate ventilation is provided;
- combustible materials do not accumulate on the construction site.
- welding, flame cutting, and other hot work are done only after appropriate precautions have been taken to reduce the risk of fire;
- suitable and sufficient fire-extinguishing equipment is placed at strategic locations or as may be recommended by the Fire Chief or local authority concerned, and that such equipment is maintained in a good working order;
- the fire equipment contemplated above is inspected by a competent person, who has been appointed in writing for that purpose, in the manner indicated by the manufacturer thereof;
- a sufficient number of workers are trained in the use of fire- extinguishing equipment;
- where appropriate, suitable visual signs are provided to clearly indicate the escape routes in the case of a fire.
- the means of escape is kept clear at all times.
- there is an effective evacuation plan providing for all -

- persons to be evacuated speedily without panic.
- persons to be accounted for; and
- plant and processes to be shut down; and
- a siren / air horn is installed and sounded in the event of a fire.

2.30 CONSTRUCTION EMPLOYEES' FACILITIES

A contractor must, in addition to the construction site provisions in the Facilities Regulations, 2004, promulgated by Government Notice No. R. 924 of 3 August 2004, provide at / or within reasonable access of every construction site, the following clean, hygienic and maintained facilities:

- One sanitary facility for each sex and for every 30 workers;
- changing facilities for each sex.
- and sheltered eating area.

2.31 FALL PROTECTION

The Contractor must:

- designate a competent person to be responsible for the preparation of a fall protection plan
- ensure that the fall protection plan contemplated above is implemented, amended where and when necessary and maintained as required; and
- take steps to ensure continued adherence to the fall protection plan.

A fall protection plan contemplated above must include:

a risk assessment of all work carried out from a fall risk position and the procedures and methods used to address all the risks identified per location;

- the processes for the evaluation of the employees' medical fitness necessary to work at a fall risk position and the records thereof.
- a programme for the training of employees working from a fall risk position and the records thereof.
- the procedure addressing the inspection, testing and maintenance of all fall protection equipment; and a rescue plan detailing the necessary procedure, personnel and suitable equipment required to affect a rescue of a person in the event of a fall incident to ensure that the rescue procedure is
  implemented immediately following the incident.
- All persons working on scaffolding must be trained and in possession of a valid training certificate on working at height as well the safe use of safety harnesses.
- A trained Scaffold inspector must ensure that all scaffolding is inspected daily prior to staff make use of the scaffold. This must be tagged SAFE FOR USE with a valid date and signature by the inspector.

A contractor must ensure that a construction manager appointed under regulation 8(1) is in possession of the most recently updated version of the fall protection plan.

A contractor must ensure that all unprotected openings in floors, edges, slabs, hatchways and stairways are adequately guarded, fenced or barricaded or that similar means are used to safeguard any person from falling through such openings;

Also that no person is required to work in a fall risk position, unless such work is performed safely as contemplated in above and fall prevention and fall arrest equipment are approved as suitable and of sufficient strength for the purpose for which they are being used, having regard to the work being carried out and the load, including any person, they are intended to bear; and securely

attached to a structure or plant, and the structure of plant and the means of attachment thereto are suitable and of sufficient strength and stability for the purpose of safely supporting the equipment and person who could fall, and fall arrest equipment is used only where it is not reasonably practicable to use fall prevention equipment.

2.32 EXCAVATION IF REQUIRED

If an excavation is more than 2.5 metres long / deep a safe working procedure shall be submitted for approval by The Project Client.

The Contractor shall make sure that:

- The excavations are inspected before the shift starts and record is kept;
- There are no unguarded excavations regardless of depth;
- The safe working procedure has been communicated to the workers;
- The safe working procedures is enforced and maintained by the Contractor's Responsible Persons at all times; and
- That the written permission is granted to all relevant parties daily to enter excavations as per the Construction Regulations 13 (3) (b) (ii) (a).

2.33 DEMOLITION WORK

Demolition works do not form part of this contract.

2.34 SCAFFOLDING

The Contractors' competent scaffold erectors shall ensure that when erecting scaffolds that they are erected in accordance to the SANS 10085-1:2004 code. Scaffold erectors are to wear double lanyard safety harnesses when erecting and dismantling scaffolding. No unauthorized persons are to alter or build scaffolding. The scaffolding supervisor and inspector must ensure that, as far as is reasonably possible, that the scaffold is safe and fit for the purpose, before allowing anyone to utilize the scaffold. They must ensure that the scaffold platforms are constructed to the loading requirements for the work to be carried out. They must ensure the stability check for adequate ties has been done. The inspector must ensure a 'safe to use' sign is displayed on the scaffold when satisfied that the scaffold is safe. A "not to be used" sign must be displayed until the scaffold has been completed, checked and approved as safe. All alterations to the scaffold are to be done under supervision of the competent person. All scaffold erectors and team leaders are to be competent to do the work.

Users of the scaffold must co-operate with the scaffolding supervisor to ensure that overloading is prevented and must agree on safe working procedures.

Scaffold inspections are to be done by a competent appointed person, experienced in the erection and maintenance of scaffolds at least daily, plus after rain or displacement or major change to the scaffold. All deviations are to be recorded on the scaffold inspection register and must be rectified immediately where required.

Loading of scaffolds with materials, personnel and equipment must be in accordance with the maximum loadings as specified by the consulting engineers / designers. Contractors must be clear on the maximum loadings before carrying out any activities where maximum loadings are in question.

Working platforms are to be fully boarded with double handrails and toe boards where required. The relevant appointed competent persons are to ensure that the correct signage is in place. Scaffold towers must not be used in the vicinity of overhead power lines. Design for use of scaffolds will need

to take into account the site ground conditions expected, height restrictions and obstructions. Ladder access must be internal and fixed to the narrowest side. Maximum height to base will not exceed 3.5 (internal use) and 3 (external use) without ties. Where scaffold is at risk from trespassers/unauthorized person accessing it then ladders should be removed, or alternative security measures should be introduced.

Mobile scaffolds and static frame towers must be erected as per the manufacturers' requirements.

A scaffold plan needs to be compiled and submitted to the client agent for approval, before any scaffold is erected on site.

2.35 Hazardous Chemical Substances (HCS)

In addition to the requirements in the HCS Regulations, the principal contractor must provide proof in the Health and Safety Plan that:

- Material Safety Data Sheets (MSDS's) of the relevant materials / hazardous chemical substances are available prior to use by the contractor. All MSDS's shall be available for inspection by the agent at all times.
- How the relevant HCS's are being/going to be controlled by referring to:
  - Limiting the amount of HCS
  - Limiting the number of employees
  - Limiting the period of exposure
  - Substituting the HCS
  - Using engineering controls
  - Using appropriate written work procedures
  - The correct PPE is being used.
  - HCS are stored and transported according to SABS 072 and 0228.
  - Training with regards to these regulations was given.

The Health and Safety plan should make reference to the disposal of hazardous waste on classified sites and the location thereof (where applicable).

The First Aider must be made aware of the MSDS and trained in how to treat HCS incidents appropriately.

2.36 Noise Induced Hearing Loss

Where noise is identified above 85db as a hazard the requirements of the NIHL regulations must be complied with and the following must be included / referred to in the Health and Safety Plan:

Proof of training with regards to these regulations.

- Risk assessment done within 1 month of commencement of work.
- Medical surveillance programme established and maintained for the necessary employees. Control of noise by referring to:
  - Engineering methods considered
  - Admin control (number of employees exposed) considered
  - Personal protective equipment considered/decided on
  - Describe how records are going to be kept for 40 years.

2.37 Personal Protective Equipment (PPE)

The Contractor shall carry out PPE or clothing needs analysis in accordance with his risk assessment, to determine the necessary PPE or clothing to be used during construction. The

Contractor shall always make provision and keep adequate quantities of SABS approved PPE or clothing on site. The Contractor must ensure that lost, stolen, worn out or damaged PPE is replaced as required and receipt signed for by employees on site.

2.38 Fire Extinguishers and Fire Fighting Equipment

The Contractor shall provide adequate, regularly serviced fire extinguishers located at strategic points on site. The Contractor shall keep spare serviced portable fire extinguishers. The Contractor shall have adequate persons trained or competent to use the Fire Fighting Equipment.

Safety signage shall be posted up in all areas where fire extinguishers are located.

2.39 Lifting Machinery and Tackle

The Contractor shall ensure that lifting machinery and tackle are inspected before use and thereafter in accordance with the Driven Machinery Regulations and the Construction Regulations 2014. There must be a competent lifting machine inspector (registered with the Department of Labour, Gazette number 27305) and a competent lifting tackle inspector designated who must inspect the equipment, taking into account that;

- All lifting machinery and tackle have a safe working load clearly indicated;
- Regular inspection and servicing are carried out (3-monthly inspections and records for tackle and 6-monthly inspections and records for lifting machines);
- Records are kept of inspections and of services;
- There is proper supervision in terms of guiding the loads, which includes a trained banks man to direct lifting operations and check lifting tackle and attachments daily;
- Rigging of loads is done in accordance with acceptable safe work practices;
- Annual load test certificates for lifting machines are in place;
- Load test institutions are registered with the department of Labour;
- The operators are certified to operate the specific machine (valid certificate to be on site);
- The operators are physically and psychologically fit to work and in possession of a medical certificate of fitness to be available on site.

2.40 Ladders and Ladder work

The Contractor shall ensure that all ladders are numbered and inspected regularly keeping record of inspections. It should be noted that Aluminium ladders are preferred to wooden ladders.

Always maintain 3 point contact when working on ladders. Ensure that the correct angle is used at all times. All ladders must be supported by an assistant.

2.41 General Machinery

The Contractor shall comply with the Driven Machinery Regulations, which include inspecting machinery regularly, appointing a competent person to inspect and ensure maintenance, issuing PPE or clothing and training those that use machinery and enforce compliance.

2.42 Portable Electrical Tools

The Contractor shall ensure that use and storage of all explosive actuating fastening devices and Portable electrical tools are in compliance with relevant legislation.

The Contractor shall consider that:

- A competent person undertakes routine inspections;
- Only authorised persons use the tools;
- There are safe working procedures applied;
- Awareness training is carried out and compliance is enforced at all times; and
- PPE and clothing are provided and maintained

2.43 Night Work

The Contractor shall not undertake any night work without prior arrangement and a written agreement in the contract from the Project Client. The Contractor shall ensure that adequate lighting is provided for all night work and failure to do so shall result in work being stopped.

2.44 Occupational Health

Exposure of workers to occupational health hazards and risks are very common in any work environment, especially in construction. Occupational health hazards and risks exposure is a major problem and all Contractors are to ensure that proper health and hygiene measures are put in place to prevent exposure to these hazards and risks. The occupational hazards and risks may enter the body in three ways:

- Inhalation through breathing e.g. cement dust;
- Ingestion through swallowing maybe through food intake;
- Absorption through the skin (pores) e.g. painting or use of thinners.

The contractor is required to ensure that all his personnel are medically fit prior to being allowed onto the work site.

All Contractors should ensure that Occupational Hygiene surveys are conducted as per the Occupational Health and Safety Act to ensure employees are not exposed to hazards. Risk Assessments should identify areas where surveys are to be conducted.

2.45 Weather

Heat, cold, rain and wind can adversely affect the site conditions and negatively affect workers. For this reason the Contractor must ensure that adequate controls is in place to mitigate these conditions and protection of workers against circumstances arising from these conditions.

3 PART 3 – OTHER HEALTH AND SAFETY SPECIFICATION REQUIREMENTS

The contractor must be aware of the following additional requirements:

What	When	Output
Awareness training (Inductions)	Before work stats and new workers	Attendance Register
Awareness training (Toolbox Talks)	At least fortnightly and before hazardous work is carried out	Attendance Register
Health and Safety Committee Meetings	Monthly	Minutes signed by the employer (Contractor) covering: a) Health and Safety b) Representative Checklist
Health and Safety Reports	Monthly	Report covering: a) Incidents/Accidents and Investigations b) Non conformance c) Health and Safety Training d) HIRA updates e) Internal and External audits
General Inspections (daily / monthly)	As per Health and Safety Specification and OHSA (Occupational Health and Safety Act, 1993)	Report on Health and Safety Specification and OHSA compliance: a) Scaffolding b) Lifting Machinery c) Excavations d) Fire fighting Equipment e) Portable Electrical Equipment f) Ladders
Record keeping	Ongoing	Covering: a) General complaints b) Fines c) General incidents d) MSDS e) Surveillance Medicals f) Inspection Register g) Dept of Labour Notices

ANNEXURE A – TASK COMPLETION FORM

The Contractor shall submit the info in Annexure A below prior to construction commencement.

Item No.	Health & Safety Specification Requirement	OHSA Requirement	Submission date
1.	Notification of Intention	Construction Regulations 2014	At least 7 days before
2.	Assignment of Responsible Person to Manage Building Work via Health and Safety Organogram	Construction Regulations 2014	Before commencement on site
3.	Competency for Health and Safety Positions	Client / Client Agent requirement	Before commencement on site
4.	Compensation of Occupational Injuries and Diseases Act (COIDA) 130 of 1993	COIDA Requirement	Before commencement on site
5.	Occupational Health. and Safety Policy	Client / Client Agent requirement	Before commencement on site
6.	Risk Assessment, Safety Plan and Fall Protection Plan, Demolition Method Statement	Client / Client Agent requirement	Before construction work commences

ANNEXURE B – CONTRACTOR'S RESPONSIBLE PERSONS

The contractor shall make the following appointments, as required:

Chief Executive Officer (OHSACT 16(1)
Contract Director/Manager (OHSACT 16(2)
Construction Manager (CR 8(1))
Construction Supervisor (CR 8(7))
Assistant Construction Supervisor (CR 8(8))
Construction Safety Officer (CR 8(5))
Risk Assessor (CR 9(1))
Safety Representative (where > 20 employees on site)
Construction risk assessor (CR 9(1))
Demolition Supervisor (CR14(1))
Scaffold Supervisor (CR16(1))
Construction Vehicle and Mobile Plant Operator (CR23(1)(d)(i))
Controller of Temporary Electrical Installations (CR24(c))
Stacking Supervisor (CR28(a))
Fall Protection Plan Developer (CR 10(1)(a))
Incident Investigator (OSHACT 9(2))
First Aider (GSR3)
Ladder inspector
Hand tools inspector

ANNEXURE C – PROPOSED CONTRACTOR HEALTH AND SAFETY FILE INDEX

1. Health and Safety Specification
2. Annexure 1 (Permit) / Annexure 2 (Notification of Construction)
3. 37 (2) Mandatory Agreement and 5 (1)(k) Appointment between Client and Principal Contractor
4. Scope of Works
5. Company organogram
6. Health, Safety and Environmental Policy and other Policies i.e Smoking / Drug and Alcohol / HIV
7. Health and Safety Management Plan
8. Environmental Plan
9. Letter of good standing and Tax Clearance Certificate
10. Risk assessments
11. Daily task specific risk assessment and job observations
12. Method statements
13. Fail protection plan (where applicable)
14. Appointment letters and site specific Health and Safety organogram
15. Registers (daily/weekly/monthly)
16. Induction module and record – employees and visitors
17. Toolbox talks and record
18. Safe Work Procedures / Safe Operating Procedures
19. Training matrix and training certificates
20. Medical certificates of fitness and ID's
21. Competence of appointed staff (abbreviated CV)
22. Safety Representative Repots / Checklists and Minutes of Safety Committee Meeting
23. Internal / External audit reports
24. First aid dressing record
25. Accident / Incident procedures, register and Incident Investigation form
26. WCL2 form and Annexure 1 form
27. Material Safety Data Sheets
28. Fire and Emergency Procedure
29. Copy of Occupational Health and Safety Act
30. Copy of Construction Regulations, 2014
31. List of Sub-Contractors and Documentation from Sub-Contractor:
    a. 37(2) Mandatory agreement between client and sub-contractor
    b. Appointment 7(1)(c)(v) between client and sub-contractor
    c. Letter of good standing

ANNEXURE D – HEALTH AND SAFETY COSTS (ANTICIPATED)

ITEMS COSTED		ESTIMATE COST
1.	PERSONAL PROTECTIVE EQUIPMENT	
	Overalls	R
	Hard hats and safety glasses	R
	Safety boots / shoes	R
	Visors / gloves	R
	Other	R
TOTAL		R
2.	FIRE FIGHTING	
	Fire extinguishers	R
	Training	R
	Surveys	R
	Other	R
TOTAL		R
3.	HEALTH AND SAFETY PERSONNEL	
	Safety Manager	R
	Safety Officer	R
	Full time safety representatives if required	R
	Fire watchers	R
	First aiders	R
	External auditors costs	R
TOTAL		R
4.	MEDICALS	
	Medicals for each staff on Annexure 3 by Occupational Practitioner	R
TOTAL		R
5.	FACILITIES	
	Provision of ablution facilities	R
	Service and maintenance of ablution facilities	R
	Provision of eating areas	R
	Cleaning of Lay down and other storage areas	R
TOTAL		R
6.	FALL PREVENTION AND PROTECTION	
	Safety harnesses with double lanyards	R
	Lanyard extenders	R
	Scaffold hooks	R
	Lifelines and vertical fall arrest systems	R
	Scaffolding – material, erection and inspection (estimate for project)	R
	Temporary hand railing material and kick boards	R
TOTAL		R

7.	LIFTING MACHINERY AND EQUIPMENT	
	Annual inspections and load testing as per legal requirement	R
	Certification of all lifting gear during the course of the project	R
	Third party inspections	R
TOTAL		R
8.	INSURANCES	
	COID cover for the project	R
	Liability insurances	R
TOTAL		R
9.	FIRST AID	
	First aid boxes	R
	Rescue equipment and stretchers	R
	Replenishment of boxes and other supplies	R
	Other	R
TOTAL		R
10.	TRAINING	
	Health and Safety representatives	R
	H&S Supervisory training	R
	First aid training	R
	Firefighting training	R
	Legal liability training	R
	Risk assessment training	R
	Other	R
TOTAL		R
11.	SIGNAGE	
	All signage as required by law: regulatory, warning and information	R
	Posters for awareness	R
TOTAL		R
12.	ELECTRICAL	
	Locks required for lockouts	R
	Tags	R
	Permit books	R
	Calipers	R
	Key Safes	R
TOTAL		R

GRAND TOTAL WHICH COULD BE USED IN THE TENDER	**R**
This list is not exhaustive and contractors may expand all levels to include all relevant H&S expenditure	

ANNEXURE E – MONTHLY ACCIDENT / INCIDENT STATISTICS

SITE		
MONTH		
DETAILS	**FIGURES**	**EXPLANATIONS**
Number of Persons on site for a month (maximum)		
Hours worked for month		
Near miss for month		
First aid cases for month		
Lost time injuries for month		
Serious accidents (disabling / fatal) for month		
Asset incidents for month (damage to property / vehicle)		

_____ _____

SIGNED DATE

Annexure C5.3: Baseline Risk Assessment

Mthojaneni Baseline Risk Assessment

Risk Matrix

A	Injury Severity	B	Frequency of Occurrence	C	Potential Damage / Loss	D	Environmental
0	No injury.	0	No occurrence.	0	No damage.	0	No effect.
2	Minor lacerations.	2	Occurs seldom.	2	Minor damage.	2	Minor effect.
4	More severe injury.	4	Occurs occasionally.	4	Medium damage (repair on site).	4	Serious effect (short term).
8	Serious injuries.	8	Occurs often.	8	More serious damaged.	8	Very serious effect (long term).
10	Loss of life.	10	Could / Has happened.	10	Severe damage.	10	Catastrophic effect.

Risk Value and Classification

0 to 5 Low | **6 to 16** - Medium | **17 to 32** - High | **33 - 40** Critical

Risk ID	Task/ General Activity	Hazards Identifications	Risk Related Hazards	Controls	Risk Evaluation. A	B	C	D	R	Further Action
1	Site clearing and grubbing with grader or dozer.	Ground contamination Property Damage and Company loss Damage to indigenous fauna and flora as well as traditional graves	Lost time injury, property damage and major reportable incidents Pollution of the environment Property Damage relating in financial loss	Pre use plant inspection, competent operators, risk assessment, toolbox talks, follow safe work proceduers and stay a distance of 5 meter away from the machine. Reverse alarms fitted to the plant and machinery on site. Grader/Dozer to be operated by competent operator. Operator to keep to the designated area of work LDV's to keep clear of the area of work. Supervisor & section leader to ensure that no unauthorized persons in the vicinity of construction work. Employees to be trained on dangerous snakes and insects in the area. Use of drip trays, proper maintainance of the machines, sepation of top soil from other spoils, park machines at the designated areas and pre use inspections must be done at all times. Supervisors to maintain full supervision at all times and make sure all operators comply with all safety precaution. Site/work area to be inspected before any work commence. All operators will be randomly tested for alcohol before work can commence and before mobile machine gets started. Permit to be in place before work commence.	8	4	8		22	Wearing of Personal Protective Equipments, only authorised operator to use the machines. Flagman must be trained and on site. 'Snakes found to be removed by trained snake catcher and relocated. First aid provisions must be made available to staff. 'Drip Trays to be placed under vehicles when parked. Administration control, Supervision, engineering
2	Dozer- Bush Clearing	Excessive dust, injuries, moving rocks and stumps Community movement	Serious injury, dust inhalation, Accident	Correct size dozer to be used, operator to be experienced and competent, no pedestrians allowed in the area , inspect the area for didtches and high ground. Cab must be closed. Seat safety belt must be used.	8	4	4		20	Ensure that the dozer has a reverse alarm fitted and working. A flagman must be used when the machine is in operation. Signage must be in place notifying public of the hazards
3	Loading and hauling to spoil site	Man and machinery interphase, incompetent operator, excessive dust	Fatal injuries, dust inhalation, Motor vehicle accidents	Dust control, all drivers and operator to be competent and authorised, spotter to stand out of path-way of trucks and be highly visible.	8	4	8		28	Administration control, Supervision, engineering
4	Hand excavation	Fall of Ground, insufficient supervision, underground services	Crush injuries, fatalities, damage to equipment, damage to underground services,	Exacavtions to be shored or braced. Ecavations must be barricaded at all times. Signage erected to advise community and employees of open excavations. Daily inspections of the excavations prior to entry. All excavated soil to be a minumum of 1m away from teh edge of teh excavation	10	2	4		24	Administration control, Supervision, engineering
5	Backfilling with plant	Fall of Ground, confined spaces, underground services.	Crush injuries, fatalities, damage to underground services	Competent operator, inspect plant before use, Use a spotter or flagman	10	2	4		24	Administration control, Supervision, engineering
6	Lay Pipeline	Machines laying pipline fallinto into the excavation. Persons laying pipes trapped in excavation due to collapse	Persons crushed from soil collapse. Machine operator injured by falling into the excavation. Damage to equipment and material	Competent operator, inspect plant, pedestrians to be removed or communicate with operators, PPE for spotters, correct type of plant for the task. Trained persons to inspect trenches prior to entering.	8	2	4		16	Administration control, Supervision, engineering
7	Temporary fencing of the site	Could cause hand & finger injuries	Medical treatment, First aid case and can be reportable	Employees must at all times wear gloves when manual handling. Employees need to be trained on the risk assessments. Supervision needs to reinforce the procedures on a daily basis.	4	2	2	0	8	Administration control, Supervision, engineering

Risk Value and Classification

0 to 5	Low	6 to 16 - Medium	17 to 32 - High	33 - 40 Critical						
Risk ID	**Task/ General Activity**	**Hazards Identifications**	**Risk Related Hazards**	**Controls**	**Risk Evaluation.**					**Further Action**
					A	**B**	**C**	**D**	**R**	
8	Installation of rebar	Could cause strain injuries to the back muscles. Pinch points	Permanent disabilities and medical treatment	Employees must ask for assistance when picking up and carrying large lengths of steel or other heavy material. Keep your back straight and knees bent when picking up heavy material. Employees to carry no more that 25 kg by themselves or when object is to not fit for one person to carry. Communication when lifting at all times	4	4	2		10	Administration control, Supervision, engineering
9	Working at heights >2m	Falling objects from height Fall from height	Lost time injury, property damage and major reportable incidents	Employees must ensure that edge protection is secured when erecting the scaffold. Nets to be installed below scaffold to ensure that falling objects are caught. All tools must be tied when working at heights. Lifting of tools from ground level must be in a tool bag and lifted. No persons to work below people working at heights. Employees must be trained to work at height. Site medicals must be completed. Scaffolding must be inspected and tagged safe for use by a competent person prior to use. Only double lanyard safety harnesses must be used with 2 point tied down at all times. Inspection of safety harnesses to be conducted prior to use of teh harness.	10	4	8		22	Administration control, Supervision, engineering ,PPE
10	Removal and stockpiling of topsoil	Ground or topsoil contamination	Pollution of the Environment	Use of drip trays, proper mantainance of the machines, sepation of top soil from other spoils, park machines at the designated areas and pre use inspections must be done at all times.	0	4	4		12	Administrative controls and supervison
11	Use of Construction vehicle and equipment on site	Caught by moving parts on equipment, Engine failure, property damage, absence of traffic control, Noise and vibration, speeding	Lost time injury, property damage and major reportable incidents, Loss of production, loss of hearing	All protective guards and covers must be in place before start of the engine. The Construction Vehicle will be operated by a competent and trained operator. Operator to mount and dismount the Construction Vehicle only at locations that have steps and handholds Engine to be started in line with pre check procedure Flagman / Banksman to be used at all times on site Reverse alarms to be fitted and checked Speed identification signs oerected on site Operator to undergo medical and hearing test	8	4	8		22	Administration control, Supervision, engineering ,PPE
12	Electrical distribution boards	Electrocution and Unauthorised entry	Fatalities, electrical burns	SWP, Checklist, Isolation Procedure, Only competent persons to work on DB's, DB's to be kept closed.	10	4	8		24	Effective
13	Temporary lighting	Electrocution and Unauthorised entry	Fatalities, electrical burns	SWP, Checklist, Isolation Procedure , competent people to do the connection of power.	10	4	8		24	Administration control, Supervision, engineering ,PPE
14	Public Safety	Public injuries, public disturbance	Fatalities, interruptions	SWP, adherence to the laws, proper traffic control methods and good communication, no working after hours and there should be security at the entrances.	8	4	8		20	Administration control, Supervision, engineering ,PPE
15	Safety and security	Unauthorised entry and theft	Fatalities and property missing	Security to have adequate riot gear and protective material. Access emergency numbers. Security to be suitably competent	8	8	8		24	Administration control, Supervision, engineering ,PPE
16	General Site Hazards	Material Handling, crush injuries, suspended loads	Serious injuries, lacerations, slip trip and fall injuries	SWP, banksman to control and direct loads. Site establishment Plan to be in place and implemented, use guide ropes, use of PPE, barricading the workplace and competent people to do the job. Inspect all lifting equipments.	8	4	4		16	Administration control, Supervision, engineering ,PPE
		Material Handling, unprotected excavations, Working from heights, not wearing correct PPE	Serious injuries, lacerations, slip trip and fall injuries	Material to be offloaded strategically to minimize manual handling and lifting of heavy material. All excavations will be barricaded. Ladders will be numbered and inspected and findings will be recorded. 3 point contact when climbing up or down a ladder. tool bags will be used when working from a ladder. ladder will be secured and at a 1/1 angle.	8	2	4		14	Staff to be trained on working at heights. Scaffold erection must be completed by trained persons. All scaffold must be tagged and inspected before use.

Risk Value and Classification

0 to 5	Low	6 to 16 - Medium	17 to 32 - High	33 - 40 Critical						
Risk ID	Task/ General Activity	Hazards Identifications	Risk Related Hazards	Controls	Risk Evaluation.					Further Action
					A	B	C	D	R	
		Defective plant, defective lifting machines, incompetent operator, lifting and rigging equipment not complying to legislation, falling from heights	Fatal and serious injuries, property and plant damage	All plant and lifting equipment will be pre use inspected and signed off by supervisor. Operator will have a valid COC and be appointed. DSTI will be completed and discussed with relevant employees and attendance register signed. Lifting machine will have a valid Load test certificate not older than 12 month, if load test is older than 6 months a 6 monthly inspection report is required. All lifting tackle will have a inspection not older than 3 months by a competent LTI. Any employee working from heights will be secured with a safety harness. Guide ropes will be used to guide container into position	10	4	2		16	Administration control, Supervision, engineering ,PPE
		Unhygienic and unhealthy, waste not being removed attract rodents and snakes	Ill Health, snake bites	Sufficient change and eating facilities will be available on site. A cleaning schedule will be implemented. Dustbins will be available and clean regularly and form part of the environmental waste management plan.	8	4	8		24	Administration control, Supervision, engineering ,PPE
		Construction affecting Public, Dust, Noise, unauthorised entry by public.	Serious injuries to the public. Property damage,	Access to the construction site will be controlled. All visitors will be accompanied by a responsible person with all the required site access. Dust suppression will be done with water trucks to control dust. Noise will be kept to the minimum as far as reasonable practicable. Community engagement must be conducted by the team. Appoint a CLO to discuss community concerns and prevent strike actions	8	4	4		20	Administration control, Supervision, engineering ,PPE
		Damage to properties adjacent to construction site	Damage to properties	If there is a possibility that adjacent building / properties can be damaged due to vibration of compacting equipment all adjacent buildings / properties will be inspected and all existing damages will be recorded.	4	2	4		12	Administration control, Supervision, engineering ,PPE
		Poor Housekeeping, working on elevated areas, defective hand and electrical tools, defective ladders, substandard working platforms, uncontrolled collapse of FSM sections, Incorrect PPE	Serious injuries, lacerations, slip trip and fall injuries	Stacking of material will be managed by the relevant supervisor. A fall protection plan will be in place and communicated to all relevant employees. All elevated work will be done from inspected and approved working platforms, safety harnesses will be used. Approved life lines will be erected to secure fall arrest equipment. All fall prevention equipment will be inspected and findings will be recorded. All hand and electrical tools will be numbered inspected and findings recorded. PPE compliance will be enforced.	8	4	4		18	Administration control, Supervision, engineering ,PPE
		Inadequate fire fighting equipment, incorrect type of fire extinguishing equipment, lack of control of serviceability, untrained fire fighters, lack of fire drills, inadequate accessibility of fire fighting equipment	Fatalities, serious injuries and burns, smoke inhalation, damage to property and equipment	SWP, establish emergency crew, emergency preparedness and response procedure, HAZCHEM control, training and well established emergency plan.	10	4	8		30	Administration control, Supervision, engineering ,PPE
17	Driving on site	Accidents caused by persons not adhering to speed limits on site	Fatalities, serious injuries, due to collision with other vehicles, persons and possible farm animals	Site to ensure that all staff and visitors undergo saite safety induction. Signage erected to display correct speed limit. Speed humps could be installled to ensure vehicles reduce speed	10	4	8		30	Administration control, Supervision, engineering ,PPE
18	HIV/AIDS	Blood Bourne pathogens infections	Ill Health	Health and Hygiene survey, Medical Policy. Use condoms. Do not share needles or have unprotected sex. Awareness Training	8	4	2		14	Administration control, Supervision, engineering ,PPE

Risk Value and Classification

0 to 5	Low	6 to 16 - Medium	17 to 32 - High	33 - 40 Critical						
Risk ID	Task/ General Activity	Hazards Identifications	Risk Related Hazards	Controls	Risk Evaluation.					Further Action
					A	B	C	D	R	
19	Cleaning of offices	Dust, fumes from cleaning products, Allergic rection to cleaning products.	Injuries	SWP, RA, Ergonomics, Have correct MSDS for chemicals used. Always wear the correct type of PPE as per the MSDS.	0	2	0	2	4	Administration control, Supervision, engineering ,PPE
20	Steel fixing (loading and off loading)	Suspended material, unstable ground	injuries and disability.	All employees must ensure that they do not stand below an overhead load and banks man are to ensure the load is properly balanced and secure. Banks man must use a Whistle to warn employee of lifting tacking place, competent operators to operate machines and effective communication.	10	4	8		22	Administration control, Supervision, engineering ,PPE
		Employees supporting suspended load by hands.	Hand and Finger Injuries	Supervisor to ensure all workers involved in the off loading are wearing safety gloves and regular toolbox talks are to be conducted.Control and guide equipment using ropes by trained persons. SWP compiled and communicated	4	4	2		10	Administration control, Supervision, engineering ,PPE
		Reinforcement falling onto employees	injury and disability to employees	Stacking supervisor must ensure that all off loaded reinforcing is immediately demarcated and neatly stacked to ensure no protruding steel outside the demarcated area.	10	4	8		22	Administration control, Supervision, engineering ,PPE
		Not considering the load	back injuries and disability.	Foreman to conduct regular toolbox talks to communicate to employees that they should not lift heavy loads and that they must seek assistance to help lift the load.	8	4	4		16	Administration control, Supervision, engineering ,PPE
		Use of manual handling where not required.	hand injuries and disability.	Supervisors need to be informed of any steel that needs to be bent and proper tools must be used to bend the steel. Beware of exposed sharp edges.	8	4	4		16	Administration control, Supervision, engineering ,PPE
		Substandard electric equipment	electric shock and disability.	Steel fixers must be alert at all times not to bring steel in contact with electrical power lines and DB boards. Supervisors must ensure that the area is free from any electrical supply prior to steel fixing.Tools to be inspected daily by storeman prior to issue. All tools to be inspected monthly by a competant person	8	4	4		16	Administration control, Supervision, engineering ,PPE
22	Placement of concrete	May lead to serious eye injuries and permanent disability.	Concrete entering employee's eyes	Employees to make use of eye protection. Task to be supervised by a competent supervisor. Use correct PPE	8	4	4		18	Administration control, Supervision, engineering ,PPE
		May result in long term disability.	Employee sustaining a skin problem	Employees to be made aware of risks with working with concrete. All injuries to be reported to the site HSE officer.	8	4	4		18	Administration control, Supervision, engineering ,PPE
		May cause long term disability, back strain	Back injuries	Employees to ensure breaks are taken regularly. Always work in teams. Do not lift heavy objects on your own	8	4	4		16	Administration control, Supervision, engineering ,PPE

Risk Value and Classification

0 to 5	Low	6 to 16 - Medium	17 to 32 - High	33 - 40 Critical						
Risk ID	Task/ General Activity	Hazards Identifications	Risk Related Hazards	Controls	Risk Evaluation.					Further Action
					A	B	C	D	R	
		Public and or employees can drown in trenches/ excavations containing water; Excavations or trenches could collapse and overwhelm employees or members of the public; loose rocks on edges can struck employees whilst installing pipes or preparing installation; Employees obstructed by shoring practices in case of emergency, increasing the severity of injuries; Inundation by harmful gasses - Material Handling, crush injuries and falling objects; Possible Multiple Fatalities	Multiple Fatalities	SWP; Construction Regulation 13; Fatal Risk Standards; 20 x Cardinal Safety Rules; Competent Supervisory Appointments; DSTI's; Proper supervision; dedicated spotters / flag personnel ; adhere to company fall protection plan pertaining to at fall risk positions and edge protection; Only lifting machines designed for the purpose are to be utilised to install pipes. No TLB's or Excavators are to be used as lifting machines; Oxygen deficiency testing and applicable dangerous/ harmful gas testing to be conducted in critically identified excavations and trenches - refer to site specific / issue based risk assessments.	10	4	8		22	Administration control, Supervision, engineering ,PPE
23.0	Electrical distribution boards	Electrical distribution boards	Fatalities, electrical burns	SWP, Checklist, Isolation Procedure, Only competent persons to work on DB's, DB's to be kept closed.	10	4	8		24	Administration control, Supervision, engineering ,PPE
24.0		Public injuries, public disturbance	Fatalities, electrical burns, Cable theft	SWP, adherence to the laws and good communication. Available security at the entrances for unauthorised entry to site.	10	8	8		28	Administration control, Supervision, engineering ,PPE
25	Placing piping	Finger injuries,	Serious l injuries.	Competent Supervisor, SWP, RA, Training, Lifting operations so operators to be trained. Daily DSTI . Rigger present at all times. Lifting tackle to be inspected and on register	8	4	2		14	Administration control, Supervision, engineering ,PPE
		Materials handling, injuries, ergonomics	Serious injury	SWP, RA, Supervisor to make sure that employees wear the correct PPE. Barricade area, Operators to be trained. Constant supervision.	8	4	2		14	Administration control, Supervision, engineering ,PPE
26	Cutting and Welding of Pipes	Burn to employee or other employees, Body injuries, Fire	Serious injury, burns to the body, fires	SWP, Task based Risk Assessment, DSTI. Ensure that there is a fire extinguisher at the site area at all times with a trained fire fighter. Don not cut toward the body, always cut away. Ensure that the cutting disc is secure and in good condition at all times. Always wear goggles when cutting and welding. Make use of welding spats to prevent burns. Do not leave cutting torch unattended on site and in the fileds.	8	8	8		28	Administration control, Supervision, engineering ,PPE

Risk Value and Classification

0 to 5	Low	6 to 16 - Medium	17 to 32 - High	33 - 40 Critical						
Risk ID	Task/ General Activity	Hazards Identifications	Risk Related Hazards	Controls	Risk Evaluation.					Further Action
					A	B	C	D	R	
27	Demolition works using jackhamers	Injury to employee, Excessive noise, electrocution,	Contracting Hand -arm vibration syndrome, Eye injuries due to flying objects, Serious injuries	Allow for rest periods when working with a jackhammer. Rotate staff to reduce the risk. Ensure that eye protection is worn at all times. Use water to reduce dust and flying chips. Ear protection to be workn at all times, Be aware of existing underground services.	4	4	4		12	Administration control, Supervision, engineering ,PPE
28	Working below overhead lines	Electrocution	Serious injury or death	Plant are to maintain a safe distance from the overhead lines. Make use of spotters. Ensure that we have the correct permits from the municipality to work under the lines. Limit the amount of time under the live lines.	10	4	8		24	Administration control, Supervision, engineering ,PPE

Annexure C5.4: Signboard

(Refer to book of drawings)

Annexure C5.5 PROFORMA P.T.O

PERMISSION TO ACCESS PRIVATE PROPERTY FOR

PROJECT:……..

Property Address: Date Visited:

I/We……..the owner(s)/Occupant (s) of the property situated at the abovementioned address hereby grant permission for the Contractor, , as represented by their staff along with their construction equipment, to access my/our property during normal working hours from 08h00 in the morning until 17h00 in the afternoon for the purpose of constructing a new ND400 welded steel pipeline.

I/We hereby confirm that we agree to a ND400 welded steel pipeline being constructed on our property as shown on the attached sketch, subject to the following conditions:

The area around be shaped, and all construction spoil material removed from the property after completion of the work;
All fences be reinstated and disturbed areas to be made good on completion

Owner: Name:…… Signature:……..,…..

Representative Contractor Name:…… Signature:……

The construction team will make every effort to minimize the inconvenience to you during the construction period, and we ask for your co-operation and patience. We appeal to you to keep away from the construction area until construction has been completed.

Reference photographs to be attached

COMPLETION INSPECTION DATE:…….

The following defects were noted:

See attached photographs.

Owner: Name:…… Signature:……..,…..

Representative Contractor Name:…… Signature:……

Reference photographs to be attached

Annexure C5.6 Principal Controlled Construction Insurance Programme

(Not applicable to this tender)

Annexure C5.7: Environmental Management Plan

KING CETSHWAYO DISTRICT MUNICIPALITY

CONSTRUCTION AND OPERATION OF THE GREATER MTHONJANENI SSA-2 BULK WATER SUPPLY PROJECT, KING CETSHWAYO DISTRICT MUNICIPALITY, KWAZULU-NATAL

FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME

Prepared for:

King Cetshwayo District Municipality
Private Bag X1025
Richards Bay
3900

Prepared by:

ACER (Africa) Environmental Consultants
PO Box 503
Mtunzini
3867

February 2015

NAME AND EXPERTISE OF PERSONS WHO COMPILED THE ENVIRONMENTAL MANAGEMENT PROGRAMME

Name	Education Qualifications	Professional Affiliations	Experience at Environmental Management
Dr Rolf-Dieter Heinsohn	PhD	South African Association of Botanists International Association of Impact Assessment (South African Chapter) South African Institute of Ecologists and Environmental Scientists Certified Environmental Practitioner with the Interim Certification Board of South Africa Certified with the South African Council for Natural Scientific Professions (400442/04)	23 years
Mr Giles Churchill	MSc	Environmental Consultant	8 Years

TABLE OF CONTENTS

TABLE OF CONTENTS iii

LIST OF FIGURES v

ABBREVIATIONS AND ACRONYMS vi

1 INTRODUCTION 7
1.1 Background 7
1.2 Project Description 7
1.2.1 Bulk mains 7
1.2.2 Reservoirs 7
1.2.3 Reticulation network 7
1.3 The receiving environment 7
1.3.1 Overview 7
1.3.2 Sensitive environments 8
1.4 Objective and Scope of the Environmental Management Programme 8

2 ENVIRONMENTAL PRINCIPLES AND LEGAL REQUIREMENTS 9
2.1 Environmental Principles 9
2.2 Environmental standards 9
2.2.1 Air quality guidelines 9
2.2.2 Noise control regulations 9
2.2.3 Storage of hazardous substance 9
2.2.4 Health and safety of work team 10
2.3 Environmental Legal Requirements (Norms and Standards, Licences, Approvals and Permits) 10
2.3.1 Environmental Authorisation and NEMA 10
2.3.2 Heritage Resource Permits 11
2.3.3 National Water Act, 1998 (Act No. 36 of 1998) 11
2.3.4 Protected Trees and Forests (National Protection) 11
2.3.5 Protected Plants (Provincial Protection) 11
2.3.6 Control of Invasive Plants and Declared Weeds 12
2.3.7 Waste Disposal 12
2.3.8 Public health 13
2.3.9 Other Applicable Legislation 13

3 ADMINISTRATION AND REGULATION OF ENVIRONMENTAL OBLIGATIONS 14
3.1 Organisational Structure 14
3.2 Roles and Responsibilities 14
3.2.1 Employer (King Cetshwayo District Municipality) 14
3.2.2 Project Engineer and Resident Engineer 15
3.2.3 Environmental Manager and Environmental Control Officer (ECO) 16
3.2.4 Contractor 17
3.3 Compliance Monitoring, Reporting and Record Keeping 18
3.3.1 Compliance Monitoring 18
3.3.2 Design Phase 18
3.3.3 Construction Phase 18
3.3.4 Non-Compliance and Remedial Action 20
3.3.5 Penalty Clause 21
3.3.6 Regulatory Authorities' Site Inspections 21
3.3.7 Record Keeping 21
3.4 Environmental Awareness Training 22
3.5 Emergency Preparedness and Reporting 22

3.6 Liaison with Interested and Affected Parties 23
3.7 Review and Updating of the EMPr....23

4 DESIGN PHASE....24
4.1 Technical design....24
4.2 Erosion Control and Drainage....24
4.3 Protection of Sensitive Ecosystems and Habitats....24
4.4 Stockpile Areas....25
4.5 Spoil Areas....25
4.6 Construction Site....26
4.6.1 Construction Site Layout Plan....26
4.6.2 Construction Camps....26
4.7 Access/Haul Roads....27
4.8 Disturbance to Landowners and Service Providers....27
4.9 Servitude Negotiations and Compensation....27
4.10 Aesthetics....28

5 PRE-CONSTRUCTION PHASE....28
5.1 Construction Site Layout Plan....28
5.2 Construction Preparation....29
5.3 Acquisition of Permits and Licenses....29
5.4 Procurement Process....29

6 CONSTRUCTION PHASE....30
6.1 Site Establishment....30
6.1.1 Demarcation of the Site....30
6.1.2 Site clearance....30
6.1.3 Protection of Sensitive Habitats....31
6.1.4 Protection of Cultural Heritage Resources....32
6.1.5 Topsoil Conservation....33
6.1.6 De-bushing and de-stumping....33
6.2 Site Infrastructure....33
6.2.1 Structures....33
6.2.2 Services....34
6.2.3 Batching Sites....34
6.2.4 Construction Camp, Lay-Down Areas and Pipe Storage Yards....35
6.2.5 Storm Water Control....35
6.2.6 Roads and Access....35
6.3 Implements and Equipment....36
6.4 Site Management....36
6.4.1 Solid Waste....36
6.4.2 Liquid Waste....36
6.4.3 Hazardous Waste....36
6.4.4 Pollution Control....37
6.4.5 Air Quality....38
6.4.6 Noise Control....38
6.4.7 Fire Control....38
6.4.8 Health and Safety....39
6.4.9 Safety and Security....39
6.5 Earthworks....39
6.5.1 Excavations and Trenches....39
6.5.2 Shaping and Trimming....40
6.5.3 Borrow Pits and Rock Quarries....40
6.6 Stockpiles, Storage and Handling....40
6.6.1 Topsoil....40

6.6.2 Spoil *41*
6.6.3 Vehicles and Equipment *42*
6.6.4 Fuel *42*
6.6.5 Hazardous Substances *42*
6.7 Water Use 43
6.8 Erosion Control 43
6.8.1 Drainage Systems *43*
6.8.2 Erosion Protection *43*
6.9 Weed and Invader Plant Control 44
6.10 Nuisance Control 45

7. REHABILITATION PHASE 46
7.1 General Specifications 46
7.2 Removal of Structures and Infrastructure 46
7.3 Stockpiles, Inert Waste and Rubble 46
7.4 Hazardous Waste and Pollution Control 46
7.5 Final Shaping 47
7.6 Topsoil Replacement and Soil Amelioration 47
7.7 Ripping and Scarifying 48
7.8 Reinstatement of wetland areas and water courses 48
7.9 Planting 48
7.10 Grassing 48
7.11 Weed and Invader Plant Control 49
7.12 Monitoring of Rehabilitated Areas 49

8. OPERATIONS PHASE 50
8.1 Operational Site 50
8.2 Maintenance of Water Supply Infrastructure 50
8.3 Alien Invasive Species Control 50
8.4 Access Roads 50
8.5 Soil Erosion and Storm Water Control 51
8.6 Waste Management and Pollution Control 51
8.7 Protection of Fauna and Flora 51
8.8 Emergency Preparedness 51
8.9 Monitoring 52
8.10 Liaison with Interested and Affected Parties 52
8.11 Registers 52

ANNEXURE 1 53

ANNEXURE 2 54

LIST OF FIGURES

Figure 1: Proposed layout of the Greater Mthonjaneni SSA-2 Bulk Water Supply Project 8
Figure 2: Organisational organogram for construction: communication/reporting relationship 15

ABBREVIATIONS AND ACRONYMS

ACER	ACER (Africa) Environmental Consultants
Amafa	Amafa aKwaZulu-Natali
DAEA	KwaZulu-Natal Department of Agriculture and Environmental Affairs
DAFF	Department of Agriculture, Forestry and Fisheries
DMR	Department of Mineral Resources
DWA	Department of Water Affairs
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EKZNW	Ezemvelo KwaZulu-Natal Wildlife
I&APs	Interested and Affected Parties
KZN	KwaZulu-Natal
RE	Resident Engineer
WTW	Water Treatment Works

1 INTRODUCTION

1.1 Background

The King Cetshwayo District Municipality is currently engaged in the design and implementation of the proposed Greater Mthonjaneni SSA-2 Bulk Water supply Project which is aimed at supplying water to rural areas to the southwest of the town of Melmoth.

1.2 Project Description

The proposed water scheme is aimed at providing potable water to communities within this region and will require the construction of bulk water supply pipelines (not exceeding 400 mmm in diameter), reservoirs (each not exceeding 2.5 Ml in volume) and a reticulation network (pipes not exceeding 200 mm in diameter). Water for the proposed project will be obtained from a licensed treatment works. The water license number for this treatment works is No. 43/168/93 dated 30/06/1993.

1.2.1 Bulk mains

The bulk mains will have a maximum diameter of 400 mm and will consist of a lined steel pipe which will be buried to a depth of approximately 1.5 m. Scour and pressure release valves will be installed along the length of the bulk mains where required. The construction servitude will be up to 20 m wide in unrestricted areas and down to 5 m in restricted/sensitive areas. The final operational servitude width will be 5 m.

1.2.2 Reservoirs

A total of six reservoirs within the scheme (all-smaller than 2.5 Ml in volume).

1.2.3 Reticulation network

From the reservoirs located near the target communities, water will be supplied through a reticulation network to service the surrounding communities. The reticulation network will consist of either HDPE or uPVC pipes depending on topography and range in diameter from 50 mm – 200 mm in size and will be buried to a depth of approximately 1 m.

1.3 The receiving environment

1.3.1 Overview

The project is located approximately 9.5 km to the southwest of the town of Melmoth in a severely impoverished rural area. The closest settlement to the Greater Mthonjaneni SSA-2 Bulk Water supply Project is the settlement of KwaMagwaza to the north of the scheme.

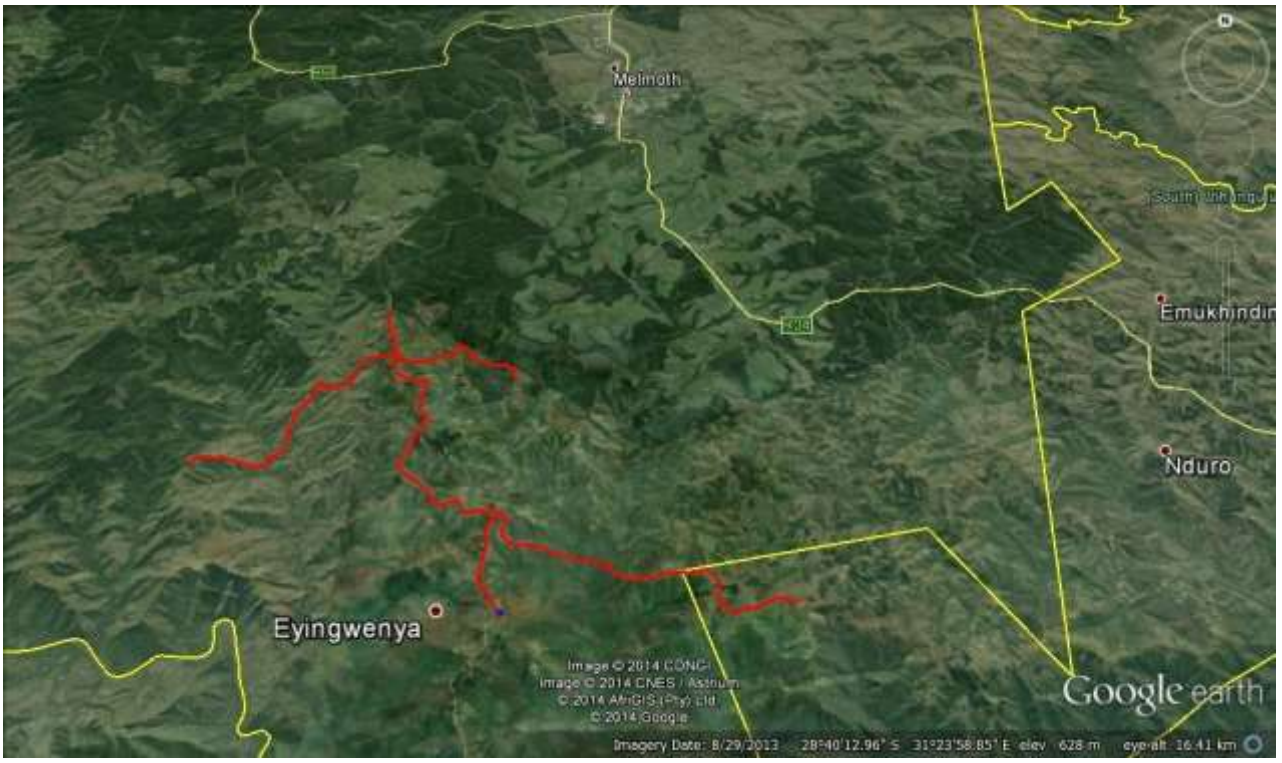

Figure 1: Proposed layout of the Greater Mthonjaneni SSA-2 Bulk Water Supply Project

1.3.2 Sensitive environments

Sensitive environments within the proximity of the pipeline alignments are restricted mainly to the stream/river crossings, drainage lines and wetlands which the water pipelines will traverse. For the remainder of the pipeline alignment, no sensitive environments are present as the pipeline follows a watershed which is dry and highly modified through grazing pressures and subsistence agriculture.

It must be noted that no construction through any sensitive environments may commence prior to the issuing of Environmental Authorisation for the project to commence from the Department of Agriculture and Environmental affairs (DAEA[1]).

1.4 Objective and Scope of the Environmental Management Programme

This EMPr covers the principles, responsibilities and requirements applicable in order to implement effective environmental management during the design, pre-construction, construction and rehabilitation phases of the Greater Mthonjaneni SSA-2 Bulk Water supply Project.

In addition, the EMPr does the following:

- Assigns roles and responsibilities to the parties charged with implementation.
- Sets out environmental specifications that are applicable to the project and its associated activities, and provides guidance in order to achieve these environmental specifications.
- Defines corrective actions, which must be taken in the event of non-compliance with the environmental specifications of this EMPr.
- Specifies requirements and procedures for monitoring, auditing and reporting.

[1] Please note that the DAEA is now referred to as the Department of Economic Development, Tourism & Environmental Affairs (EDTEA)

- Specifies requirements and procedures for record keeping.
- Makes provision for the fulfilment of other relevant legal requirements pertaining to the environment.

2 ENVIRONMENTAL PRINCIPLES AND LEGAL REQUIREMENTS

2.1 Environmental Principles

The following principles should be considered by all parties at all times during all phases of the project:

- The environment is considered to be composed of both biophysical and social components.
- Construction is a disruptive activity and all due consideration must be given to the environment, including the social environment, to minimise the impact during the execution of a project.
- Minimisation of areas disturbed by construction activities (i.e. the footprint of the construction area) should minimise many of the construction related environmental impacts of the project and reduce rehabilitation requirements and costs.
- As minimum requirements, all relevant standards relating to international, national, provincial and local legislation, as applicable, shall be adhered to. This includes requirements relating to waste emissions (e.g. hazardous, airborne, liquid and solid), waste disposal practices, noise regulations, road traffic ordinances, protected species, etc.
- Every effort should be made to minimise, reclaim and/or recycle “waste” material.
- Every effort should be made to apply the best practicable environmental option.

2.2 Environmental standards

All applicable environmental standards contained within the environmental legislation shall be adhered to. Without derogating from the generality of the above and without limitation, at the time of compiling this EMPr, the following environmental guidelines and standards are highlighted. The list is intended to serve as a guideline only and is not exhaustive.

2.2.1 Air quality guidelines

In terms of air quality, the Contractor will be required to describe how effective dust control measures will be achieved during the construction phase.

2.2.2 Noise control regulations

No provincial Noise Control Regulations have been promulgated in KwaZulu-Natal. Therefore, the national Noise Control Regulations of the Environment Conservation Act, 1989 (Act No. 73 of 1989), Government Notice Number GN 154 of Government Gazette 13717 of 10 January 1992, apply.

2.2.3 Storage of hazardous substance

Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards which may include the Hazardous Substances Act, the Occupational Health and Safety Act, relevant associated Regulations, and applicable SABS and international standards.

2.2.4 Health and safety of work team

Construction Regulations (2003) published under the Occupational Health And Safety Act, 1993 (Act No. 85 of 1993) apply to construction activities including “the moving of earth, clearing of land, the making of an excavation, piling, or any similar type of work”. A “health and safety plan” which addresses hazards identified, and includes safe work procedures to mitigate, reduce or control the hazards identified, is required under this Act. A risk assessment must also be undertaken by an appropriately qualified person(s) and the Contractor shall ensure 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 before any work commences, and thereafter at such times as may be determined in the risk assessment.

2.3 Environmental Legal Requirements (Norms and Standards, Licences, Approvals and Permits)

A number of laws and regulations apply to the protection and conservation of the environment. It is the responsibility of the employer to ensure that the necessary permits, approvals and licences are obtained prior to commencement of construction.

2.3.1 Environmental Authorisation and NEMA

In terms of NEMA, anyone who causes or may cause significant pollution or degradation of the environment must take reasonable measures to prevent this and to minimise and rectify such pollution or degradation of the environment (Section 28 - Duty of Care and Remediation of Environmental Damage).

The Environmental Impact Assessment Regulations under NEMA list activities for which environmental authorisation is required before construction can commence in sensitive areas as outlined below.

Listing Notice 1: No. R. 544 of June 2010	No. 9	The proposed bulk water infrastructure will include pipes with a diameter greater than 0.36 meters. As such the project triggers this listed activity.
Listing Notice 1: No. R. 544 of June 2010	No. 11	The proposed water supply project will include construction activities within or near to drainage lines and wetlands. As such, this project triggers this listed activity as construction will be taking place within 32 meters of a water course.
Listing Notice 1: No. R. 544 of June 2010	No. 18	The proposed water supply project will result in the infilling or removal of more than 5 cubic meters of material from a water course. As such this listed activity is triggered.
Listing Notice 1: No. R. 544 of June 2010	No. 37	The proposed bulk water infrastructure will include pipes with a diameter greater than 0.36 meters and will be linked to an existing water supply network within the region. As such, the project triggers this listed activity as it could be argued that the proposed project is an expansion to the existing water supply network in this region.
Listing Notice 3: No. R. 546 of June 2010	No. 14	The construction of the proposed water supply scheme will result in the clearance of over 5 Ha of vegetation where 75% of the vegetation constitutes indigenous vegetation. As such the proposed development triggers this listed activity.

2.3.2 Heritage Resource Permits

In terms of Section 27(1) of the KwaZulu-Natal Heritage Act, 2008 (Act No. 4 of 2008), any person who intends to undertake a development categorised as one or more of the listed activities, must, at the very earliest stages of initiating such a development, notify Amafa aKwaZulu-Natali (Amafa) and provide details regarding the location, nature and extent of the development.

This includes the construction of a road or linear development exceeding 300 m in length, the construction of a bridge or similar structure exceeding 50 m in length, and a development, or other activity which will change the character of an area of land, or water exceeding 10,000 m^2 in extent. Amafa must notify the developer whether a Heritage Impact Assessment and Report are required prior to construction commencing.

If, during construction, archaeological or paleontological objects or material or a meteorite is discovered, the find must immediately be reported to Amafa. No person may, without a permit, destroy damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site or any meteorite.

2.3.3 National Water Act, 1998 (Act No. 36 of 1998)

Alteration of a stream or river (i.e. alteration of the course or river bed) requires a permit from the Department of Water Affairs (DWA) in terms of Sections 21, 36, 40 and 41 of the National Water Act. In certain cases, a general authorisation is given to impede or divert the flow of a watercourse. Pollution of river water (silt-laden run-off, oil from machines, etc.) is a contravention of the Act and is not permitted. Wetlands are also protected under this Act. No land use shall utilise the vegetation in a vlei or flood area of a watercourse in a manner that may cause damage or the deterioration thereof.

If water is required during construction a licence is required from the Minister of Water Affairs for the abstraction of water where the abstraction exceeds the levels prescribed by a general authorisation. General authorisations have been published in terms of Section 39 of the Act, with regard to the taking of water from a water resource, storage of water and discharge of water containing waste (GN 399, GG 26187, 24 March 2004).

2.3.4 Protected Trees and Forests (National Protection)

In terms of the National Forests Act, 1998 (Act No. 84 of 1998), trees in natural forests or protected tree species (as listed in Government Gazette Notice 1012 of 27 August 2004) may not be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold, except under licence granted by the Department of Agriculture, Forestry and Fisheries (DAFF). Thus, protected species and natural forests should be avoided where possible. Where this is not possible, other mitigation measures should be implemented such as relocation or off-site rehabilitation. Furthermore, accurate and detailed records of plant specimens should be assembled and forwarded to DAFF for record purposes.

2.3.5 Protected Plants (Provincial Protection)

Certain indigenous plant and animal species in KwaZulu-Natal are provided with special protection under KwaZulu-Natal nature conservation legislation and permits are required from Ezemvelo KZN Wildlife (EKZNW) for their removal, destruction or translocation. This is in accordance with the Natal Nature Conservation Ordinance, No 15 of 1974. Accordingly, accurate and detailed records of plant specimens should be assembled and forwarded to EKZNW for record purposes.

2.3.6 Control of Invasive Plants and Declared Weeds

Declared weeds or invader plants are defined by the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) as follows:

- **Category 1: Declared weeds.** These species must be eradicated from all areas, and are only permitted with written permission from the Executive Officer (as defined by the Act) or in the case of a formally approved biological control reserve.
- **Category 2: Invader plants.** These species are only permitted in specially demarcated areas and should be eradicated in all areas, except where permission has been granted. These species are not permitted to grow within 50 m of the 1:50 flood line.
- **Category 3:** These plants shall not occur on any land or inland water surface other than in biological control reserves. No land user shall allow Category 3 plants to occur within 30 metres of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland.

In terms of Government Notice R 1048, the following regulations are applicable with regards to the control of invasive plants and declared weeds:

- It is illegal to have declared weed species or invasive alien vegetation on one's property.
- The landowner must immediately take steps to eradicate them by using the methods prescribed in the regulations, viz:
  - Uprooting and burning.
  - The application of a suitable chemical weed-killer (herbicide).
  - Any other method of permanent eradication.
- One may not uproot or remove such plants and dump or discard them elsewhere to re-grow or allow their seeds to be spread or to be blown onto other properties.
- If the landowner does not comply with requirements above, a person may be found guilty of a criminal offence.

Alien invasive plants are to be removed and controlled in the cleared construction areas and other areas disturbed by construction.

2.3.7 Waste Disposal

The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) aims to minimise the consumption of natural resources, avoid and minimise the generation of waste, reduce, re-use, recycle and recover waste whenever possible, treat and safely dispose of waste as a last resort and prevent pollution and ecological degradation.

Waste produced by the activities will be disposed of at an authorised waste management facility, thus, no permitting or licensing will be required.

2.3.8 Public health

Soak-aways, French drains and other similar types of sewage effluent and human waste disposal facilities, if constructed, must be approved by the nearest local authority in terms of their by-laws and relevant provincial standard by-laws.

2.3.9 Other Applicable Legislation

This list is intended to serve as a guideline only and is not exhaustive:

- Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965).
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).
- The Constitution of the Republic of South Africa Act, 1996 (Act No. 108 of 1996).
- Explosives Act, 1956 (Act No. 26 of 1956).
- Environment Conservation Act, 1989 (Act No. 73 of 1989).
- National Environmental Management Act, 1998 (Act No. 107 of 1998).
- National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004).
- National Environment Management: Air Quality Act (Act No. 39 of 2004).
- National Environmental Management: Waste Act (Act No.59 of 2008).
- National Water Act, 1998 (Act No. 36 of 1998).
- National Heritage Resources Act, 1999 (Act No. 25 of 1999).
- National Roads Act, 1998 (Act No. 7 of 1998).
- National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998).
- Hazardous Substances Act, 1973 (Act No. 15 of 1973).
- Land Survey Act, 1921 (Act No. 9 of 1921).
- Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
- Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).
- KwaZulu-Natal Heritage Act, 2008 (Act No. 4 of 2008).
- Local Government Ordinances and Bylaws.

3 ADMINISTRATION AND REGULATION OF ENVIRONMENTAL OBLIGATIONS

3.1 Organisational Structure

An organisational structure for the construction phase of the project is illustrated in Figure 5[2]. Communication and reporting lines related to the EMPr (including instructions, directives and information) shall be channelled according to the organisational structure implemented by the employer.

3.2 Roles and Responsibilities

The roles and responsibilities that are assigned to the various parties listed below are for all phases of the project.

3.2.1 Employer (King Cetshwayo District Municipality)

The King Cetshwayo District Municipality is responsible for ensuring that the conditions within the EMPr are met. The employer is responsible for the following:

- Implementation of the EMPr.
- Submission of any substantial changes, updates or amendments to the EMPr to DAEA for approval.
- Ensuring that the provisions of the EMPr are binding on all Contractors operating on the site during the life of the project, including a performance-based requirement in all Contract Documents.
- Ensuring that weekly environmental site inspections and monthly audit reports are compiled during construction to establish how well the Contractor is complying with the EMPr. The monthly environmental audit reports must be submitted to DAEA.
- Ensuring that compliance/non-compliance records are kept in good order and made available on request by the authorities.
- Complying with all applicable environmental legislation, regulations and guidelines, and ensuring that Contractors undertake responsibility to do the same.
- Being committed to the principles contained within NEMA, including the prevention of pollution and sustainable development.

[2] The organogram will need to be updated once all roles have been filled and companies appointed.

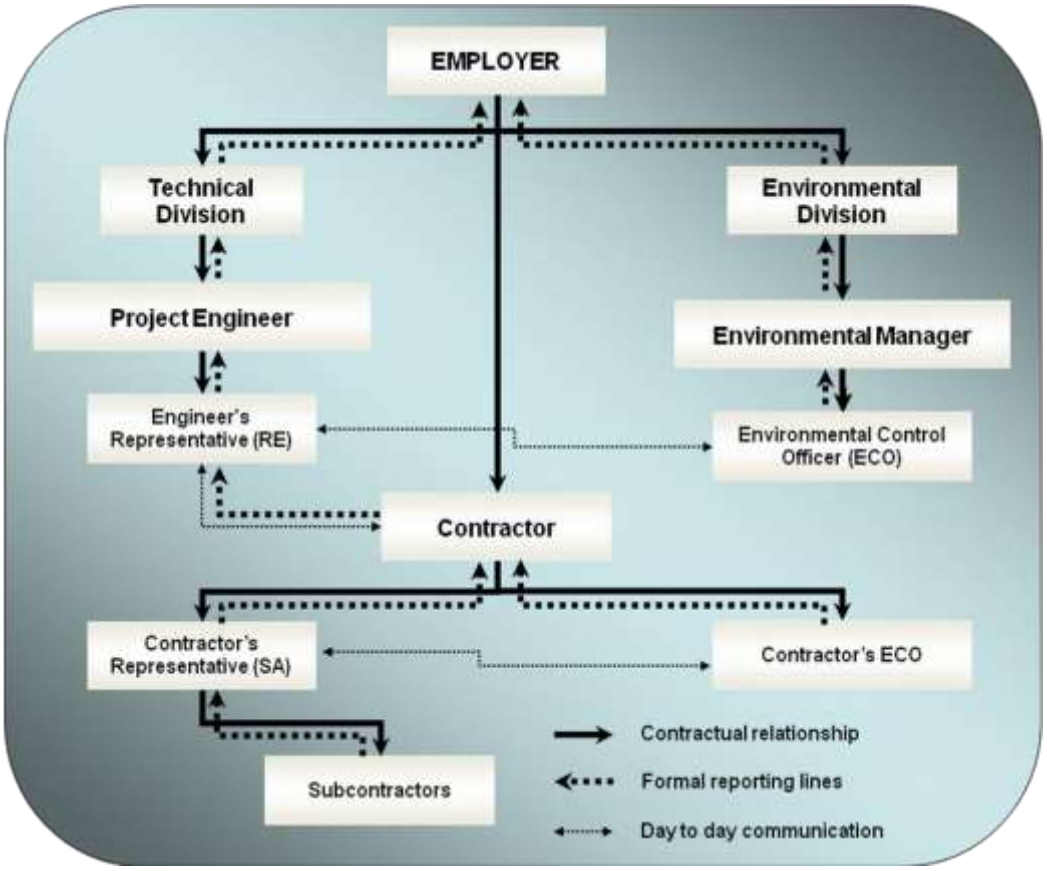

Figure 2: Organisational organogram for construction: communication/reporting relationship

3.2.2 Project Engineer and Resident Engineer

The Project Engineer represents the employer and co-ordinates all aspects of the project, including project co-ordination, design and construction. The Resident Engineer (RE) is the Project Engineer's representative on site. The Project Engineer is ultimately responsible for ensuring, on behalf of the employer that the provisions of the EMPr are complied with. The Project Engineer, assisted by the RE on site, is responsible for the following:

- Ensuring that the provisions of the EMPr are binding on all Contractors operating on the site during the construction of the project and that a performance-based requirement is included in all contracts.
- Including the approved EMPr as part of the contract documents.
- Ensuring that the Contractor(s) and Sub-contractor(s) are conversant with the requirements of the EMPr and that all members of staff on site have attended an environmental awareness-training course presented by the ECO.
- Compiling preliminary construction site layout plans prior to construction commencing.
- Approving final construction site layout plans in conjunction with the Environmental Manager.
- Ensuring that the Contractor(s) complies with the EMPr and, if not, ensure that the Contractor(s) bears the costs of damages/compensation resulting from non-compliance with the EMPr.

- If necessary, on the recommendation of the Environmental Manager or ECO, instruct the Contractor(s) to suspend any or all works on site, if the Contractor(s) or his/her Sub-contractors/suppliers fail to comply with the EMPr.
- Ensuring that the Contractor(s) conduct all activities in a manner that minimises disturbance to the project area, local communities and road users and forwards complaints and queries by members of the public at the site office, to the RE.
- Liaison with stakeholders including landowners and land users, utility providers[3], neighbours, and relevant authorities. This should be done in association with the Contractor (and the ECO where necessary).
- Ensuring that a register of complaints and queries by members of the public is maintained at the site office and the actions taken in response to these complaints.
- Liaising directly with the Environmental Manager in terms of environmental issues and maintaining close channels of communication with the Environmental Manager regarding foreseeable activities that may require environmental input.
- On behalf of the employer, reviewing any substantial changes, updates or amendments to the EMPr prior to its submission to the DAEA for approval.
- On behalf of the employer, ensuring that the Environmental Manager keeps the compliance/non-compliance records in good order and makes them available on request to the authorities.
- Ensuring that all EMPr-related instructions from the RE to the Contractor are recorded in the site diary.
- Having available on request a copy of the EMPr at the construction site at all times and ensuring that all staff, Contractors and Sub-contractors are familiar with or made aware of the contents of the EMPr.
- Complying with all applicable environmental legislation, regulations and guidelines, and ensuring that Contractors undertake responsibility to do the same.
- Ensuring that an environmental performance certificate is obtained from the Environmental Manager prior to awarding the Certificate of Completion to the Contractor(s).

3.2.3 Environmental Manager and Environmental Control Officer (ECO)

The Environmental Manager is responsible for managing and co-ordinating environmental obligations and shall advise the Project Engineer, the employer and Contractors on all environmental management matters relating to the project. This includes providing input during all phases of construction (including design), monitoring environmental performance of Contractors during construction and ensuring that all environmental specifications and EMPr requirements are met at all times.

The Environmental Manager is responsible for the following:

- Co-ordinating all matters relating to the environmental management of the project.
- Being fully conversant with the EMPr and all relevant environmental legislation, guidelines and standards.
- Assisting the employer, the Project Engineer, the RE and the Contractor(s) with EMPr compliance and all environmental legislation related to the project.
- Liaising with the relevant authorities with respect to licenses, approvals, authorisations, permits, agreements etc., in collaboration with the Project Engineer and Contractor(s) where required.
- Ensuring that all authorisations, licenses and permits required in terms of the applicable legislation have been obtained.
- Liaising closely with and reporting any breaches of EMPr implementation and the relevant legislation to the Project Engineer.

[3] The Project Engineer is to ensure liaison with utility operators regarding safety requirements for work within utility servitudes or crossing utilities.

- Attending project meetings, and reporting and advising as necessary on environmental matters.
- Reviewing and updating the EMPr in relation to specific requests, non-compliances or changes in the legislation and obtaining the necessary input from the Project Engineer.
- Providing input into construction site layout plans.
- Obtaining environmental specialist input as required.
- On behalf of the employer and upon direction of the Project Engineer, informing DAEA of non-compliance of any of the conditions of the EMPr within a reasonable period.
- Providing the Project Engineer with an environmental performance certificate at the end of a Contract confirming that all environmental specifications applicable to the Contractor have been met.
- With assistance of the ECO, reviewing training programmes, construction site layout plans, method statements and specifications and advising as necessary.

The Environmental Control Officer (ECO) is the Environmental Manager's representative on site and is responsible for the following:

- Assisting with enforcing environmental specifications on site via the RE.
- Conducting weekly site visits to monitor and verify compliance with the EMPr.
- Keep records of compliance/non-compliance.
- Producing a monthly environmental audit report. These monthly environmental audit reports must be submitted to DAEA.
- Identifying and assessing previously unforeseen, actual or potential impacts of the project on the environment.
- Bringing any environmental concerns to the attention of the Project Engineer.
- Recommending to the RE that the Contractor suspend any or all works on site if the third parties who carry out all or part of the Contractor's obligations fail to comply with the environmental specifications.
- Advising on the rectification of any pollution, contamination or damage to the project site, rights of way and adjacent land.
- Reviewing and approving construction method statements with input from the Environmental Manager, Project Engineer and RE, where necessary, in order to ensure that the environmental specifications contained within this EMPr are adhered to.
- Attending site meetings (scheduled and *ad hoc*).
- Keeping accurate and detailed records of all EMPr-related activities on site.
- Recording complaints or queries from I&APs and actions taken to address complaints. Copies of all interactions and correspondence shall be kept as part of record keeping.
- Maintaining a photographic record of construction activities and construction progress.
- Checking that a copy of the EMPr is available on site.
- Ensuring that the RE and Contractor(s) are made aware of all applicable changes to the EMPr.

3.2.4 Contractor

The Contractor is the successful tenderer, appointed by the employer to undertake the project. It is the responsibility of the Contractor to ensure that he or an appointed advisor is well versed in environmental matters to efficiently carry out the requirements of the EMPr. The Contractor is responsible for the following:

- The implementation of the applicable environmental specifications in accordance with the requirements of this EMPr.
- Obtain written permission from the landowner for use of a suitable site for erection of the construction camp, pipe storage yards, stores and stockpile areas.
- Appoint a Community Liaison Officer to assist with procurement of labour and for general communication with the community.

- Liaise with stakeholders, including affected landowners and tenants, utility providers, neighbours, and relevant authorities. This should be done in association with the Project Engineer and ECO.
- Ensure that a register of complaints and queries by members of the public is maintained at the site office and the actions taken in response to these complaints.
- Ensure that all third parties who carry out all or part of the Contractor's obligations comply with the requirements and provisions of this EMPr.
- Be responsible for the timeous procurement of all applicable approvals, authorisations, licenses and permits required for a particular activity that is part of the Contract.
- Report any non-compliance to the RE and ECO within 12 hours of the event occurring.
- Report any non-compliance event that constitutes an emergency immediately and in line with the protocol applicable to that particular emergency event.
- With the ECO, present an environmental awareness-training course to all sub-contractors and employees.
- Ensure that all sub-contractors and employees attend the environmental awareness-training course.
- Ensure that a copy of the EMPr is available at the construction site at all times.

3.3 Compliance Monitoring, Reporting and Record Keeping

3.3.1 Compliance Monitoring

During the various construction phases (design, pre-construction, construction and rehabilitation), the Environmental Manager, with assistance from the ECO, will monitor the overall compliance of the conditions of authorisation and mitigation measures outlined in the EMPr by all parties concerned.

3.3.2 Design Phase

During the design phase, the Environmental Manager will meet with the Project Engineer to highlight design needs as specified in the EMPr. On completion of the design, relevant information will be reviewed by the Environmental Manager to ensure that the design demonstrates compliance with environmental requirements. The Project Engineer will also provide preliminary construction site layout plans to the Environmental Manager for review.

3.3.3 Construction Phase

3.3.3.1 Construction Site Layout Plan

Prior to construction, the Project Engineer, with input from the Environmental Manager and ECO, must approve the construction site layout plan prepared by the Contractor showing the positions and extent of all permanent and temporary site structures and infrastructure. The Project Engineer is responsible for the co-ordination of construction site layout plans should there be overlap between multiple Contractors on site.

The earlier this information is provided to the Project Engineer and ECO, the less likelihood of delays to construction and the less likelihood of unforeseen environmental impacts occurring during construction.

3.3.3.2 Method Statements

Prior to construction, the RE and ECO will agree which activities require a written method statement. Where relevant, the Contractor must submit a written method statement, which should include the following:

- The type of construction activity.
- Locality where the activity will take place.
- Identification of impacts that might result from the activity.
- Identification of activities or aspects that may cause an impact.
- Methodology and/or specifications for impact prevention for each activity or aspect.
- Methodology and/or specifications for impact containment for each activity or aspect.
- Emergency/disaster incident and reaction procedures.
- Treatment and continued maintenance of impacted environment.

The ECO must review the construction method statements to ensure that the environmental specifications contained within this EMPr are adhered to.

3.3.3.3 Site Handover

The ECO will attend the site handover meeting, where the EMPr will form part of the agenda. The construction site layout plan is a key component of site handover and must be finalised before site handover can be completed. The approved plan must be attached to the site handover meeting minutes. Amendments to this plan must be discussed and approved at subsequent site meetings.

3.3.3.4 Site Inspections and Meetings

The ECO will conduct bi-monthly site inspections and meetings to establish how well the Contractor is complying with the EMPr. The ECO will compile a site inspection checklist, to be forwarded to the RE and Contractor for their attention and records. The checklists will also be included as an appendix to the monthly audit report to be submitted to DAEA.

Anything of an environmental nature that arises in between the site weekly audits must be recorded in the site diary and recorded in written correspondence to the ECO. If required, the ECO must conduct a site visit to address the matter and must report the matter in an addendum to the site inspection checklist.

3.3.3.5 Practical Completion

The ECO must attend the practical completion inspections. Outstanding environmental matters requiring attention must be provided to the RE for inclusion in the snag list, which is attached to the practical completion certificate.

3.3.3.6 Final Completion and Environmental Performance Certificate

Once the environmental items on the snag list have been addressed to the satisfaction of the ECO, the Environmental Manager will provide an environmental audit report confirming that the environmental specifications applicable to the Contractor(s) has been met. This report will be submitted to the Project Engineer prior to the final Certificate of Completion being issued.

3.3.3.7 Independent Environmental Auditing

Periodic auditing of environmental compliance by an independent auditor may be required and is also advisable as best environmental practise. As discussed with DAEA, they may undertake periodic site audits to confirm the findings of the monthly audit reports submitted to them by the ECO.

3.3.4 Non-Compliance and Remedial Action

Matters of non-compliance by any parties must be reported to DAEA within a reasonable period. This should be discussed with DAEA. Failure to comply with these conditions of authorisation will, under Section 22(4) of the Environment Conservation Act, 1989 (Act No. 73 of 1989), render it invalid and the applicant liable to legal action under Section 29 of the said Act.

The Contractor(s) and their Sub-contractors are deemed not to have complied with the EMPr if:

- There is evidence of contravention of the EMPr specifications within the boundaries of the construction site, site extensions and haul/access roads.
- There is contravention of the EMPr specifications that relate to activities outside the boundaries of the construction site.
- Construction activities take place outside demarcated areas.
- Environmental damage ensues due to negligence or intent.
- Failure to comply with corrective or other instructions issued by the Project Engineer within a specific time period.

Where the ECO identifies non-compliance by the Contractors and Sub-contractors, it will be discussed at the bi-monthly site visits (when identified) and remedial actions and timeframes specified. The ECO must record these incidents of non-compliance, the remedial actions and timeframes in the site inspection checklist. The RE must also record the relevant instructions for the Contractor(s) in the site diary.

If the specified remedial action has not been carried out by the Contractor(s) within the period stipulated, the non-compliance must be dealt with as follows:

- Where non-compliance has resulted in environmental damage to the site which cannot be rectified by the remedial action specified by the ECO, or the Contractor(s) has failed to carry out the remedial work within the prescribed time limit (or permitted extension thereof), the ECO shall convene a meeting between the RE and the Contractor to discuss the appropriate fine. Appropriate remedial work shall also be discussed and agreed.
- In determining appropriate remedial action, the Environmental Manager and Project Engineer shall consult with DAEA and, where necessary, obtain specialist input.
- The Project Engineer shall issue an instruction to the Contractor to procure execution of the remedial work as agreed between the parties, and the Contractor shall be obliged to procure such remedial work within the prescribed period to the satisfaction of the Project Engineer.
- Failure by the Contractor to comply with an instruction from the Engineer to procure the carrying out of the required remedial work shall constitute a material breach of the Contract.
- Where the employer has taken action to procure the remediation of such consequences it shall be entitled to recover from the Contractor the full cost of remediation.

Incidents of non-compliance, the remedial actions and timeframes must be recorded in the site inspection checklist and the site diary. Fines, applied at the discretion of the Engineer (with input from the Environmental Manager) must be applied in addition to any remedial costs incurred as a result of non-compliance. The Engineer will inform the Contractor of the contravention and the amount of the fine, and will deduct the amount from monies due under the Contract

3.3.5 Penalty Clause

Any avoidable non-compliance with the EMPr, Site-Specific Addendum, Environmental Authorisation or applicable regulations shall be considered sufficient grounds for imposing a penalty (fine). The penalty imposed shall be per incident. Upon receipt of a notice of non-compliance, the Contractor shall correct whatever is the cause of the issuing of the notice.

The Rand values of the penalties to be imposed per incident or violation are provided in **Annexure 1**. They reflect first-time incidents of non-compliance only. Penalties of repeat offences are calculated at an incremental increase of 10% up to a maximum of R100 000. Thus, the penalty for a first-time repeat incident would be 110% of the original penalty value, 120% for a second-time repeat incident, etc. Certain penalties may be waived or reduced at the discretion of the Project Engineer (with the approval of the Authority's Environmental Manager). Where deemed necessary (e.g. where the receiving environment is particularly sensitive), penalty values greater than those contained in **Annexure 1** may be stipulated in the Site-Specific Addendum to the EMPr.

The enforcement of penalties shall be through a separate agreement between the employer, Project Engineer and Contractor.

Penalties for non-compliance are imposed over and above the costs required for remediation/rehabilitation, and/or penalties that may be imposed in terms of relevant legislation.

3.3.6 Regulatory Authorities' Site Inspections

DAEA, and other relevant authorities, e.g. DWA may conduct site inspections as desired.

3.3.7 Record Keeping

The Environmental Manager and ECO must ensure that all documentation related to the EMPr is filed, and made available on request to the authorities. The following documents may be relevant:

- Environmental Management Programme.
- Weekly site inspection checklists.
- Monthly audit reports.
- Design documents and drawings.
- Construction site layout plans.
- Method statements.
- Communication and correspondence.
- Environmental awareness training programme.
- Environmental incident and accident reports.
- Emergency preparedness and response plans.
- Complaints register.
- Environmental performance certificates.

3.4 Environmental Awareness Training

A copy of the approved EMPr shall be available at the construction site at all times and all staff; Contractors and Sub-contractors shall be familiar with or be made aware of the contents of the EMPr and environmental authorisation.

The ECO must prepare and present an environmental awareness training programme to the Contractor, Sub-contractors and employees in English and isiZulu.

The environmental awareness training programme must include the following:

- The importance of compliance with all environmental policies, procedures, plans and systems.
- Understanding, the importance of, and the reasons why, the environment must be protected.
- Basic awareness and understanding of the key environmental features of the work site and environs, particularly sensitive habitats.
- The significant environmental impacts, actual or potential, as a result of their work activities.
- The mitigation measures required to be implemented when carrying out their work activities.
- The environmental benefits of positive environmental performance.
- The various roles and responsibilities in achieving compliance with the environmental policy and procedures, including emergency preparedness and response requirements.
- The potential consequences of departure from specified operating procedures.
- Health and safety awareness.

The Contractor must ensure that its Sub-contractors and employees (and any other third parties) attend the course. At the discretion of the ECO and Environmental Manager, employees involved in events of non-compliance may be given further relevant training by the ECO.

A record of the environmental awareness training programme must be kept by the ECO and RE.

3.5 Emergency Preparedness and Reporting

The Contractor must compile and maintain environmental emergency procedures to ensure that there will be an appropriate response to unexpected or accidental actions or incidents that will cause environmental impacts. The RE should be familiar with these procedures and be responsible for the co-ordination thereof should there be multiple Contractors on site simultaneously.

Emergencies are defined as serious cases of the following incidents, which cannot be dealt with according to the standard specifications contained in Sections 4 - 8, and include:

- Accidental discharges to water and land.
- Accidents involving members of the public.
- Accidental exposure of employees to hazardous substances.
- Accidental veld or forest fires.
- Accidental spillage of hazardous substances.
- Injurious encounters with dangerous animals.
- Natural disasters (e.g. flooding).

These plans should include:

- Emergency organisation (manpower) and responsibilities, accountability and liability.
- A list of key personnel.
- Details of emergency services applicable to the various areas along the route (e.g. the fire department, ambulance services, spill clean-up services, etc.).

- Internal and external communication plans, including prescribed reporting procedures where required by legislation.
- Actions to be taken in the event of different types of emergencies.
- Incident recording, progress reporting and remediation measures required to be implemented.
- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.
- Training plans, testing exercises and schedules for effectiveness.

In compiling the emergency plans, the Contractor shall comply with the emergency preparedness and incident and accident-reporting requirements, as required by the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), the National Environmental Management Act, 1998 (Act No. 107 of 1998), the National Water Act, 1998 (Act No. 36 of 1998) and the National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998) as amended and/or any other relevant legislation.

3.6 Liaison with Interested and Affected Parties

Liaison with I&APs is to be co-ordinated by the Project Engineer and the Contractor. This shall include liaison with landowners and land users, utility providers[4], neighbours, and relevant authorities.

Complaints or queries received from I&APs and actions taken to address complaints shall be addressed in writing (with copies forwarded to the Environmental Manager and ECO). Copies of all interactions and correspondence shall be kept as part of record keeping by the Environmental Manager and ECO.

3.7 Review and Updating of the EMPr

The EMPr is a living document and should be reviewed and updated in response to new or changing technical information, environmental conditions, legislation and policy, and environmental best practice. Substantial changes must be approved by DAEA.

Sections 4 to 8 contain the environmental specifications required for each of the stages, viz. design, pre-construction, construction, rehabilitation and operation. These sections are deliberately repetitive, as in many cases, an environmental aspect requires attention at more than one stage of the project cycle.

[4] The Project Engineer is to ensure liaison with utility operators regarding safety requirements for work within or crossing utilities.

4 DESIGN PHASE

Various environmental management considerations must be dealt with prior to construction by the Project Engineer, ECO and/or the Contractor. Responsible parties are indicated in the sections below.

4.1 Technical design

- Environmental sensitivities identified during the environmental impact assessment (EIA) process must be communicated to the Project Engineer by the relevant Environmental Assessment Practitioner so that, where applicable, project specific mitigation measures may be incorporated into the technical designs.

4.2 Erosion Control and Drainage

- Technical design and planned construction methods must build in measures to prevent soil erosion associated with construction, with particular attention given to scour points, crossings of water bodies and drainage lines, storm water outlets and other areas of high erosion potential, such as steep slopes (where these cannot be avoided).
- In determining the location of the construction camp, stockpile areas, pipe storage yards as well as any required new access roads and borrow pits/quarries (if required), areas of high erosion potential must be avoided.
- The design must allow for the ground conditions encountered, including adequate allowance for settlement of embankments and drainage layers.
- Technical design and planned construction methods must build in measures to avoid soil compaction associated with construction.
- Drainage systems must be kept as natural as possible. Natural drainage must be retained, and normal flow ensured at all times.
- Runoff must not be canalised or concentrated in areas where sheet flow may occur, or where highly erodible soils occur.
- Erosion or scouring of any watercourses resulting from construction must be prevented.
- Alteration of groundwater movement patterns must be prevented. To this end, design and planned construction techniques to provide for subsurface water movement are to be implemented.
- No excavation of alternative channels to re-route any river/stream may be done (to avoid unnecessary erosion).
- Design must include measures such as drainage layer, well pointing, shoring and concrete encasement of the pipeline in sensitive areas.
- Excavation will be selective to ensure that the topsoil is placed back on top.
- Concrete encasement and other pipe protection measures will be used where the structural integrity of the pipe is compromised.
- Shoring must occur where excavation is in loose sand.

Refer to Section 6.8 for further detail regarding erosion control and drainage considerations.

4.3 Protection of Sensitive Ecosystems and Habitats

- Prior to construction commencing, the project area must be inspected by the ECO to identify the following:
  - Protected trees should be avoided as far as possible.
  - In the event that a protected tree species needs to be removed, the Contractor must obtain ECO agreement and the necessary license from DWA for its removal.
  - Identify and mark large, established, indigenous trees that should not be removed.

- Suitable sites for the relocation of sensitive plant material to be removed and trees to be transplanted (Annexure 2).
- Areas outside the construction site for off-site mitigation replanting (where relocation is not possible).
- Identify, delineate, photograph and clearly mark likely wetlands and rivers/streams to be intersected by the project.
- Where necessary, appoint a suitably qualified botanist to provide assistance with the above-mentioned tasks.

- The Project Engineer, in consultation with the Environmental Manager and ECO, must prepare a programme to remove alien invasive plants on site during the construction period.
- The construction servitude must not be wider than 20 metres.
- In sensitive areas, such as wetlands and indigenous forest, it is recommended that the construction servitude be narrower.
- Watercourse and wetland protection measures must be put in place.
- Concrete encasement and other pipe protection measures will be used where the structural integrity of the pipe is compromised.

Refer to Section 6.1.4 for further detail regarding the protection of sensitive environments.

4.4 Stockpile Areas

- Where possible, stockpile areas must be identified and approved by the Project Engineer and ECO during the design phase.
- Where possible, stockpile areas must be located within the construction site.
- Environmentally sensitive and no-go areas must be avoided.
- If the stockpile area is located closer than 50 m to a watercourse, erosion prevention measures must be designed and implemented.
- As far as possible, existing roads must be used to access stockpile areas.

Refer to Section 6.6 for further detail regarding stockpiling.

4.5 Spoil Areas

- The Contractor must dispose of excess trench excavation material and construction rubble.
- Where possible, spoil sites must be identified and approved during the design phase. In determining the appropriate location of spoil areas, cognisance must be taken of sensitive and no-go areas.
- The reinstated site may be used as a spoil area for excess trench excavation material provided that the net increase in ground level is less than 200 mm. The reinstated servitude must be lightly compacted and made free-draining.
- Excess trench material may also be used to replace unsuitable local material (e.g. bedding for pipes).
- The Contractor may be allocated a spoil burial site (approved by the Resident Engineer and ECO) where the construction rubble can be buried without causing future problems.
- Spoil areas must not negatively affect surface drainage, and must not alter the topography to the extent that they become visually intrusive.
- Spoil areas must be re-vegetated and rehabilitated after construction.

Refer to Section 6.6.2 for further detail regarding spoil.

4.6 Construction Site

4.6.1 Construction Site Layout Plan

A construction site layout plan must be compiled during the design phase by the Project Engineer, with assistance from the Environmental Manager. The plan should show the positions and extent of the known permanent and temporary site structures and infrastructure as listed below (as applicable). Additional items and amendments to this plan must be made during the pre-construction phase.

- Site access (including entry and exit points).
- Roads and haul/access routes.
- Buildings and structures.
- Contractor camp(s).
- Pipe storage yards.
- Site office.
- Security requirements (including temporary and permanent fencing, and lighting) and accommodation areas for security staff.
- Gates and fences.
- Concrete batching areas.
- Essential services (permanent and temporary water, electricity and sewage).
- Sanitation (including the treatment/removal of sewage).
- Construction materials storage areas including the storage of fuels.
- Vehicle and equipment storage areas.
- Wash bays.
- Storm water control measures.
- Borrow areas (if required).
- Excavations and trenches.
- Stockpile/lay-down areas.
- Spoil areas.
- Waste management including waste storage and disposal sites.
- Areas where vegetation will need to be cleared.
- Features and plants to be conserved.

4.6.2 Construction Camps

The following must be designed for with regard to the construction camps:

- In determining the location and layout of these areas, cognisance must be taken of sensitive and no-go areas. The construction camp and pipe storage yards must be located in areas that will have minimal environmental impact, such as grazing areas, agricultural land, for which compensation may need to be paid.
- The construction camp and pipe storage yards must be sited within previously disturbed areas, but may not be located within 50 m of identified ecologically sensitive areas such as watercourses, drainage lines or wetland areas.
- No staff accommodation is allowed on site, except for security/emergency personnel.
- Strict stock control systems must be enforced in storage areas.
- The construction camp must be fenced.

4.7 Access/Haul Roads

- The design phase must make provision for the utilisation of existing roads in the area (as far as possible).
- The design phase must make provision for the establishment of required temporary haul/access roads within the boundaries of the construction site. Where roads are required outside the construction site, sensitive and no-go areas must be avoided.
- The final design must detail all access/haul roads outside the construction site.
- Any clearing for access or haul roads, both within, and where necessary, outside the construction site may only be undertaken once the necessary landowner permission has been obtained.

Refer to Section 6.2.6 for further detail regarding roads and access.

4.8 Disturbance to Landowners and Service Providers

- The minimum disruption to services must be maintained at all times.
- The design must address the disturbance of access to affected landowners during the construction phase, and must make provisions for maintaining access, adequate notice of access closures and alternative routing if required.
- The accommodation of services, e.g. Telkom, Eskom and other utilities must be incorporated into the design with full liaison with the relevant utility companies regarding safety requirements for work within or crossing utility servitudes.
- Direct liaison is required between the design engineers and the relevant organs of state in order to identify exact positions, to negotiate permission to cross servitudes and/or services infrastructure and to identify optimal ways to minimise disruption and interruptions to services.
- Dust control management practices and procedures must be defined during the design phase to ensure the effective suppression of dust during construction.
- Design must include mitigation measures in order to ensure construction noise levels are within permitted levels.
- Sufficient notice to the local community, including affected landowners and/or tenants, must be provided by the Project Engineer in consultation with the Environmental Manager and ECO, before construction commences. Information regarding the expected types of construction activities must be supplied.

Refer to Section 6.10 for further detail regarding Nuisance control.

4.9 Servitude Negotiations and Compensation

As soon as possible, the employer must commence with servitude negotiations for land acquisition for the project elements (pipeline, temporary access roads, etc):

- The Project Engineer must ensure that liaison regarding land acquisition has been undertaken and that compensation has been agreed upon. The process must be aimed at obtaining mutual acceptance of compensation by all affected parties.
- Independent property valuators must be appointed (by the employer) to determine the extent of compensation to affected parties.
- Compensation must be paid by the employer.
- Information must be provided to affected landowners regarding any servitude restrictions.
- Agreements must be entered into between the employer and landowners for access to the project site.

4.10 Aesthetics

- During design, the overall aesthetics of the project must be considered, with a view to minimise any potential negative impacts and/or to improve the visual aesthetics of the local environment.

5 PRE-CONSTRUCTION PHASE

The pre-construction phase refers to the period following final project planning and the tender phase, leading up to, but not including, the establishment on site by the appointed Contractor. These items may be the responsibility of the **Contractor** or the **Project Engineer**. Input and assistance may be obtained, where necessary, from the **Environmental Manager** and **ECO**.

5.1 Construction Site Layout Plan

A construction site layout plan must be compiled during the design phase by the Project Engineer, with assistance from the Environmental Manager. The plan should show the positions and extent of the known permanent and temporary site structures and infrastructure as listed below (as applicable):

- Site access (including entry and exit points).
- Roads and haul/access routes.
- Buildings and structures.
- Contractor camp(s).
- Pipe storage yards.
- Site office.
- Security requirements (including temporary and permanent fencing, and lighting) and accommodation areas for security staff.
- Gates and fences.
- Concrete batching areas.
- Essential services (permanent and temporary water, electricity and sewage).
- Sanitation (including the treatment/removal of sewage).
- Construction materials storage areas including the storage of fuels.
- Vehicle and equipment storage areas.
- Wash bays.
- Storm water control measures.
- Borrow areas (if required).
- Excavations and trenches.
- Stockpile/lay-down areas.
- Spoil areas.
- Waste management including waste storage and disposal sites.
- Areas where vegetation will need to be cleared.
- Features and plants to be conserved.

5.2 Construction Preparation

- The Contractor must ensure that any required written permission from the landowner for use of land for the construction camp, pipe storage yards, stores and stockpile areas has been obtained.
- The ECO must take detailed, colour photographs of the site before any clearing may commence.
- The Contractor must ensure that he/she is familiar with the following prior to construction commencing:
  - Sensitive areas.
  - Mitigation measures.
  - Large, established, indigenous trees that should not be removed.
  - Wetlands and rivers/streams likely to be intersected by the project.
- Sanitation arrangements must be made to the satisfaction of the Environmental Manager, the ECO, and the local authorities, and be compliant with all applicable legal requirements.
- The Contractor must ensure that the Project Engineer and Environmental Manager are given timeous notice of the intention to commence construction.

5.3 Acquisition of Permits and Licenses

Applicable permits and licences must be obtained prior to construction, as per section 2.3.

5.4 Procurement Process

- The Contractor's procurement process is bound by the contract agreement with the employer and must be in accordance with applicable procurement norms and standards.
- Local institutional structures, e.g. Amakhosi, must be included in the procurement process.
- Where practical and applicable, training must be provided to local labourers in order to perform more specialised jobs.
- The Contractor must trade locally for goods and services, where possible and practical.
- The Contractor is encouraged to make use of emerging contractors from formerly disadvantaged communities, as sub-contractors or by the formation of joint ventures.

6 CONSTRUCTION PHASE

The construction phase refers to the period of the project during which construction activities are carried out. This section of the EMPr outlines those general environmental specifications that are required to be implemented by the **Contractor** during construction. Where applicable, approval, assistance and/or guidance may be sought from the **Project Engineer**, **RE**, **Environmental Manager** and the **ECO**.

6.1 Site Establishment

When establishing the site, the environmental objective is to minimise the footprint of disturbance and to minimise the extent of soil erosion, loss of vegetation and the potential for pollution of soils and water resources.

The site must be established in accordance with the approved construction site layout plan, prior to the commencement of construction. Any relaxation or modification of the construction site layout plan must be approved by the Project Engineer and ECO.

6.1.1 Demarcation of the Site

The extent of the construction site, including working areas, must be clearly demarcated and no movement or work outside these areas is permitted.

The Contractor must:

- Identify and demarcate the extent of the construction site as indicated on the approved construction site layout plan using barrier tape with steel droppers or another method as approved by the Project Engineer and ECO.
- Minimise the extent of the construction site footprint as much as possible.
- Ensure that the main site camp is completely fenced and has controlled security access.
- Identify and demarcate sensitive sites in collaboration with the ECO. This may require perimeter fencing or steel droppers with barrier tape.
- Maintain site demarcations in position until the cessation of construction works and ensure that no personnel or construction materials move outside the designated site.
- Ensure that the site is not used for any other purpose other than for the carrying out of construction activities.
- Ensure that no natural features are painted or permanently marked. Marking for surveying and other purposes must be done using pegs, beacons or rope and droppers.
- Ensure that security lighting from the construction camp and pump stations does not unduly disturb neighbours.

6.1.2 Site clearance

- Detailed, colour photographs shall be taken of the proposed site before any clearing may commence. These records are to be kept by the ECO to aid in the rehabilitation of the site.
- Prior to site clearance, the ECO must be informed, with 14 days notice, in order to identify and demarcate any indigenous trees or plants, nesting sites or heritage sites that required protection or translocation.
- Areas of the construction site requiring clearance shall only be cleared immediately prior to construction activities commencing, i.e. at the last practicable stage.
- Clearance of indigenous vegetation must be kept to an absolute minimum.

- No indigenous trees or shrubs may be felled, lopped, pruned or removed without the prior permission of the ECO. De-bushing and de-stumping are dealt with in section 6.1.6 of this document.
- Topsoil is to be stripped, together with grass, groundcover and sedges, from all areas where permanent or temporary structures and access roads are to be constructed. Conservation and handling of topsoil is to be in terms of this document (Section 6.1.5).

Wood obtained from clearing and grubbing operations remains the property of the Authority and must be stacked at sites designated by the ECO. The Contractor shall be required to remove and dispose of any wood from site at a designated site for vegetation disposal, should this be required.

6.1.3 Protection of Sensitive Habitats

- The Contractor must ensure that the necessary rescue and translocation of plants and animals be undertaken prior to the commencement of construction.
- The width of the initial clearance for the construction servitude must be minimised to reduce the loss of indigenous vegetation and natural forest
- The removal of indigenous vegetation must be kept to a minimum by minimising the construction footprint and by confining areas for structures, services, stockpiling, new temporary access roads, etc, to existing disturbed areas or areas within the construction servitude.
- Protected trees should be avoided as far as possible. However, in the event of avoidance being impossible, the Contractor should obtain ECO agreement for the removal. The ECO must identify these trees, in consultation with a suitably qualified botanist, before the commencement of construction.
- As far as possible, indigenous plants or natural features should not be disturbed, defaced, destroyed or removed. The Contractor will be held liable for the replacement of any indigenous plant or natural feature that is removed or damaged by the Contractor's negligence or mismanagement.
- Should the ECO confirm that clearing of indigenous vegetation is unavoidable, plant material must be transplanted where practical and possible.
- Where possible, the clearance of indigenous forest should be mitigated by replanting elsewhere in the area with appropriate locally indigenous species.
- The method of excavation must be selected to minimise interference with indigenous forest to be retained on either side of the servitude, i.e. manual labour should be utilised for pipelaying in sensitive areas (large excavation machinery can cause considerable damage to trees outside of the construction footprint if working in a narrow corridor flanked by tall trees either side).
- No material storage or laydown is permitted under trees.
- Vehicle and pedestrian traffic outside the construction area must be avoided.

6.1.3.1 Protection of Watercourses and Drainage Lines

- The Contractor must not cause any physical damage to any aspect of a watercourse, other than that necessary to complete the works as specified and in accordance with the accepted method statement.
- Short lengths of concrete encasement must be utilised to avoid erosion of the pipe fill material.
- The Contractor must repair the existing drainage systems and augment these where applicable with additional drainage or increased capacity so as to accommodate normal, as well as flood conditions.
- The Contractor must ensure that uncovered soil and stockpiles are not eroded and material washed away.
- The Contractor must not alter the flow of water, i.e. it may not be stopped, disconnected, diverted, ponded, or caused to become stagnant.

6.1.3.2 Wetland and River/Stream Crossings

- The ECO and Contractor must ensure that all wetlands and rivers/streams likely to be intersected by the project have been identified, delineated, photographed and clearly marked by the ECO prior to any construction work on the pipeline route.
- Timing of trenching and pipe laying through wetland and river/stream areas should be during the low flow season to minimise increased sedimentation and turbidity.
- The Contractor must avoid the unnecessary compaction and impacts on sensitive wetland and riparian soils.
- No construction materials may be stockpiled in any wetland and riparian areas.
- Watercourses must be crossed with an open cut trench through the stream, with the pipe buried sufficiently deep not to interfere with the backfilled stream bed.
- Concrete encasement and other pipe protection measures should be used where the structural integrity of the pipe is compromised.
- For the trenching operation in rivers/streams, the use of coffer dams to cross rivers/streams and confining construction work to the existing river/stream channel at all times is recommended.
- To avoid unnecessary erosion, no excavation of alternative channels to re-route any river/stream is allowed.
- Replanting of wetland and riparian vegetation must be undertaken immediately after surface reinstatement is complete.
- Where possible, plants must be replanted in wetland and river/stream areas from which they were removed.
- The pre-construction profile of the wetland and river/stream must be returned to one similar to before construction.
- Wetlands must have no created “ridge or channel” features present to ensure that no depressions remain, which could act as channels for preferential water flow thereby affecting the hydrological regime of the wetland.

6.1.3.3 Protection of Fauna

- Wild animals must not be fed, handled, removed, hunted, snared, captured, injured or killed or otherwise interfered with. The penalty clause associated with the needless destruction of wildlife is a fine and/or imprisonment[5].
- The Contractor must ensure that the construction area is kept clean, tidy and free of litter/rubbish that would attract animal pests.
- The Contractor must not use any pesticides, unless approved by the ECO.
- Where trenches pose a safety risk to animals, the Contractor must ensure that they are adequately cordoned off.
- The ECO, in consultation with the Contractor, must report problem or injured wild animals to EKZNW.

6.1.4 Protection of Cultural Heritage Resources

If a cultural heritage artefact on site is uncovered, work in the immediate vicinity must be stopped immediately. The Contractor must take reasonable precautions to prevent any person from removing or damaging any such article and must immediately inform the Environmental Manager of such a discovery. Amafa aKwaZulu-Natali, the provincial heritage authority of KwaZulu-Natal must be contacted so that an archaeological/heritage resources consultant can be appointed to record the site and excavate if necessary. Work may only resume once clearance is given in writing by Amafa aKwaZulu-Natali.

[5] In terms of the Animals Protection Act, 1962 (Act 71 of 1962) Section 2.

6.1.5 Topsoil Conservation

- Ahead of all construction, the topsoil layer must be stripped from all areas to be cleared, excavated, compacted or otherwise disturbed.
- In the absence of a recognisable topsoil layer, the upper most 300 mm of soil must be stripped.
- The topsoil must be stockpiled separately from overburden material (subsoil and rocky material).
- Construction works must be co-ordinated to limit unnecessarily prolonged exposure of stripped areas and stockpiles.
- Vegetation and soil must be retained in position for as long as possible, removing it immediately ahead of construction/earthworks in that area.
- Herbaceous vegetation, along with overlying grass and other fine organic matter must be stripped and stockpiled.
- The stockpile height of topsoil must not exceed 2 m unless approved by the ECO.
- The stripped topsoil must be stored at an approved location and in an approved manner for later reuse in the rehabilitation process.
- Topsoil stripped from different sites must be stockpiled separately, as re-application during rehabilitation must preferably be site specific.
- Topsoil obtained from different sites must not be mixed.

6.1.6 De-bushing and de-stumping

- Prior to any disturbance/stockpiling and clearing of natural vegetation and soil (either within the construction servitude, working footprint or at designated or instructed areas outside the construction servitude), the Contractor must submit a method statement to the Project Engineer for approval (in line with the approved construction site layout plan (Sections 5.6.1 and 6.1)). The plan must contain reference points (e.g. chainage) of the areas to be disturbed for easy identification at a later stage.
- The Contractor must obtain permission from the ECO to proceed with debushing as this needs to be carefully co-ordinated with specified plant rescue and the DWA permit requirements[6] (Section 2.2).
- The Contractor must only debush specified areas as indicated on the approved construction site layout plan (Sections 5.6.1 and 6.1).
- Remaining plant material and stumps must be disposed of as solid waste or left on site to decompose naturally as advised by the ECO.
- De-stumping must only be carried out in consultation with the ECO

6.2 Site Infrastructure

6.2.1 Structures

- All buildings and structures, including offices, workshops, stores, etc. must be located as per the approved construction site layout plan.
- Only security and emergency personnel may be housed on the construction site. Accommodation for other construction staff must be located in suitable venues off site.
- On site accommodation for security and emergency personnel must be securely fenced. These fences must remain in position for the duration of construction.
- Essential services must be provided and maintained in a functional state and not overloaded. Defects and inadequacies must be rectified immediately.

[6] Permits in terms of the National Forests Act, 1998 (Act No. 84 of 1998).

6.2.2 Services

6.2.2.1 Water

- Permission from the relevant landowner and DWA must be obtained prior to abstracting water from any watercourse where the volumes abstracted require registration or licensing in terms of the National Water Act, 1998 (Act No. 36 of 1998) and any general authorisation in terms of Section 39(1) of the National Water Act.
- The point and method of abstraction must be approved by the ECO.

6.2.2.2 Sanitation and Ablution Facilities

- The Contractor's intended methods for waste management and waste minimisation must be implemented at the outset of the contract, and approved by the Project Engineer.
- Adequate sanitation facilities[7] must be provided and maintained for construction workers and security personnel along the entire route of the project.
- Sanitation facilities must be in the form of portable serviced toilets.
- Separate sanitation facilities must be provided for male and female workers.
- Outside toilets must be must be adequately secured to prevent them from blowing over and provided with locks and doors.
- The facilities must be placed outside areas susceptible to flooding.
- Grey water must not be discharged via French drains or directly into the surrounding environment where there is a high groundwater level and associated risk of contamination.

6.2.2.3 Power supply

- The power supply to be used is to be approved by the Project Engineer and ECO.
- If generators are to be used, establish generators, motors and stored fuel on a hardened, bunded surface and ensure any associated pollution is controlled (Section 6.4.4).
- Noise from generators must be controlled (Section 6.4.6).

6.2.3 Batching Sites

- Locate the batching activity in an area of low environmental sensitivity[8] to be identified and approved by the ECO.
- Clear topsoil from the batching site and stockpile for later rehabilitation purposes.
- Cement may not be mixed directly on the ground, but rather on a protective sheet or board.
- Protect the batching plant on the up-slope side by an earth berm or sandbag system to deflect clean surface runoff away from the plant.
- Contain the batching plant on the down-slope side by a trench and earth berm or sandbag system to control contaminated runoff and construction water emanating from within the plant.
- Effluent from concrete batch plants should be treated in a designated sedimentation (sludge) dam to the legally required standards to prevent surface and groundwater pollution.
- Ensure that measures are in place to prevent the overflow of sludge dams during heavy rains and storm conditions.
- Ensure screening and containment are in place to prevent wind-blown contamination associated with bulk cement silos, loading and batching

7 Chemical toilets and hand washing facilities.

8 Do not locate batching plants or associated sludge dams within the 1:100 year flood line, or within a horizontal distance of 100 m (whichever is greater) of a watercourse, drainage line or identified wetland, unless unavoidable and approved by the ECO. Do not locate batching plants or associated sludge dams within any riparian vegetation zone.

6.2.4 Construction Camp, Lay-Down Areas and Pipe Storage Yards

- The construction camp will house administrative offices, construction plant, material stockpiles, fuels, storage facilities and security guard accommodation.
- No construction workers may be accommodated at the construction camp.
- All pipe storage yards, storage areas and material lay-down sites must be located within predetermined zones as per the approved construction site layout plan.
- Additional areas required by the Contractor for pipe storage yards, lay-down and storage must be approved by the Project Engineer with input from the ECO, in the form of an amended construction site layout plan indicating the extent and anticipated utilisation of the storage and lay-down areas.
- The construction camp, pipe storage yards and lay-down areas must be kept secure and neat at all times with appropriate access control measures employed during construction.
- Security lighting must be positioned so that it does not pose a nuisance to neighbouring properties or a danger to road users.

6.2.5 Storm Water Control

- Appropriate drainage measures must be taken to ensure that excessive run-off, and as a result, soil erosion, does not occur from the construction site.
- Where directed by the ECO, embankments must be grassed to minimise erosion.
- Storm water diversions must be constructed above the construction campsite to direct run-off away from the site.

6.2.6 Roads and Access

- As far as possible, existing roads must be used for access/haulage purposes, as per the construction site layout plan.
- Adequate vehicle turning areas must be allowed for.
- Alternative temporary access routes must be provided where construction will obstruct existing access.
- Routes through drainage lines and riparian zones must be avoided wherever possible. When this is unavoidable, only one road is permitted, constructed perpendicular to the drainage line (use of existing crossing points is recommended).
- Speed limits appropriate to the type and condition of road must be enforced at all times.
- Safe pedestrian access and crossing must be provided where necessary.
- All access routes and roads must be adequately maintained in order to minimise erosion, undue surface damage and pollution.
- Topsoil (and other material) that has accumulated inside drains of roadways must be regularly removed to keep these open and functional.
- Gravel or cement spillage must be cleared immediately (both within and outside the construction site).
- Damage to public or private roads caused by the Contractor during the construction phase must be repaired immediately to the same or a better state.
- No off-road driving is permitted outside of the demarcated construction area or in sensitive areas.
- Traffic disruptions along roads must be minimised and controlled.

6.3 Implements and Equipment

- Mobile plant and equipment which is appropriate to the task must be utilised in order to minimise the impact on and extent of damage to the environment.
- Should the ECO at any time determine that the method, mobile plant or equipment utilised by the Contractor is unsuitable for the task at hand, or unnecessarily detrimental to the environment, then he/she must specify the use of a suitable alternative.

6.4 Site Management

6.4.1 Solid Waste

- The Contractor must ensure that personnel make use of the litter bins provided and that the construction site and the construction camp are kept tidy and litter-free at all times.
- All domestic waste must be collected in litter bins.
- Litter bins must be equipped with a closing mechanism to prevent their contents from blowing out and scavengers from getting in.
- Litter bins must be emptied weekly (or as required before they reach capacity).
- Domestic waste must be taken to a licensed landfill site. Waste must be transported responsibly, avoiding waste spills en-route.
- Where necessary, a storage area must be dedicated on site for the collection of construction waste.
- No solid waste may be burned or buried on site or disposed of by any other method.
- Where feasible, waste paper, glass and metal waste must be collected separately and arranged for collection by recycling Contractors.
- No burning of waste is permitted.

6.4.2 Liquid Waste

- Suitable, sufficient and conveniently located sanitation facilities must be provided as per the approved construction site layout plan.
- Toilets must be regularly emptied and serviced.
- The Contractor is entirely responsible for enforcing their use and for maintaining all toilets in a clean, orderly and sanitary condition to the satisfaction of the ECO.
- Sewage must be disposed of at a licensed wastewater treatment site and may under no circumstances be dumped in the bush or buried.

6.4.3 Hazardous Waste

- Compliance with all national, regional and local legislation must be ensured with regard to the storage, handling and disposal of hydrocarbons, chemicals, solvents and any other harmful and hazardous substances and materials.
- Hazardous waste must be stored as indicated on the approved construction site layout plan.
- Drip trays must be used where dispensing mechanisms or stored receptacles may leak.
- No spillage of hazardous products must be allowed on site. Special care must be taken to avoid contamination of surface or groundwater.
- Under no circumstances shall the spoiling of hazardous products on site be allowed.
- Waste oils and batteries must be retained for recycling by the supplier, wherever possible.
- Used oil and lubricants must be collected in a holding tank and disposed of at a registered hazardous waste disposal site.
- Hazardous waste not earmarked for reuse, recycling or resale must be disposed of at a registered hazardous waste disposal site.
- The repair and/or maintenance of vehicles and equipments on site are not permitted.

6.4.4 Pollution Control

- The storage for any substance, which causes or is likely to cause pollution must not be located within the 1:100 year flood line, or within a horizontal distance of 100 m (whichever is greater) of a watercourse, drainage line or identified wetland.
- Waste or foreign material must not be dumped into any watercourses or wetland areas.
- Watercourses and wetland areas must not be used for swimming, bathing, or the cleaning of clothing, tools or equipment.
- The discharge of water containing polluting matter or visible suspended materials, fines and sediments directly into drainage lines or wetlands must be prevented.
- Unpolluted water/runoff must be deflected away from any dirty area.
- Where necessary, turbid water pumped from excavations within watercourses must be passed through a sand filter or settling pond before being released back into the watercourse. Discharge of this water must be in a controlled manner, and no erosion may result.
- No storm water must enter any drainage installation for the reception, conveyance, storage and/or treatment of sewage.
- Special care during rainy periods must be taken to prevent the contents of sumps and drip trays from overflowing.
- Before any water is permitted to enter natural drainage lines, the quality of the water must comply with the South African Water Quality Guidelines (Department of Water Affairs and Forestry, 1996) and the Standard Requirements for Effluent and Waste Water[9].
- Watercourses must be protected from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials, etc.
- The Contractor must ensure that an emergency preparedness plan is in place for implementation in the case of a spill or substances that can be harmful to an individual or the receiving environment.
- The Contractor must ensure that accidental oil or fuel spills or leakages (other than those classed as emergency) are immediately contained and cleaned up.
- Oil or fuel spills must not be hosed into a storm water drain or sewer, or into the surrounding natural environment.
- Small oil or fuel spills must be cleaned with an approved absorbent material, such as 'Drizit' or ‘Spill-sorb’.
- Oil or fuel spills must be contained in water using an approved oil absorbent fibre.
- Soil contaminated by oil or fuel must be treated using one of the following approved methods, as per instruction of the ECO:
  - The soil to the depth of the contamination must be removed and disposed of at a registered hazardous waste disposal site.
  - The soil to the depth of the contamination must be removed and regenerated using approved bio-remediation methods.
- All on-site operations that involve the use of cement and concrete must be carefully controlled.
- Cement and concrete mixing must be limited to single sites, where possible.
- Plastic trays or liners must be used when mixing cement and concrete (cement and concrete must not be mixed directly on the ground).
- All visible remains of excess cement and concrete must be disposed of after the completion of tasks. Solid waste concrete must be treated as inert construction rubble, but wet cement and liquid slurry, as well as cement powder must be treated as hazardous waste.
- Water and slurry from cement and concrete mixing operations must be contained and directed into a settlement pond or sludge dam for later disposal.

[9] As set out in Government Notice 399 (26 March 2004) – Revision of General Authorisations in terms of Section 39 of the National Water Act, 1998 (Act No 36 of 1998) Sections 21(f), (h) and (g).

- Trucks delivering concrete may be washed only within designated wash bays equipped with runoff containment and infrastructure to direct wastewater into a settlement pond or sludge dam for later disposal. Trucks must deliver bags and aggregate along existing access roads/tracks.

6.4.5 Air Quality

- Dust-suppression techniques (e.g. the use of water spray vehicles) must be employed on all exposed surfaces during periods of high wind. Potential methods include:
  - Remove only limited vegetation to accommodate construction activities.
  - Spray unpaved roads and construction areas, including stockpiles and spoil, with water routinely throughout construction to contain dust.
  - All surfaced public roads shall be cleaned within 50 metres of points of ingress and egress in order that mud and dust on the road surface is minimised.
  - Implement traffic control measures to limit vehicle entrained dust from unpaved roads (e.g. by limiting construction vehicle speeds and by restricting traffic volumes).
  - Re-vegetate verges and cuttings once all construction is completed, and when the lay down area/construction camp is vacated.
- Vehicles emitting black smoke and fumes must be repaired and maintained.
- No burning of waste material shall be allowed anywhere on site.

6.4.6 Noise Control

- Compliance with the legislation with respect to noise is mandatory.
- Noisy activities must take place during normal working hours.
- Adjacent residents must be notified of after-hours construction work and of any other activity that is likely to cause a nuisance.
- If noise levels at the boundaries of the site exceed 7dB above ambient levels, then the local health authorities must be informed.
- Noise suppression measures must be applied to all construction equipment.
- Construction equipment must be kept in good working order and, where appropriate, fitted with silencers.
- Community complaints with regard to noise generation must be responded to, taking reasonable action to ameliorate the impact.

6.4.7 Fire Control

- The Project Engineer must ensure that he is aware of the requirements of landowners, in terms of fire control regulations on their property and impart this information as necessary to the RE and Contractor(s).
- Adequate precautions must be taken to ensure that fires are not started as a result of construction. The Contractor will be held liable for any damage to property adjoining the site as a result of any fire caused by one of his employees.
- The Contractor must agree to a fire reporting and extinguishing protocol with each affected landowner.
- The Contractor must compensate affected landowners for any loss due to fire resulting from the contract.
- The construction camp must be equipped with adequate fire fighting equipment[10] (this includes at least rubber beaters when working in veld areas, and at least one fire extinguisher of the appropriate type, irrespective of the site).
- Immediate steps must be taken to extinguish any fire, which may break out on the construction site.
- No open fires are permitted anywhere on site.

[10] In terms of SABS 1200.

- Contained fires for heating and cooking (i.e. in a fire drum) must be restricted to designated areas on site. Employees must be prevented from creating fires randomly outside designated areas.
- Fuel or chemicals must not be stored under trees.
- Gas and liquid fuel must not be stored in the same storage area.
- Smoking must not be permitted within 3 m of any fuel or chemical storage area, or refuelling area.

6.4.8 Health and Safety

- Adhere to the requirements of the Occupational Health and Safety Act, and associated Construction Regulations.
- Ensure that emergency numbers and First Aid supplies are always easily accessible.
- Obey speed limits and travel more slowly where conditions dictate.
- Ensure that operators and drivers limit their potential to endanger humans and animals at all times, by observing strict safety precautions

6.4.9 Safety and Security

Where relevant, implement security measures to:

- Prevent access by people with criminal intent.
- Prevent dangerous animals entering the site.
- Comply with the relevant provisions under the Occupational Health and Safety Act, and associated Construction Regulations.
- Inform staff of the risk of contraction, the symptoms thereof, and the steps for prevention and treatment of the following:
  - HIV/AIDS.
  - Malaria.
  - Tick bite fever.
  - Heat stroke.
  - Cholera (Guidelines for cholera are available from the Department of Environmental Health, Pietermaritzburg).

6.5 Earthworks

6.5.1 Excavations and Trenches

- Excavations must be undertaken carefully, incorporating appropriate drainage.
- For significant trees identified by the ECO, trenching must be outside the drip line of the tree as specified by the ECO.
- The pipeline must be constructed with the dig and lay method where pipes are laid length by length. Excavate and backfill trenches on a progressive basis.
- The Contractor must not have more than 500 m of trench open at any one time.
- Excavations must not stand open for longer than two days, where possible (maximum of four days). Excavations should preferably be opened and closed on the same day.
- If de-watering is required where the water table is high, the trench should only be open for one day.
- Where trenches pose a risk to human or animal safety, they must be adequately cordoned off to prevent accidents.
- Wild animals that are found trapped in excavations must be assisted provided there is no risk to workers' safety. Should there be a danger to workers or the animal is injured, the matter should be reported to EKZNW as soon as possible.
- Excavation must be programmed to take place once the required materials are on site. This facilitates the immediate laying of services and/or construction of subsurface infrastructure and minimises open trench time.

- Where trenching through wetlands and drainage lines is required (as per the approved site layout plan), the Contractor must return the profile of the wetland/drainage line to one similar to the pre-construction profile. No ridge or channel feature may remain.
- During construction through a wetland, the majority of the flow of the wetland must be allowed to pass downstream (i.e. no damming must be allowed to take place). In-stream diversions must be used rather than the construction of new channels.

6.5.2 Shaping and Trimming

- The Contractor must execute bulk (shaping) and fine (trimming) earthworks according to the design (aimed at the prevention of soil erosion, of efficient storm water control, of the eventual reestablishment of vegetation and of ultimately achieving aesthetically acceptable landscapes).
- The shaping and trimming operations must be planned to allow for topsoil application: final trimmed levels must make provision for the specified depth of reapplied topsoil.
- Trimmed surfaces must be left slightly rough to facilitate topsoil binding for the natural establishment of vegetation.
- Where machine operations are not practicable, trimming must be carried out using hand tools.

6.5.3 Borrow Pits and Rock Quarries

- Where it is required to import material, this shall be from legal[11] commercial sources or legal borrow areas. Sources of material are to be approved by the ECO, to ensure that no importation of alien invasive plant seeds or other potentially hazardous substances enters the project environment.
- Do not commence with quarrying activities before the necessary DME approvals are in place.
- Comply with the provisions of the environmental management programme for the development, use and rehabilitation of the particular borrow pit. Of particular importance is to:
  - Remove and separately stockpile topsoil and overburden for use during rehabilitation, locating these in areas where they will not be disturbed by the progress of the gravel pit/quarry.
  - Avoid stripping material to bedrock. This limits rehabilitation potential for these areas.
  - Minimise the flow of any surface water or floodwater into borrow areas. Where necessary, protect borrow areas by an earth berm or sandbag system to deflect clean surface runoff away from the excavations.
  - Allow for the natural free drainage of borrow areas. All borrow areas must be drained unless otherwise specified.
  - Bury coarse material incapable of supporting vegetation beneath the finer material.

6.6 Stockpiles, Storage and Handling

6.6.1 Topsoil

- If temporary stockpiling is required, stockpiles must be positioned as indicated on the approved construction site layout plan.
- Any additional topsoil stockpile areas required by the Contractor must be approved by the ECO, in the form of an amended construction site layout plan indicating the position and extent thereof.
- Topsoil is to be kept separate from subsoil and handled twice only – once to strip and stockpile, and once to replace and level.
- Topsoil stockpiles must be positioned on the higher side of a disturbed area, and above a 1:50 year flood line wherever possible.
- Stockpile height must not exceed 2 m unless approved by the ECO.

[11] In terms of the requirements of the National Mineral and Petroleum Resources Development Act, 2002.

- All topsoil must be stored in such a way and in such a place that it will not cause the damming up of water, erosion gullies, or wash away itself.
- Topsoil must be stockpiled in windrows parallel to the excavation.
- Near watercourses or wetland areas, topsoil must be stockpiled above the riverine zone.
- Topsoil must not be stockpiled in drainage lines.
- Topsoil must not be stockpiled in sensitive areas.
- Topsoil must be stockpiled in a suitable form in order to minimise visual impact.
- Topsoil stockpiles must be protected from erosion by wind and water.
- Topsoil must not be compacted in any way during storage.
- Exotic/invasive plants and broad leaf weeds that emerge on topsoil stockpiles must be removed.
- If topsoil is to be stockpiled for extended periods, especially during the wet season, the ECO must recommend one of the following measures:
  - The stockpiles must be re-vegetated with indigenous grasses as indicated by the ECO.
  - The stockpiles must be covered with protective material, such as hessian mats.
- Topsoil must not be buried, mixed with spoil (excavated subsoil), rubble or building material, or subjected to compaction or contamination by vehicles or machinery. This will render the topsoil unsuitable for use during rehabilitation.
- The Contractor will be held liable for the replacement of any topsoil rendered unsuitable for use during rehabilitation, for reasons due to his negligence or mismanagement on site.

6.6.2 Spoil

- A photographic record (before construction and after rehabilitation) must be kept of all spoil sites for monitoring purposes.
- The reinstated construction site, used as a spoil area for excess trench excavation material, must only have a net increase in ground level of less than 200 mm. The reinstated site must be lightly compacted and made free-draining.
- Excess trench material may also be used to replace unsuitable local material (e.g. bedding for pipes).
- The allocated burial site (approved by the Resident Engineer and ECO) must be used for construction rubble.
- Spoil areas must not negatively affect surface drainage, and they must not alter the topography to the extent that they become visually intrusive.
- Dumping of material over embankments is not permitted.
- The use of spoil sites for the disposal of hazardous or toxic wastes is not permitted.
- No spoil site may be located within 500 m of any watercourse or in sensitive areas.
- Spoil must be positioned on the higher side of a disturbed area, and above a 1:20 year flood line wherever possible.
- Spoil must be stored in such a way and in such a place that it will not cause the damming up of water, erosion gullies, or wash away itself.
- No slopes steeper than 1(V):3(H) are allowed.
- Coarser material must be buried beneath the finer material, and all permanent spoil overlayed with a layer of 200 mm topsoil.
- If required, additional spoil storage areas required by the Contractor must be approved by the ECO, in the form of an amended construction site layout plan. The following information is required for approval:
  - The location, description and access to proposed sites.
  - The quantity of material to be spoiled.
  - The type of material to be spoiled.
  - The proposed method of spoiling.
  - A proposal for the reinstatement and rehabilitation plan, including the final profile.

- Written approval from the landowner/relevant authority that material may be spoiled on the land in question, subject to conditions.

- Spoil areas must be re-vegetated and rehabilitated after the construction phase.

6.6.3 Vehicles and Equipment

- Vehicles used during construction must have the minimum impact on the environment and other road users.
- Vehicles, machinery and equipment must be checked regularly to ensure that none have leaks or cause spills of oil, diesel, grease or hydraulic fluid. Problematic vehicles, machinery or equipment must be sent for repair or removed from site immediately.
- Drip trays must be provided for any machinery that will be in position for longer than one day. Drip trays are to be watertight, and must be emptied regularly and before rain events. The contents of drip trays are to be treated as hazardous waste.
- All the necessary handling and safety equipment for vehicles, machinery and equipment must be provided by the Contractor and used or worn by staff.

6.6.4 Fuel

- Fuel stores must be positioned as indicated on the approved construction site layout plan.
- Fuel depots must not be located within the 1:100 year flood line, or within a horizontal distance of 100 m (whichever is greater) of a watercourse, drainage line or identified wetland.
- In the event the contractor has a diesel tank on site at the construction camp, the diesel tank must be on a stand, within a bunded area, with a metal drip tray under the dispensing hose. The dispensing hose must have a control pump with a valve, tap, hose and funnel.
- An impervious layer (paving or PVC sheeting with a layer of sand) must be provided adjacent to the diesel tank upon which vehicles must park during refuelling. This will help to accommodate fuel spills during refuelling.
- All spills (within the bund and dispensing area) must be directed to a collection sump.
- Spills and the contents of the sump must be treated as hazardous waste.
- All the necessary handling and safety equipment for fuels must be provided by the Contractor and used or worn by staff.

6.6.5 Hazardous Substances

- Compliance with all national, regional and local legislation must be ensured with regard to the storage, transport and use of harmful and hazardous substances and materials.
- The Contractor must provide a register of hazardous substances to be used on site and must provide proof to the Project Engineer that relevant authorisation to store such substances has been obtained from the relevant authority. In addition, hazard signs indicating the nature of the stored materials must be clearly displayed on the storage facility or containment structure.
- The Contractor must provide the Project Engineer with details of the preventative measures that are proposed to be installed in order to mitigate against pollution of the surrounding environment from leaks or spillages. This must include the emergency procedures to be implemented in the event of misuse or spillage of substances that will negatively impact on an individual or the environment.
- Hazardous substance stores must be positioned as indicated on the approved construction site layout plan, in areas not threatening human life or the environment.
- Hazardous substances may only be stored under controlled conditions (in a secured, appointed area that is fenced, has restricted entry, has weatherproof facilities, and is underlain by a bunded concrete slab to protect against soil and water pollution).

- Controlled loading/unloading areas must be provided which are underlain by an impervious paving or PVC sheet to protect against soil and water pollution.
- Personnel handling hazardous substances must have been educated in terms of the correct handling, use and disposal thereof.
- Empty containers in which hazardous substances were kept must be treated as hazardous waste.
- The responsibility for spill treatment lies with the Contractor. The individual responsible for, or who discovers a hazardous waste spill must report the incident to the RE. The ECO must assess the situation in consultation with the RE and act as required. In all cases, the immediate response shall be to contain the spill. The exact treatment of polluted soil/water must be determined by the Environmental Manager in consultation with the Project Engineer. Areas cleared of hazardous waste must be re-vegetated according to the Environmental Manager's instructions.
- Should the spill be serious and constitute an emergency, the emergency procedure must be applied.
- Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice must be sought for treatment and remedial procedures to be followed. The requirement for such input shall be agreed with the Environmental Manager. The costs of containment and rehabilitation shall be for the Contractor's account, including the costs of specialist input.

6.7 Water Use

- Water must not be wasted (e.g. leaks must be repaired).
- Where possible, water must be recycled on the construction site.

6.8 Erosion Control

6.8.1 Drainage Systems

- Culverts, pipes and channels shall be concrete lined.
- Design calculations shall prove that the optimum solution is being implemented.
- Drainage must be controlled to ensure that runoff from the site will not culminate in off-site pollution or cause water damage to properties downstream of the site.
- Drainage must be provided (e.g. mitre drains) in accordance with the local topography to accommodate storm water and to minimise soil erosion.
- Surface water or storm water must not be concentrated or permitted to flow down cut or fill slopes or along pipeline routes without erosion protection measures being in place.
- Wetlands, drainage lines and river banks must not be drained, filled or altered in any way, unless this forms part of construction or upon specific instruction by the ECO[12].
- The extent of hardened or paved areas must be kept to a minimum.
- Culvert design must encourage their use as underpass crossings for small to medium sized animals.

6.8.2 Erosion Protection

- All areas susceptible to erosion must be protected to ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and construction area.
- Natural trees, shrubbery and grass species must be retained, wherever possible.
- Vehicular or pedestrian access must not be permitted into areas beyond the demarcated boundary of the construction area.
- Only light equipment must be used for access and deliveries into areas of unstable soils, in areas where erosion is evident, and at stream and river embankments.

[12] Relevant permits from DWA and DAEA are to be in place before such instruction may be given.

- In sensitive areas, measures such as a drainage layer, well pointing, shoring and concrete encasement of the pipeline where the pipeline crosses watercourses, must be taken.
- Shoring must occur where excavation is in loose sand and/or swamp areas.
- Erosion donga crossings must be addressed as watercourse crossings, applying soil erosion control and bank stabilisation procedures as specified by the ECO.
- Erosion problems must be repaired on a progressive basis throughout the contract.
- Slopes steeper than 1(V):3(H) or slopes where the soils are by nature dispersive or sandy must be stabilised (in consultation with the ECO). One or more of the following methods may be required:
  - Topsoil covered with a geotextile[13], plus a specified grass seed mixture[14].
  - A 50:50 by volume rock:topsoil mix 200 mm thick, plus specified grass seed mixture[15].
  - Logging or stepping (logs placed in continuous lines following the contours).
  - Earth or rock-pack cut-off berms[16].
  - Benches (sand bags).
  - Packed branches.
  - Ripping and/or scarifying along the contours.
  - Storm water berms.
- Slopes of watercourse diversions must be protected with one or more of the following (in consultation with the ECO):
  - Sandbags.
  - Reno mattresses.
  - Plastic liners and/or coarse rock (undersize rip-rap).
- During the course of construction, the ECO may identify additional slopes in need of stabilisation and will specify actions in terms of the most appropriate approved method and technology.

6.9 Weed and Invader Plant Control

- The Contractor is responsible for the control of weeds and invader plants within the construction area for the duration of the construction phase.
- This control involves killing the plants present, killing the seedlings, which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion. Weeds and invader plants will be controlled in the manner prescribed for that category by the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (as amended) or in terms of Working for Water guidelines.
- The ECO must identify alien plants (terrestrial and aquatic species) that should be removed by the Contractor.
- The ECO must monitor all sites disturbed by construction activities for colonisation by weeds, exotics or invasive plants, to be controlled by the Contractor as they emerge.
- Removed vegetation must be disposed of at a DWA approved waste disposal facility.
- Only properly trained people must handle and make use of chemical herbicides. Workers must wear protective clothing when applying the herbicides.
- Spraying must not take place in windy conditions, when the herbicide may drift onto healthy indigenous plants.
- The use of herbicides is not permitted within identified sensitive areas. The removal of weeds and invader plants within these areas must be undertaken by hand.
- Affected areas must be reinstated and rehabilitated as soon as practically possible.

13 Preferably made of sisal, with openings of at least be 225 mm^2 and guaranteed to last at least 24 months.
14 The subsoil must be broken up/roughened to properly bind with the topsoil.
15 The subsoil must be broken up/roughened to properly bind with the topsoil.
16 Angled across the contour at approximately 30 degrees form the bisector of the contour.

6.10 Nuisance Control

- Disruptions to farming activities must be minimised and managed.
- Private property, access roads and other existing services on and in the vicinity of the construction site must be treated with respect and protected against damage.
- The Contractor must bear the cost of the repair of damage as a result of the Contractor's operations on site.
- On-going liaison with affected landowners, service providers and other parties must be undertaken to minimise disruption and interruptions to services.
- The Contractor must accommodate planting, maintenance and harvesting regimes (sugarcane farms, timber plantations and subsistence farming) in the construction schedule.
- Sufficient prior notice must be provided to affected landowners, service providers and other parties of the disruption of access.
- Construction activities must be restricted to within the construction site.
- The movement of construction workers must be confined, as far as possible, to the construction area.
- Access points must be clearly demarcated with barrier tape and signage.
- While the trenches are open at access points, the access points must be clearly cordoned off with signage to prevent people or vehicles accidentally attempting to make use of the access points.
- Between the opening of trenches and the laying of the pipeline, ramps across trenches at access points must be provided in order to keep loss of access as short as possible.
- The trench must be back-filled and rehabilitated as soon as the pipe has been laid on a progressive basis.
- The local community must be kept informed as to restrictions within the servitude areas.

7. REHABILITATION PHASE

The concept of progressive rehabilitation is to be implemented throughout the life of the project. As soon as work in one area is complete the rehabilitation of that site is to commence. This will involve returning the condition of the disturbed areas to a state that they were in before the project began, or better. The Project Engineer will be responsible for the monitoring of rehabilitation.

Unless specified otherwise, the Contractor shall be held responsible for the re-establishment of vegetation within the construction site boundaries for all areas disturbed during construction.

7.1 General Specifications

- The principle of progressive reinstatement must be followed wherever possible. This includes the reinstatement of disturbed areas on an ongoing basis, immediately after the specified construction activities for that area are concluded.
- As soon as a section of pipeline or a reservoir site is finished and a construction site or pipe storage yard vacated, the disturbed areas must be rehabilitated by landscaping, levelling, topsoil dressing, alien plant eradication and vegetation establishment, including the planting of replacement trees where trees have had to be removed.
- Erosion control measures must be implemented and the effectiveness thereof must be monitored and corrected where necessary. Environmental damage due to the failure of erosion control measures must be rehabilitated to a state agreed with DAEA.

7.2 Removal of Structures and Infrastructure

- All construction plant, equipment, signage, storage containers, temporary fencing and gates, temporary services, fixtures, foundations and any other temporary construction infrastructure must be cleared from the construction site.
- Access roads utilised during construction (which are not earmarked for closure and rehabilitation) must be returned to a usable state and/or a state no worse than prior to construction.
- Unless otherwise directed by the Project Engineer, all temporary access and haul roads earmarked for closure must be ripped, scarified, top soiled and seeded.

7.3 Stockpiles, Inert Waste and Rubble

- All stockpiles and surplus material must be transported to an approved location off site.
- After the stockpiled material has been removed, the site must be re-instated and rehabilitated.
- The site must be cleared of all inert waste and rubble, including surplus rock and foundations.
- Excess spoil and inert rubble must be transported to waste sites as approved by the Project Engineer and ECO.
- All domestic waste must be removed and disposed of at a registered waste disposal site.

7.4 Hazardous Waste and Pollution Control

- All fuel stores, hazardous substance stores, hazardous waste stores and pollution control sumps must be removed from site.
- Pollution containment structures must be removed from site.
- All sanitation infrastructure and wastewater disposal systems must be removed from site.

7.5 Final Shaping

- All excavations must be backfilled with *in situ* material.
- All dangerous excavations must be made safe by backfilling and grading as required.
- The reinstated construction site must be graded to ensure free flow of run-off and to prevent damming of water.
- Slopes must not be steeper than 1(V):3(H). The slopes must mimic the natural slopes and topography of the surrounding environment.
- The backfilling of excavations must be programmed so that subsoil is deposited first, followed by topsoil. The layers must be compacted as part of final shaping.
- Backfilled areas must be monitored for subsidence (as the backfill settles) and depressions filled using available material.
- Temporary drifts and watercourse crossings must be dismantled and flattened, reinstating all drainage lines to approximate the original profile.
- All disturbed areas must be shaped to blend in with the surrounding landscape.
- No excavated material or stockpiles must be left on site and all material remaining after backfilling must be smoothed over to blend in with the surrounding landscape.
- The site must be monitored for signs of erosion and remedial action taken where there are problems.

7.6 Topsoil Replacement and Soil Amelioration

- Topsoil must be replaced prior to the rainy season or any expected wet weather conditions.
- Stockpiled topsoil must be replaced and redistributed, together with herbaceous vegetation, overlying grass and other fine organic matter in all disturbed areas of the construction site, including temporary access routes and roads.
- Topsoil must be replaced to the original depth (i.e. as much as was removed prior to construction).
- Topsoil must be replaced in the same area from where it was stripped. If there is insufficient topsoil available from a particular soil zone to produce the minimum specified depth, topsoil of similar quality may be brought from other areas[17] (this must be approved by the ECO).
- Topsoil suspected to be contaminated with the seed of alien vegetation must not be used.
- Imported topsoil must be sprayed with specified herbicides (approved by the ECO).
- Topsoil not utilised must be shaped in an acceptable manner to blend in with the local surrounding area.
- After topsoil placement is complete, available stripped vegetation must be spread randomly by hand over the topsoiled area.
- In the event that no topsoil is available on site prior to construction, and thus no topsoil is available for rehabilitation, the following ameliorative action must be undertaken (in consultation with the ECO):
  - The soil to a depth of 200 mm must be sampled in all areas allocated for grass planting and the samples sent for soil analysis to determine the type of fertiliser and rate thereof to be applied.
  - The necessary soil ameliorants as indicated by soil tests must be added to and worked into the soil.
  - After the application of fertilisers, a waiting period of six to eight weeks is required prior to the execution of planting and/or grassing.

[17] The suitability of substitute material will be determined by means of a soil analysis addressing soil fraction, fertility, pH and drainage, and approved by the ECO.

7.7 Ripping and Scarifying

- Following the application of topsoil, all areas must be ripped[18] and/or scarified[19] to facilitate mixing of the upper most layers. The ECO will specify whether ripping and/or scarifying is necessary.
- All disturbed and compacted areas of the construction site must be ripped and/or scarified, including the site offices, stockpile areas, temporary access routes and roads.
- Ripping and/or scarifying must be done along the contour to prevent the creation of down-slope channels.
- Ripping and/or scarifying must be done at 300 mm intervals (not more than 400 mm intervals).
- Ripping and/or scarifying must not be done under wet conditions (the soil will not break up).

7.8 Reinstatement of wetland areas and water courses

Where water courses or wetlands have been affected by construction activities:

- Ensure that watercourse banks are returned to their original profile.
- The surface reinstatement of wetland areas is to ensure that no depressions remain that could act as channels for preferential water flow (thereby affecting the hydrological regime of the wetland).
- The Contractor shall preserve all riparian and wetland vegetation for use in rehabilitation of those environments. This vegetation is to be kept moist at all times. It is to be placed in the shade and covered with moistened hessian cloth until replanting, which is to be undertaken immediately after surface reinstatement is complete.
- Plants are to be, as nearly as possible, replanted in areas from which they were removed.

7.9 Planting

- All planting work must be undertaken by a suitably qualified Contractor.
- The sourcing of seed or other plant material used for vegetation establishment must be from within 50 km radius of the site and within the bio-climatic region.
- The reinstatement of disturbed areas with locally indigenous herbaceous vegetation must be conducted progressively.
- In moist areas, re-vegetation must include hygrophilous grassland or reed bed, and in dry areas indigenous runner grasses must be used.
- The use of fertilisers must be carefully controlled by the ECO. No fertiliser must be used in the re-vegetation process near watercourses or wetlands areas.
- If possible, reseeding and replanting must occur just prior to or during the wet season. If planting and reseeding occurs in a dry period, it may be necessary to irrigate plants to ensure their successful establishment.

7.10 Grassing

- Grassing must be undertaken by a suitably qualified Contractor.
- Affected areas must be grassed using the method specified on the plant plans.
- Affected areas must be trimmed to be grassed to the required level.
- Sodding may be done at any time of the year, but seeding must be done during summer when the germination rate is better.
- Hydro-seeding with a winter mix will only be specified where regrassing is urgent, and cannot wait for the summer.

[18] Loosening of the soil to a depth of 300 mm.

[19] The roughening of the surface of the soil to a depth of approximately 50 mm, creating a smoother surface than ripping.

- Within terrestrial, non-wetland areas, indigenous runner grasses must be used, such as *Stenotaphrum secundatum, Dactyloctenium australe* and *Cynodon dactylon*. Exotic invasive grasses, such as Kikuyu (*Pennisetum clandestinum*) must not be used.
- In wet areas, hygrophilous grassland or reed bed must be encouraged as the final vegetation cover depending on the degree of local wetness (temporary/seasonal/permanent wetland).

7.11 Weed and Invader Plant Control

- The Contractor is responsible for the control of weeds and invader plants within the construction site for the duration of the rehabilitation phase.
- The control involves killing the plants present, killing the seedlings, which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion. Weeds and invader plants will be controlled in the manner prescribed for that category by the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (as amended) or in terms of Working for Water guidelines.
- Removed vegetation must be disposed of at a licensed waste disposal facility.
- Only properly trained people must handle and make use of chemical herbicides. Workers must wear protective clothing when applying the herbicides.
- Spraying must not take place in windy conditions, when the herbicide may drift onto healthy indigenous plants.
- The use of herbicides is not permitted within identified sensitive areas. The removal of weeds and invader plants within these areas must be undertaken by hand.
- Affected areas must be reinstated and rehabilitated as soon as practically possible.

7.12 Monitoring of Rehabilitated Areas

- Upon completion of all work, the ECO and Resident Engineer must survey all rehabilitated areas to ensure compliance with specifications.
- A monitoring and alien weed control programme must be implemented (by the employer) for a minimum of one year to ensure no nick-point erosion develops in disturbed soils, wetland vegetation re-establishes and that alien weeds are controlled.
- A photographic record must be maintained.
- Monitoring should be done quarterly each year, for the minimum of one year, or until the rehabilitated areas are well established.
- Alien weed control and soil erosion will be the main items that require monitoring.

8. OPERATIONS PHASE

The operations phase refers to the period of the project during which the project will be in operation. This section of the EMPr outlines general environmental specifications that are required to be implemented by the employer.

8.1 Operational Site

- The employer must identify and demarcate the extent of the operational servitude and its access points, and indicate these on an operational site layout plan.
- No movement or work outside the servitude is permitted other than activities involving gaining access to the site along approved access roads/tracks.
- Any areas disturbed outside of the operational servitude by the employer, its staff or visitors will be subject to reinstatement and rehabilitation at the employer's cost.

8.2 Maintenance of Water Supply Infrastructure

- The operational servitude may not be used for any other purpose other than for the proper carrying out of operational activities.
- A regular monitoring and maintenance program must be developed.
- Permission must be obtained from each relevant landowner prior to going on site.
- Operational staff must protect and maintain private property, fences and gates. The open or closed status of gates must be respected during operational activities.
- During maintenance activities, there must be minimal disruption to affected landowners and/or tenants.
- Operations staff should not create excess dust or noise during operational activities.
- On-going liaison with affected landowners, service providers and other parties must be undertaken to minimise disruption and interruptions to services.

8.3 Alien Invasive Species Control

- The employer is responsible for the control of weeds and invader plants. The employer must monitor all sites disturbed by operational activities for colonisation by weeds, exotics or invasive plants, and these are to be controlled as they emerge.
- The control involves killing the plants present, killing the seedlings which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion.
- Weeds and invader plants will be controlled in the manner prescribed for that category by the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) or in terms of Working for Water guidelines.
- Removed vegetation must be disposed of at a licensed waste disposal facility.
- Only properly trained people must handle and make use of chemical herbicides and workers must wear protective clothing when applying the herbicides.
- Spraying must not take place in windy conditions, when the herbicide may drift onto healthy indigenous plants.

8.4 Access Roads

- The project site must be accessed using existing roads.
- No private access roads other than those required directly for operational purposes may be used. The landowner's permission must be obtained.
- Speed limits, appropriate to road conditions and the vehicle driven, are to be observed at all times.

- Damage or erosion to access roads incurred as a result of operational activities must be rectified by the employer.
- Access roads must be adequately maintained in order to minimise erosion and undue surface damage. Runoff from roads must be managed to avoid erosion and pollution problems. Responsibility for the general maintenance of access roads should be clearly defined and understood between the relevant parties.

8.5 Soil Erosion and Storm Water Control

- Soils must be monitored for signs of erosion at regular intervals. Upon identification of a potential erosion problem, measures are to be put in place to prevent further soil loss.
- Particular attention must be paid to areas around scour valves.
- Any wetland and/or stream crossings that may occur along the route must be checked to ensure no nick-point erosion develops in disturbed soils and that no undue sedimentation is occurring downstream.
- Runoff must not be canalised or concentrated in areas where sheet flow may occur, or where highly erodible soils occur.
- Storm water drainage measures must be implemented where necessary to control runoff, prevent soil erosion and sedimentation of water bodies.

8.6 Waste Management and Pollution Control

- No litter or any other debris shall be left on site after the completion of monitoring or maintenance activities.
- Watercourses and rivers must be protected and maintained free of any pollution as a result of operational activities.

8.7 Protection of Fauna and Flora

- Fauna and flora within the operational servitude and surrounding environment must not be disturbed unnecessarily.
- Sensitive indigenous vegetation[20] must be avoided, where possible, by operations staff.
- The penalty clause associated with the needless destruction of wildlife is a fine and imprisonment[21].

8.8 Emergency Preparedness

The employer must compile and maintain environmental emergency procedures to ensure that there will be an appropriate response to emergency incidents that will cause environmental impacts, such as:

- Accidental discharges to water and land due to burst pipes from reservoir or storage facilities.
- Accidental veld or forest fires.

The employer must report any incidents to the authorities and undertake remedial actions as required in terms of Section 28 of NEMA.

[20] Swamp forest, indigenous natural forest, protected trees, wetlands, rivers and other watercourses (including riparian vegetation).

[21] In terms of the Animals Protection Act, 1962 (Act No. 71 of 1962) Section 2

8.9 Monitoring

- A monitoring programme, as well as a service and maintenance schedule, must be put in place to monitor the project for any infrastructural problems, e.g. cracks, leaks.
- The monitoring and maintenance programme must include the following:
  - A regular maintenance schedule to maintain the water supply infrastructure.
  - A monitoring schedule for alien invasive plant species.
  - A regular monitoring schedule for damage to access roads.
  - A monitoring schedule for soil erosion.
- Written records of monitoring programmes are to be maintained.
- A photographic record must be maintained.

8.10 Liaison with Interested and Affected Parties

Liaison with stakeholders, including local communities and their representatives, is to be undertaken by the employer as required and as appropriate. This must include liaison with landowners and land users, utility providers, neighbours, and relevant authorities. Complaints or queries received from stakeholders and actions taken to address complaints must be addressed in writing. Copies of all interactions and correspondence shall be kept as part of record keeping.

8.11 Registers

The employer must have registers for the following:

- Emergency procedures.
- Environmental incidents.
- Complaints and actions taken.

ANNEXURE 1

The following penalties for incidents of non-compliance shall apply:

Failure to demarcate working servitudes	R 1,000
Working outside of the demarcated servitude	R 2,500
Failure to strip topsoil with intact vegetation	R 2,500
Failure to stockpile topsoil correctly	R 2,500
Failure to stockpile or spoil materials in designated areas	R 2,000
Pollution of water bodies (including increased suspended solid loads)	R 5,000
Failure to control storm water runoff	R 5,000
Failure to prevent siltation of natural habitat outside of working servitudes	R 5,000
Failure to provide adequate sanitation	R 5,000
Unauthorised removal of indigenous woody vegetation	R 5,000 basic fine plus R 1,000 per shrub/tree
Failure to erect temporary fences	R 1,000
Failure to provide protection measures for hippopotami or rhinoceros in deep excavations	R 5,000
Failure to provide adequate waste disposal facilities and services	R 5,000
Failure to reinstate disturbed areas within the specified time frame	R 5,000
Failure to rehabilitate disturbed areas within the specified time frame	R 6,000
Failure to obey site protection measures	R 8,000
Failure to maintain demarcation tape	R 1,000
Fire – costs of runaway fires will be borne by the Contractor, should he/she be proven responsible for such fires	Costs to be borne by Contractor
Animal poaching	R 6,000
Medicinal plant and other plant removal	R 1,500
Any other contravention of the project specific specification	R 5,000
Any other contravention of the particular (general) environmental specification	R 5,000

In addition to a fine, the Contractor may be required to undertake the necessary rehabilitation/mitigation measures resulting from non-compliance. These will be as instructed by the Project Engineer, on the advice of the ECO.

ANNEXURE 2

PLANTING AND GRASSING

PLANTING

Transplanted plants

Transplanting entails the removal of plant material and replanting the same plants in another designated position. The following are guidelines, which should be applied:

- Where possible, transplant trees and shrubs during the winter (between April and September). Transplant deciduous trees, before the new growth appears.
- Prune back the plants to limit transpiration and spray foliage with an evapo-transpiration retardant liquid if they are evergreen.
- Aloes and bulbous plants may be transplanted at any time of the year.
- Trees to be transplanted must be carefully removed from the soil so as to retain as large a rootball as practically possible. Use the tree's driplines as an indicator: the larger the tree the larger the rootball (and subsequently the planting hole).
- Minimise disturbance of the soil and the remaining roots in the rootball during the lifting, moving and or transportation of all species.
- Wrap the rootball in Hessian or in plastic sheeting to retain the soil and to keep the rootball moist.
- Unless otherwise specified by the ECO, excavate square holes of 800 mm x 800 mm x 800 mm on average for trees and 500 mm x 500 mm x 500 mm on average for shrubs.
- If impenetrable shale, rock, clay or a high water table is encountered, making the above hole sizes impossible, then seek advice from the ECO.
- Where local soil has poor drainage, broken rock (approx. 75 mm in diameter) must be placed to a depth of 150 mm at the bottom of the planting hole prior to planting and backfilling with approved plant medium mixture.
- Backfill planting holes with excavated material/approved topsoil, thoroughly mixed with weed free manure or compost (per volume about one quarter of the plant hole). Approval from the ECO should be obtained for the application of fertiliser (e.g. 2:3:2 fertiliser) and/or pesticides (e.g. ant and termite poison) where required.
- Plant trees and shrubs so that their stems or trunks are at the same depth as in their original position.
- Orientate trees and shrubs in the same direction as in their original position.
- Plant aloes and bulbs in similar soil conditions and to the same depth as in their original position.
- Stake all trees using three weather resistant wooden or steel stakes anchored firmly into the ground. Two of the three stakes are to be located on the windward side of the plant. Galvanised wire binding, 3 mm thick, covered with a 20 mm diameter plastic hosepipe must be tied tightly to the stakes, half to two thirds the height of the tree above the ground and looped around the trunk of the tree.
- Place stakes at least 500 mm apart and away from the stem and roots of the tree, so as not to damage the tree or its roots. This distance will depend upon the size of the tree planted and must be approved by the ECO before staking.
- Where necessary, protect newly planted trees against wind, and wild animals by means of fencing or sacking, as specified by the ECO.
- Water transplanted trees and shrubs as required until the plants are able to survive independently (i.e. depending on the rainfall).

- A raised circular 200 mm high subsoil berm, placed 500 mm (shrubs) to 750 mm (trees) from the plant's stem must be provided for the watering. Do not simply leave the excavated plant hole partially backfilled for this purpose – the berm must be raised above the natural soil level.
- Water aloes and bulbs once directly after transplanting to settle the soil.
- Remove stakes and wire binds over time as required, as plants become established.

Plants sourced from nurseries

- Plant all trees, shrubs and individual plants in positions as indicated on the plant plans or as indicated by the ECO.
- Planting should preferably be done during the rainy season.
- Unless otherwise specified by the ECO, excavate square holes of 800 mm x 800 mm x 800 mm on average for trees and 500 mm x 500 mm x 500 mm on average for shrubs.
- If impenetrable shale, rock, clay or a high water table is encountered, making the above hole sizes impossible, then seek advice from the ECO.
- Where local soil has poor drainage, broken rock (approx. 75 mm in diameter) must be placed to a depth of 150 mm at the bottom of the planting hole prior to planting and backfilling with approved plant medium mixture.
- Backfill planting holes with excavated material/approved topsoil, thoroughly mixed with weed free manure or compost (per volume about one quarter of the plant hole). Approval from the ECO should be obtained for the application of fertilizer (e.g. 2:3:2 fertiliser) and/or pesticides (e.g. ant and termite poison) where required.
- As much of the soil from container plants as possible must be retained around the roots of the plant during planting.
- The plant must be planted into the specified hole size with the approved soil, compost and fertiliser mix used to refill the plant hole and must cover all the roots and be well firmed down to a level equal to that of the surrounding in situ material.
- After planting, each plant must be well watered, adding more soil upon settlement if necessary.
- Add mulch to the surface area of the bermed basin.
- Stake all trees using three weather resistant wooden or steel stakes anchored firmly into the ground. Two of the three stakes are to be located on the windward side of the plant. Galvanised wire binding, 3 mm thick, covered with a 20 mm diameter plastic hosepipe must be tied tightly to the stakes, half to two thirds the height of the tree above the ground and looped around the trunk of the tree.
- Place stakes at least 500 mm apart and away from the stem and roots of the tree, so as not to damage the tree or its roots. This distance will depend upon the size of the tree planted and must be approved by the ECO before staking.
- Where necessary, protect newly planted trees against wind and wild animals by means of fencing or sacking, as specified by the ECO.
- Thoroughly water plants as required until the plants are able to survive independently (i.e. depending on the rainfall).
- A raised circular 200 mm high subsoil berm, placed 500 mm (shrubs) to 750 mm (trees) from the plant's stem must be provided for the watering. Do not simply leave the excavated plant hole partially backfilled for this purpose – the berm must be raised above the natural soil level.
- Water aloes and bulbs once directly after transplanting to settle the soil.
- Remove stakes and wire binds over time as required, as plants become established.

Seeds and seedlings

- All planting work is to be undertaken by a suitably qualified Contractor, making use of the appropriate equipment.
- An alternative to harvesting seeds and germinating these is to uproot small seedlings between 40 mm to 100 mm high from an area of mature forest undergrowth where there are many. Best results are obtained immediately after heavy rain.
- Tree seedling material should be fresh and of local origin. Resist using plants from far afield as they may not be best suited to local climatic or soil conditions.
- Small seedlings are likely to transplant more successfully than large ones. These should be potted and kept under nursery conditions until they are large enough to plant out.

GRASSING

Sods

Sodding is defined as the laying of grass sods.

- The soil should be uniformly wet to a depth of at least 150 mm before planting of grass sods.
- Protect sods against drying out: Keep these moist from the time of harvesting until final placement.
- Rake or spike the area to give a loose surface to a depth of 100 mm.
- Lay the first row of sods in a straight line, starting at the bottom of a slope, where possible.
- Place the next row of sods in the same way, tightly against the bottom row with the joints staggered, until the full area is covered with sods.
- Tightly butt sods together, taking care not to stretch or overlap sods.
- Where a good fit cannot be obtained, the intervening spaces may be filled with parts of sods or topsoil.
- On steep slopes the sods must be secured using timber stakes of at least 300 mm in length.
- After planting, water sods to prevent drying out.
- Irrigate as required until the grass is able to survive independently (i.e. depending on the rainfall).

Runners

- Plant grass runners evenly by hand or by mechanical means at a rate of at least 400 runners per hectare (i.e. at 250 mm centres).
- Use only fresh runners, avoiding grass runners that have been allowed to dry out.
- Rake or spike the area to give a loose surface to a depth of 100 mm.
- The soil should be uniformly wet to a depth of at least 150 mm before planting of grass runners.
- After planting, runners must be given copious amounts of water and, when sufficiently dry, must be rolled with a light agricultural roller and re-watered.
- Irrigate as required until the grass is able to survive independently (i.e. depending on the rainfall).

Hand seeding

- All seed supplied should be labelled in accordance with the Government Seed Act, 1961 (Act No. 20 of 1961).
- The soil should be loose and uniformly wet to a depth specified by the ECO, before any seeding commences.
- Halve the seed and fertiliser mixture as specified and apply evenly in two immediate successive applications perpendicular to each other.

- The seeded area must be raked over after seed application and well watered.
- Irrigate as required until the grass is able to survive independently (i.e. depending on the rainfall).

Hydroseeding

- Hydroseeding entails adding a specified seed mix to a slurry containing water and other approved materials to enhance plant growth potential. This mixture is applied by means of a spraying device onto the prepared ground areas to be seeded.
- All seed supplied should be labelled in accordance with the Government Seed Act, 1961 (Act No. 20 of 1961).
- The soil should be loose and uniformly wet to a depth specified by the ECO, before any seeding commences.
- Add the specified seed mix and necessary fertiliser to the required amount of water and apply using an approved hydroseeding machine.
- Unless otherwise specified, the rate of application of the slurry will not be less than 30 cubic metres per hectare and will be applied in such a manner as to ensure even distribution of seed and fertiliser throughout.
- Additional ingredients to be added to the slurry may be specified.
- In certain cases, the specification may require that mulch be applied by hand to the area to be hydroseeded, prior to hydroseeding.
- If possible, keep the seedbed moist after hydroseeding, to ensure good germination.
- Irrigate as required until the grass is able to survive independently (i.e. depending on the rainfall).

Annexure C5.8: Geotechnical Report

ground africa
CONSULTING GEOTECHNICAL ENGINEERS

GEOTECHNICAL REPORT (RESERVOIRS)

MTHONJANENI SSA2 WATER SUPPLY
MTHONJANENI
KWAZULU-NATAL

Requested by
Mott MacDonald PDNA

Project GA0203/2013
December 2013

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Contents

1 INTRODUCTION 1

2 SITE DESCRIPTIONS 3

2.1 Reservoir R2A 3

2.2 Reservoir R2B 5

2.3 Reservoir R3A 7

2.4 Reservoir R3B 9

2.5 Reservoir R3C 11

2.6 Reservoir R4 13

3 GEOLOGY 15

4 FIELDWORK METHODS 18

4.1 Soil Profiles 18

4.2 Dynamic Penetrometer Light Tests 20

5 LABORATORY TEST RESULTS 20

6 GEOTECHNICAL ASSESSMENT 23

6.1 Earthworks 23

6.2 Slope Stability and Retaining Structures 23

6.3 Foundations 24

6.4 Groundwater and Drainage 26

7 CONCLUSION 27

Appendix A – Locality Map

Appendix B –Individual Soil Profiles

Appendix C – Dynamic Penetrometer Light Test Results

Appendix D – Laboratory Test Results

Project GA0203/2013
20th December 2013

GEOTECHNICAL REPORT
MTHONJANENI SSA2 WATER SUPPLY (RESERVOIRS)
MTHONJANENI

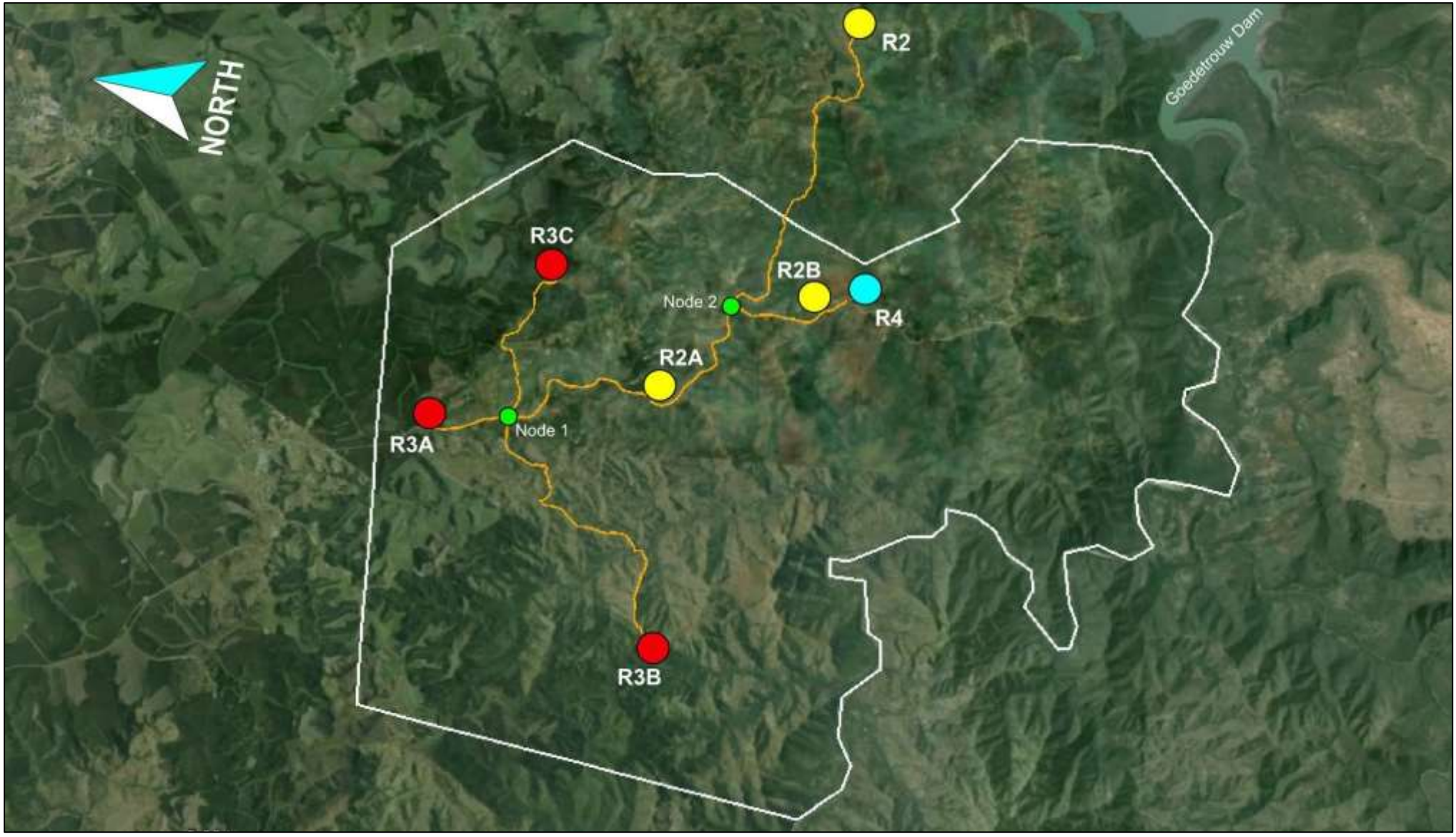
1 INTRODUCTION

The following report describes the results of a geotechnical investigation conducted by Ground Africa Consulting Geotechnical Engineers for the Mthonjaneni SSA2 Bulk Water Supply network during the months of October and November 2013. A total of six (6) reservoir sites were investigated. The geotechnical fieldwork was conducted at the request of Mott MacDonald PDNA's Richards Bay office.

The 6 reservoirs identified for the investigation are listed in the table below with their respective GPS co-ordinate positions as well as their capacity in kilolitres.

Reservoir	GPS Co-ordinate		Capacity
R2A	28°41'10.70"S	31°21'22.80"E	1500kl
R2B	28°42'54.30"S	31°22'34.30"E	20kl
R3A	28°39'14.60"S	31°20'56.40"E	1500kl
R3B	28°41'15.00"S	31°18'58.20"E	500kl
R3C	28°40'14.70"S	31°22'33.90"E	250kl
R4	28°43'4.30"S	31°22'33.90"E	1000kl

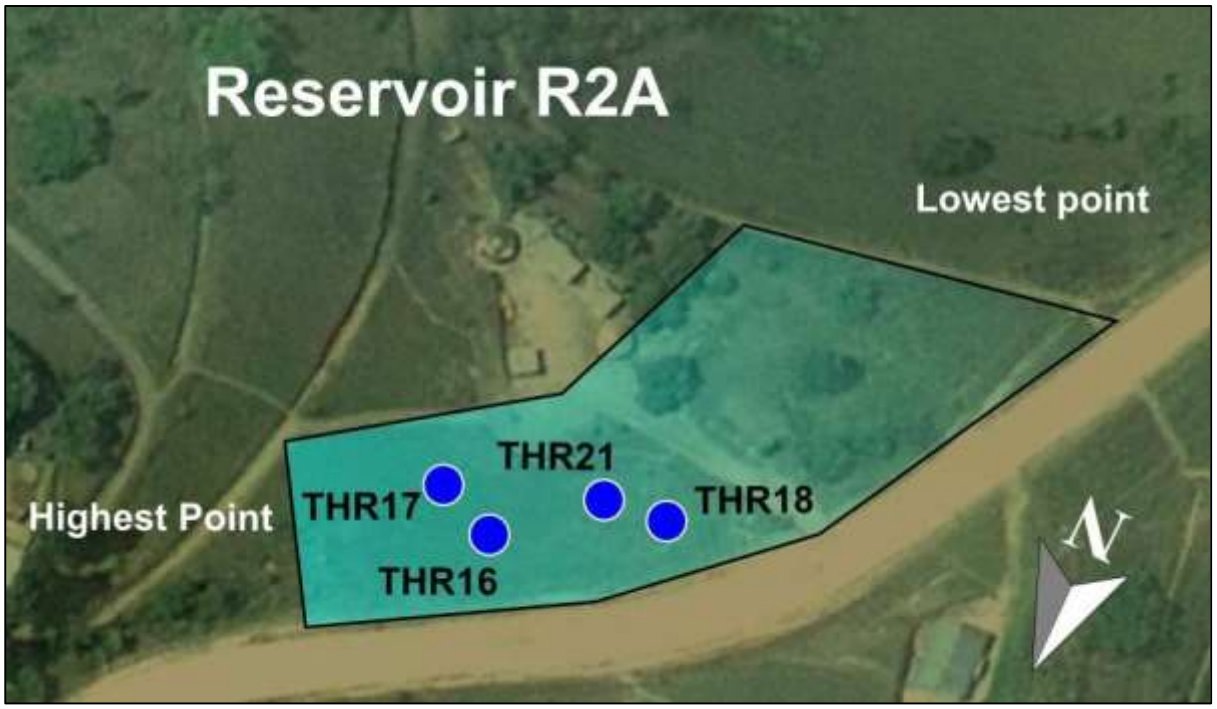
An aerial image showing the locations of the reservoirs with respect to the project area is shown over-page. Reservoir R2 is an existing reservoir.


NORTH
R2
Goedetrouw Dam
R3C
R2B
Node 2
R4
R2A
R3A
Node 1
R3B

2 SITE DESCRIPTIONS

2.1 Reservoir R2A

The proposed site for reservoir R2A is located along the eastern shoulder of the main district road which passes through the earmarked project area. The site has GPS co-ordinates of *28°41'10.70"S; 31°21'22.80"E* and is situated mid - slope near an existing homestead. The area surrounding the site comprises a hilly topography which has large incised valleys with stream courses at their base. Granitic boulders were noted to be at surface and are scattered along the moderately steep slope which is present. The slope has a gradient ranging from 5° to 10° with its highest point situated in the north east and the lowest point in the south west. Access to the site is by means of a gravel road in relatively good condition. An aerial image of the proposed area is shown below.



Reservoir R2A	
List of Trial Holes	**List of DPL's**
THR16	DPL R9
THR17	DPL R10
THR18	DPL R11
THR21	-

Picture 1: *Looking north east across the site showing the sloping land which is present.*

Picture 2: *Looking approximately south towards the main district road showing the granitic boulders which are scattered across the site surface.*

Picture 3: *A small homestead is situated along the eastern boundary of the site.*

Picture 4: *Vegetation in the area comprises mostly grass with some small trees also being present.*

3 GEOLOGY

Geological mapping of the area shows:

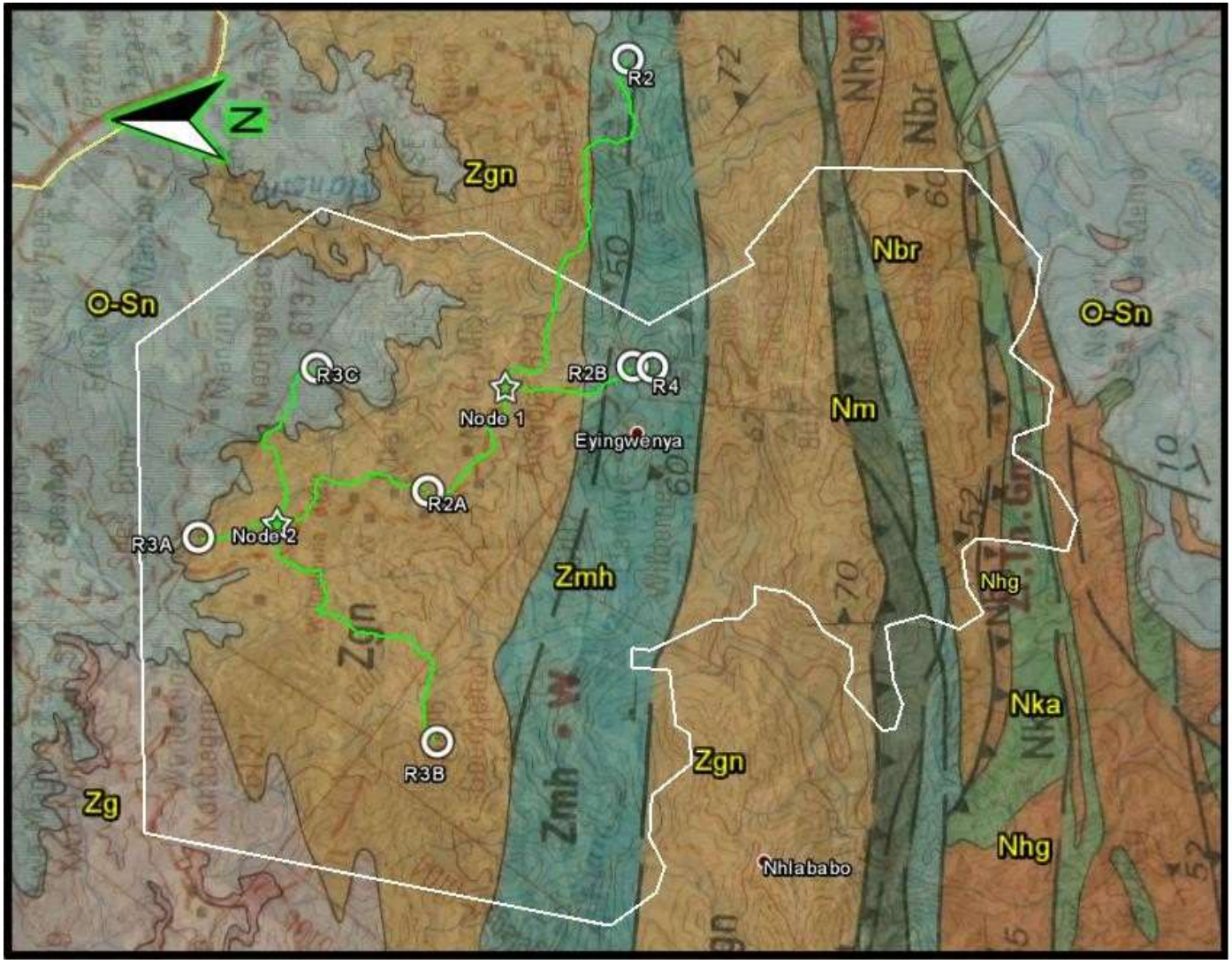
- the southern section of the site is underlain by metamorphic rocks of the Natal Metamorphic Suite (NMS), namely the Tugela and Mfongozi Group.
- The mid-sections of the site are underlain by intrusive basement granites and granitic gneisses and rocks of the Nondweni Group.
- To a lesser extent, sedimentary rocks belonging to the Natal Group underlie the northern extremities of the site.

The Natal Metamorphic Suite was formed from compressive tectonic action of the earth's surface, resulting in the mountainous and hilly terrain evident throughout most of the site. Due to the large forces and temperatures associated with these tectonic forces the rocks are generally metamorphic, having been altered from their original sedimentary and igneous appearance as well as mineral composition. The metamorphic geological units underlying the site, which form part of the NMS, fall under the Tugela group and Mfongosi Group. Geological formations belonging to the Tugela Group occuring within the project boundaries comprises the Halambu Gneiss Formation, Bull's Run Syenite-Gneiss Formation, and the Khomo Formation. Metamorphic rocks of the Tugela group and Mfongosi Group predominantly comprise steeply dipping gneisses, amphibolite and schists. These rocks of the Natal Metamorphic Suite underlying the project area are deeply weathered and masked by thick residual fine grained, clay rich, residuals soils.

Rocks of the Nondweni Group, all from the Mhlatuze Formation underlie the central part of the site. The formation is flanked by deeply weathered basement granite and granitic gneiss. The Mhlatuze Formation comprises interbedded lava and sediments and is usually intensely folded and contorted showing evidence of intense shearing and recrystallisation in places which have altered the rocks to greenschist.

The Natal Group can be found along the eastern border of the site. This group of rocks are younger than the rocks of the Natal Metamorphic Suite and consist of a series of sandstone and shale horizons. Only residual soils from parent rock belonging to the Natal Group were observed during the investigation as these sedimentary deposits were found to be deeply weathered.

A number of relic fault lines pass through the site. These are mainly large thrust faults running approximately east – west. In addition a number of other minor faults are present. These faults are relic features of past tectonic movement and are deemed to presently be inactive. A section of the geological map, showing the relative positions of the different geological units underlying the proposed site, has been included over-page.



GEOLOGICAL UNITS

O-Sn Natal Group

(Tugela Group)
Nhg Halambu Gneiss
Nbr Bulls Run Syenite-Gneiss Fm
Nka Khomo Formation

Nm Mfongosi Group

Zg Granite
Zgn Granitic Gneiss

(Nondweni Group)
Zmh Mhlatuze Formation

4 FIELDWORK METHODS

Fieldwork conducted on site during the geotechnical investigations for the respective reservoirs includes the following:

- Mechanical excavation of eighteen (18) trial holes using a Tractor-Loader Backhoe
- Manual excavation of three (3) trial holes
- Soil profiling of ground horizons intersected in respective trial holes.
- Retrieval of representative soil samples for laboratory testing
- Fifteen (15) Dynamic Penetrometer Light (DPL) tests

The locations of the trial holes are shown in ***Appendix A***. Trial hole depths were determined by tape measurement from present ground level. All the trial holes were profiled according to the method of Jennings, Brink and Williams as per the paper "Revised guide to soil profiling for civil engineering purposes in Southern Africa" as published in the Transactions of the South African Institution of Civil Engineers, vol 15, no.1, 1973, pp 3-12.

In the dynamic penetrometer light test (DPL), a specific angle ended cone fixed to the end of a steel rod is driven into the ground using a standard weighted hammer that drops by a constant height. The distance measured at each blow as the rod moves into the ground is recorded, and these values are correlated to known values for well understood soils. This information is then used to assess the density/consistency of the soils and obtain an indication of likely bearing capacities with the aid of numerical calculation. DPL field results are included in ***Appendix C***.

4.1 Soil Profiles

Despite the large geographical spread between reservoir sites, it was found that, all 6 proposed reservoir positions are underlain by deep, fine grained residual soils with little to no rock. The precise position for reservoir R4, however, is underlain by near surface rock albeit the immediate surrounding area is underlain by deep residual soils as viewed in trial holes at the other reservoir sites.

The generalised ground profile underlying the site can be summarised as depicted over- page:

Colluvium	Slightly moist, dark brown/black, medium dense, intact to shattered; CLAYEY SILT/SANDS – ***Colluvium*** with some gravel and small rock fragments noted in some areas.	
Residual	Slightly moist, pale orange/red brown, medium dense, intact to highly shattered; CLAYEY SANDY SILTS/SANDS - ***Residual*** with relic joint lines and bedding planes noted in some trial holes.	

The overlying colluvial soils mostly comprised of fine grained sands and silts with noticeable, but relatively less, clay and gravelly components. The overlying colluvial layer was generally found to have an average thickness of approximately 0.2m to 0.6m thick.

The colluvial horizon was found to overlie deep residual horizons of fine grained sands, silts and clays. It some trial holes, some weathered rock fragments, relic quartz veins and relic joint lines were noted. Some colour variation of these residual soils was noted in these residual soils between the individual reservoir sites, however, they were found to generally have similar grading.

Reservoir 4 intersected weathered gravel and hard rock fragments of granite in a clay rich silt and sand matrix. Removal of the rock was possible with the use of the TLB to a depth of 1.4m where refusal was reached. Owing to the nature of the underlying geology, the depth to hard rock and excavator refusal will vary considerably within this relatively small area in the vicinity of this earmarked site.

No groundwater was intersected in any of the trial holes.

4.2 Dynamic Penetrometer Light Tests

Dynamic Cone Penetrometer light tests (DPLs) were undertaken from natural ground level (NGL) and located alongside individual trial holes. Similarly to the soil profiles, DPL results in the colluvial and residual soils underlying the reservoir sites were found to be similar.

DPL blow counts obtained within the overlying colluvial horizons appear to be slightly erratic albeit generally range between 15mm/blow to 30mm/blow with occasional higher values of 50mm/blow. Generally, these values indicate this horizon to be of medium dense consistency with the presence of occasional soft spots.

At the intersection of the colluvial horizon and the underlying residual fine grained soils, DPL results show a marked localised increase relative to the results obtained in the overlying colluvial layers. This sudden increase, which indicates a relative softening of the soil profile at these may be attributed to higher moisture levels emanating from possible perched moisture conditions. Perched moisture appears to occur on top of the relatively impermeable residual fine grained soils.

Once the relatively softer zone was penetrated, DPL blow counts were found to stabilise to a medium dense consistency with blow counts generally being recorded below 10mm/blow. DPL results sheets, showing the locations and depths of the tests, have been included in ***Appendix C***.

5 LABORATORY TEST RESULTS

Representative soil samples of the soils underlying each reservoir site were retrieved and laboratory tested to determine grading, clay content, moisture/density relationships and California Bearing Ratios for material strength verification. Some samples were subjected to Foundation Indicator Tests in order to determine the soils' clay content, plastic properties and particle size distribution to obtain an indication of heave and shrinkage properties. Drained Shear-Box tests were also carried out on disturbed samples to obtain an indication of the soils shear strength properties to determine the general strengths and bearing capacity of these materials. Summarised results have been tabulated below with laboratory result sheets included in ***Appendix D***.

Foundation Indicator Results

Sample	TH	Depth (m)	Material	LS	PI	% Clay (<0.002mm)	GM	Grading (% comprising)						Heave Potential
								Gr	CS	MS	FS	Si	Cl	
M95	THR20	2.70	Silty Gravelly Sand – Residual	2.0	4	5	1.22	21	6	21	26	21	5	LOW
M02	THR2	1.50	Silty Sand – Residual	3.2	6	4	1.31	1	24	33	19	19	4	LOW
M03	THR5	2.60	Silty Sand – Residual	3.0	6	4	0.74	1	9	31	24	31	4	LOW
M16	THR6	1.20	Clayey Sandy Silt – Residual	7.4	15	23	0.21	0	3	8	15	51	23	MEDIUM
M25	THR7	1.20	Slightly Clayey Silty Sand	4.9	10	11	0.25	1	2	5	39	42	11	LOW
M68	THR11	1.80	Silty Sand – Residual	2.1	4	9	0.62	3	6	21	25	36	9	LOW
M69	THR12	3.00	Slightly Silty Sand – Residual	4.5	9	3	0.97	4	13	35	27	18	3	LOW
M82	THR13	2.80	Silty Sand – Residual	0.9	SP	1	0.91	1	16	26	26	30	1	LOW
M84	THR14	2.10	Silty Sand – Residual	2.9	6	7	0.62	2	2	21	33	35	7	LOW

MOD/CBR Results

Sample	Trial Hole	Depth (m)	Material	LS	PI	MDD (OMC)	GM	CBR					TRH 14	(% Swell)
								90	93	95	98	100		
M01	THR1	2.8	Slightly CLAYEY SILTY SAND - Residual	8.3	17	1731 (19.4)	0.61	3	5	7	12	16	G10	0.17
M15	THR4	2	Slightly SANDY CLAYEY SILT - Residual	10.9	22	1547 (25.7)	0.42	4	5	5	8	10	>G10	2.01
M24	THR9	2	Slightly CLAYEY SANDY SILT - Residual	4.8	10	1823 (14.5)	0.70	3	4	5	7	8	G10	0.60
M66	THR10	2.5	Slightly CLAYEY SILTY SAND - Residual	3.2	6	1857 (12.2)	0.73	3	5	7	10	11	G10	0.72
M81	THR13	2.1 - 2.6	SILTY SAND - Residual	0.9	SP	1841 (9.9)	0.95	8	9	10	13	15	G9	0.37
M83	THR14	2.4 - 2.7	Slightly SILTY CLAYEY SAND - Residual	5.6	11	1632 (14.6)	0.55	1	4	8	11	13	G10	0.68
M85	THR15	1.6 - 2.0	SILTY SAND - Residual	1.7	4	1748 (8.1)	0.73	1	2	4	6	7	>G10	0.17
M92	THR16	2.6 – 2.9	SILTY SAND - Residual	0.6	SP	1681 (12.5)	0.90	3	4	5	6	7	G10	0.46
M94	THR20	2.1 – 2.4	SILTY SAND - Residual	2.6	5	1951 (10.7)	1.35	6	19	38	52	58	G7	0.00

Drained Shear-Box Results

Sample	TH	Depth (m)	Material	Compactive Effort (Mod AASHTO)	Phi'	C (kPa)
M01	THR1	2.8	Slightly CLAYEY SANDY SILT - Residual	93%	35	14
M24	THR9	2	Slightly CLAYEY SANDY SILT - Residual	93%	31	53
M66	THR10	2.5	Slightly CLAYEY SANDY SILT - Residual	93%	33	30
M92	THR16	2.6 - 0.3	Slightly CLAYEY SANDY SILT - Residual	93%	33	55
M81	THR13	2.1 - 2.6	Slightly CLAYEY SANDY SILT - Residual	93%	34	30
M83	THR14	2.4 - 2.7	Slightly CLAYEY SANDY SILT - Residual	93%	28	33
M94	THR20	2.1 - 0.3	Slightly CLAYEY SANDY SILT - Residual	93%	38	32

Where:

TH: Trial hole from which samples were retrieved
LS: Linear Shrinkage
MDD: Maximum Dry Density at Optimum Moisture Content
CBR: California Bearing Ratio
% Clay: Clay content (<0.002mm)
Si: Silt
Cl: Clay
Phi': Drained Angle of Internal Friction
HP: Heave Potential
PI: Plasticity Index
GM: Grading Modulus
TRH: Technical Recommendations for Highways
Gr: Gravel
Sa: Sand
% comprising is according to Jennings' classification
C: Cohesion

Foundation indicator results show the residual soils underlying the reservoir sites have similar grading, comprising fine grained sands with considerable silt contents. The clay content of these materials were generally found to have low clay contents of 1% to 11% with only Sample M16 showing a moderately high clay content of 23%. Other than sample M16, which has classified as being medium expansive, the soils are deemed to have low heave potentials. Heave and shrinkage movement, with corresponding changes in in-situ moisture content, of less than 2% of layer thickness can be expected.

California Bearing Ratio's (CBR) of compacted material were found to be low, indicating that the residual soils are generally of poor quality. Material quality designations, according to TRH 14, show material generally of G9/G10 quality with some samples not qualifying with the minimum G10 classification. Sample M81, however, showed a relatively better quality classification of G7, albeit, this is within the lower quality spectrum. As such, the natural residual materials are deemed to be of low quality and are not deemed suitable for re-use in structural applications such as a granular base material beneath surface beds. It is suggested, that this material only be utilised for backfilling of pipe trenches.

Shear-Box results show the residual materials have a large spread of drained internal angle of friction angle (phi) values from low values of 28° to high values of 38°. Similarly, cohesion values range from low values of 14kPa to very high values of 55kPa. These tests show a large spread of shear strength parameters. Phi values, however, are mostly between 30° to 35° and cohesion values tend to generally be between 30kPa to 33kPa. It is suggested for design purposes that this condensed envelope of values are used during design as unfactored parameters.

6 GEOTECHNICAL ASSESSMENT

6.1 Earthworks

Owing to the rolling hill and steep mountainous topography of the project area, the proposed new reservoirs will need to be constructed on levelled localised cut and fill platforms. The creation of these platforms will require a considerable amount of excavation and earthworks. Excavation through the deep residual soils is anticipated to be easy. A standard sized Tractor-Loader-Backhoe (TLB) should suffice as suitable sized plant choice to execute the expected soil excavations. In areas where shallow weathered rock was intersected, in the vicinity of Reservoir R4, rock excavation will need to be allowed for. Here allowance for a suitably sized rock bucket attachment to the TLB or a boom mounted pneumatic hammer will need to be made. Further to this, some tree stump and hard rock boulder removal must be allowed for during construction.

6.2 Slope Stability and Retaining Structures

Overall site stability of individual sites perched on the side of steep slopes, underlain by fine grained deep residual soils is a significant geotechnical concern pertaining to this project. Individual cut and fill slopes will need to be battered back to safe batter angles to ensure long term stability and vegetation growth. Some slope retention will be required at certain sites located in steeper areas where the exposed cut and fill slopes are greater than 1.0m in height. In these areas, it is suggested that pre-cast concrete retaining blocks be used.

For purposes of the earthworks design, where no slope retention is required, the following general exposed slope geometries are suggested:

Type	Suggested Gradient
Cut Face through Colluvial and Residual Soils	1V:2.5H
Fill slope embankment	1V:3H

The toe of all cut and constructed slopes should be positioned at a distance of at least 2m away from the edge of any structure and provision for surface drainage must be made. It is suggested that in areas where extensive use of cut and fill platforms are required, that concrete V-Drains be installed along the crest of all slopes to ensure minimal moisture ingress beneath the site.

6.3 Foundations

The individual reservoir sites are deemed suitable for the planned development from a geotechnical perspective; however, certain structural design measures will need to be taken to mitigate the effects of anticipated differential settlements which can be expected due to the deep underlying fine grained, low strength, residual soils.

Prior to any foundation construction, the overlying grasses and colluvial horizon, must be excavated and removed from all foundation footprint areas. No foundations will be permitted to be founded on or within this upper ground horizon. The varying composition and density of this layer makes it highly unsuitable for the placement of foundations. All foundations must be placed within the underlying residual layers.

The natural deep residual soil horizon underlying the site will be able to support the proposed structures on shallow foundations provided some geotechnical precautions and ground preparation is undertaken to counter-act the anticipated long term settlement this fined grained material will undergo once loaded.

It is recommended that adequately steel reinforced strip footings be used and that final foundation levels ensure an embedment of at least 1.0m. To take account of any post construction movement and variation in ground strengths beneath the foundation, sufficient articulation must be incorporated into the structure.

The following will be required to be undertaken prior to foundation construction:

- Strip and remove all colluvial material from the foundation footprint. This material should be stockpiled for use in later landscaping. This will require soil removal to

approximately 0.2m to 0.6m below present ground level. In some places, this depth will be greater. The underlying residual horizon must be cleanly exposed throughout the entire foundation footprint.

- Excavate to final footing depth, ensuring a minimum final embedment of at least 1.0m below finished ground level.
- Ensure the excavation is wide enough to accommodate a small mechanical hand compactor for compaction of the base
- Scarify to 200mm below final foundation level and wet to 2% of optimum moisture content (OMC)
- Compact the base to at least 98% MOD AASHTO
- Introduce a 150mm thick layer of geotechnically inert material, such as weathered dolerite from a commercial source, of at least G5 quality. Compact imported layer to 98% Mod ASSHTO. (This horizon is not intended to increase the bearing capacity of the underlying ground, it is intended that this horizon will provide a better working surface on which to cast the strip footings and will assist in mitigating the magnitude of any differential movements of the underlying residual soils).
- All foundations must extend down into the underlying in-situ residual soils and have an embedment of at least 1.0m.

Should the option of reinforced strip footings be found to be uneconomical an alternative founding solution of using a reinforced raft foundation, placed within the underlying residual clayey sandy silts could be adopted. After the foundation excavations have been completed, the exposed residual soils will need to be scarified to at least 200mm and compacted to 98% MOD ASSHTO. Thereafter, to assist in providing a competent surface on which to cast the raft foundation, it is suggested that a 200mm imported G5 quality material be placed on the exposed in-situ residual silts and clays. This imported granular layer will need to be compacted in 100mm lifts to 98% MOD ASSHTO within 2% of Optimal Moisture Content (OMC). Should the invert level of the raft foundation need to be lifted to a higher level than the base of the excavation, the number of compacted granular G5 layers can be increased until the desired level is reached. It is imperative that the quality and compaction of this layer be strictly monitored during construction to ensure a competent founding surface.

Considering the DPL test results and empirical assessment, some indicative allowable bearing capacities for various foundation dimensions and depths have been tabulated below. These are provided to enable preliminary design choices to be made. Further calculation must be undertaken for final foundation design which pertains to the actual foundations.

Material	Foundation Type	Dimensions (width)	Final Embedment	Allowable bearing capacity*
Medium dense, Residual fine grained sand, silts	Strip	0.8m	1.0m	100kPa
Medium dense, Residual fine grained sand, silts	Strip	1.0m	1.0m	120kPa

**Values based on the assumption that the natural groundwater table remains below the base of foundations*.

It is the opinion of Ground Africa Consulting, that the primary concern regarding foundations for this development is that of settlement rather than low bearing capacities of the underlying residual material. It is anticipated that loaded foundations will undergo both immediate and long term settlement. Settlement magnitudes of approximately 1% of foundation width for foundations loaded safely within the bounds of their allowable bearing capacity can be expected. It must be noted, that the tabulated bearing capacities are indicative and that final specified foundations be designed and checked by the structural engineers responsible.

6.4 Groundwater and Drainage

Though no groundwater was intersected in the individual trial holes, high moisture contents were noted in the soil profiles. It is anticipated that in wetter periods, perched water will rest above the low permeable fine grained residual soils. Therefore it is recommended that the contractor be made aware that in times of increased rainfall, the site is expected to suffer from extended wet ground conditions and any open excavations will probably trap pools of water for extended periods of time.

The colluvial and deep residual soils underlying large parts of the project area are deemed to be highly erosive; evident by the deeply incised erosion gullies that scar the landscape. As such, drainage of stormwater run-off from the site will be of paramount importance. It is imperative that a concrete apron, at least 0.8m wide, surrounding each reservoir be incorporated into the final design. This apron should be designed to ensure water is quickly

and non-destructively channelled away from the site. These aprons will assist in ensuring no water, standing/ponding water is allowed to seep beneath the immediate outer bounds of the reservoirs foundations. Water seepage into these areas would serve to increase the moisture content of the underlying soils, which in turn would assist in furthering soil movement, causing damage to foundations.

7 CONCLUSION

The six reservoir sites were found to be underlain by very similar ground conditions comprising thin colluvial surface horizons of varying density overlying deep natural residual fine grained sands and silts with notable clay and gravel components. The site earmarked for Reservoir R4 differed slightly as it was found to be underlain by gravel and rock fragments contained within a matrix of residual soil. This ground profile was only observed underlying a small localised area as trial holes excavated in the nearby vicinity also intersected thin colluvial soils underlain by deep residual, fine grained, sands, silts and clays.

No groundwater was intersected in the trial holes, however, high moisture contents above the residual layer suggest perched water could occur in wetter periods. The in-situ residual materials are deemed to be of poor quality with low strength CBR values. Long term settlement of the residual horizons is expected to occur.

Founding recommendations are to either place sufficiently steel reinforced strip footings with an embedment of 1.0m or to make use of a reinforced raft foundation. Imported granular material of at least G5 quality could be compacted in lifts, of no more than 100mm to 150mm, to heighten the final foundation levels.

Long term and differential settlements, rather than low bearing capacities are deemed to be the primary geotechnical concern pertaining to the proposed construction on this site.

The recommendations as listed will not entirely prevent all post-construction movements, but will contribute to their mitigation. It is concluded that the site is geotechnically acceptable for the development envisaged provided the recommendations as outlined are adhered to.

GROUND AFRICA CONSULTING ENGINEERS

Frederick Volbrecht *MIEAust CPEng*
Geotechnical Engineer

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APPENDIX A
Locality Map

To Babanango
To Ulundi
R68
Melmoth
NORTH
R34
R66
SITE AREA
Goedertroudam
Empangeni
Richem
Kuleka
R102
2
Ghubu Lak
Esikhawini H
Esikhawini J
Eshowe
To Gingingdlovu / Durban
To Stanger / Durban

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APPENDIX B
Individual Soil Profiles

TRIAL HOLE PROFILE

CLIENT: Mott MacDonald PDNA
PROJECT: Mtonjaneni Water Supply SSA2
PROJECT NO: GA0203
LOCATION: Reservoir R2A

HOLE No: THR16
LATITUDE: 28°41'10.15"S
LONGITUDE: 31°21'23.64"E

Sheet 1 of 1

Depth	Description
	Present Ground Surface
0.00	**SANDY CLAYEY SILT** Dry to slightly moist, brown, medium dense, slightly shattered; SANDY CLAYEY SILT - Colluvium with root and organic material, as well as large rock fragments.
0.27	**CLAYEY SILT** Slightly moist, with black and olive speckles orange, medium dense, slightly shattered; CLAYEY SILT - Residual.
0.97	**CLAYEY SILT** Slightly moist, light olive to beige with black streaks and speckles, medium dense, slightly shattered; CLAYEY SILT - Residual.
1.90	**SILTY SAND** Slightly moist, with black streaks and white speckles olive, medium dense, slightly shattered to intact, medium to coarse grained; SILTY SAND - Residual.
2.90	End of log

NOTES:
1: End of hole at 2.9m
2: No refusal
3: No groundwater encountered
4: No sample obtained

EXCAVATION METHOD: TLB
DATE PROFILED: 20/09/2013
PROFILED BY: NB
CHECKED BY: FCV

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TRIAL HOLE PROFILE

CLIENT: Mott MacDonald PDNA
PROJECT: Mtonjaneni Water Supply SSA2
PROJECT NO: GA0203
LOCATION: Reservoir R2A

HOLE No: THR17
LATITUDE: 28°41'10.1"S
LONGITUDE: 31°21'23.8"E

Sheet 1 of 1

Depth		Description
		Present Ground Surface
	0.00	**CLAYEY SAND** Slightly moist, brown, loose, intact, fine grained; CLAYEY SAND - Colluvium.
0.5	0.50	**CLAYEY SILT** Slightly moist, orangey brown, medium dense, intact; CLAYEY SILT - Residual with some small hard rock fragments.
1.0		
	1.30	**CLAYEY SILT** Slightly moist to dry, pale whitish orange, medium dense to, intact; CLAYEY SILT - Residual with come mica flakes.
1.5	1.60	End of log

NOTES:
1: End of hole at 1.6m
2: No sample obtained
3: No refusal
4: No groundwater encountered
5: Hand auger commenced from surface

EXCAVATION METHOD: Manual Excavation and Hand Auger
DATE PROFILED: 27/11/2013
PROFILED BY: MTB
CHECKED BY: FCV

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TRIAL HOLE PROFILE

CLIENT: Mott MacDonald PDNA
PROJECT: Mtonjaneni Water Supply SSA2
PROJECT NO: GA0203
LOCATION: Reservoir R2A

HOLE No: THR18
LATITUDE: 28°41'10.4"S
LONGITUDE: 31°21'22.5"E

Sheet 1 of 1

Depth	Description
	Present Ground Surface
0.00	**CLAYEY SILT** Slightly moist, brown, loose, intact; CLAYEY SILT - Colluvium.
0.20	**CLAYEY SILT** Slightly moist, pale reddish brown, medium dense, intact; CLAYEY SILT - Residual.
0.50	**Slightly CLAYEY SILT** Slightly moist, pale reddish brown becoming pale orange, intact; Slightly CLAYEY SILT - Residual.
1.80	End of log

NOTES:
1: End of hole at 1.8m
2: Hand auger commenced from surface
3: No refusal
4: No sample obtained

EXCAVATION METHOD: Manual Excavation and Hand Auger
DATE PROFILED: 27/11/2013
PROFILED BY: MTB
CHECKED BY: FCV

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TRIAL HOLE PROFILE

CLIENT: Mott MacDonald PDNA
PROJECT: Mtonjaneni Water Supply SSA2
PROJECT NO: GA0203
LOCATION: Reservoir R2A

HOLE No: THR21
LATITUDE: 28°41'10.5"S
LONGITUDE: 31°21'22.8"E

Sheet 1 of 1

Depth	Description
	Present Ground Surface
0.00	**CLAYEY SILTY SAND** Slightly moist, brown, medium dense, intact, fine grained; CLAYEY SILTY SAND - Colluvium.
0.20	**CLAYEY SILT** Slightly moist, pale brown to pale orange, medium dense, intact; CLAYEY SILT - Residual.
0.70	**CLAYEY SILT** Slightly moist, pale brownish orange, medium dense, intact; CLAYEY SILT - Residual.
1.40	End of log

NOTES:
1: End of hole at 1.4m
2: No refusal
3: No sample obtained
4: No groundwater encountered

EXCAVATION METHOD: Manual Excavation
DATE PROFILED: 27/11/2013
PROFILED BY: MTB
CHECKED BY: FCV

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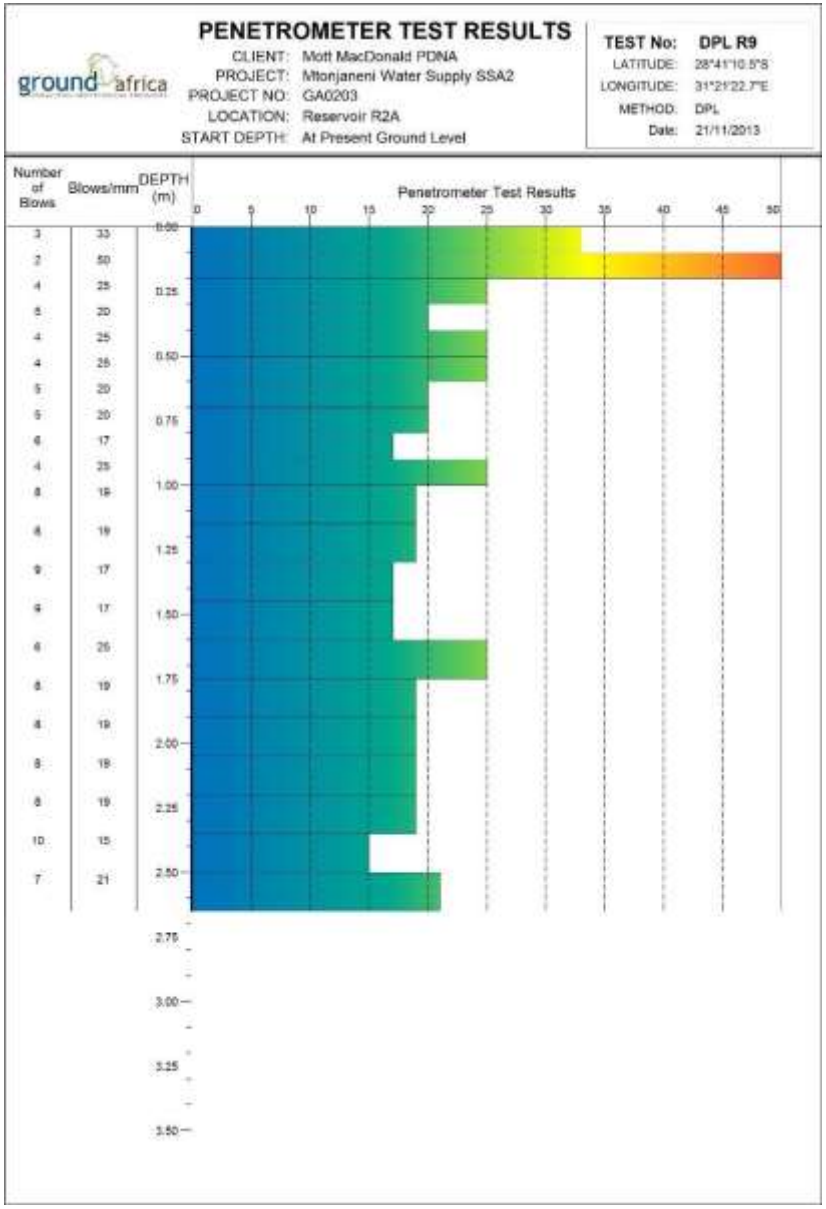
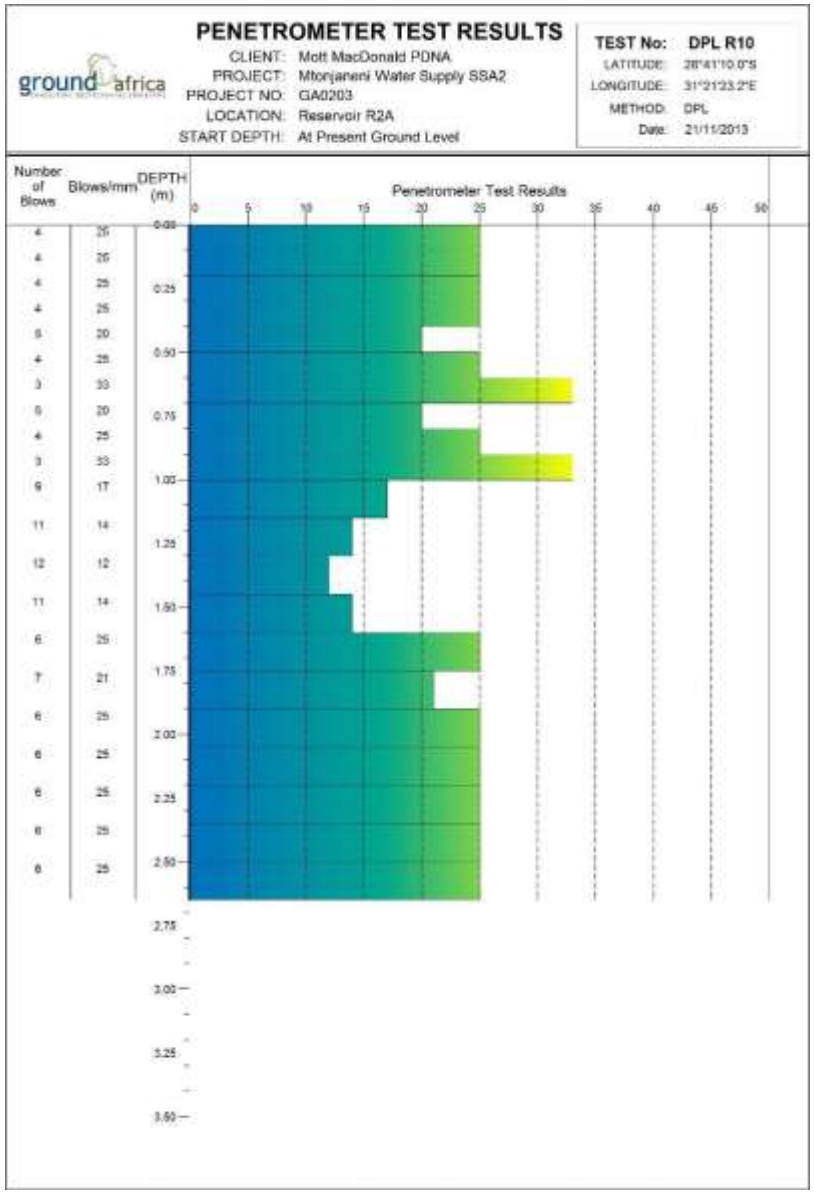
APPENDIX C

Dynamic Penetrometer Light Test Results

Dynamic Penetrometer Light Test Results





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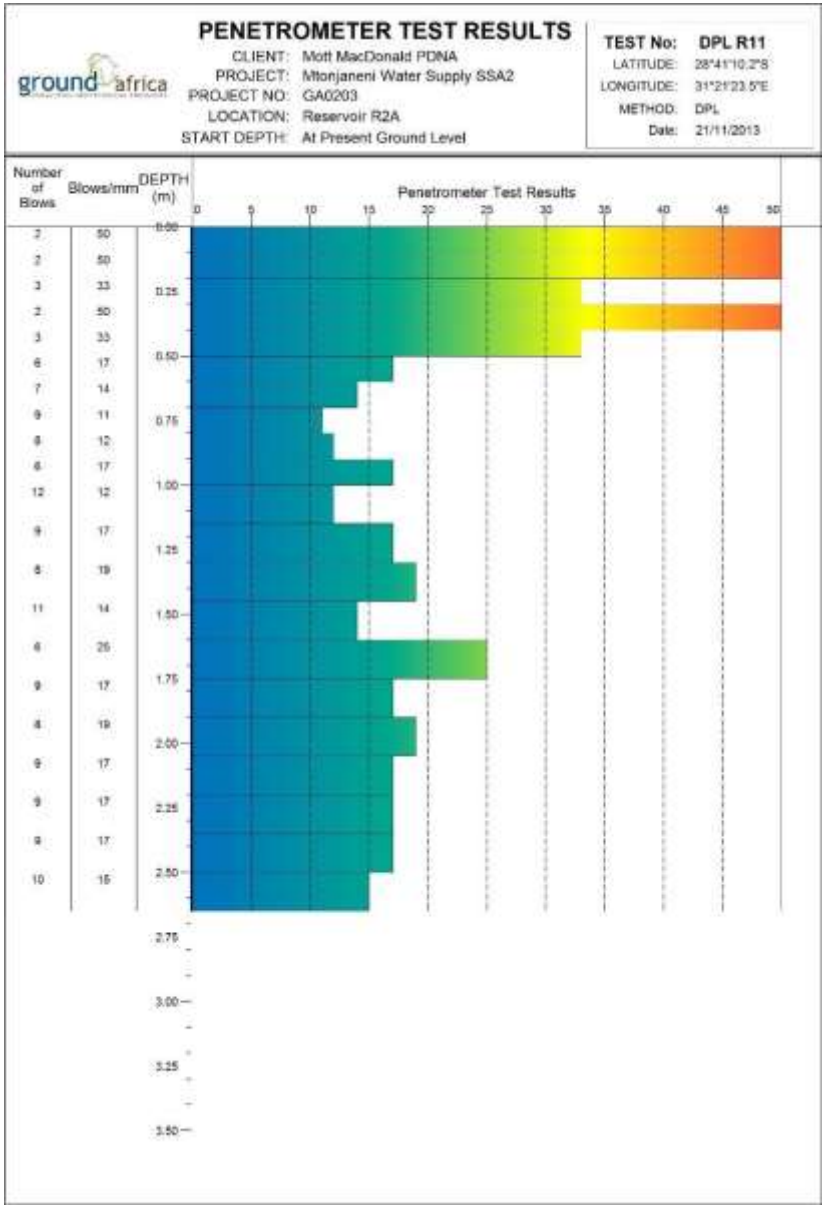
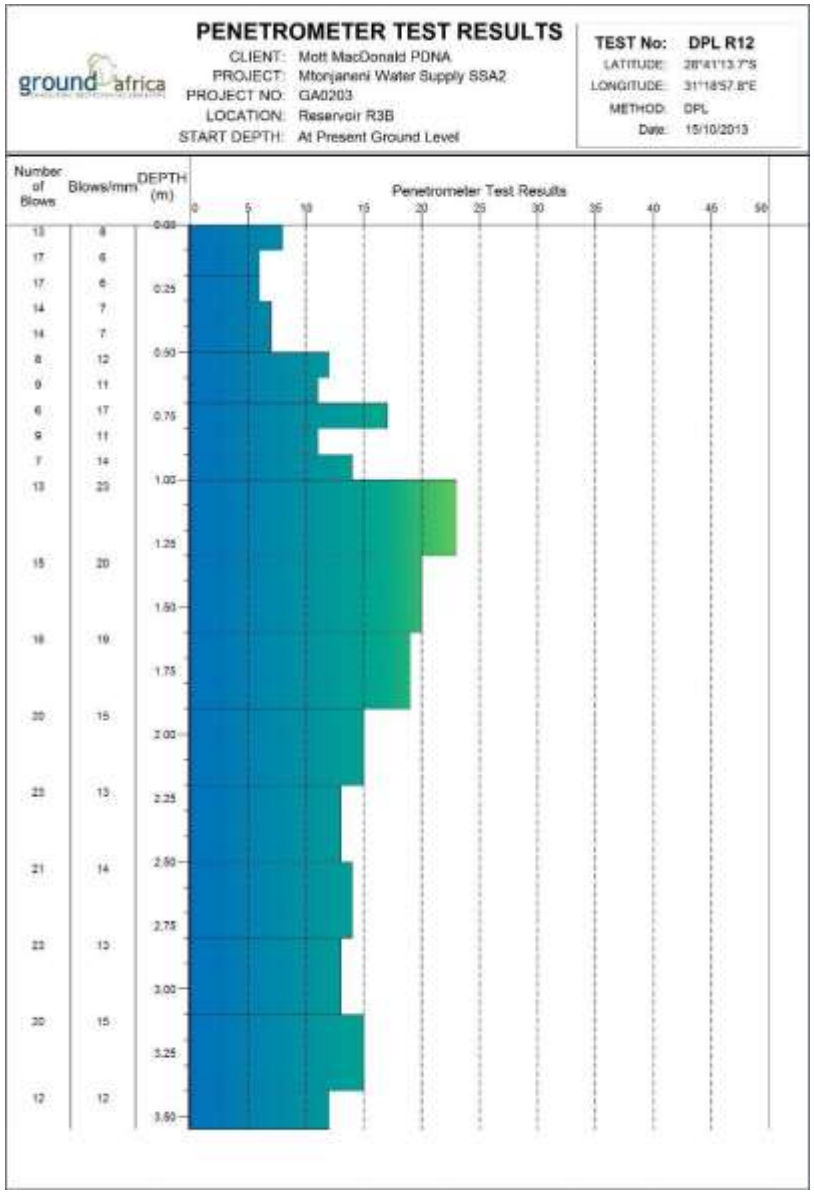
Dynamic Penetrometer Light Test Results





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APPENDIX D
Laboratory Test Results

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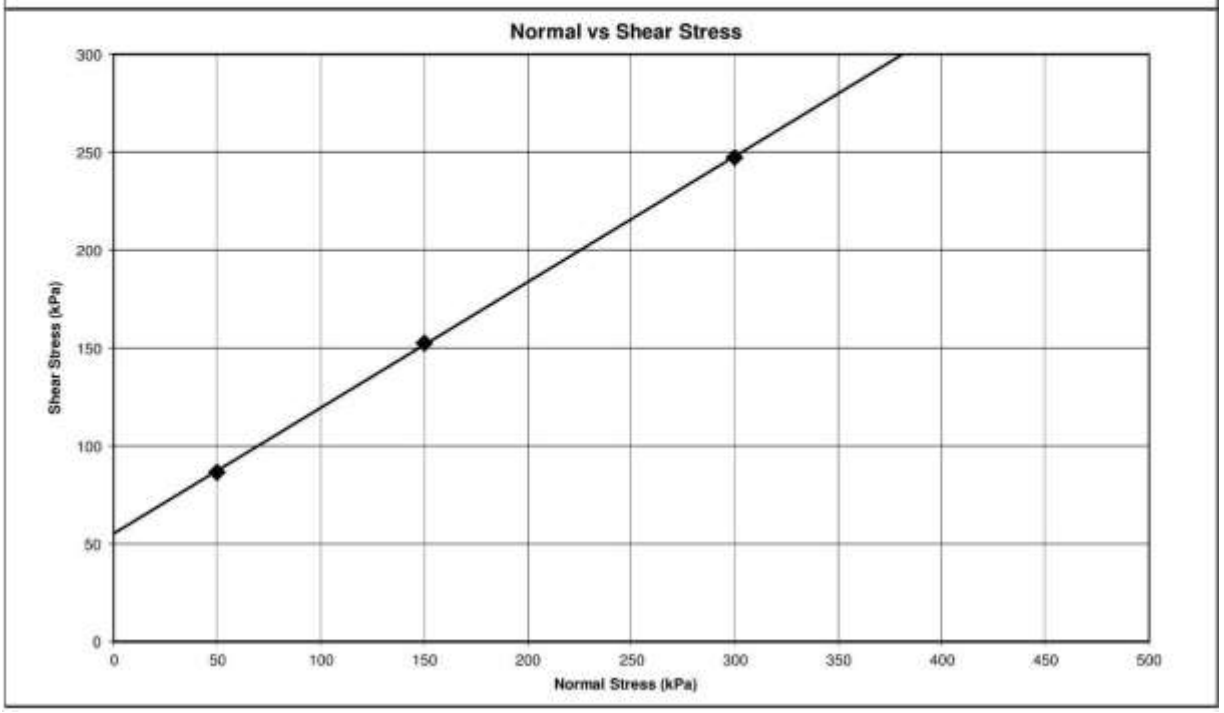
Laboratory Results

CONSOLIDATED DRAINED SHEAR BOX TEST

THEKWINI SOILS LAB. CC
V.A.T. REGISTRATION NO. 4930216661
58 Ridge Road, Tollgate, DURBAN
Tel : (031) 201-6992
P.O. Box 30464, MAYVILLE, 4058
Fax : (031) 201-7920

Project Mthonjaneni - GA 0203/2013
Ref no. 7119
Lab no. 11184 **Sample Type**
Depth (m): 2.6 - 0.3 Recompacted to 93% MOD.
Position: THR 16 **Description:**
-

	Test 1	Test 2	Test 3
Normal Stress (kN/m^2)	50	150	300
Dry Density (kg/m^3)	1563	1563	1563
Moisture Content (%)	12.5	12.5	12.5
Shear Strain (%)	3.3	4.2	7.5
Shear Stress (kN/m^2)	86.6	152.4	247.4

Shear Strength Perameters

Angle of Internal Friction (O°)	33
Cohesion (kPa)	55